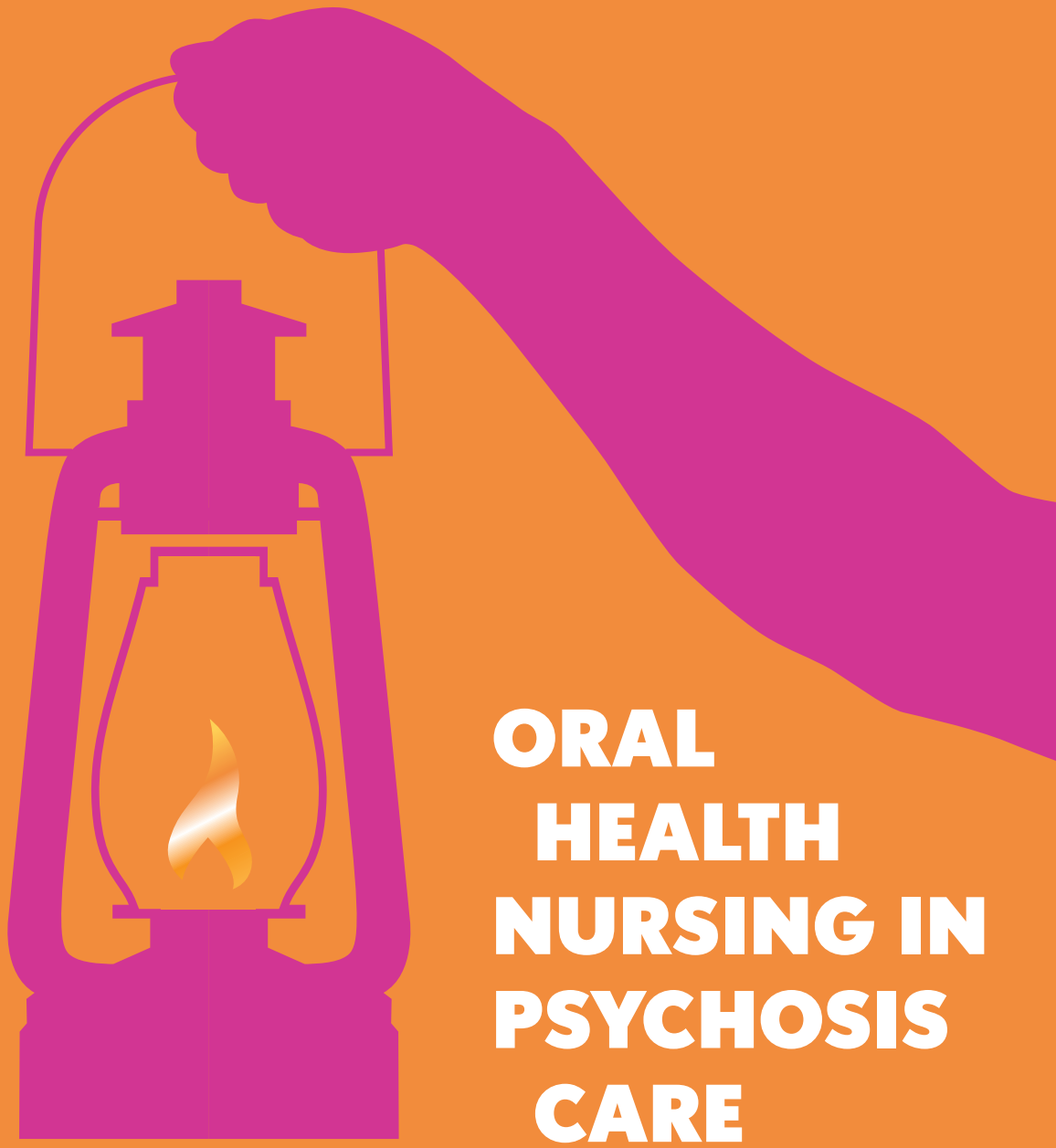

ORAL HEALTH NURSING IN PSYCHOSIS CARE

From Knowledge to Action

SONJA ANNETTE KUIPERS

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“So never lose an opportunity of urging a practical beginning,
however small, for it is wonderful how often in such matters
the mustard-seed germinates and roots itself”

-Florence Nightingale (Notes on Nursing, what it is, and what it is not)-

Table of contents

Chapter 1

General introduction

Introduction

This thesis is predicated on a specific case that served as the impetus for further investigation into the role of mental health (MHNs) in oral healthcare with respect to patients diagnosed with psychotic disorders.

> One day, Maaike, a mental health nurse specialist, arrived at the department and encountered a young man of 22 years old, Joshua. Joshua was admitted due to a psychotic episode characterized by hallucinations and delusions, significantly impacting his functioning, including self-care. Maaike noticed that Joshua appears to have neglected his dental hygiene for an extended period. She observed that he has an unkempt set of teeth, and Joshua exhibited halitosis and conversed with his hand covering his mouth. When she raised this issue with a mental health nurse at the department, the response was as follows: "Oral health is not my responsibility as a mental health nurse; the responsibility lies with the client themselves. We focus on the improvement of mental health."
>
> Maaike was surprised by this. She did not concur with these MHNs and raised the issue for discussion during a team meeting, which was attended by all MHNs. During this team meeting, it quickly became apparent that this MHN was not alone in her perspective, but rather, a significant number of the nurses shared this opinion. In light of the diverse viewpoints, it was imperative to initiate a dialogue concerning the responsibilities of a MHN in the realm of dental care. She suggested that additional research was necessary. Motivated by her curiosity, she assigned a student to undertake an initial inquiry by means of an exploratory study.

The scenario in our case is not unique. In the following introduction, a general background describes the oral health of people with a psychotic disorder and the role of MHNs, as well as the research questions explored within this thesis.

Contextualizing the thesis

Psychosis

Individuals with psychotic disorders encounter challenges across various domains of life. In psychopathology, a psychotic disorder is considered as one of the most severe mental states [1]. During a period of psychosis, people's thoughts and perceptions can be disturbed, and their distinct experiences often lead to feelings of being misunderstood [2]. Psychotic symptoms are, for instance, hallucinations and delusions [3]. Hallucinations are delineated as "perception-like experiences that manifest without an external stimulus, marked by their vividness, clarity, and the intensity of normal perceptions, while being beyond voluntary control" [4]. Delusions are defined as "inflexible beliefs resistant to change despite contradictory evidence, which are not endorsed by others" [2]. Both hallucinations and delusions can be symptoms that are part of severe, debilitating mental disorders, such as psychotic disorder, yet they may also appear in transient, less severe, or non-distressing forms within the general population, independent of psychiatric illness [5].

Psychotic disorders tend to emerge in late adolescence and young adulthood [6,7]. Epidemiological studies indicate that nearly 75% of first onsets occur before the age of 40 [7]. Young males have a higher risk of psychotic disorders [6]. Adolescence and young adulthood represent pivotal periods for the emergence of psychotic disorders, underscoring the critical significance of these developmental periods [8]. Because young people in this developmental phase still have much to learn, it is essential that they are guided and coached through it. This is because they are in a vulnerable period, and it is crucial that they receive specialized and appropriate guidance and support in which engagement in all social roles and the prevention of the chronic progression of psychosis are key [9]. MHNs are often tasked with educating, guiding, and supporting vulnerable patients and families and thereby are well positioned to address problems that occur during adolescence and young adulthood [10].

This thesis started with a focus on patients with first-episode psychosis. It is well known that psychotic experiences exist on a continuum, ranging from mild, attenuated psychotic experiences in the non-clinical population to clinically significant psychotic symptoms in individuals with fully developed psychotic disorders [11]. There are various stages within a psychotic disorder. In this dissertation, the focus

has primarily been on individuals with first-episode psychosis (FEP). Of all patients with FEP, one-third of individuals recover after FEP; another relapse occurs in one-third of individuals, but these people also usually function well; the final one-third have a more chronic course and are considered people with severe mental illness [5,9].

Globally, the yearly incidence of psychotic disorders is about 15 per 100,000 inhabitants, but this differs geographically between countries and can be based on the urban environment, migration, or drug and alcohol abuse [12,13]. The prevalence of people who meet the diagnostic criteria for a psychotic disorder according to the DSM-5 is around 1.5 to 3.5%, and a significantly larger number experience at least one psychotic symptom in their lifetime [13].

The recent literature shows that, until now, antipsychotic medication has been the cornerstone of treatment since its introduction in the 1960s [14]. Guidelines for psychosis care [5,9] described that the focus of treatment is directed toward symptom management (clinical recovery and medical model). However, recent psychosis care guidelines have adopted a broader understanding of recovery. They provide a neatly organized classification of both pharmacological and non-pharmacological treatments [5,9].

Recovery

In psychiatry, the traditional approach involves working from the medical model. This model fundamentally suggests that if an individual presents with complaints, a physician addresses these complaints by clarifying the underlying symptoms. Currently, a paradigm shift towards recovery-oriented care is evolving. Recovery extends beyond merely the absence of clinical symptoms. Recovery in mental healthcare encompasses three domains: clinical, societal, and personal recovery [15]. Clinical recovery in psychosis stems from a perspective with broad symptoms: positive symptoms (i.e., hallucinations), negative symptoms (i.e., demotivation), and cognitive symptoms. All these symptoms might be reflected in the oral health issues of people with psychosis: e.g., a lack of motivation to act, neglecting to consider the issue, or being preoccupied with other matters. The recovery of these clinical symptoms implies a state in which these symptoms are eliminated [16]. Societal recovery involves persons who can fulfil societal roles (i.e., a partner, parent, employee). Often, patients with a psychotic disorder are limited with respect to

their participation in society, and patients show impairments in several challenging everyday activities (i.e., informal and formal relationships) [17]. Oral health might be related to societal recovery, and poor oral health can undermine self-esteem and confidence and discourage social engagement. It might also hinder speech and communication, complicating social interactions [18]. Given society's emphasis on appearance, including oral aesthetics, visible oral health issues can expose individuals to stigma, discrimination, and social isolation and, in this way, obstruct social recovery. Personal recovery involves the development of new meaning and purpose in one's life as one recovers beyond the catastrophic effects of a mental illness. Personal recovery has a focus beyond clinical and societal recovery, and it has been defined as 'a deeply personal, unique process of changing one's attitudes, values, feelings, goals, skills, and/or roles' and 'a way of living a satisfying, hopeful, and contributing life even within the limitations caused by illness' [19]. Oral health problems can significantly impact an individual's self-image, self-esteem, and mental well-being. Concerns about dental appearance can lead to social withdrawal, hindering the process of personal recovery. With respect to social withdrawal, people do not make connections, which can affect an individual's hope for the future and how they view themselves (identity); it may also impact an individual's sense of meaning and empowerment [20].

Another movement strives to improve personal well-being rather than being focused on symptoms, and it comprises an altered perspective on (positive) health. The concept of health is defined as follows: "*Health as the ability to adapt and self-manage, in light of the physical, emotional and social challenges of life*" [21]. In this concept, health is no longer seen as the absence or presence of disease (such as in the medical model) but as the ability of people to deal with (changing) physical, emotional, and social life challenges and manage their own lives. The increasing focus on recovery and positive health might enable mental MHNs to integrate oral health more effectively into mental healthcare as it provides a broader view of (mental) health.

Holistic nursing

Health promotion is not a new concept. Thousands of years ago, Hippocrates recognized the power of lifestyle and prevention as medicine when he said, *"If we could give every individual the right amount of nourishment and exercise, not too little and not too much, we would have found the safest way to health"* [22]. Little

progress was made from then until the 1900s. The basis of current nursing practices can be traced to the 19th century when Florence Nightingale characterized the profession of nursing as follows: *"Medicine, so far as we know, assists nature to remove the obstruction but does nothing more. What nursing must do is to put the patient in the best condition for nature to act upon him"* [23]. This principle has been crucial in contemporary nursing. Subsequent perspectives, such as those of Virginia Henderson [24], Dorothea Orem [25], and Mieke Grypdonck [26], adopted an emancipatory and integrated viewpoint in their approach to nursing, centring on the human aspect and focusing on the repercussions of illnesses or conditions. Moreover, these perspectives address the impact of illnesses or conditions on daily functioning and an individual's self-perception. The professional profile of nurses is based on a holistic view of care, which includes the utilization of knowledge in anatomy, physiology, (psycho)pathology, and psychosocial processes. This holistic process entails also considering prevention. Nurses must make every effort to improve the quality of care and quality of life of patients [27].

The Bachelor of Nursing 2030 educational profile can be found on the Professional Profile for Nurses [28]. In the new BN2030 educational profile, there is a shift in the focus of nursing work from predominantly curative tasks to distinctly recognizable preventive tasks. Lifestyle interventions are a part of prevention, and they are not new to nursing [23]. A healthy lifestyle also includes good oral health; oral health plays a pivotal role in advancing positive overall health outcomes [10]. However, it is not clear how MHNs think about oral health and what MHNs need in interventions to support patients with psychotic disorders in maintaining their oral health. Another important part of prevention is risk assessment. Although risk assessment and early detection are part of clinical reasoning, the case of Joshua demonstrates that the integration of physical health issues within psychiatry has not yet become standard practice. Here, the NANDA (North American Nursing Diagnosis Association) risk diagnosis can be used (such as risk for impaired oral mucous membranes (domain 11, class 2, code 00247))[28]. Risk diagnoses are clinical judgments that conclude that a problem does not exist, but the presence of risk factors indicates that a problem is likely to develop over time unless nurses intervene [28]. Readiness diagnoses are diagnoses referring to a specific category of nursing diagnoses employed when an individual or group demonstrates motivation and willingness to enhance their health status, reduce risk factors, or optimize wellness (such as readiness for enhanced self-care (domain 4, class 5, code 00182)). To effectively

establish a precise nursing diagnosis, it is crucial to undertake a thorough collection of data followed by an analytical assessment of this information. This methodological approach is vital for accurately reflecting the patient's current health conditions and facilitating the formulation of appropriate intervention strategies. MHNs often experience hesitation in addressing oral care issues in patients with psychotic disorders. Therefore, it is crucial to explore what oral health interventions are available for MHNs.

Oral health in mental health

Patients with mental illness have overall poor physical health [29]. The importance of attention to oral healthcare in patients diagnosed with a psychotic disorder is described and is poor in patients with SMI [30]. This indicates the importance of prevention at an earlier stage, such as during first-episode psychosis (FEP). Therefore, this research study starts with a primary focus on oral health in patients after FEP. A study among outpatients in Sweden who have been diagnosed with schizophrenia showed that a decrease in mental health is associated with an increased need for dental care [31]. This underscores the importance of thoroughly assessing the experiences and needs of patients with FEP. Population surveys show that impaired mental health is associated with an increased need for oral healthcare [31–34]. These studies also indicated that people with enduring mental health problems make less frequent planned visits to the dentist and report a greater number of missing teeth than the general population. Kilbourne et al. [32] demonstrated that 61% of patients diagnosed with psychotic disorders reported poor oral health and that over 34% of patients stated that oral health problems made it difficult to eat. Poor oral health (gum disease and tooth loss) impacts daily living (e.g., eating, social acceptance, self-esteem, feeling comfortable) and is also associated with chronic disorders: for example, diabetes; high blood pressure; and respiratory disease in patients diagnosed with a severe mental illness, such as psychosis [33–35]. A large cohort study (>one million participants) showed that patients with poor oral health have an increased risk of coronary heart disease, and smoking can be a confounder [36]. This finding shows that oral care is an important part of general health in patients diagnosed with a psychotic disorder. Risk factors for poor oral health are also known, and inferences can be carried out from syntheses of the literature. These risk factors include the following: the type and stage of mental illness; a lack of motivation and low self-esteem; a lack of perception with respect to oral health problems; lifestyle (e.g., smoking, drinking alcohol, substance use,

eating and drinking sugary food/drinks) and the ability to sustain self-care and dental attendance; socio-economic factors (e.g., low income, low education); and the oral side effects of medication [35,37,38]. These risk factors significantly impact oral health, as well as quality of life. In particular, given that patients with psychotic disorders possess numerous risk factors, it is imperative that nurses allocate attention to this matter. In practice, nurses find it challenging to initiate action when it comes to oral health, in part because they are unsure about the appropriate interventions [29,39]. This situation may arise not only because mental health services primarily focus on symptoms but also because nurses' reason from a broad perspective, and risk and health-promoting diagnoses are inadequately applied. This highlights the importance of analyzing existing nursing interventions focused on oral care and developing appropriate interventions in addition. Hence, it is crucial to adopt a co-creative approach in developing interventions. This means choosing a design where MHNs actively participate, provide feedback, and engage in the development of prototypes to ensure that the interventions are relevant and effective. Therefore, we opted for a human-centered and design-oriented approach [40–42].

Oral health in the general population

Research among younger people in the Netherlands, conducted by TNO (2017), reveals that the oral health of 5-year-olds has improved in recent years. However, for the other age groups studied (11-, 17-, and 23-year-olds), oral health has either stagnated or deteriorated. Moreover, disparities in oral health exist across all age categories between high- and low-socioeconomic-status (SES) groups, with the low-SES group exhibiting poorer oral health. It is also notable that youths with a migration background have worse oral health and dental behaviours. Furthermore, the significant increase in (erosive) dental wear is concerning: one-fifth of 17 year olds and more than half of 23 year olds show wear down to the dentin [43]. The reasons provided for this include not brushing their teeth twice daily (in 11-year-olds); among the 17-year-olds, there is a prevalence of significant dental plaque and pockets, as well as damage resulting from the consumption of acidic foods and beverages. In 23-year-olds, a high incidence of cavities and periodontal pockets is observed, along with a tendency to delay treatment due to financial considerations. Although this pertains to the general population in the Netherlands, the findings of this study highlight the importance of exploring measures to enhance preventive health behaviours. The points highlight that young adolescents in the general population also suffer from oral health issues. We have contemplated whether this

issue is pervasive among adolescents at large or disproportionately affects young individuals with FEP.

Oral-health-related quality of life (OHRQoL)

OHRQoL is a multidimensional construct that includes a subjective evaluation of the individual's oral health, functional well-being, emotional well-being, expectations and satisfaction with care, and sense of self [44]. OHRQoL is an integral part of general health and well-being. In fact, it is recognized by the World Health Organization (WHO) as an important segment of the Global Oral Health Program (2003) [44,45]. It encompasses the physical, psychological, and social aspects of oral health and how they affect a person's ability to eat, speak, smile, and engage in social interactions. OHRQoL considers subjective experiences and perceptions of oral health rather than focusing solely on clinical indicators. It recognizes that oral health issues can have a significant impact on a person's self-esteem, social interactions, and overall happiness. OHRQoL takes a holistic approach to oral health, recognizing that it extends beyond the mere absence of disease or the presence of good oral health. By considering the impact of oral health conditions on an individual's daily activities, social interactions, and psychological well-being, healthcare providers can tailor treatments and interventions to address specific patient needs and goals. By considering OHRQoL, MHNs can provide more comprehensive and patient-centered care; promote oral health as an integral part of overall well-being; and enhance an individual's quality of life by addressing the functional, psychological, and social aspects of oral health. However, it is established that patients with SMI have poor OHRQoL [44], but these experiences have never been investigated in patients with FEP. Additionally, it is crucial to determine whether OHRQoL is also dependent on risk factors.

Outline of this thesis

This thesis consists of three parts. In part 1, the aim is to explore patients' experiences in oral health, risk factors, and oral health-related quality of life. In part 2, the body of research will be examined to provide an overview of current oral health interventions for MHNs. In part 3, the main aim is to develop oral health nursing interventions and study their practical feasibility in human-centered designs. The main research questions are described for each part:

Part I. Experiences of oral health in psychosis

- How have patients found their oral health after FEP, and what needs do they have regarding oral health (Chapter 2)?
- Which oral health risk factors do patients with a first-episode psychosis experience? How do they perceive their oral health-related quality of life compared to individuals without a history of psychotic disorder (Chapter 3)?

Part II. State of the art

- Which oral health interventions aiming to improve oral health in patients with a mental health disorder are described in the existing literature (Chapter 4)?

Part III. The development of a supportive oral health nursing intervention

- What are the attitudes, barriers, needs, and suggestions for the interventions of MHNs in providing support for maintaining and increasing oral health in patients with a psychotic disorder (Chapter 5)?
- Which supportive tool can be developed for MHNs regarding the recognition of potential oral health problems in patients with psychotic disorders (Chapter 6)?
- How feasible is the implementation of the developed supportive tool for MHNs in the context of care for patients with a psychotic disorder (Chapter 6)?

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Part I

Experiences of oral health in psychosis

Chapter 2

Oral health experiences and needs among young adults after a first episode psychosis: a phenomenological study.

Kuipers, S. A., Castelein, S., Malda, A., Kronenberg, L., & Boonstra, N. (2018). Oral health experiences and needs amongst young adults after a first-episode psychosis: A phenomenological study. *Journal of Psychiatric and Mental Health Nursing*, 25(8), 475-485. https://doi.org/10.1111/jpm.12490

Abstract

Introduction: Oral health affects quality of life, self-esteem, physical health, and daily functioning. Treatment guidelines on patients after FEP recommend interventions, but clinical interventions are lacking. No research on the experiences of young adults' oral health after FEP has been conducted.

Aims: This study aims to explore the lived experiences and needs of patients after FEP with regard to their oral health.

Design and Methods: Single-centre phenomenological study using open interviews (N=30). Data were analysed using the Colaizzi method.

Results: Patients reported oral health problems since their FEP. The problems that patients encountered were dental care in general (e.g., a lack of awareness), risk factors (e.g., substance use, poor diet, and financial problems), overall experiences with dentists/dental hygienists, and the gap between needs and interventions.

Discussion: There is a lack of awareness among patients after FEP about oral health while patients are not able to adequately attend to their oral health and patients have high burden on this topic.

Implications for mental health nursing: To bridge the gap between patients' needs regarding oral health, the awareness of patients and mental health professionals, should be heightened, and patients should be better supported by mental health professionals.

Introduction

The importance of attention to oral health care in psychiatric patients diagnosed with severe mental illness (SMI) is well described and has been shown to be poor [1]. A decrease in mental health is associated with an increased need for dental care [2]. Kilbourne et al. [3] demonstrate that 61% of patients diagnosed with SMI reported poor oral health and that over 34% of patients stated that oral health problems made it difficult to eat. Poor oral health impacts daily living (e.g., eating, social acceptance, self-esteem, feeling comfortable) and is also associated with chronic disorders, e.g., diabetes, high blood pressure, respiratory disease, and coronary heart disease in patients diagnosed with SMI [4,5]. Kisely [6] states that poor oral health in this group also contributes to avoidable admissions to a general hospital and that dental conditions are a common cause of acute avoidable admissions. This finding shows that oral care is an important part of general health in patients diagnosed with SMI (and a chronic disorder, e.g., diabetes, high blood pressure, respiratory disease, and coronary heart disease). Risk factors for poor oral health are also known, and inferences can be made from syntheses of the literature. These risk factors include the type and stage of mental illness; a lack of motivation and low self-esteem; a lack of perception of oral health problems; lifestyle (e.g., eating, substance use) and the ability to sustain self-care and dental attendance; socio-economic factors (e.g., low income or low education); and the oral side effects of medication [6–8].

Rationale

Awareness of and support regarding oral health for patients diagnosed with SMI are of great importance. To prevent poor oral health, with all its consequences, it would be of great interest to intervene in an earlier stage, such as the first episode psychosis (FEP). However, no research on the experiences of young adults' oral health after FEP has been conducted.

The British Society for Disability and Oral Health [8] has published recommendations for oral health care for people with mental health problems, but the suggestions were not practical. In the Netherlands, multidisciplinary guidelines for patients after FEP describe that "during somatic screening it is important to check oral health" (8, p.140) and "during lifestyle screening it is important to check oral health hygiene" [9]. Clinical interventions are lacking, and therefore, there is a sig-

nificant risk that nothing will be taken. As Crowe [10] states, “If mental health nursing practice is a patient-centred partnership, as many of our nursing standards suggest, then nursing’s focus should be on the patient’s experience rather than the psychiatric diagnosis with which the experience is attributed. Mental health nurses need to turn to service users to learn how best to help” (p.125).

Research question:
The research question in this study was the following:

How do patients experience their oral health after FEP, and which needs regarding their oral health do they have?

Aim:
The current paper aims to gain insight into the lived experiences and needs of young adults after FEP regarding their oral health using an interpretive phenomenological approach.

Study design

Theoretical framework
In this study, a descriptive, interpretative phenomenological approach was used to gain insight into the lived experiences portrayed by the patients. The first aim of this study is to explore the experiences and needs of oral health behaviour among patients between 18 and 35 years after FEP.

Participant selection
The study population consisted of patients after FEP treated by the Early Intervention Service of the Friesland Mental Health Care Services in the Netherlands. Patients were asked by their psychiatric nurses to participate and were approached face to face. A convenience sample based on availability and willingness to participate was assembled. In this study, thirty patients between 18 and 35 years were included. Patients in a period of “florid” psychosis were excluded from the interviews.

Data collection

The data were collected through in-depth and open-ended interviews between April and October 2016. During the interviews, an aide memoire in the form of a list of relevant topics was used to provide flexibility during the interviews (table 1.). The interviews started with a broad and open-ended question to address lived experiences: "What does oral health mean to you, how do you report your oral health, and do you have needs to improve it?" Follow-up questions were then asked based on the information provided by the patients. Due to the characteristics of the interview approach used, issues were less standardized, and the patients had the opportunity to provide their perspectives.

Table 1. *An aide memoire*

Oral health	Is defined as: "Is multi-faceted and includes the ability to speak, smile, smell, taste, touch, chew, swallow and convey a range of emotions through facial expressions with confidence and without pain, discomfort and disease of the craniofacial complex. Oral health is a fundamental component of health and physical and mental wellbeing. It exists along a continuum influenced by the values and attitudes of individuals and communities; Reflects the physiological, social and psychological attributes that are essential to the quality of life; Is influenced by the individual's changing experiences, perceptions, expectations and ability to adapt to circumstances" (P3)[11]
Patients experience	Patients diagnosed with SMI report many problems, e.g.: eating, social acceptance, self-esteem, feeling comfortable [3]
Riskfactors	Risk factors for poor oral health in patients diagnosed with SMI were ,e.g., type and stage of mental illness; a lack of motivation and low self-esteem; a lack of perception of oral health problems; lifestyle (e.g., eating, substance use, smoking, and nutrition) and the ability to sustain self-care and dental attendance; socio-economic factors (e.g., low income or low education); and the oral side effects of medication [6–8]

The interviews were conducted by nursing students (bachelor students in the final phase of their study) under the supervision of a research team (SK. and NB.). After written informed consent was given, the interviews were documented using a voice recorder. The duration of the interviews was between 30 and 90 minutes. The iterative process of sampling, data collection, and analysis was continued until data saturation was reached; no new codes were found in the last five interviews.

Analysis

Data analysis

The research team, consisting of two experienced nurses, analysed the data and coded them independently. In the current study, we used Colaizzi's seven-step phenomenological method [12]. Bracketing by maintaining a reflective log file was common in the phase of analysing the data. During this phase, peer debriefing was conducted following each step in the coding process. The data discovered were compared with the literature to substantiate our findings. Each theme was described in the findings, and notable quotes were used to clarify the findings. Table 2 provides a short summary of the analysis technique of Colaizzi's strategy used in this study.

Ethical considerations

For this study, the research proposal was submitted to the ethics committee (Leeuwarden, the Netherlands) although formal approval was unnecessary. The committee confirmed the approval, registered under no. RTPO979a. Informed consent was given in writing: the principle of justice was followed by providing oral and written information about the research, confidentiality, voluntary participation, guaranteed anonymity, the possibility to quit participation at any time, and consent to the audio recordings. The recordings of the interviews are retained, according to the international safety regulations for the storage of data, at the NHL/Stenden University of Applied Sciences and are accessible only to the researchers.

Assessing the rigour of this study: Trustworthiness and authenticity

There were four criteria to establish trustworthiness: credibility, transferability, dependability and confirmability [13,14]. Establishing the credibility of findings entails both making every effort to ensure that research is carried out according to the canons of good practice and, where appropriate, submitting the research results to the patients who were studied for confirmation that the researcher had correctly understood their world. This technique is referred to as respondent validation [14]. In this research, the research group fed back (in Dutch) to the interviewees its impressions and findings of the discussions. In this study, transferability was strengthened by comparing the data discovered to the literature on this subject to substantiate the findings. Dependability requires trying to ensure that complete records and an audit trail of all phases of the research process were kept [14]. It should be evident that personal values or ideological inclinations have not been

allowed to sway the performance of the research and the findings deriving therefrom [14]. In this study, two members of the research team (SK. and NB.) led and monitored this research and gave feedback during the study.

Table 2. *A summary of the steps by using Colaizzi's strategy as employed in this study[12]*

Step	What and result
Step 1 Obtain an overview of the data	Interviews were transcribed verbatim Read and re-read to gain a feeling for and to make sense of the patients' lived experiences regarding oral health
Step 2 Extracting significant statements	- Significant statements of the participants experiences, meanings and needs were extracted - Coding in Atlas TI V 7.5.12 software package
Step 3 Compare and discussion	Compared the original quotes with the formulated meanings to achieve consistency We illuminated experiences and meanings that were hidden in various contexts of the phenomenon. Minimal differences were found within the research group, and there was a discussion to reach a solution, when necessary 458 Quotes classified into 458 significant meanings
Step 4. Categorize	Categorizing the meanings into codes that reflect a vision to form a code 40 Codes were obtained from 458 meanings 40 Codes were incorporated into 5 themes
Step 5. Describe	Provided a sufficient description of the experiences, meanings and needs of the patients. The formulated themes were integrated in a description of the phenomenon under study
Step 6. Clear relationships	Generate clear relationships between the themes, it also included eliminating some ambiguous structures that weaken the whole description
Step 7. Validation	"Member check technique" was used to validate the findings within participants Discussion about participants feedback and changes were incorporated.

Guba and Lincoln [15] suggest criteria of authenticity, and these standards raise a wider set of issues. This research fairly represents the experiences, and needs of the patients, and every effort was made to serve the patients. The ontological authenticity of this study can be formally assessed upon completion, but in this regard, an indication was gained from the responses to the feedback sessions,

which indicated that the patients felt they had increased their awareness and understanding of the phenomena.

Findings

Interviews were carried out between April and October 2016. The themes of oral health experiences emerged from an analysis of approximately 23 hours of audio (range: 30-90 minutes), transcribed in 146 pages, from 30 patients after FEP who ranged in age from 18 to 35 years (mean 26.9). Table 3 illustrates the participant demographics and their medications (in groups) and diagnoses. Most frequent reported antipsychotics were Olanzapine (N=13), Risperidone (N=5), Aripiprazole (N=4) and Sulpiride (N=2).

Within the theme of oral health experiences and needs, we further categorized and coded the data with regard to dental care in general, risk factors, the financial situation, experiences and needs for interventions of the participants. These themes were inextricably linked. Table 4 gives an example of the phenomenological process.

Table 3. *Participant demographics and self-reported medications and diagnoses*

Participant	Gender	Age group	Residential status	Marital status	Self-reported medications	Diagnoses
1	Female	18-21	With parents	Not married	-	FEP*, PTSS†, Drug abuse
2	Male	22-25	Sheltered living	Not married	Antipsychotic medication	FEP, Asperger, PDD‡, Drug abuse
3	Male	18-21	Sheltered living	Not married	-	FEP, ADD§, Drug abuse
4	Male	18-21	Sheltered living	Not married	-	FEP, Drug abuse
5	Male	18-21	Sheltered living	Not married	Antipsychotic medication, Anti-Anxiety Medication	FEP, Drug abuse
6	Female	22-25	Sheltered living	Not married	Antipsychotic medication	FEP
7	Male	31-35	Sheltered living	Not married	Antipsychotic medication	FEP, ADHD¶, Drug abuse
8	Male	26-30	Sheltered living	Not married	-	FEP, Drug abuse
9	Male	26-30	Sheltered living	Not married	Antipsychotic medication, Anti-Anxiety Medication	FEP, Drug abuse
10	Male	22-25	Sheltered living	Not married	Antipsychotic medication	FEP
11	Male	26-30	With partner	Living together	Antipsychotic medication, antidepressants, Anti-Anxiety Medication	FEP, Drug abuse
12	Male	22-25	Single	Not married	Antipsychotic medication	FEP, Drug abuse
13	Female	26-30	With parents	Not married	Antipsychotic medication	FEP, Drug abuse
14	Female	26-30	With parents	Not married	Antipsychotic medication	FEP
15	Female	31-35	With partner	Not married	Antipsychotic medication	FEP
16	Male	31-35	Single	Not married	Antipsychotic medication	FEP, Drug abuse
17	Female	22-25	Sheltered living	Not married	Antipsychotic medication	FEP, Drug abuse

Table 3. *Participant demographics and self-reported medications and diagnoses (continued)*

Participant	Gender	Age group	Residential status	Marital status	Self-reported medications	Diagnoses
18	Male	26-30	Sheltered living	Not married	Antipsychotic medication	FEP, Drug abuse
19	Female	31-35	With partner	Living together	Antipsychotic medication	FEP
20	Female	31-35	Single	Not married	Antipsychotic medication	FEP
21	Male	31-35	Single	Not married	Antipsychotic medication	FEP
22	Male	22-25	Sheltered living	Living together	Antipsychotic medication	FEP, Drug abuse
23	Female	22-25	Single	Not married	Antipsychotic medication, antidepressants, Mood Stabilizer	FEP, Drug abuse
24	Male	31-35	Sheltered living	Not married	Antipsychotic medication	FEP, Drug abuse
25	Female	22-25	Single	Not married	Antipsychotic medication	FEP, Drug abuse
26	Male	31-35	With parents	Not married	Antipsychotic medication, Anti-Anxiety Medication	FEP, Drug abuse
27	Male	26-30	Sheltered living	Not married	Antipsychotic medication	FEP, Drug abuse
28	Male	22-25	Sheltered living	Not married	Antipsychotic medication, mood stabilizer	FEP, Bipolar, Drug abuse
29	Female	26-30	With partner	Living together	mood stabilizer	FEP, Bipolar
30	Female	31-35	With partner	Living together	Antipsychotic medication, antidepressants	FEP

*FEP: First episode psychosis

†PTSS: Post traumatic stress syndrome

‡PDD: Pervasive Developmental Disorder

§ADD: Attention deficit disorder

¶ ADHD: Attention deficit hyperactivity disorder

Table 4. *Oral health in patients after FEP: Examples of the phenomenological process using Colaizzi's strategy*

Quotes	Significant meanings	Codes	Theme
I did not go to the dentist for over 3 or 4 years. Because of my debts. I am in debt restructuring; I cannot really pay the dentist. (part.7, line 61-63)	Patient realizes that he has not been to the dentist for a long period of time because of his debts and the financial consequences thereof.	No dental control/no insurance	Risk factors
I do not have insurance for the dentist because I am €15.000 in debt. Moreover, I cannot pay the bill. (Part. 3, line 75)	Patients have difficulties paying bills because of their debts, and they do not have the money to pay for insurance.	Debts	
I have had a mentor for over a year, but I do not have insurance for the dentist. I still need debt restructuring, but the system works very slowly, and it takes a long time before everything is settled. (part.7, line 193*-201)	Patients state that the debt structuring system does not work.	System does not work	
When I have used drugs I think often, I do not mind, and I do not care about anything. This includes dental care. (part.1, line 30)	Dental care is not a priority for patients when they have used drugs.	Consequences of drug abuse	Risk factors
When I have used drugs, I often forget and do not feel like it. Everything is bullshit. I am basically continuously making excuses for not doing things. (part.2, line 92)	Patients who often used drugs forget things or do not feel like doing something.	Not on mind	
When I was using drugs, I was only busy doing blow, and I did not feel like brushing my teeth and did not think about it. (part.3, line 38-39)	Dental care is not on the mind of patients using drugs.	Not on mind	Interventions

Table 4. *Oral health in patients after FEP: Examples of the phenomenological process using Colaizzi's strategy (continued)*

Quotes	Significant meanings	Codes	Theme
I am continuously so tired that I forget, and besides that, I do not feel like it. The psychosis and drugs make a person very confused. (part.5, line 43)	Patients feel chaotic in and after a first episode psychosis, which, together with drugs, makes the world confusing.	Not on mind	Risk factors
I have a lot on my mind, and brushing my teeth is not a priority (part.5, line 74)	Patients have many things on their mind after a first episode psychosis; dental care is not one of them	Lack of structure	
Because of the medication I used for my psychosis, I feel hungry, and I eat a lot. I have gained many pounds since then. (part.6, line 300-306)	Patient feels hungry because of the use of medication for psychosis. Weight gain.	Side effect of medication	
I receive an email from the dentist when it is time to make an appointment. (part.18, line 34)	Losing a reminder card from the dentist makes it hard for patients to remember that they have to make an appointment.	Losing memories	Interventions

Dental care in general

The patients were asked to describe what oral health mean to them, but the patients' answers remained superficial, or the patients described their current state. This question was difficult for the patients to answer. The patients were not aware of the meaning and importance of oral health.

> "I do not know, as long as my mouth looks fresh and does not hurt." [part. 1]
> "I have had a root canal. My right front tooth is fake. When I was young, it broke off. And now, with so much time, it gets stuck again because it often falls off." [part. 2]

All patients were using devices for dental care. Most frequently, the patients named a toothbrush (electric or manual) and toothpaste. One-third of the patients used a toothpick or dental floss. Seven patients brushed their teeth irregularly and not twice a day. Some of the patients only brushed when they remembered or thought about it, meaning that the frequency with which they did so could be only once or twice a week. The patients were hindered by many mental health problems, and as a result, they thought less about cleaning their teeth. The patients stated that for regularly cleaning their teeth, awareness is the most important factor, and it is precisely this awareness that they do not have.

Risk factors that affect oral health

The patients' experiences and knowledge of risk factors was discussed. The risk factors were also important factors that the patients experienced when trying to take care of their oral health. Twenty-one patients (70%) reported that they use or used drugs, some recently and some in the past. The most frequently used drugs were marijuana, cocaine, speed and MDMA. These patients commonly indicated that the misuse of drugs caused many problems. They described that the chaotic feelings in and after FEP combined with drug use make their world more complicated.

> "Well, I do know the importance of oral health, but I did not care, and I did not think about it and did not feel like doing anything with that. I was busy using drugs and alcohol." [part. 3]
> "I had a lack of motivation, and oral health was not in my system." [part. 7]

The patients who have used drugs state that they often forget things and do not feel like doing anything. All patients state in common that dental care is not prioritized (N=30).

> "When I was 17 years old, I was really lazy, and especially when I smoked marijuana, I did not think about oral health or brushing my teeth." [part. 1]
> "My thoughts were completely somewhere else. I lived in my own world. My thoughts were not about taking care of my teeth and such things." [part. 25]

All patients portrayed cognitive difficulties such as a lack of fluency, working memory and flexibility. In addition, there was no motivation for the patients to take care of themselves. Most patients frequently reported a lack of structure and a lack of planning in daily life as a result of abusing drugs and alcohol, and the patients did not link this aspect directly to FEP. After quitting drugs, the patients became more aware of their health problems. More than half of the patients' smoke, but they did not link smoking to their oral health.

Nutrition was indicated as a risk factor by the patients. It was connected to not only a period of drug abuse but also the side effects of medication. The patients stated that dental problems also affect the intake of nutrition. Binge-eating and an unhealthy food pattern were common for half of the patients. All patients linked drinking sugary beverages (e.g., redbull or cola) to a dry mouth as a side effect of medication; some patients also linked it to a period of drug abuse.

> "In a period of drug use, I hardly ate. If I was hungry, I got a bag of crisps; I did not care." [part. 1]
> "Because of the medication I used for my psychosis, I feel hungry, and I eat a lot. I have gained many pounds since then. In the last half year, I became ten kilograms heavier after starting medication." [part. 6].

All patients mentioned the side effects of medication as part of reduced oral health. Xerostomia, somnolence, reduced responsiveness, pain, concentration problems and weight gain were the most reported experiences as a consequence of the side effects of medication. All patients felt that their teeth became worse as a result of the use of medication, and the patients were not aware of other factors that influence oral health.

The patients mentioned their financial situation as an important reason why they will not go to the dentist. They were often in debt; debts were incurred during FEP. The patients could not afford to pay for insurance for dental care. Because of their mental illness, almost all patients could not work for a period. Twelve patients incurred heavy debts at the time of their psychosis, and most patients had marginal incomes. The patients who were in this situation felt very uncomfortable. Their financial situation was directly affecting their ability to pay for dental health care.

> "I do not have insurance for the dentist because I am €15.000 in debt. I cannot pay the bill." [part. 3]

In the Netherlands, people with a diagnosis of psychosis are sometimes supervised by a financial administrator who manages their debts, and when the financial situation is stabilized, debt structuring is an option. The patients stated that this system is slow, and they became desperate. The distance to dental care is increased by not going to the dentist for many years. The patients stated that they entered a vicious circle and could not solve this problem themselves.

After FEP, a period of recovery was experienced as complicated, and the patients reported insecurity about their appearance. Insecurity about themselves was linked to a decrease in overall wellbeing after FEP. For some patients, insecurity was a reason for using drugs and drinking alcohol.

Experiences with dentists and dental hygienists

The patients were questioned in regard to their experiences with dentists and dental hygienists. Early in life, almost everybody went to the dentist twice a year, the standard in the Netherlands. There were no negative experiences. One of the grew up without a dentist in Indonesia. The period no longer going to appointments started while using drugs and during the FEP. This aspect is linked to the period of overall neglect. In this stage, there was no ability for the patients to take care of themselves, nor did they pay attention to doing so. Going to a dentist or dental hygienist is linked to their financial situation. Having insurance indicates that the patients go to the dentist twice a year, but doing so is "conditional on remembering."

A few patients had experiences with a dental hygienist. The patients had no bad experiences. Fear of dentists or dental hygienists was discussed, but in general, it was not an issue.

Needs and interventions to increase oral health.
All patients confirmed that they require more structure in their daily life so that they can have more insight into their day-to-day activities. They described this aspect as a helping intervention. The patients explained that more structure is necessary to reintroduce things such as brushing their teeth into their system. Additionally, the patients mentioned help with planning daily activities such as taking care of themselves and making appointments.

> "I think I can improve my oral health by drinking fewer sugary drinks and brushing more often. I had alcohol- and drug abuse. But, really, I do not like to do that, and I am not motivated. When I hear those voices, then there is even more lack of motivation. I live with my partner, I can ask her, but I do not know if that would work." [part. 11]
> "I need help with planning; it is not that I do not think it is important, but I forget many things I have to do. It takes much effort, and I would like to have someone to tell or remind me to brush my teeth." [part. 23]

To obtain more structure and better planning, the patients suggested placing all their appointments in a digital agenda or app. A frequent reminder prevents forgetting appointments.

> "I got a reminder by post from the dentist, but I lost it." [part. 16]
> "A week before the appointment, the dentist called me to remember. That was helpful." [part. 20]

Despite reminders from the dentist, the patients forgot their appointments often because they were preoccupied with something else. The patients experienced support from the environment, especially parents.

> "My mother is important for giving structure to my daily activities." [part. 6]
> "If my parents we not there, I probably never would have gone to any appointment in that period." [part. 24]

All patients reported a lack of knowledge of oral health and oral health care. In particular, there was a lack of knowledge on the influence of risk factors on oral health. There was no difference between patients regarding whether they used drugs or not. There was also a lack of knowledge of the consequences of not taking care of their teeth. It seemed hard to motivate the patients, especially when they used drugs. Nevertheless, in all patients, there was no reported need for health promotion. The patients stated that interfering is not desirable and will only generate resistance. The patients felt stigmatised as though they were children and could no longer think for themselves. Moreover, they believed that they know how to take care of their oral health. This belief is in contrast to the statement from one patient earlier: “awareness is critical.

Discussion

This phenomenological study in the Netherlands context is unique, and it gives insights into the lived experiences and needs regarding oral health among patients between 18 and 35 years after FEP. The WHO recommends that more investment in under-funded areas of health research were needed and also recommends to translate knowledge into actions to improve oral health [16,17]. Therefore, it was important to explore the experiences and needs of patients after FEP. This study is the first to explore patients’ experiences in four themes.

Overall, participants were satisfied with their oral health before the occurrence of psychotic symptoms, and they stated that a decrease in oral health started after that period. In total, four themes were reported based on the lived experiences and needs of the patients: dental care in general, risk factors, experiences, needs and interventions. These four themes were linked to each other. All participants had difficulties in managing their oral health; they were unaware of the consequences of the risk factors and reported the importance of others in helping them.

With regard to dental care in general, the participants were not aware of the importance of oral health. A study among patients after FEP and patients after multiple episodes shows that there is less awareness among patients after FEP than among patients after multiple episodes [18]. These findings indicate the importance of using psychoeducational approaches to improve awareness in patients after FEP.

In practice, patients receive psychoeducation, but the psychoeducation is focused on specific topics, e.g., sports or life style, or psychotic symptoms and the effect of cannabis use [19]. To date, studies among psychoeducation have not taken oral health into account, and it is not known in what way psychoeducation on oral health is effective in patients after FEP.

Here, the question of nurses' oral health awareness arises. Research shows the overall lack of oral health awareness among nurses. Gillam et al. [20] tested a questionnaire on oral care knowledge and awareness in nurses and identified deficiencies in their knowledge of oral care and concluded that a basic awareness of conditions and medications that may affect the mouth would be of great value. This current research shows the importance of teaching oral care to nurses, which would enable nurses to provide a higher standard of oral care to patients.

In this study, all participants were confronted with many risk factors (e.g., substance use, poor diet and financial problems) and experienced the consequences of bad oral health (e.g., pain and feeling insecure). Our research explored lived experiences and was not focused exclusively on assessing risk factors. The participants stated that there are financial problems, and the participants did not always have insurance. This was directly affecting their ability to pay for dental health care. The evidence showed that inappropriate decisions were a consequence of poverty and a scarcity mentality. Moreover, these consequences have a large cognitive impact on, for instance, working memory and flexibility (executive functioning) [21]. Participants were restricted by their short-term memory; long-term perspectives and appropriate long-term aims were limited. It is known that people stricken by poverty use less preventive health care, fail to adhere to drug regimens, are less likely to keep appointments, and are worse managers of their finances. This study confirms that patients after FEP are a high-risk group for whom support is necessary. This fits in the approach of the WHO, the importance of promotion of oral health to reduce burden and disability in poor and disadvantaged populations [22].

The participants in this study showed no negative experiences regarding dentists/dental hygienists. We believe that it is important to realize that fear can be a reason for not going to the dentist. There is evidence in patients diagnosed with SMI: "One half of all dental patients experience some anxiety about their dental visits, and in

some cases this leads to dental phobia" [23] (p.278). In our study, fear was not an issue for patients after FEP.

With regard to needs and interventions, the participants stated the importance of support from others. This support could be in the form of a reminder for an appointment to prevent missing appointments. In sending reminders, there is a difference between dentists and dental hygienists. The results of our study showed that participants report a lower level of non-attendance when they receive a message the day before and the day of the appointment. Studies reporting the needs and interventions of patients diagnosed with SMI support the importance of sending reminders for their appointments, for example, studies focusing on medication adherence using text messages [24]. To date, however, studies have not taken oral health into account, and it is not known whether these outcomes are feasible in patients after FEP.

The participants reported the importance of others in helping them remember their daily oral health routine and remember to visit the dentist. This finding raises questions about who is responsible for oral health care for patients after FEP, particularly to prevent problems. Oral health prevention is primarily the responsibility of dentists/dental hygienists, but there is a role to be played by mental health nurses. Mental health nurses have contact with patients on a regular basis, and therefore, they have the opportunity to support patients diagnosed with their oral health, just as they also do in regard to physical health and healthy eating habits. Because of the lack of concrete tools, the Oral Assessment Guide for Psychiatric Care (OAG-PC) can be appropriate to methodically coordinate, assess, and evaluate patients' oral health [25]. The WHO recognizes oral health as a part of integrated care [22]. Using an oral health assessment guide, e.g. during somatic screening, should be incorporated to integrate oral health into daily care, but, studies among integrated care have not taken oral health into account, and therefore, it is not known if an Oral Assessment Guide will increase oral health in patients after FEP.

This study was carried out with a small sample size of 18 men (60%) and 12 women, and although the ratio is not equal, the results were comparable, and no gender issues were found. Out of thirty participants, 21 participants used drugs, often cannabis, at some time in their life (70%). The prevalence of substance use among people with FEP is in line with previously published data in Canada [26] and Austra-

lia [27], which indicates that the high prevalence of abuse in these authors' studies in patients after FEP is particularly notable. Therefore, we conclude that the sample used in this study is representative of patients who experienced FEP. However, in our findings, there was no particular difference between participants who used or did not use drugs regarding their oral health or other specific mental health-related issues. The implication is that the findings are more related to problems after FEP than they are related to problems after a drug-induced psychosis.

Study limitations

This research is a single-centre study in the northern of the Netherlands, and replication of this study in a multiple-centre design with a comparable population can be suggested. However, there are no direct indications to assume that there are substantial differences between the studied sample and the patients of other mental health organizations: the sample used in this study is not distinct in gender or age.

Nevertheless, this research has given new insights into the experiences and needs of patients and research can be continued.

Implications for mental health nursing

For many years, research on oral health among patients diagnosed with SMI has been conducted. Interestingly, however, no research the poor oral health of patients after FEP is available, and poor oral health still remains a major forgotten problem. This phenomenological study gains insight into the experiences of patients after FEP regarding their oral health and demonstrates that oral health among patients after FEP is associated and linked with other phenomena and that there is a need for care. The problems in oral health in patients after FEP are enormous, and it is preferable to indicate this priority.

For mental health nurses and other professionals, to assess patients' oral health, the consideration of using an oral health assessment guide should be part of a somatic or lifestyle screening. The contribution of risk factors (financial problems

included) should be monitored and managed. To methodically coordinate, assess, plan, implement, and evaluate patients' oral health, the OAG-PC can be appropriate and is available. Nurses and other mental health professionals should play their role. Our study shows the lack of awareness among patients and nurses. Oral health integrated in psychoeducation after FEP can be appropriate, but conditionally, nurses have to be properly trained. In this regard, it is important to start with students in nursing schools.

Oral health has many consequences for patients after FEP, and therefore, prevention is needed, as patients encounter many risk factors after FEP that decrease oral health, e.g., oral health education to create awareness. There is a need to develop evidence concerning oral health care after FEP with regard to practical interventions.

After FEP, patients might not be able to adequately attend to their oral health, and patients need help planning and remembering daily activities with regard to dental care. It is important to develop evidence to prove that remembering to address oral health care can help increase oral health (e.g., oral health adherence), and it is worth focusing on this topic in future research.

An integrated approach between mental health professionals and dentists and dental hygienists to improve oral health for patients after FEP is indicated; this approach includes psychoeducation and promotion. Policy and decision makers should consider providing free dental care for people with mental illness, given the importance of oral health for overall health. The government and municipalities together with health insurance agencies should work on adjusted services with regard to insurance plans and financial problems for this vulnerable group of young patients.

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Chapter 3

Risk Factors and Oral Health-Related Quality of Life: A Case-Control Comparison Between Patients diagnosed with a Psychotic Disorder (First-Episode) and People from the General Population

Kuipers, S. A., Castelein, S., Barf, H., Kronenberg, L., & Boonstra, N. (2022). Risk factors and oral health-related quality of life: A case–control comparison between patients after a first-episode psychosis and people from general population. *Journal of Psychiatric and Mental Health Nursing*, *29*(3), 430-441. https://doi.org/10.1111/jpm.12820

Abstract

Introduction: No research is available about the oral health risk factors and oral health-related quality of life (OHRQoL) in patients diagnosed with a psychotic disorder.

Aim: To compare oral health risk factors and OHRQoL in patients diagnosed with a psychotic disorder (first-episode) to people with no history of psychotic disorder.

Method: A case-control comparison (1:2) multivariable linear regression analysis and an estimation of prevalence of impact on OHRQoL.

Results: Patients diagnosed with a psychotic disorder (first-episode) have lower OHRQoL with more associated risk factors. Of the patients diagnosed with a psychotic disorder (first-episode), 14.8% reported a negative impact on OHRQoL, higher than the prevalence of 1.8% found in people from the general population.

Discussion: The high prevalence rate of a negative impact on OHRQoL in patients diagnosed with a psychotic disorder (first-episode) shows the importance of acting at an early stage to prevent a worse outcome.

Implications for practice: The findings highlight the need for oral health interventions in patients diagnosed with a psychotic disorder (first-episode). Mental health nurses, as one of the main health professionals supporting the health of patients diagnosed with a mental health disorder, can support oral health (e.g. assess oral health in somatic screening) in order to improve the OHRQoL.

Introduction

Oral health is an important factor in general health and wellbeing [1]. The WHO emphasises that oral health is essential to general health [2] and oral health is a determining factor for quality of life [3]. In the last years, oral health is improved in the general population, but vulnerable patients (e.g. patients diagnosed with a mental health disorder) have not benefited of the worldwide improvement in oral health and remain disadvantaged [4]. Impacts of diseases are categorised in the WHO's international classification of general health [5] and are categorised in a hierarchy, ranging from internal symptoms, which primarily affect the individual (e.g. pain), to limitations that are (also) associated with social roles (e.g. family). Poor oral health has a significant impact on the individual and his environment [3].

Since 1995, the Healthcare Institute of the Netherlands has periodically examined the development of oral health and the preventive dental behaviour of juveniles [6]. The outcomes for 17- and 23-year-olds showed that oral health had stagnated or even deteriorated compared to the same study in 2011. Some differences, in all age categories, are attributable to socioeconomic status (SES): the lower the SES group, the poorer the oral health. Furthermore, the increase in (erosive) dental wear is a cause for concern: 20% of the 17-year-olds and more than half of the 23-year-olds show wear and tear of the dental bone. Of these groups, 13% of the young adults (>17 years) indicated that they had occasionally postponed dental treatment due to financial considerations. Some young adults will receive information on oral health from their oral health professionals, however not on a structural basis.

Another part of the group may not receive adequate information, which, from the perspective of public oral health, is an alarming development [6].

In the Netherlands, there are guidelines for oral health and oral health care in young children, however no guidelines are available for oral health in (vulnerable) young adults, e.g., patients diagnosed with a psychotic disorder (first-episode).

To date, no research has been conducted on oral health in patients diagnosed with a psychotic disorder (first-episode). A recent study indicates that patients are hardly concerned with their oral health, there is a lack of awareness and patients are not able to adequately attend to their oral health [7]. Studies on patients diagnosed

with a severe mental illness (SMI) showed poor oral healthcare, and highlight the importance of paying attention to oral healthcare [8,9]. Poor oral health in patients diagnosed with SMI is associated with chronic diseases, e.g. diabetes or cardiovascular diseases [8]. Moreover, the prevalence of diabetes in patients diagnosed with schizophrenia is two to three times higher than in the general population [8,10,11]. A meta-analysis among studies of patients diagnosed with SMI showed a 53% higher risk of having cardiovascular disease (CVD), a 78% higher risk for developing CVD, and an 85% higher risk of death from CVD, compared to the regionally matched general population [12]. Thus, due to the high risks of developing diabetes and/or CVD in patients diagnosed with SMI, it is important to gain insight into oral health-related risk factors and OHRQoL in patients diagnosed with a psychotic disorder (first-episode).

Risk factors influencing oral health care

Risk factors for poor oral health are related to lifestyle in patients diagnosed with a mental health disorder (e.g. smoking, using alcohol or illicit drugs), side effects (e.g., xerostomia) or (anti-psychotic) medication, and consumption of sugary food/drinks [4,7,13,14].

The Ivory Cross is the Dutch scientific association for the prevention of dental and oral health problems in the Netherlands. They advise brushing two times a day with fluoride toothpaste, for at least two minutes. The use of dental aids (e.g., toothpicks) is also recommended (Ivory Cross, 2011). This advice is substantiated by evidence-based practice or expert opinions.

Due to poor oral health habits and risk factors related to lifestyle, the influence on patients' oral health increases the needs for regular check-ups (e.g., dentist or dental hygienist) [11,14,15]. Young adults are advised to pay preventive visits to the dentist and dental hygienist at least once a year [15].

The accessibility of oral health services and finances (e.g. sufficient money, insurance) have also been determined as risk factors in patients diagnosed with a psychotic disorder (first-episode) or SMI [1,7,9]. A sample of outpatients diagnosed with SMI show that financial barriers remain a major hurdle to reduce the unmet needs (of dental care) [9].

There is no research known that gives insight into the risk factors and oral health-related quality of life in patients diagnosed with a psychotic disorder (first-episode) compared to individuals in the general population without any history of a psychotic disorder.

Objectives

This study aims to compare risk factors and oral health-related quality of life in patients diagnosed with a psychotic disorder (first-episode) with individuals without any history of psychotic disorder, and to determine risk factors of OHRQoL.

Methods

Study design

A case-control comparison was conducted, using survey methodology. To strive for a representative control group, a ratio of 1:2 was opted for. A 1:2 ratio seems the optimal ratio to improve statistical efficiency and to avoid overmatching [16,17]. According to Grimes & Schulz [16], avoidance of selection bias is important when choosing a control group. Therefore, case and control groups were matched on age (18-25, 25-30, 31-35), gender (male/female), and educational degree (low, middle, or high as defined by the Dutch Central Office of Statistics, 2016). In total, 166 individuals were included in the control group.

Recruitment

We carried out a questionnaire (online as well as on paper) among (1) patients diagnosed with a psychotic disorder (first-episode), and (2) the general population. Data were collected from September 2016 to November 2018.

Patients diagnosed with a psychotic disorder (first-episode) were recruited from an early intervention service in Leeuwarden (the Netherlands). Patients with a clinical diagnosis of psychotic disorder according to the DSM 5 [18] were included. McGorry [19] distinguishes different stages in a psychotic disorder, from stage 0 (increased risk of psychotic disorder) to stage 4 (severe, persistent, or unremitting illness, as judged by symptoms, neurocognition, and disability criteria). All patients in stage 2 having a first-episode of psychosis, between 18-35 years and able to complete the questionnaire were included. Patients with florid psychosis were excluded. Patients

who met the inclusion criteria were informed about the study by their mental health nurse and were asked to complete the questionnaire. A total of 130 patients were eligible for the study of which 49 refused to participate. The 81 remaining patients (response rate = 62%) agreed to participate and were included in the study.

The recruitment of the control group was in the same period as the case group, based on quota sampling. Case and control group were matched on gender, age, and educational level [20]. Based on these matching criteria, the control group was recruited from the general population in Leeuwarden (the Netherlands) in shopping malls, on the street, at the University of Applied Sciences, and at sporting associations just until the matching criteria were adequately represented. These respondents were recruited by nursing students (bachelor students in the final phase of their study) under the supervision of a research team (S.K. and N.B.). Individuals from the general population were included if they had no mental health problems.

Data collection

The following data were collected: 1. demographical data; 2. risk factors: a) general lifestyle (smoking, alcohol, drugs, antipsychotic medication, sugary food/drinks); b) oral health behaviour (brushing frequency, brushing duration, cleaning tools); c) prevention (dentist visits, dental hygienist visits), accessibility of oral health services, and financial possibilities (sufficient money, insurance); 3. oral health-related quality of life (OHIP-49).

1. Socio-demographic data

Sociodemographic information included gender, age, educational level, and occupational status. The use of antipsychotic medication was registered as a patient characteristic.

2. Risk factors

Risk factors were assessed based upon the prior month as recall period for risk factors in lifestyle in general, smoking, alcohol, illicit drugs, antipsychotic medication, and consumption of sugary food/drinks [4,7,14,21,22]. Risk factors were scored dichotomously (present or absent). If participants marked 'yes', this was noted as risk factor. Regarding the frequency of toothbrushing, brushing less than two times a day was scored as a risk factor (Ivory Cross, 2011). Regarding the brushing time, brushing less than two minutes at a time was scored as a risk factor (Ivory

Cross, 2011). When no cleaning tools were used, it was also marked as a risk factor (Ivory Cross, 2011). The frequency of dentist and dental hygienist visits were marked as a risk factor if patients visited the dentist and dental hygienist once a year or less [6,7,15]. Financial risk factors were marked as a risk factor when respondents stated that they did not have enough money to take care of their oral health or if respondents stated that they had no insurance for dental care [9].

3. Oral health-related quality of life (OHIP-49)

The Oral Health Impact Profile-49 (OHIP-49) [23,24] was used as a self-report questionnaire to assess participants' OHRQoL over the last month. The OHIP consists of 49 items, distributed among seven dimensions: functional limitation (nine items), physical pain (nine items), psychological discomfort (five items), physical disability (nine items), psychological disability (six items), social disability (five items), and handicap (six items) [23]. Respondents were asked how frequently they experienced the phenomenon in the last month and responses were recorded using a 5-point Likert scale, where higher scores indicate worse functioning (0= never, 1= hardly ever, 2=occasionally, 3=fairly often, and 4=very often). OHRQoL impairment was determined by the total OHIP-49 total score, ranging from 0 (no adverse impacts within the last month) to 196 (all 49 impacts are experienced 'very often' within the last month). The OHIP-49 is reported to be valid and reliable [23,24]. The total OHIP-49 Cronbach's alpha in the current study was 0.91 for cases and 0.90 for controls. Cronbach's alphas for all subscales (case|control) were satisfactory. For functional limitation 0.79|0.74, physical pain 0.82|0.77, psychological discomfort 0.80|0.85, physical disability 0.71|0.74, psychological disability 0.82|0.91, social disability 0.73|0.79, and handicap 0.71|0.83.

The questions of the 14-item Oral Health Impact Profile (OHIP-14) [23,24] which is the shorter version of the OHIP-49, were used to calculate the estimation of prevalence of impact on OHRQoL in case and control group. OHIP-14 scores were ranging from 0 (no adverse impacts within the last month) to 56 (all 14 impacts are experienced 'very often' within the last month). The cut-off scores for the OHIP-14 were used [9,25,26], since cut-off scores for the OHIP-49 were were never studied in previous research. 'A negative impact on OHRQoL' indicates that participants reported in line with existing literature: 'occurring fairly often' or 'often' on one or more of the OHIP-14 items [9,25,26]. 'No impact on OHRQoL' indicates that participants did report in line with existing literature: "Never", "Hardly Ever", "Occasion-

ally" on the OHIP-14 items. The OHIP-14 has been demonstrated to be reliable in the Netherlands [24]. Internal reliability in our sample was moderate (Cronbach's alpha 0.71|0.77).

Analysis

Descriptive statistics were used to report the demographic information and risk factors of oral health-related quality of life. Differences in demographics and risk factors between both study groups were analysed using Chi-square tests (χ^2) and independent t-tests. Significant group differences were analysed post hoc with Bonferroni correction. Subscale scores of the dimensions of the OHIP-49 were calculated by summing the responses to subsets of items. The assumption of normality was tested, leading to the conclusion that data were non-normally distributed. Mann-Whitney U-tests were conducted to compare dimensions of the OHIP-49 and the OHIP-49 total score between the study groups.

To build a model with risk factors as predictors for OHRQoL, a multiple linear regression was conducted. The predictors that were added in the model had never been studied in other studies. Therefore, forced entry was used as a method (Field, 2014). The sum score of the OHRQoL-49 was used as the dependent variable. Case and control group were entered in the first stage of the regression. Risk factors were entered at the second stage, to assess the degree to which the model could explain the variance in total OHRQoL. Preliminary analyses were performed to ensure there was no violation of the assumption of normality, linearity, multicollinearity, and homoscedasticity (Field, 2014). Chi square test of independence (Phi) were performed to examine the strength of the association between binary and dichotomized risk factors (Appendix 1) When associations between variables were < 0.60 and the variance inflation factor (VIF) <2, variables were included in the final two models (Field, 2014). There were no associations between risk factors >.60. The assumption of normal distribution was violated; therefore bootstrap was used, and the 95% CI Bias was corrected and accelerated.

To calculate the estimation of prevalence of impact on OHRQoL in case and control group, the outcomes of the OHIP-14 items scale were dichotomized, 0= no impact on OHRQoL (score OHIP-14= 0), 1= negative impact on OHRQoL (score OHIP-14 ≥1). Next, cross-tabulation was used on the outcomes of impact on OHRQoL, measured with the Fisher's exact test. Odds ratios and confidence intervals (CIs) were calcu-

lated. Statistical significance was defined as $p \leq 0.05$ (α level= 5%) and a 95% CI was chosen. Statistical Package of the Social Sciences (SPSS, version 26) was used for these analyses (IBM, 2018).

Ethical considerations

The research protocol has been approved by The Medical Ethical Committee in Leeuwarden, the Netherlands (decision no. RTPO979a). Standard rules for good clinical practice and ethical principles that have their origin in the Declaration of Helsinki were followed by informing all participants about the study and their rights, and all subjects gave oral consent to participation (The World Medical Association, 2013).

Results

Table 1 shows the patient characteristics. The mean age of the participants in the case group (N=81) was 25.9 years. The mean age in the control group (N=166) was 25.0 years. There were no significant differences in case and control group in gender, age, and educational level, which demonstrates a successful matching process.

Comparison of risk factors

Table 2 shows the results of the Chi-square test, conducted to test the differences between case and control group on risk factors. First, regarding risk factors in general, we found that there was a statistically significant difference between the case and control group in smoking, $\chi^2(1) = (20{,}51)$, $p = <.001$. The case group demonstrated to smoke more frequently than the control group. Second, regarding risk factors in dental health care behaviour, we found that there was a statistically significant difference between the case and control group in low frequency of brushing, $\chi^2\ (1) = (13.45)$, $p = <.001$. The case group brushed their teeth less often. Last, regarding financial risk factors, we found that there was a statistically significant difference between the case and control group in finances, $\chi^2\ (1) = (33.87)$, $p = <.001$. The case group reported more frequently a lack of finances to take care of their teeth compared to the control group. No significant differences were found on other risk factors.

Comparison of dimensions and total score of OHRQoL

Table 3 shows the results of the Mann-Whitney U tests, conducted to compare the dimensions and total score of OHRQoL between the study group. A higher score indicating a poorer OHRQoL.

Scores in psychological discomfort of the case group (*Mdn* = 0, interquartile range [*IQR*] = 3) were higher than those of the control group (*Mdn* = 0, *IQR* = 2). A Mann-Whitney test indicated that this difference was statistically significant, *U* ($N_{case\ group}$ = 81, $N_{control\ group}$= 166,) = 4635.5, *z* = -4.91, *p* < .001. The scores in physical disability of the case group (*Mdn* = 0, *IQR* = 1) were higher than those of the control group (*Mdn* = 0, *IQR* = 1). A Mann-Whitney test indicated that this difference was statistically significant, *U* ($N_{case\ group}$ = 81, $N_{control\ group}$= 166,) = 5622.5, *z* = -3.086, *p* = .002. Last, Mann-Whitney tests indicated that scores in the OHIP-49 total were higher for the case group (*Mdn* = 5, *IQR* = 6.5) than for the control group (*Mdn* = 1, *IQR* = 4), *U* ($N_{case\ group}$ = 81, $N_{control\ group}$= 166,) = 4659.0, *z* = -3.91, *p* < 001. No significant differences were found on the other dimensions.

Table 1. *Characteristics of case and control group*

Characteristics	Case group		Control group		*p*
	n	%	*n*	%	
Age, years; mean (SD)	81	25.9 (4.89)	166	25.0 (4.99)	.98
Gender, male	52	64.2	107	64.5	.97
Education					.81
Low	8	9.9	16	9.6	
Middle	50	61.7	100	60.2	
Higher	23	28.4	50	30.1	
Occupational status[b]	81		166		
School	11	13.6	82	49.4	.00*
Work	24	29.6	114	68.7	.00*
Volunteer work	18	22.2	21	12.7	.06
Day-care	19	23.5	2	1.2	.00*
Nothing	14	17.3	-	-	
Other	9	11.1	14	8.4	.49
Medication [a,b]	66	81.5			
Aripiprazole	5	7.6			
Clozapine	9	16.6			

Table 1. *Characteristics of case and control group (continued)*

Characteristics	Case group		Control group	*p*
Haloperidol	2	3		
Lithium	3	4.5		
Olanzapine	25	37.9		
Risperidone	15	22.7		
Quetiapine	3	4.5		
Other	23	34.8		
No antipsychotics	10	18.5		

Note: *Statistically significant p-values (p<.05). [a] Anti-psychotics and other common medication that is related to oral health. [b] Option to choose more than one.

Table 2. *A comparison of oral health risk factors in case and control group*

Risk factors	Case group (n=81)		Control group (n=166)			
	n	%	n	%	χ^2	*p*
Risk factors in general						
Smoking	43	53.1	40	24.1	20.51	.00*
Illicit drugs	9	11.1	22	13.3	0.23	.69
Alcohol	52	64.2	127	76.5	4.13	.05
Sugary food/drinks	64	79.0	119	71.7	1.52	.28
Antipsychotics and other common medication that is related to oral health	66	81.5	N/A	N/A	N/A	
Risk factors dental behavior						
Low frequency brushing	40	49.4	43	25.9	13.45	.00*
Short duration brushing	33	40.7	46	27.7	4.25	.04
Few uses of dental aid	31	38.3	60	36.1	0.11	.78
Risk factors preventive care						
Low number of dental visits	36	44.4	73	44.0	0.00	1.00
Low number of dental hygienist visits	67	82.7	143	86.1	0.50	.57
Financial risk factors						
Not enough finances	26	32.1	8	4.8	34.13	.00*
No insurance oral care	27	33.3	58	34.9	0.06	.89

Note. *Statistically significant p-values (p<.05) and corrected for multiple testing using Bonferroni correction (Bonferroni adjustment for alpha=<.004)

Table 3. *Dimensions and total score of OHRQoL [a] in case and control group*

	Case (*n*=81)		Control (*n*=166)			
Dimension (N items, min-max score)	Median	Range	Median	Range	Mann Whitney *U*	*p*
Functional limitation (9 items 0-36)	1	9	0	10	5428.5	.00
Physical pain (9 items, 0-36)	1	18	1	14	6418.0	.54
Psychological discomfort (5 items 0-20)	0	15	0	10	4635.5	.00*
Physical disability (9 items 0-36)	0	12	0	12	5622.5	.00*
Psychological disability (6 items 0-24)	0	10	0	12	6163.0	.05
Social disability (5 items 0-20)	0	2	0	3	6635.5	.63
Handicap (6 items 0-24)	0	9	0	9	6297.5	.09
OHIP total score (0-196)	5	60	1	50	4659.0	.00*

Note. *Statistically significant p-values (p<.05) are corrected for multiple testing using Bonferroni correction (Bonferroni adjustment for alpha =<.006). [a] As measured on the OHIP-49 scale 0-196. Higher scores mean lower OHRQoL.

Table 4 *Multivariable model of risk factors associated with OHRQoL, with 95% bias corrected and accelerated confidence intervals (CI) (bias corrected and accelerated bootstrap, based on 1000 bootstrap sample; N = 247).*

Variable	Model 1			Model 2		
	B	95% CI for B		B	95% CI for B	
		LL	UL		*LL*	*UL*
Constant	6.89	4.93	9.29	3.82	-1.67	9.45
Case control group [a]	**-2.89***	-5.54	-.49	.24	-4.15	4.83
Smoking [b]				1.25	-1.32	3.86
Alcohol [b]				**2.34***	.33	4.51
Illicit drugs [b]				**-3.43****	-5.58	-1.31
Sugary food/drinks [b]				.98	-.62	2.53
Antipsychotics and other medication related to oral health				2.48	-1.98	7.74
Low frequency brushing [b]				1.59	-.62	3.78

Table 4 *Multivariable model of risk factors associated with OHRQoL, with 95% bias corrected and accelerated confidence intervals (CI) (bias corrected and accelerated bootstrap, based on 1000 bootstrap sample; N = 247). (continued)*

Variable	Model 1			Model 2		
	B	95% CI for B		B	95% CI for B	
		LL	UL		*LL*	*UL*
Short duration brushing [b]				1.79	-.53	4.48
Few use of dental aid [b]				-1.50	-3.54	.63
Low dental visits [b]				.85	-1.14	2.85
Low dental hygienist visits [b]				-2.58	-6.76	.83
Not enough finances [b]				.59	-2.64	4.32
No insurance oral health [b]				**-2.67****	-4.43	-1.04
R^2	.03			.14		
ΔR^2	.02			.09		
F	**6.85***			**2.78****		

Note: Significant coefficients are displayed in bold. We examined the impact of risk factors on OHRQoL. In model 1, we entered case-control group as predictor. In model 2, we entered the risk factors as predictor. [a] Case = 0, control = 1. [b] No risk factor = 0, risk factor = 1. * P < .05. ** P < .01.

Risk factors associated with OHRQoL

A multiple regression with forced entry was used to predict risk factors on OHRQoL (Table 4). The first block, the study group was significantly associated with the value of OHRQoL, $F(1, 244)= 6.85$, $p<.01$, $R^2= .03$, $R^2_{ajusted}= .02$. The case-control group was a significant predictor of OHRQoL, $\beta= -.17$, $t(244)= -2.62 = p = .009$. The control group corresponded, on average, to a lower score in OHRQoL score of 2.89 points, $B= -2.89$, 95% CI [-5.54,-.49]. Lower score means better OHRQoL.

The multiple linear regression revealed in block 2, introducing the risk factors to the regression model, significantly predicted the value of OHRQoL, $F(12, 232)= 2.78$, $p = .006$, $R^2=.14$, $R^2_{ajusted}= .09$. Drinking alcohol was a significant predictor of OHRQoL, $\beta=.13$, $t(229)=1.82 = p = .036$. Drinking alcohol as risk factor corresponded, on average, to a higher score in OHRQoL score of 2.48 points, $B= 2.48$, 95%CI [-1.98,-7.74]. Illicit drug use was a significant predictor of OHRQoL, $\beta= -.14$, t (232)= -2.08= $p = .007$. Illicit drug use as risk factor corresponded, on average, to a lower score in OHRQoL score of 3.43 points, $B= -3.43$, 95%CI [-5.58, -1.31]. Having an insurance for oral health

was a significant predictor of OHRQoL, *ß*= -.15, *t*(232)= -2.44= *p* = .006. Not having an insurance for oral health as risk factor corresponded, on average, to a lower score in OHRQoL score of 2.67 points, *B*= -2.67, 95%CI [-4.44, -1.04]. The other risk factors were found not to be significant in the model.

Prevalence and odds ratio for the impact on OHRQoL

Statistically, a negative impact on OHRQoL was significantly more prevalent in the case group compared to the control group (14,8 % versus 1,8 % respectively, $p < 0.0001$, Fisher's exact test) (Table 5). Based on the odds ratio, the odds of a negative impact on OHRQoL in the case group was 9.45 (CI 2.59–34.54, $p < .001$) times higher than in the control group.

Table 5. *Prevalence of impact on OHRQoL in case-control group. N = 247*

	Negative impact on OHRQoL	No impact on OHRQoL	Total N
Case group	12 (14.8%)	69 (85.2%)	81 (100%)
Control group	3 (1.8%)	163 (98.2%)	166 (100%)

Discussion

To the best of our knowledge, this is the first study with a case-control comparison design, providing insight into risk factors and the impact on OHRQoL in patients diagnosed with a psychotic disorder (first-episode) between 18 and 35 years, compared to peers without a history of a psychotic disorder. Our two main findings were, firstly, OHRQoL was significantly lower among patients diagnosed with a psychotic disorder (first-episode) than in the general population, and, secondly, of the patients diagnosed with a psychotic disorder (first-episode) 14.8% reported a negative impact on OHQoL, much higher than the prevalence of 1.8% found in people from the general population. This led to a 9.45 times higher risk of impact on OHRQoL in patients diagnosed with a psychotic disorder (first-episode), compared to their controls. The width of the CI is large. As large CI's led to limited confidence in the magnitude of the detected difference, more research would be required.

This study shows that patients diagnosed with a psychotic disorder (first-episode), in general, have more risk factors (smoking, sugary food/drinks, low frequency of brushing, short duration of brushing, not enough financial means) compared to their peers. This means that oral health awareness training would be beneficial for all young people, especially those diagnosed with a psychotic disorder (first-episode). At this moment, no oral health interventions are available. However, oral health education, the use of a mechanical toothbrush, reminder systems, and brief motivational interviewing sessions in patients diagnosed with SMI or psychotic disorders showed to be effective [27–30]. In all samples, oral health knowledge and oral health status (Quigley Hein plaque index) improved significantly. There is no evidence if OHRQoL improved for these populations.

The results in OHRQoL showed that the case group scored significantly poorer in the dimensions psychological discomfort, physical disabilities, psychological disabilities, and in the overall OHIP-49 score. This could be an effect of antipsychotic medication, however the objective of this study could not facilitate adding medication as a confounder. The multiple linear regression analysis showed that 14% of the variance in the outcome could be explained by the variables included in the model. Even though there are significant differences between the two study groups in the outcome for OHRQoL, the factors included in the model have limited exploratory value in explaining outcome differences. Additionally, in this research, patients diagnosed with a psychotic disorder (first-episode) were included. However, these patients might have been more ill than expected. Furthermore, the independent variables included in the analysis did not constitute all factors affecting the OHRQoL. Considering that the mentioned risk factors explained 14% of variance in the outcome of OHRQoL, more insight is needed to identify additional factors affecting OHRQoL. Introducing the risk factors in stage 2 of the regression, illicit drugs contribute to poor OHRQoL. This concurs with recent studies [14,31]. Using illicit drugs causes xerostomia (dry mouth). Xerostomia is an important risk factor for dental caries. Additionally, xerostomia is a debilitating condition in itself causing discomfort and reduced quality of life [14,31,32].

The results of this study show some unexpected outcomes. Introducing the risk factors in stage 2 of the regression, drinking alcohol, and not having an insurance for oral health care were beneficial risk factor for improving OHRQoL. The literature has shown individuals with alcohol abuse have been found to be at high risk of oral

diseases, regardless of the use of alcohol was combined with drugs or not. But the association between alcohol and OHRQoL is questionable since the association is more related to social circumstances and not directly by alcohol consumption [33,34]. In contrast, current study included patients diagnosed with a psychotic disorder (first-episode) and their peers and did not include the level of alcohol drinking and social circumstances. Furthermore, having no insurance oral health was an unexpected beneficial risk factor for improving OHRQoL. This is in contrast with the findings of Lam et al. [9] who state that underserved individuals receiving care for SMI in a public mental health service had low OHQoL, driven by unmet dental care needs and xerostomia.

The unexpected outcomes of the multiple regression might be related to differences in the effects of risk factors on OHRQoL between patients diagnosed with a psychotic disorder (first-episode) and individuals from the general population. This study focussed on main effects. Future studies with an appropriate sample size should also take interactions between group and other risk factors into account.

Study limitations

This study aimed to compare the risk factors and OHRQoL in patients diagnosed with a psychotic disorder (first-episode) to individuals from the general population. In this study, 81 patients diagnosed with a psychotic disorder (first-episode) were successfully matched with 166 individuals from the general population without any history of psychotic disorder. Although this sample provides a realistic representation of people living in Friesland, a rural region in the north of the Netherlands, generalisability to a greater population or more urban settings remains to be investigated.

Self-assessments were used to gain insight into risk factors and OHRQoL, and it could be possible that socially desirable answers were given in the areas of illicit drug or alcohol use. The influence of self-report in patients diagnosed with a psychotic disorder (first-episode) or the general population is not known.

In this study, we dichotomized the risk factors. A limitation could be the level of the risk factors (e.g., how much alcohol). These were not taken into account in this study.

We could not use the OHIP-49 to calculate the prevalence and the odds ratios in this study as previous studies studied no cut-off points. These were available for the OHIP-14 in previous studies (Slade et al., 2004; Sanders et al., 2009; Lam et al., 2019). Therefore, the OHIP-14 was applied to this part of the analysis. It is unknown if this affected the results.

Recommendations

The findings in this study indicate the importance of using educational and behavioural interventions to improve oral health knowledge and motivation in patients diagnosed with a psychotic disorder (first-episode). Literature showed effective interventions regarding oral health in patients diagnosed with a psychotic disorder [27–30], however the stage a psychotic disorder was in [19] and the effect thereof on OHRQoL were not identified. There is a need for studies exploring what kind of treatment can improve OHRQoL in young adults in general, and patients diagnosed with a psychotic disorder (first-episode) especially. This means that further research should be continued, and such research should take the stage of the psychotic disorder and the effect thereof on OHRQoL into account.

The results of this study were discussed with an expert by experience, three mental health nurses, and professionals from KieN Early Intervention Service Leeuwarden, the Netherlands. The results of the discussion were that mental health nurses state that there is an unintended lack of awareness among mental health nurses regarding the importance of oral health and oral health care. This is based on a lack of knowledge among mental health nurses, as well as a lack of suitable interventions, to be aware of the risk factors and its influence on oral health. Guidelines for lifestyle and patients diagnosed with a psychiatric disorder are lacking. The only guideline, developed for people diagnosed with a severe mental illness state that there must be “some attention to oral health”. Because there are no interventions described for this population (or similar populations), many mental health nurses feel to be shy of action. Therefore, an oral health care training for mental health nurses is

indicated. These results concur with previous research in patients diagnosed with a severe mental illness [27,35] showing that not all mental health nurses routinely address oral health interventions in patients.

Mental health nurses, as one of the main health professionals supporting the health of patients diagnosed with a mental health disorder, can support oral health (e.g., assess oral health in somatic screening, motivate patients, provide oral health education to increase awareness of risk factors, integration of oral health care services). To be able to pay attention to the oral health of patients, it is important that nurses are aware about the importance of the topic. Mental health nurses can provide more information on their needs, what their barriers are and their attitude on oral health and related issues of physical health care in mental health services.

In order to develop new evidence-based nursing interventions in oral health care, it is important to involve mental health nurses, as well as experts by experience from the beginning. A design-oriented approach is an appropriate iterative way of working in co-creation and suitable for tackling problems in healthcare interventions [36,37]. The participatory and iterative method of design-oriented research gives professionals and experts by experience the opportunity to think along from the very start and to give them a decisive voice in appropriate solution directions that really add value.

The results of this study show that there is a need for a prevention and treatment programme for young adults diagnosed with a psychotic disorder. This programme should include an integrated approach between nurses (in mental health care, general health care, and community care) and dental professionals. An oral health programme with advice for treatment and prevention of oral health-related problems, focusing on all young adults (18-35 years), but specially modified to vulnerable young people.

Implications for mental health nursing

This study describes a sample of 81 patients diagnosed with a psychotic disorder (first-episode) compared with a matched sample of 166 individuals from the general population without a history with psychotic disorder. This study demonstrates the differences in risk factors and oral health related quality of life between patients diagnosed with a psychotic disorder (first-episode) and the general population. A negative impact on OHRQoL is more prevalent in patients diagnosed with a psychotic disorder (first-episode) (14.8%) compared to the general population (1.8%). The results of this study support the importance of preventive oral health interventions in patients diagnosed with a psychotic disorder (first-episode). Mental health nurses, as one of the main health professionals supporting the health of patients diagnosed with a mental health disorder, can support oral health (e.g., assess oral health in somatic screening, motivate patients, provide oral health education to increase awareness of risk factors, integration of oral health care services), all in order to improve OHRQoL. At this time, existing interventions in patients diagnosed with SMI or psychotic disorders should be modified and tailored to patients' individual needs.

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Part II

State of the art

CHAPTER 4

Oral Health Interventions in Patients with a Mental Health Disorder: A Scoping Review with Critical Appraisal of the Literature

Kuipers S, Boonstra N, Kronenberg L, Keuning-Plantinga A, Castelein S. Oral Health Interventions in Patients with a Mental Health Disorder: A Scoping Review with Critical Appraisal of the Literature. *International Journal of Environmental Research and Public Health*. 2021; 18(15):8113. https://doi.org/10.3390/ijerph18158113

Abstract

Introduction: Poor oral health affects quality of life and daily functioning in the general population and especially in patients with mental health disorders. Due to the high burden of oral health-related quality of life in patients with a mental health disorder, it is important for nurses to know how they can intervene in an early phase.

Aim: The aim of this systematic scoping review was to identify and appraise oral health interventions in patients with a mental health disorder.

Methods: A systematic scoping review with a critical appraisal of the literature was conducted using the Joanna Briggs Institute (JBI) methodology for scoping reviews and their checklists. MEDLINE, CINAHL, PsycINFO and reference lists were searched from their inception until December 2020.

Results: Eleven quantitative studies were included in the review: four randomized controlled trials, six quasi-experimental studies and one cohort study. Studies focused on interventions for patients (*n* = 8) or focused on patients together with their professionals (*n* = 3). Four types of oral health interventions in mental health were found: I) educational interventions; II) physical interventions; III) interventions combining behavioural and educational elements and IV) interventions combining educational and physical elements. All studies (*n* = 11) had an evaluation period ≤12 months. Nine studies showed an effect on the short term (≤12 months) with regard to oral health knowledge, oral health behaviour, or physical oral health outcomes (e.g., plaque index). Two studies showed no effects on any outcome. Overall, the methodological insufficient to good.

Conclusion: Four types of interventions with positive effects (≤12 months) on oral health knowledge, oral health behaviour, and physical oral health outcomes in different diagnostic patient groups were found. Due to the heterogeneity in both interventions, diagnostic groups and outcomes, one golden standard oral health intervention cannot be advised yet, although the methodological quality of studies seems sufficient. Developing an integrated oral health toolkit might be of great importance in mental health considering its potential effect on oral health-related quality of life.

Introduction

The World Health Organisation (WHO) emphasises that oral health is integral and essential to general health and wellbeing [1,2]. Oral health is improved in the general population, but vulnerable patients (e.g., patients diagnosed with mental health disorders) have not benefited from the worldwide improvement in oral health [3]. Poor oral health is associated with diabetes (both type 1 and 2) [4], respiratory disease and abdominal obesity It might also be related to cardiovascular diseases [4–7], but cigarette smoking might influence this relationship [8].

Nearly 20% of the population worldwide suffers from a mental health disorder [9,10], and this outlines the importance of oral health in patients diagnosed with a mental health disorder [11] who are exposed to more oral health risk factors [3,11–14].

Several risk factors of poor oral health in patients with a mental health disorder were described [15]. Many patients consume medication such as antipsychotics, antidepressants, and lithium. A dry mouth [16,17] is a side-effect of the medication which can increase plaque [18–21]. Next, oral health will be worsened by the consumption of sugary sweets and sugary drinks [22], which are more frequently used in patients with a mental health disorder. Inadequate oral health self-management, a lower tooth brushing frequency, a lack of motivation for proper oral hygiene and health care habits and poor psychosocial functioning are known as other barriers for adequate oral health in patients diagnosed with a mental health disorder [15–17,23]. Bad breath (halitosis) may lead to poor self-image, low self-esteem, decreased self-confidence, social phobia, loneliness, depression and suicidal intents in the general population [24,25].

Thus, poor oral health affects quality of life and daily functioning in the general population and especially in patients with a mental health disorder [1,2]. As a consequence, patients living with severe mental illness (SMI) (e.g., schizophrenia or related psychotic disorders, bipolar disorder,) are almost three times more likely to have lost all of their teeth compared to the general population [26].

It is evident that routine and effective oral care is necessary for maintaining oral health of in- and outpatients [27]. Mental health professionals (e.g., nurses) have an important role in the care for (out)patients with a mental health disorder. There-

fore, nurses should consider oral health care as an essential part of their care for patients with mental health disorders [28].

Until now, existing NICE-guidelines primarily focus on oral health in general practice [29] and on adults in care homes [30]. No NICE-guideline focusses on oral health interventions of patients diagnosed with a mental health disorder, their oral health needs and risk factors (e.g., the use of antipsychotic medication). A British guideline titled "Oral Health Care for People with Mental Health Problems" [16] describes the severity and prevalence of oral health problems in mental health. This guideline does not meet the needs with outdated literature. The evidence of interventions is mostly focussed on institutionalised elderly and not on patients with mental health disorders. It is important to outline interventions in groups of mental health disorder due to the differences in management (e.g., the management of oral health of a patient with depression might differ from that of a patient with severe cognitive problems).

Considering the poor oral health, increased risk factors, the high burden of poor oral health [11–13,26,31] and the lack of interventions in existing guidelines, it is important to explore which oral health interventions are available for our patient population in existing research. This scoping review will have a broader "scope" with correspondingly less restrictive inclusion criteria. Peters et al. [32] suggests to follow the PCC (Population, Concept and Context) elements. Therefore, the following question based upon the inclusion criteria may be posed: "Which oral health interventions aiming to improve oral health in patients with a mental health disorder are described in existing literature?"

We aim to provide a broad overview of oral health interventions for patients with a mental health disorder including an evaluation of the study quality.

Materials and Methods

This research aims to provide a broad overview of oral health interventions for patients with mental health disorders and to evaluate the study quality of included studies using Joanna Briggs Institute (JBI) methodology for scoping reviews [32,33] and their checklists [34,35]. A scoping review seeks to provide thorough coverage of

literature and is thereby a mechanism for findings for mental health professionals [33]. In contrast to a systematic review, a scoping review adopts more flexibility in study selection, e.g., more flexibility with inclusion and exclusion criteria, and the search terms may be redefined during the process and more criteria can be devised post hoc [32,33].

Although a critical appraisal was not mandatory [36], Brien et al. [37] discussed the lack of quality assessment, and thereby the creation of difficulties in interpretation and conclusion, and a lack of quality also limits the uptake of findings into policy and practice [36]. Therefore, to prevent conclusions based on potential bias, a critical appraisal is legitimised. This scoping review was conducted according to the Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) Statement [38–40].

Stage 1. To Identify the Research Question

The research question for this scoping review was: "Which oral health interventions aiming to improve oral health in patients with a mental health disorder are described in existing literature?"

In this review, 'oral health' and 'mental health disorder' are defined as follows. In regard to oral health, the definition of Glick et al. [41] will be used. 'Oral health is multi-faceted and includes the ability to speak, smile, smell, taste, touch, chew, swallow and convey a range of emotions through facial expressions with confidence and without pain, discomfort and disease of the craniofacial complex. Oral health is a fundamental component of health and physical and mental wellbeing. It exists along a continuum influenced by the values and attitudes of individuals and communities; reflects the physiological, social and psychological attributes that are essential to the quality of life; is influenced by the individual's changing experiences, perceptions, expectations, and ability to adapt to circumstances.' [41](p. 229).

Mental health disorder is defined as follows: 'A mental health disorder is a syndrome characterised by clinically significant disturbance in an individual's cognition, emotion regulation, or behaviour that reflects a dysfunction in the psychological, biological, or developmental processes underlying mental functioning. Mental health disorders are usually associated with significant distress in social, occupational, or other important activities. An expectable or culturally approved

response to a common stressor or loss, such as the death of a loved one, is not a mental disorder. Socially deviant behaviour (e.g., political, religious, or sexual) and conflicts that are primarily between the individual and society are not mental disorders unless the deviance or conflict results from a dysfunction in the individual, as described above' [42](p. 20).

Stage 2. Identifying Relevant Studies

The whole point of scoping the field was to be as comprehensive as possible [33]. Therefore, a search strategy was developed in collaboration with a Medical Information Officer (TI) from the University Medical Centre of Groningen (The Netherlands). The search strategy was conducted from the research question and the definitions (Appendix A). Electronic databases MEDLINE, CINAHL, PsycINFO and reference lists were searched from their inception until December 2020. RefWorks Version 2 was used in the study selection process.

For this study, we included peer-reviewed full-text studies published in the English language. Randomised controlled trials (RCT's), non-randomised intervention studies, observational studies (cohort, case–control and cross-sectional studies), and qualitative studies about oral health interventions in patients with a mental health disorder were included. Systematic reviews and meta-analyses are included, and cross-referencing was applied to search for other relevant articles. Grey literature and guidelines were excluded, because they are composed for knowledge artefacts and were not peer-reviewed [43]. Exclusion criteria were: (i) no focus on an oral health intervention; (ii) an exclusive focus on exploring the severity of oral health problems; (iii) absence of explicit reference to mental health disorders; (iv) primary focus on dementia or mental health retardation; and (v) interventions focusing on the frequency of appointments with the dentist.

The search identified 1313 potential papers after removing duplicates (Figure 1). Two researchers (S.K. and A.K.-P) screened the abstracts on eligibility based on title and abstract.

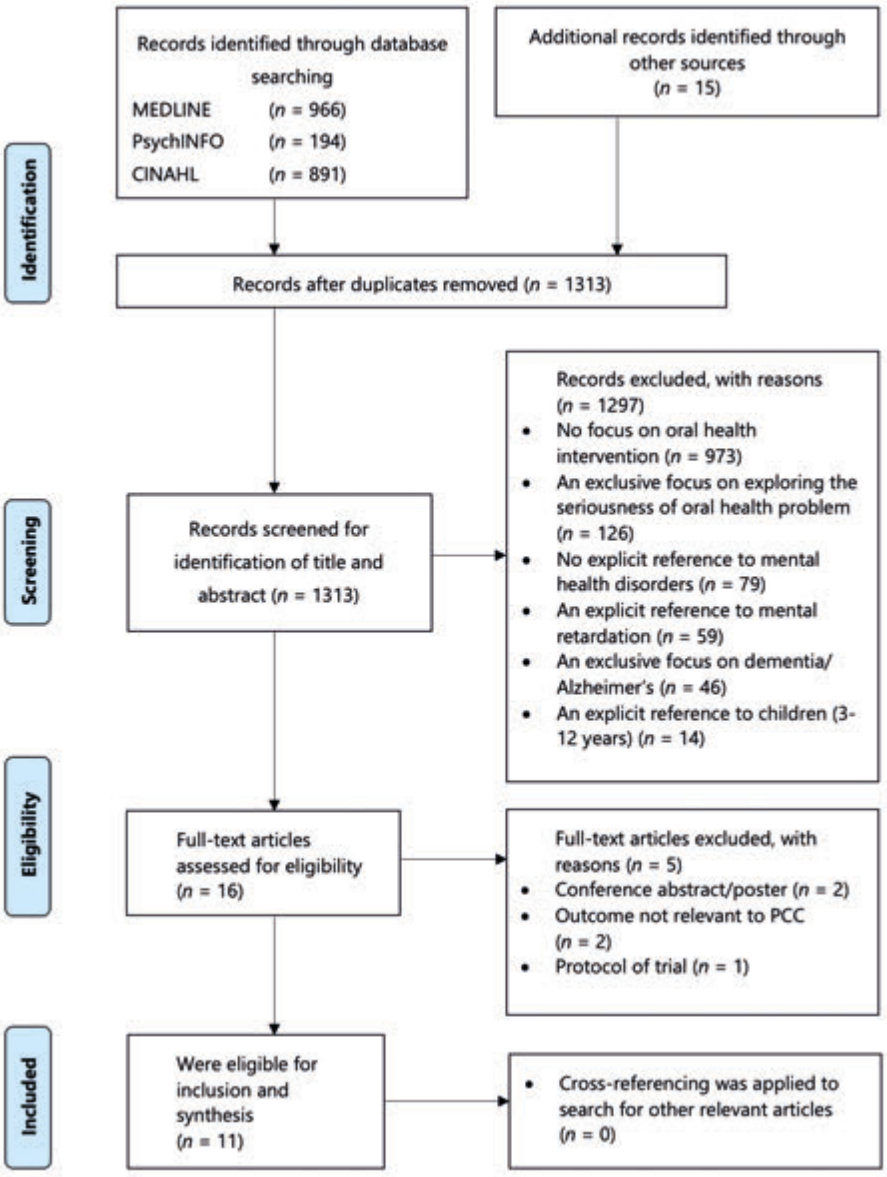

Figure 1. *PRISMA flow diagram for the scoping review process [38,39]*

Stage 3. Study Selection

The full texts of the remaining 16 articles were screened (S.K. and A.K.-P), and 5 articles were excluded as the studies were conference abstracts, with no relevant outcome and protocol of trial (Figure 1). To evaluate the methodological quality, all studies were critically appraised using the checklists developed by the Joanna Brigg's Institute (JBI). RCTs were assessed with the JBI-tool developed for RCTs consisting of 13 items [34]. Non-randomised intervention studies and pre-test–post-test studies were assessed with the JBI-tool for Quasi-Experimental Studies (9 items) [34]. Cohort studies were appraised with the 11-item JBI-tool developed for cohort studies [35]. Two researchers (S.K. and A.K.-P.) critically assessed the methodological quality independently. Disagreements were discussed. Cohen's Kappa statistics were calculated to test inter-rater reliability [44]. In case of any disagreement, the aim was to reach consensus with the help of a third researcher (N.B.) during a review meeting. Cross-referencing was applied to search for other relevant articles.

Stage 4. Charting the Data

Following the stages of Arksey and O'Malley [33], the next step was charting the data. In a systematic review, this process is called 'data extraction' and was done by two researchers (S.K. and A.K.-P). In this study, charting the data means recording information relating to the author(s); year of publication; study location; study populations; intervention type and control group (if available); duration of the intervention; aims of the study; methodology; measurement instrument; and important results.

Stage 5. Collating, Summarizing and Reporting the Results

The literature was thematically analysed and from this, groups of mental health disorders, for which the interventions were developed, were distinguished, e.g., SMI (not further specified), psychotic disorders, mood disorders, anxiety disorders, autism spectrum disorder, eating disorders, or substance abuse disorders [42]. The data was abstracted on article characteristics (author, total N, type of study, population, age, gender, type of oral health interventions, outcome, Measurement instrument, assessment time). Next, data on study design and results (intervention/control group, intervention, comparator, results, effect) was summarised.

Ethics and Dissemination

This study did not require ethical approval, as data was collected from existing published peer-reviewed literature and grey literature. The protocol for this review was registered in PROSPERO (ID: CRD42018114415).

Results

Literature Search

The search yielded a total of 2081 publications as shown in the PRISMA Flow Diagram (Figure 1) [38–40]. After removal of duplicates and review of titles and abstracts, 1313 publications were screened for title and abstract. Of these publications, 102 publications were discussed with a third reviewer (N.B.). Finally, 16 full-text publications were assessed for eligibility. Of these, 11 publications were eligible for inclusion and synthesis. Inter-rater reliability for the title and abstract showed a 99.32% agreement with a k = 0.80, demonstrating a high agreement between both raters.

Article Information

With regard to the study design, four RCTs [45–48], six quasi-experimental studies [28,49–53] and one cohort study [54] were included. Four studies were conducted in Europe, three studies in North America and four studies in Asia. No qualitative studies could be included. The literature was analysed thematically and distinguished groups of mental health disorders for which the interventions were developed: severe mental illness (SMI) or not further specified, psychotic disorders, personality disorders, mood disorders, anxiety disorders, autism spectrum disorder, eating disorders, or substance abuse disorders (Table 1). Data was abstracted on article characteristics (author, total *n*, type of study, population, age, gender, type of oral health interventions, outcome, measurement instrument, assessment time), as included in Table 2. Data on research design and results (intervention/control group, intervention, comparator, results and effect) are summarised in Table 3.

Table 1. *Overview of oral health interventions in mental health: type of intervention (I-IV), study participants (professionals or patient group) and study design.*

Author	I Educational intervention									II Physical intervention									III Interventions combining behavioral and educational elements									IV Interventions combining educational and physical elements								
	Prof	Patient group								Prof	Patient group								Prof	Patient group								Prof	Patient group							
		SMI	PSD	PD	MD	AD	ASD	ED	SAD		SMI	PSD	PD	MD	AD	ASD	ED	SAD		SMI	PSD	PD	MD	AD	ASD	ED	SAD		SMI	PSD	PD	MD	AD	ASD	ED	SAD
Randomised controlled trials																																				
Adams et al. [45]																			x		x															
Almomani et al. [46]																					x		x													
Almomani et al. [47]																					x		x													
Kuo et al. [48]																				x																
Quasi-experimental studies																																				
Barbadoro et al. [51]									x																											
Khokhar et al. [52]		x																																		
De Meij et al. [28]																												x		x	x	x	x	x		
Mori et al. [50]																x																				
Silverstein et al. [53]								x																												
Singal et al. [49]		x																																		
Cohort study																																				
Yoshii et al. [54]		x	x		x																															

Abbreviations: Prof: professionals. Patient disorder: SMI: Severe Mental Illness not further specified—PSD: Psychotic Disorder—PD: Personality Disorder—MD: Mood Disorder—AD: Anxiety Disorder—ASD: Autism Spectrum Disorder—ED: Eating Disorder—SAD: Substance Abuse Disorder.

Table 2. *A summary of the general characteristics, outcomes and measurements of the included studies*

First Author, Year Publication	Total N	Type of Study	Population	Age in Years	Gender % Man	Setting (Recruitment)/ Country	Type of Oral Health Interventions	Outcome	Measurement Instrument	Assessment Time
Adams et al. [45]	35 EIP teams and their service users (N = > 1682)	RCT	Suspected psychosis Outpatients	15–56	66%	EIP Teams, Manchester, United Kingdom	Interventions combining behavioural and educational elements	Behaviour towards oral health.	Oral health: OIDP checklist Behaviour: general questionnaire: registered with dentist, routine check-up.	Baseline, 12 months
								Knowledge: dental awareness training	Owning a toothbrush, cleaning teeth twice a day, urgent dental treatment.	
Almomani et al. [46]	N = 50	RCT	Schizophrenia Bipolar disorder, depression Outpatients	19–61	46%	Communitysupport programme, Kansas, USA	Interventions combining behavioural and educational elements	Behaviour: oral health instruct-tions and reminder system. Knowledge: dental education	Plaque: Quigley-Hein plaque index. Knowledge: Questionnaire oral hygiene.	Baseline, 4 weeks
Almomani et al. [47]	N = 60	RCT	Schizophrenia Bipolar disorder, depression Outpatients	22–58	50%	Community support programme, Kansas, USA	Interventions combining behavioural and educational elements	Behaviour in oral health: MI Knowledge on oral health.	Behaviour: TRSQ Plaque: Quigley-Hein plaque index. Knowledge: 15-item oral health knowledge questionnaire.	Baseline, 4 weeks, 8 weeks

Table 2. *A summary of the general characteristics, outcomes and measurements of the included studies (continued)*

First Author, Year Publication	Total N	Type of Study	Population	Age in Years	Gender % Man	Setting (Recruitment)/ Country	Type of Oral Health Interventions	Outcome	Measurement Instrument	Assessment Time
Kuo et al. [48]	N = 58	RCT	SMI Inpatients	20–80	100%	Two psychiatric wards of a general hospital, Taiwan	Interventions combining behavioural and educational elements	Plaque accumulation	Plaque: Plaque control record	12 weeks
								Oral health promotion programme: oral health knowledge, attitude and behaviour	Knowledge, behaviour, attitude: 35 item questionnaire	
Barbadoro et al. [51]	N = 76	QES	Alcohol-addiction Inpatients	Not clear	76.3%	Residential rehabilitation clinic, Italy	Educational intervention	Knowledge on oral health and risk factors.	Knowledge: 10-item test assessing knowledge and consciousness	12 months
Khokhar et al. [52]	N = 59	QES	SMI Inpatients	22–76	68%	Heather Close Recovery Unit, Mansfield, UK	Educational intervention	Knowledge on importance of dental care	General questionnaire: Access to toothbrushes, registered at dentist, dentures checked in last 5 years. Knowledge of basic oral hygiene.	12 months

Table 2. *A summary of the general characteristics, outcomes and measurements of the included studies (continued)*

First Author, Year Publication	Total N	Type of Study	Population	Age in Years	Gender % Man	Setting (Recruitment)/ Country	Type of Oral Health Interventions	Outcome	Measurement Instrument	Assessment Time
De Mey et al. [28]	N = 27 (Pr) N = 24 (P)	QES	Psychotic, Personality Mood, Anxiety, Autism disorders	22–69	Not known	Mental health organisation, the Netherlands	Interventions combining educational and physical elements	Knowledge nurses: oral care and tools, diseases, alcohol, smoking and drugs	Nurses knowledge: 20-items knowledge of oral hygiene.	Baseline, 5 weeks
			Outpatients					Oral health in patients.	Oral health: Patients: Dental plaque index. Gingival bleeding index	
Mori et al. [50]	N = 10	QES	Autism, mental health retardation, Hydrocephalus Outpatients	21–29	90%	Special care dentistry, Osaka University Dental Hospital, Japan	Physical intervention	Oral health: reduction of bleeding sites on probing	Caries activity test (pH-meter) Debris index, Probing depth, bleeding on probing	Baseline, 2 weeks, 6 weeks, 14 weeks
Silverstein et al. [53]	N = 67	QES	AN-BP and BN Inpatients	13–50		Hospital eating disorder clinic, North Carolina	Educational intervention	Knowledge on oral health and habits, hygiene practices.	Oral health knowledge, oral habits, oral health behaviours and habits since diagnosis, self-perception.	Baseline, and after following the programme.

Table 2. *A summary of the general characteristics, outcomes and measurements of the included studies (continued)*

First Author, Year Publication	Total N	Type of Study	Population	Age in Years	Gender % Man	Setting (Recruitment)/ Country	Type of Oral Health Interventions	Outcome	Measurement Instrument	Assessment Time
Singhal et al. [49]	N-87	QES	SMI Outpatients	18–83	Not known	Rural and urban outpatient mental wellness centre, New Jersey USA	Interventions Combining Behavioural and Educational Elements	Oral hygiene education and battery-operated toothbrush or manual toothbrush	Oral health: Quigley-Hein plaque index and gingival index	Baseline, 12 weeks
								Level of negative symptoms related to SMI	Self-evaluation of negative symptoms survey (SNS)	
Yoshii et al. [54]	N = 390	Cohort study	Mental illness, Psychotic and mood disorders Outpatients	20–80	Not known	Psychiatric day-care centres, Japan	Educational intervention	Knowledge: cause of tooth loss, dental caries, dental cleaning periodontal disease and routine dental check-ups.	Knowledge: 20-item selfcare questionnaire	Baseline, 1 week, 1 month, 3 months, 6 months.

Abbreviations: total N—PR: professionals—P: Patients. Type of study—RCT: Randomised Controlled Trial—QES: Quasi-Experimental Study. Population—SMI: Severe Mental Illness—AN-BP: patients with Anorexia-binge eating/purging—BN: Bulimia Nervosa. Measurement—OIDP: Oral impact on daily profile—TRSQ: Treatment Self-regulation Questionnaire—DMFT: Decayed, Missing, and Filled Teeth—EIP: Early Intervention Psychosis.

Table 3. *Summary of results of oral health interventions in mental health.*

First Author, Year Publication	Intervention Group (N)	Control Group (N)	Intervention	Comparator	Results	Effect +/-
Adams et al. [45]	18 EIP teams	17 EIP teams	Dental awareness training. Dental checklist. Oral hygiene information sheet with oral hygiene tips and information on how to find a dentist.	Standard care. One year after intervention: Dental awareness training, checklist and oral hygiene information sheet.	No significant differences were found in: registered with dentist (p = 0.44), routine check-up (p = 0.18), owning a toothbrush (p = 0.99), cleaning teeth twice a day (p = 0.68), urgent dental treatment (p = 0.11), OIDP checklist: no prospective data collected.	–
Almomani et al. [46]	N = 20	N = 22	Dental education. Oral hygiene instructions. Mechanical toothbrush. Reminder system.	Mechanical toothbrushes.	Q.H. plaque index: The improvement in the intervention group was significantly higher than the control group (p = 0.026). Of them, 95% reported that reminders and oral health promotion were helpful	+
Almomani et al. [47]	N = 30	N = 30	Brief MI sessions on motivation and confidence, personal values. Educational sessions: exploring advantages and disadvantages oral hygiene, effects of SMI on oral health. Two pamphlets summarizing the info from education and instruction in using a mechanical toothbrush. Weekly phone calls (for 4 weeks).	Educational sessions: exploring advantages and disadvantages oral hygiene, effects SMI on oral health. Two pamphlets summarising the info from education and instruction in using a mechanical toothbrush. Weekly phone calls (for 4 weeks).	Q.H. plaque index: scores from the inter-vention group were improved from base-line to 4 wks (p < 0.01) and from 4–8 wks (p < 0.01) and had significantly less plaque than control group after 8 weeks (p < 0.01). TRSQ: Oral health knowledge improved in both groups from baseline to 4 wks (p < 0.01). From 4–8 wks, the improvement in the inter-vention group was significantly higher (p < 0.01).	+ +

Table 3. *Summary of results of oral health interventions in mental health. (continued)*

First Author, Year Publication	Intervention Group (N)	Control Group (N)	Intervention	Comparator	Results	Effect +/-
Kuo et al. [48]	N = 27	N = 31	Oral health programme: group education in 5 sessions: structure of oral cavity and teeth; importance of oral health; pathogenesis of caries and periodontal diseases; Bass toothbrushing method; and oral hygiene. Pictures of toothbrushing methods were posted on the mirror in each bathroom. Individual instructions in Bass toothbrushing method and one-on-one training in Bass toothbrushing technique were given. Participants were checked for correctness. Individual behavioural modification: participants received tokens for successful brushing.	Nursing care as usual	After 12 weeks, the mean dental plaque index significantly improved, compared to that of the control group ($p < 0.001$). Oral health knowledge, oral health attitude and oral health behaviour were statistically significant improved after 12 weeks, compared to those in the control group ($p < 0.001$). No significant differences between intervention and control group on consumption of sugary beverage and dentist-visiting behaviour after the intervention.	+ + -
Barbadoro et al. [51]	N = 76	No control group	After oral examination with DMFT: participants received a report with clinical findings. Lecture about alcohol, tobacco smoke in oral health pathology, oral cancer prevention strategies (de, secondary and tertiary). Brochure on oral health.	No comparator.	10-item test assessing knowledge and consciousness: there was an improvement of 25% in exact answers between the pre-test/post-test ($p < 0.001$). Participants showed a significant improvement in toothbrushing after every meal ($p < 0.001$). Female, age >49 year, years of alcohol addiction had more risk of high DMFT (4.33/1.85/6.13).	+

Table 3. *Summary of results of oral health interventions in mental health. (continued)*

First Author, Year Publication	Intervention Group (N)	Control Group (N)	Intervention	Comparator	Results	Effect +/-
Khokhar et al. [52]	N = 59	No control group	Staff: education on importance of dental care and inclusion in care planning. Patients: provided with toothbrushes, toothpaste and mouthwash. Informa-tion and advice on basic dental hygiene by visual aids, posters and demonstration models. Registration status with dental practices. List of local dental practitioners was provided.	No comparator.	Access to toothbrushes increased from 68% to 86%. Knowledge of basic oral hygiene was improved from 55% to 61%. Brushing twice daily increased from 29% to 38%. There was a small increase from 34% to 39% of patients registered at dentist. There was no change in patients who had their dentures checked within the last 5 years.	+
De Mey et al. [28]	N = 27 (Pr) N = 24 (P)	No control group	Nurses: PowerPoint presentation about oral care, available tools, oral diseases (gingivitis, periodontal disease and caries), and oral health related to smoking, alcohol and drugs. Cleaning methods and tools were demonstrated by an O.H. Patients: an O.H. set up a treatment plan after oral examination. Toothbrush and fluoridated toothpaste. Concrete instructions on brushing and cleaning. Images were used of the toothbrush in different positions. Instruction card.	No comparator	Nurses: knowledge was significantly improved ($p < 0.001$). Patients: Dental plaque index was significantly improved on plaque index/6 ($p \leq 0.001$), and plaque index/2 ($p < 0.001$). Concerning gingival bleeding index there was a significant change ($p < 0.05$). No significant changes were observed in bleeding index/2.	+

Table 3. *Summary of results of oral health interventions in mental health. (continued)*

First Author, Year Publication	Intervention Group (N)	Control Group (N)	Intervention	Comparator	Results	Effect +/-
Mori et al. [50]	N = 10	No control group	Six sextant evaluation for PMTC. Six teeth were stained with Red Coat and DI. PMTC procedure was strictly according Axelsson's method.	No comparator.	Probing depth was significantly decreased at PMTC VI ($p < 0.05$). A reduction of the total number of bleeding sites on probing was significantly different ($p < 0.05$).	+
Silverstein et al. [53]	N = 67	No control group	Educational programme (Smiles Matter). Weekly presentations: general oral health education, aesthetics, effects of eating disorders, oral pain, nutrition for oral health.	No comparator.	Patients who reported regular visits to the dentist were significantly more likely to respond that teeth had a positive effect on how they looked to themselves ($p = 0.03$), looking to others ($p = 0.03$), kissing ($p = 0.04$), their general health ($p = 0.01$), romantic relationships ($p = 0.04$) and general happiness ($p < 0.001$).	+ +
Singhal et al. [49]	N = 41	N = 47	Group A: oral hygiene education and a battery-operated Arm and Hammer Truly Radiant Spin Brush. Group C: oral hygiene education as well as the Sun Star Gum ultrasoft manual toothbrush. C. Participants in group A and C received oral hygiene instructions and included video demonstrations. Observation were made while performing oral hygiene with their toothbrushes sitting in the dental chair. Dental plaque index and individual modifications were made.	Group B only received the same battery-operated toothbrush as group A. Group D received the same manual toothbrush as Group B. Next, participants received and were instructed to use Crest Cavity Protection toothpaste. A calendar and stickers were provided.	A statistically significant effect is found on the type of toothbrush participants used ($p < 0.05$). Interaction of home care instructions and type of toothbrush were not found. A significant effect is found on gingival index associated with the mechanical toothbrush ($p < 0.05$). No statistically significant changes were found in plaque index based on type of toothbrush. The mean change in plaque and gingival index were not significantly different based on the provision of oral home care instructions.	+ - + - -

Table 3. *Summary of results of oral health interventions in mental health. (continued)*

First Author, Year Publication	Intervention Group (N)	Control Group (N)	Intervention	Comparator	Results	Effect +/-
			Evaluation and instruction per visit. Participants received and were instructed to use Crest Cavity Protection toothpaste. A calendar and stickers were provided. Participants were asked to perform oral care twice daily (morning and before bedtime) at home for four weeks and affix a sticker to the calendar for that particular day.	Participants were asked to perform oral care twice daily (morning and before bedtime) at home for four weeks and affix a sticker to the calendar for that particular day.	There was no correlation between negative symptoms and the post-test mean plaque index and the post-test gingival index. Frequency of brushing and the mean change of plaque index and gingival index were not correlated. There was no significant impact of smoking on the mean change in plaque index and gingival index.	- - -
Yoshii et al. [54]	N = 390	No control group	Educational programme: (1) cause of tooth loss, (2) dental caries, (3) dental cleaning, (4) periodontal disease, (5) routine dental check-ups. This was in a 30 min-slideshow of 37 slides. Photos of patients' mouths were used.	No comparator.	The educational programme showed a significant improvement in the use of fluoride toothpaste at 6 months after the intervention (p = 0.001). The daily use of interdental brushes or floss was significantly improved 6 months after the intervention (p = 0.025). There was no change in frequency of visits to the dentist.	+ –

Abbreviations: intervention group—EIP: Early Intervention Psychosis—PR: professionals—P: Patients. Intervention—MI: Motivational Interviewing—SMI: Severe mental illness—DMFT: Decayed, Missing, and Filled Teeth—O.H.: Oral Hygienist—PMTC: Professional mechanical tooth-cleaning—DI: debris index. Results—OIDP: Oral impact on daily profile—Q.H. plaque index: Quigley–Hein plaque index. Effect: – = No significant effect, + = significant effect.

Table 4. *Critical appraisal of selected studies on oral health interventions in mental health.*

Randomised Controlled Trials [1]						
	Randomisation for assignment to treatment group	Allocation concealment	Similar treatment groups at baseline	Participants blind to treatment assignment	Delivering treatment blind to treatment assignment	Outcome assessors blind to treatment assignment
Adams et al. [45]						
Almomani et al. [46]						
Almomani et al. [47]						
Kuo et al., [48]						
Quasi-experimental studies [2]						
	Are the 'cause' and the 'effects' clear	Participants included in comparisons similar	Receiving similar treatment, other than intervention	Was there a control group?	Multiple measurements of the outcome pre- and post	Follow-up complete or differences described
Barbadoro et al. [51]						
Khokhar et al. [52]						
De Mey et al. [28]						
Mori et al. [50]						
Silverstein et al. [53]						
Singhal et al. [49]						
Cohort study [3]						
	Groups similar and recruited from the same population	Exposures measured similarly to assign people	Exposures measured valid and reliable	Confounding factors identified	Strategies to deal with confounders stated	Groups free of the outcome at the start of the study
Yoshii et al. [54]						

1 As measured with the JBI critical appraisal tool for randomised controlled trials [34]; 2 as measured with the JBI critical appraisal tool for quasi-experimental studies [34]; 3 as measured with the JBI critical appraisal tool for cohort studies [35].
Note: ■ = yes, ■ = no, ■ = unclear, ■ = not applicable.

Treatment groups treated identically	Follow-up complete or differences adequately analysed	Analysed in groups to which they were randomised	Outcomes measured in same way	Outcome measure-ments reliable	Appro-priate statistical analyses used	Appro-priate design

Outcomes measured in same way	Outcome measure-ments reliable	Appropriate statistical analyses used

Outcomes measured in a valid and reliable way	Was follow-up time reported and sufficient	Follow-up complete, reasons to loss explored	Strategies to address incomplete, follow-up utilised	Appropriate statistical analyses used

Methodological Quality

All studies (*n* = 11) were included in the methodological quality appraisal. Table 4 identifies the quality appraisal according to the JBI criteria [34,35]. Besides double blindness, three RCTs met all the other JBI criteria [46–48]. Additionally, one RCT could also not complete its follow-up assessment [45]. Five quasi-experimental studies met all criteria, except for the control group in the study design [28,50–53]. One quasi-experimental study met all criteria [49]. The only longitudinal study [54] met four out of eleven criteria. There were no strategies described for dealing with confounding factors and no statistical methods (e.g., regression) were employed to deal with confounding factors [35]. In their study, there were no confounding strategies, reliability and validity of used measurements were not clearly described.

Syntheses: Narrative Summary of Themes

All studies (*n* = 11) focused on patients of which three studies focused on both patients and professionals (Table 1). These studies were focussed on outpatients (*n* = 7) or inpatients (*n* = 4). The literature was analysed thematically, according to the different intervention types, to answer the question regarding what kind of oral health interventions were addressed to improve oral health in adults with a mental health disorder. Four types of oral health interventions emerged from our analysis: (I) educational interventions; (II) physical interventions; (III) interventions combining behavioural and educational elements and IV) interventions combining educational and physical elements.

Educational Interventions

Three quasi-experimental studies [51–53] and one cohort study [54] reported on educational interventions in patients with SMI or a mental disorder.

In the study of Barbadoro et al. [51] firstly, inpatients with substance abuse disorders received a questionnaire on socio-economic data and epidemiological data to assess oral hygiene behaviour and other oral health risk factors. After fulfilling the questionnaire, respondents received a complete oral examination according to the WHO criteria (WHO, 1987). A comprehensive oral mucosal examination was performed for evaluating the presence of precancerous lesions. Respondents received a brochure on oral health. A report of the clinical findings was presented

to all respondents to promote knowledge about their own oral health status. Results show a significant improvement in exact answers between pre-test/post-test questionnaires ($p < 0.001$), and especially in questions concerning the goals of oral hygiene [51]. One year after the intervention, respondents showed improvement in knowledge and attitude towards oral cancer prevention and toothbrushing had become a daily routine after every meal (in 67.1%). Moreover, 65.9% of respondents had received a dental examination in the previous year. Female gender and more than 10 years of smoking addiction were associated with an improvement of toothbrushing. Respondents with more than 10 years of alcohol addiction were less likely to change [51].

The study of Khokhar et al. [52] focused on outpatients with SMI (not further specified) and professionals. The intervention included the provision of toothbrushes, toothpaste, and mouthwash to respondents without a toothbrush in order to encourage better oral health. Staff was educated on the importance of dental care planning and the inclusion in individual care planning. Access to local dental services was improved. Additionally, respondents received an educational session on dental health. Results of this intervention shows the improvement in access to toothbrushes and the increase of knowledge. The practice of brushing teeth twice a day increased from 29% to 38%. There was no change in number of respondents who had their dentures checked [52].

The study of Silverstein et al. [53] focused on the impact of oral health education in inpatients with eating disorders (anorexia nervosa and bulimia nervosa) to change self-image and oral health practices. Respondents received a pre-test/post-test questionnaire to assess demographics, oral health knowledge, and self-image. The educational programme consisted of three sessions, each with one topic: (i) general oral health education; (ii) aesthetics, effects of eating disorders, pain; and (iii) nutrition for oral health. Every session took 30 min. During the last 10 min of the session, respondents were able to ask questions about their oral health or the sessions' topic. The results show that patients who reported going to the dentist regularly were significantly more likely to respond that their teeth had a positive effect on their self-image, how they look to others, their general health, and general happiness, compared to respondents who reported going occasionally, or only when they have a problem. Knowledge about general oral health and the impact of an eating disorder on oral health was improved after the oral health sessions.

The longitudinal study of Yoshii et al. [54] focused on outpatients with SMI (psychotic and mood disorders). A pre-/post-programme questionnaire was conducted with demographic characteristics and self-care related to oral hygiene. Additionally, the post-programme questionnaire included items about understanding the educational booklet. The educational programme consisted of five units: cause of tooth loss, dental caries, dental cleaning, periodontal disease and routine dental check-ups. A slide show of 37 slides was presented by a researcher and the handouts were provided. Yoshii et al. [54] used photographic images as much as possible in their educational materials instead of written explanations to make the booklet as impactful as possible. Results showed that the educational programme showed an improvement in the use of fluoride toothpaste, and the daily use of interdental brushes or floss was increased. There were no changes in the frequency of visits to the dentist in the period over 6 months after the intervention. More than 55% of the respondents still went to the dentist when there is a worrying problem or when there are multiple symptoms [54].

Physical Interventions

Mori et al. [50] reported on professional mechanical tooth cleaning (PMTC) in outpatients with an autism spectrum disorder, using an oral examination (consisting of photograph, snap impression, dental radiograph, rough scaling) and the caries activity test, debris index, probing depth, and bleeding on probing to measure the effectivity of interventions. Patients were treated in a dental hospital. The effects of self-care did not significantly change throughout the period of PMTC. The mean probing depth was less than 14 weeks after completion of PMTC, although not statistically significant. The mean number of bleeding sites and debris accumulation was significantly decreased [50].

Interventions Combining Behavioural and Educational Elements

Four RCTs combined behavioural and educational elements in an intervention for patients with a psychotic disorder (n = 3) [45–47] in patients with a mood disorder (n = 2) [46,47], and in patients with SMI (n = 1) [48]. In one of these RCTs, educa-

tional interventions focused on staff [45]. One quasi-experimental study reported behavioural and educational elements in an intervention in patients with SMI [49].

In the study of Adams et al. [45], Early Intervention Psychosis (EIP) teams received dental awareness training (and an information sheet) during a multidisciplinary team meeting (approximately 30 min). This training for teams included information about the trial and checklists for patients. Patients received a dental checklist in order to improve oral health behaviour. However, due to missing data in follow-up (e.g., high turnover of staff members), evidence could not be studied [45].

In the study of Almomani et al. [46], outpatients with psychotic or mood disorder received dental education, oral hygiene instructions, and reminders (a reminder system and a once-a-week phone call) from a dental hygienist to provide positive feedback and to underline the study instructions. The effects of these interventions were measured with the plaque index score (pre- and post-intervention). Results show that oral health in the intervention group improved significantly regarding plaque accumulation and knowledge level relative to the members of the control group ($F = 5.32$, $p = .026$, $\eta^2 = 0.1$), who only received a mechanical toothbrush [46].

In the study of Almomani et al. [47], outpatients with SMI (schizophrenia, bipolar disorder and depression) received brief motivational interviewing (MI) sessions (15–20 min, frequency is unknown) prior to an educational session (with focus on information about the effects of SMI on oral health, exploring advantages of good oral hygiene and disadvantages of bad oral hygiene, motivation, confidence, and personal values related to oral health). Patients (intervention and control group) received pamphlets with information from the educational session and an instruction on how to use a mechanical toothbrush, a reminder system, and once-a-week telephone calls [47]. In the MI group, oral health knowledge in the intervention group improved significantly 4–8 weeks after baseline. The MI group showed significantly less plaque 8 weeks after baseline compared to the education group. Additionally, on the plaque index, there was a large interaction effect ($\eta^2 = 0.8$). One of the limitations in this study is the lack of follow-up over a two-month time frame. Additionally, it is not known if these effects would be maintained over an extended period.

One study reported an RCT with an oral health promotion programme with group and individual components in outpatients with SMI [48]. In this 12-week experimental study, the intervention group received group oral health education in five sessions with an interval of 2 weeks. The intervention group received pictures of the Bass toothbrushing technique procedure that were posted on the mirror in the bathroom of participants. Songs with a message of the benefits of toothbrushing were broadcasted five times each day (upon waking up, after each meal, and before going to sleep) [48]. The individual interventions included instructions from a trained nurse. Tokens were used after the nurses had checked the accomplishment of successful toothbrushing. The control group received usual nursing care. After 12 weeks, the mean dental plaque index significantly improved in the intervention group ($p < 0.001$). Oral health knowledge, oral health attitude, and oral health behaviour were statistically improved in the intervention group after 12 weeks ($p < 0.001$). Consumption of sugary beverage and dentist-visiting behaviour did not show a significant change [48].

One quasi-experimental study reported an intervention combining behavioural and educational elements in patients with SMI [49]. In this study, with random assignment at the level of treatment centre, participants were assigned to four study groups. Group A received oral hygiene education and a battery-operated toothbrush. Group B received only the same battery-operated toothbrush as Group A. Group C received the oral hygiene education as well as a manual toothbrush. Group D received only the same manual toothbrush as Group C. Participants in Groups A and C received oral hygiene instructions [54]. Participants were observed while performing oral hygiene with their toothbrushes in the dental chair of their dentist. Dental plaque index and individual modifications were made for participants in Groups A and C when needed. All participants were provided with an evaluation and instruction per visit. They received and were instructed to use Crest Cavity Protection toothpaste for the duration of the study. Participants received a calendar with the four study weeks and stickers were provided to each participant. Participants were asked to perform oral care twice daily (morning and before bedtime) and affix a sticker to the calendar for that particular day. Smoking status (current smoker and never smoked) was assessed [49]. A statistically significant effect is found on the type of toothbrush participants used ($p < 0.05$). Interaction of home care instructions and type of toothbrush were not found. This study showed a significant effect on gingival index associated with the mechanical toothbrush

($p < 0.05$). No statistically significant changes were found in plaque index based on type of toothbrush. The provision of oral home care instructions showed no significant difference in the mean change in plaque and gingival index. There was no correlation between the negative symptoms and the post-test mean plaque index and the post-test gingival index. Frequency of brushing and the mean change of plaque index and gingival index were not correlated. There was no significant impact of smoking on the mean change in plaque index and gingival index.

Interventions Combining Educational and Physical Elements

One quasi-experimental study reported about an intervention combining educational and physical elements in professionals (nurses) and SMI patients (psychotic, personality, mood, anxiety, and autism spectrum disorders) [28].

Nurses received education to improve knowledge and awareness [28]. Nurses were educated in oral health and instructed to help patients, using an instruction card with oral hygiene tips and oral hygienists demonstrated cleaning methods and tools (e.g., interdental cleaning aids). Outcome measurements in professionals were oral health knowledge of nurses (a 20-item-list on proper oral care, oral diseases, and oral health-related factors, with an internal consistency of α 0.62, which was moderate). Patients with SMI received a patient treatment plan from the oral hygienist after a baseline oral examination. They received a soft toothbrush, fluoridated toothpaste, specific cleaning instructions from the oral hygienist (e.g., brush at least 2 min, brush systematically), and practiced the instructions under the supervision of the oral hygienist [28]. Outpatients were asked questions about medical and general health, dental and oral health, and condition. After the questionnaire, the oral hygienist carried out pre-test and post-test measurements of the dental plaque and gingival bleeding indices. The results showed a significant effect on plaque index/6 ($r = 0.82$) and index/2 ($r = 0.77$) and bleeding index/6 ($r = 0.50$).

The educational intervention had elicited a statistically significant change in mental health nurses' knowledge ($p < 0.001$). One of the limitations reported in this study was the low active commitment of nurses. Some nurses actively applied motivational interventions and others were scarcely involved in actively promoting

oral health among patients. Nurse's activity was not systematically monitored and registered.

Discussion

This scoping review was conducted to provide a broad overview of oral health interventions in mental health and to evaluate the study quality. The review demonstrates that little has been developed in order to improve oral care for people diagnosed with mental health disorders, despite the fact that this is an important topic that influences all aspects of quality of life. Eleven studies were included that reported interventions focusing on behavioural, educational or physical interventions, or combinations of these aspects for patients and/or professionals. All studies (n = 11) had an evaluation period ≤12 months. Nine studies showed an effect on the short term (≤12 months) with regard to oral health knowledge, oral health behaviour, or physical oral health outcomes (e.g., plaque index). Two studies showed no effects on any outcome. In general, the methodological quality was moderate to sufficient. Overall, this review demonstrates that educational, behavioural, and physical interventions or combinations of these elements have a positive effect on oral health knowledge (N = 5 out of 11 studies), the frequency of brushing (access to toothbrush, toothpaste) (N = 3), plaque index (N = 4) and gingival bleeding on probing depth (N= 4). No significant differences were measured on dental visits and the consumption of sugary drinks.

The positive effects were found in patients diagnosed with SMI, psychotic disorders, personality disorders, mood disorders, anxiety disorders, autism spectrum disorders, eating disorders, or substance abuse disorders—with different outcomes. Of all studies, seven studies were focussed on outpatients, four studies were focussed on inpatients. Looking for interventions, it is important to look carefully whether interventions are developed for inpatients or outpatients, because the findings may not be generalizable to all patients with a mental health disorder.

The results of this study makes it difficult to draw any firm conclusions on which intervention works for whom and which elements should be part of effective interventions. Based on the results of this study, due to the heterogeneity in both interventions, diagnostic groups and outcomes, one golden standard oral health

intervention cannot be advised yet, although the methodological quality of studies seems sufficient.

Research in patients with a severe mental illness (SMI) demonstrated that 58% of the patients had low oral health-related quality of life (OHRQoL) [55]. This supports the importance of oral health interventions in patients diagnosed with a mental health disorder.

Reflection on Types of Interventions

Firstly, it is remarkable that none of the studies in our scoping review focused on preventive care. Secondly, knowledge on oral health in patients and nurses is quite well-studied, however research into behavioural change in patients as outcome, as well as in mental health professionals, is also desirable. Knowledge and awareness are a first step; however, behaviour change in on oral health is a complex process that requires another approach.

Reminder strategies combined with oral health education showed to have a significant effect on behaviour of patients with a mental health disorder (schizophrenia, depression, bipolar disorder) [46]. Reminder systems, such as post-it, are easy to implement. Alqahtani et al. [56] show that reminder strategies enable a system to remind the user to perform the target behaviour. Reminders are often implemented to remind users to perform activity in mental health disorders [56]. There are no studies examining the effects of reminder strategies focusing on oral health in mental health apps. Therefore, further research on reminder strategies improving oral health is needed.

Overall, educational interventions significantly improve knowledge of mental health professionals on general health and the importance of oral healthcare. The combination of educational interventions and behavioural interventions are only studied in patients with psychotic and bipolar disorder. These studies demonstrate that the combination of these elements is effective on oral hygiene (as measured with the plaque index) and oral health knowledge (Almomani et al., 2006; 2009). Oral health interventions using physical elements were only studied in patients with autism spectrum disorders [50]. These patients benefitted by a decrease of bleeding sites; however, 14 weeks after this intervention, there was no longer a post-treatment effect. This is in line with the study of Kay and Locker [57], who dis-

cussed the short-term effects of oral health interventions, although this systematic review only shows the evidence on dental health education until 1996. Additionally, it shows evidence in the general population and does not have a focus on dental health education in patients with a mental health disorder. Is does, however, display the importance of continuity in treatment, as well as long-term monitoring. Future research might take this into account.

Included studies were focused on different interventions based on literature. Additionally, mental health nurses and patients with a mental health disorder should play an important role in the development of interventions so that an appropriate approach can be developed in co-creation with the end-users.

Quality of Included Studies

Interventions combining behavioural and educational elements appear to be effective in patients with SMI (diagnosis not further specified), psychotic disorder, and mood disorder. Of these studies, the methodological quality was good (n = 3) [46–48]. In one RCT, the methodological quality was moderate due to insufficient follow-up data [45]. In three RCTs, there was no blinding of participants and outcome assessors. Blinding is a measure in RCTs to reduce detection and performance bias and is an important measure in RCTs. There is evidence that lack of blinding leads to overestimated treatment effects. If participants are not blinded, knowledge of group assignment may affect participants behaviour in an RCT [58]. This means that the treatment effects in the included RCTs [45–47] can be overestimated. Blinding outcome assessors can be used in order to minimise distortion in the results of the study [34]. Detection bias can arise if the knowledge of patient assignment influences the assessment of outcome measurements. This detection bias can be avoided by the blinding of those assessing outcomes in an RCT [58,59]. For included RCTs, it is not known if knowledge of a patient's assignment had influenced outcome measurements.

Quasi-experimental studies show the effectiveness in interventions combining educational and physical elements in patients with a psychotic disorder, personality disorder, anxiety disorder, mood disorder and autism spectrum disorder [28]. Educational interventions appear to be effective in patients with SMI (diagnosis not further specified), eating disorder and substance abuse disorder [49,51–53]. Physical interventions appear to be effective only in patients with autism spec-

trum disorder [50]. The methodological quality of the quasi-experimental studies was sufficient. However, the pre-test–post-test design of the studies did not aim to compare an intervention group with a control group. The addition of control groups and sensitivity analyses can support the hypothesis that the intervention is causally associated with the outcome [60]. One 2 × 2 quasi-experimental study met all the requirements of the JBI checklist; however, this study of Singhal et al. [49] lacked the determination of the effect of the calendar. It is not known if there was a Hawthorne effect and if the calendar was a confounder for other independent variables [49]. Furthermore, SMI has to be specified because every patient group has its own needs in managing oral health problems. Additionally, physical interventions should also be examined in other mental health patient groups beside ASD (Autism Spectrum Disorder).

The quality of the cohort study (educational intervention [54]) was insufficient as confounders were not clearly identified and no strategies dealing with confounding factors were described [35]. In the literature, confounding has been described as a confusion of effects [58]. To draw appropriate conclusions about the effect of the educational intervention on an outcome, the causal effects should be separated from that of the other factors that affect the outcome (e.g., age) [61]. Strategies (e.g., matching, randomization, stratification) were not used in this cohort study [62]. Due to the lack of controlling for confounding factors in included cohort study [54], it is not clear whether the conclusions were drawn appropriately or that there were other factors that affect the outcome measurements.

Reflection on the Effect of Interventions

Overall, dental health education or lectures, dental care instructions, brief motivational interviewing, and a reminder system or a treatment plan showed a significant and positive effect on oral health knowledge, Q.H. plaque index, or TRSQ. The use of one of these interventions, combined with a mechanical toothbrush, can improve the oral hygiene of people with mental health disorders. Providing patients with a toothbrush, toothpaste, and mouthwash was helpful to increase access to toothbrushes and brushing twice a day and had a significant effect on plaque index. PMTC showed a significant decrease in probing depth and total number of bleeding sites; however, no significant change on caries activity test and debris accumulation. There was no significant impact of smoking on the mean change in plaque index and gingival index. These effects were tested in patients diagnosed

with SMI (psychotic disorders, personality disorders, mood disorders, anxiety disorders, autism spectrum disorders, eating disorders, and substance abuse disorders). There are constantly new insights regarding oral health. A recent study for example showed the effectiveness of a mechanical and ultrasonic toothbrush on oral biofilm removal [63]. This highlights the proactive approach for clinical and home management through the use of mechanical or ultrasonic toothbrushes in outpatients and inpatients with a mental health disorder. Furthermore, a recent study on students of Lee et al. [64] showed that ingestion of the oral probiotic Weissella cibaria can help reduce subjective halitosis and improve oral-health-related quality of life. However, this was not tested as intervention in patients with a mental health disorder. Therefore, further research on the use of oral probiotic Weissella cibaria could be interesting.

A significant effect associated with the mechanical toothbrush is found on gingival index [50]. The problem that arises in these studies, is the unknown effects of dental health education and behavioural interventions over a longer period of time. Interventions were measured during a period between four weeks and ≤12 months. Kay and Locker [57] concluded in a systematic review about dental health education among the general population that effects are probably short-lived. However, this study is not very recent and focussed on the general population, and not specifically on people with a mental health disorder. Long-term effects of oral health interventions in patients with a mental health disorder are not known. Thus, future studies should consider measuring the impact of oral health interventions on oral health status as well as knowledge and behaviour changes over a longer period of time, in line with and depending on the needs of patients.

Competences of Mental Health Professionals in Studied Interventions

Professionals who were involved in care for patients in the included studied were nurses. According to De Mey et al. [28] the non-participation of mental health nurses is a concern. At the end of their study, 50% of the mental health nurses took part in the project and the active commitment was even lower. To care for and motivate patients regarding their oral health is imperative, and part of mental health nurses' tasks in their daily contact with patients with SMI. Recent research shows that patients after a first episode psychosis or SMI are not always able to take care of their oral health, and this should be included in the daily work of nurses [13]. Mental health nurses do not apply motivational and supportive interventions

concerning patients' oral health and mental health nurses were scarcely involved in actively promoting better oral health [28]. In their daily care for patients, it is essential that nurses take oral health care in patients into account. Studies show the importance of training nurses in promoting better oral health, although this study also confirms our concern about the participation of mental health nurses in oral health. These concerns about the involvement of mental health professionals are in line with literature that states that mental health professionals do not routinely practice oral care [65]. The question arises if mental health nurses have sufficient knowledge about oral health care. The attitude of nurses towards personal health shows that nurses prioritise symptoms of mental health illnesses instead of risk factors and consequences. Adams et al. [45] advises further research to understand the barriers for mental health nurses to manage oral health needs of patients.

Adams et al. [45] found a lack of research culture and a high turnover rate within teams and that the initial enthusiasm for the RTC could not be sustained. One of the reasons for failure is the lack of ownership in study and design within service-users and clinicians who designed the study, due to the top-down changes in the team. Therefore, it is important to facilitate one or two nurses (or nurse practitioners) with the task of care-coordinator with special attention for oral health. To date, studies have not taken this into account.

Further studies regarding mental health nurses should consider mental health nurses' attitude and barriers towards oral health care.

Study Strengths and Methodological Considerations

This scoping review has some methodological considerations worth noting and provides information for future nursing research regarding oral health care and interventions in patients with a mental health disorder. This study is strengthened by the assessment of the study quality of included studies, which was not necessary because this was a scoping review [66]. The belief was that it was important to prevent the drawing of conclusions based on potential bias, and that a critical appraisal was legitimised. Moreover, this study is strengthened by reducing potential bias through calculating the inter-rater reliability and the involvement of two reviewers in the selection process.

This study has some methodological considerations. Firstly, studies that varied in population (patients diagnosed with different disorders), intervention (different interventions were tested), and quality (some results show missing data in follow-up for several reasons) were included. Therefore, the results may have decreased generalisability. It is not clear whether the study effects in autism or SMI will also be generalisable to all patients with a mental health disorder, since most of them were developed for specific target groups. Secondly, in this study, all results regarding oral health interventions for a mental health disorder are summarised; however, it is unknown whether elements are generic or specific. Thirdly, as is the case in every review, it was possible that negative results regarding oral health interventions in patients with mental health disorders are missed due to publication bias (e.g., exclusion of abstracts for conferences or study protocols). Additionally, due to the exclusion of grey literature, it was possible that we missed interventions that are described, but not published yet. This may have affected the results and overall conclusions of this study. However, to make our scoping review and the critical appraisal more feasible for clinical practice, we decided to include peer-reviewed articles from electronic databases. Further adding to this issue is that many grey literature contain information that is not publicly readable or available. Fourthly, due to the limitation of publications in English, it is possible that we missed peer-reviewed studies on oral health interventions in other languages. However, it is unknown if this affected the results and overall conclusions of this study.

Despite these limitations, the review does provide important understandings of oral health interventions in patients diagnosed with a mental health disorder.

Conclusions

Prior literature has examined educational, behavioural, and physical interventions in order to improve oral health among patients diagnosed with a mental health disorder. An important conclusion of this review is that despite the importance of paying attention to good oral hygiene, very little oral health interventions are developed for patients with a mental health disorder. There is no golden standard that can be recommended at this moment. To date, mental health professionals, and especially nurses, are the group that support patients in their daily activities (e.g., activities of daily living and lifestyle), so they are the primary target group that

can influence oral health in patients with mental health disorders. When caring for patients diagnosed with a mental health disorder, it is essential that mental health professionals consider oral health care as an essential part of their daily tasks and provide necessary nursing support. Mental health nurses should be more aware of oral health and oral health risk and should provide long-term interventions in order to improve oral health. Further research into the current competences of nurses to support and motivate patients with a mental health disorder and to be able to apply oral health interventions is conditional.

To develop and implement more solutions that are suitable in view of future research, it seems important to develop an integrated toolkit with interventions, in which all these components are given a place, as well as interventions for preventive care. Oral health programmes should be provided tailored to the needs of the patient.

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Appendix A. Search Strategy

CINAHL:

((((MH “Mental Disorders + ”) OR (MH “Adjustment Disorders + ”) OR (MH “Intellectual Disability + ”) OR (MH “Mental Disorders Diagnosed in Childhood + ”) OR (MH “Neurotic Disorders + ”) OR (MH “Organic Mental Disorders + ”) OR (MH “Personality Disorders + ”) OR (MH “Pregnancy Complications, Psychiatric”) OR (MH “Psychophysiologic Disorders + ”) OR (MH “Psychotic Disorders + ”) OR (MH “Sexual and Gender Disorders + ”) OR (MH “Substance Use Disorders + ”))) OR TI (mental disorder* OR mental health OR mental illness OR depression OR anxiety disorder* OR schizophrenia OR bipolar disorder* OR dementia OR PTSD OR posttraumatic stress OR psychosis OR psychoses) OR AB (mental disorder* OR mental health OR mental illness OR depression OR anxiety disorder* OR schizophrenia OR bipolar disorder* OR dementia OR PTSD OR posttraumatic stress OR psychosis OR psychoses)) AND ((((MH “Mouth Diseases + ”) OR (MH “Periodontal Diseases + ”) OR (MH “Salivary Gland Diseases”)) OR (TI (Dental disease* OR Oral health OR Oral hygiene OR Dental health OR Dental hygiene OR Oral functioning OR Gingival health OR Oral disease*)) OR (AB (Dental disease* OR Oral health OR Oral hygiene OR Dental health OR Dental hygiene OR Oral functioning OR Gingival health OR Oral disease*)))) AND (MH “Nursing Interventions” OR MH “Health Promotion” OR (TI (Intervention* OR Program* OR Training OR Trial*)) OR (AB (Intervention* OR Program* OR Training)))

Pubmed:

((((“Mental Disorders”[Mesh] OR Mental disorder*[tiab] OR Mental health[tiab] OR Mental illness[tiab] OR Depression[tiab] OR anxiety disorders[tiab] OR schizophrenia[tiab] OR bipolar disorder[tiab] OR dementia[tiab] OR ptsd[tiab] OR post-traumatic stress [tiab] OR psychosis[tiab] OR psychoses[tiab]))) AND ((“Oral Health”[Mesh] OR “Oral Hygiene”[Mesh] OR “Mouth diseases”[Mesh] OR Dental disease*[tiab] OR Oral health[tiab] OR Oral hygiene[tiab] OR Dental health[tiab] OR Dental hygiene[tiab] OR Oral functioning[tiab] OR Gingival health[tiab] OR Oral disease*[tiab]))) AND ((“Program Evaluation”[Mesh] OR “Health Promotion”[Mesh] OR Intervention*[tiab] OR Program*[tiab] OR Training[tiab]))

PsycINFO:

((DE “Mental Disorders” OR DE “Adjustment Disorders” OR DE “Affective Disorders” OR DE “Alexithymia” OR DE “Anxiety Disorders” OR DE “Autism Spectrum Disorders” OR DE “Chronic Mental Illness” OR DE “Dementia” OR DE “Dissociative Disorders” OR DE “Eating Disorders” OR DE “Elective Mutism” OR DE “Factitious Disorders” OR DE “Gender Identity Disorder” OR DE “Hoarding Disorder” OR DE “Hysteria” OR DE “Impulse Control Disorders” OR DE “Koro” OR DE “Mental Disorders due to General Medical Conditions” OR DE “Neurosis” OR DE “Paraphilias” OR DE “Personality Disorders” OR DE “Pseudodementia” OR DE “Psychosis” OR DE “Schizoaffective Disorder” OR DE “Affective Disorders” OR DE “Bipolar Disorder” OR DE “Disruptive Mood Dysregulation Disorder” OR DE “Major Depression” OR DE “Mania” OR DE “Seasonal Affective Disorder” OR DE “Anxiety Disorders” OR DE “Acute Stress Disorder” OR DE “Castration Anxiety” OR DE “Death Anxiety” OR DE “Generalized Anxiety Disorder” OR DE “Obsessive Compulsive Disorder” OR DE “Panic Disorder” OR DE “Phobias” OR DE “Post-Traumatic Stress” OR DE “Posttraumatic Stress Disorder” OR DE “Separation Anxiety Disorder” OR DE “Chronic Mental Illness” OR DE “Chronic Psychosis” OR DE “Dementia” OR DE “AIDS Dementia Complex” OR DE “Dementia with Lewy Bodies” OR DE “Presenile Dementia” OR DE “Semantic Dementia” OR DE “Senile Dementia” OR DE “Vascular Dementia” OR DE “Dissociative Disorders” OR DE “Depersonalization” OR DE “Depersonalization/Derealization Disorder” OR DE “Dissociative Identity Disorder” OR DE “Fugue Reaction” OR DE “Eating Disorders” OR DE “Anorexia Nervosa” OR DE “Binge Eating Disorder” OR DE “Bulimia” OR DE “Hyperphagia” OR DE “Kleine Levin Syndrome” OR DE “Pica” OR DE “Purging (Eating Disorders)” OR DE “Factitious Disorders” OR DE “Munchausen Syndrome” OR DE “Gender Identity Disorder” OR DE “Transsexualism” OR DE “Hoarding Disorder” OR DE “Hoarding Behavior” OR DE “Hysteria” OR DE “Mass Hysteria” OR DE “Impulse Control Disorders” OR DE “Explosive Disorder” OR DE “Neurosis” OR DE “Childhood Neurosis” OR DE “Experimental Neurosis” OR DE “Occupational Neurosis” OR DE “Traumatic Neurosis” OR DE “Paraphilias” OR DE “Apotemnophilia” OR DE “Exhibitionism” OR DE “Fetishism” OR DE “Incest” OR DE “Pedophilia” OR DE “Sexual Masochism” OR DE “Sexual Sadism” OR DE “Transvestism” OR DE “Voyeurism” OR DE “Personality Disorders” OR DE “Antisocial Personality Disorder” OR DE “Avoidant Personality Disorder” OR DE “Borderline Personality Disorder” OR DE “Dark Triad” OR DE “Dependent Personality Disorder” OR DE “Histrionic Personality Disorder” OR DE “Narcissistic Personality Disorder” OR DE “Obsessive Compulsive Personality Disorder” OR DE “Paranoid Personality Disorder” OR DE “Passive Aggressive Personality Disorder” OR DE “Sadomasochistic Personality” OR DE “Schizoid Personality Disorder” OR DE

“Schizotypal Personality Disorder” OR DE “Psychosis” OR DE “Acute Psychosis” OR DE “Affective Psychosis” OR DE “Alcoholic Psychosis” OR DE “Capgras Syndrome” OR DE “Childhood Psychosis” OR DE “Chronic Psychosis” OR DE “Experimental Psychosis” OR DE “Hallucinosis” OR DE “Paranoia (Psychosis)” OR DE “Postpartum Psychosis” OR DE “Reactive Psychosis” OR DE “Schizophrenia” OR DE “Senile Psychosis” OR DE “Toxic Psychoses”) OR (TI (mental disorder* OR mental health OR mental illness OR depression OR anxiety disorder* OR schizophrenia OR bipolar disorder* OR dementia OR PTSD OR posttraumatic stress OR psychosis OR psychoses) OR AB (mental disorder* OR mental health OR mental illness OR depression OR anxiety disorder* OR schizophrenia OR bipolar disorder* OR dementia OR PTSD OR posttraumatic stress OR psychosis OR psychoses))) AND ((DE “Oral Health” OR DE “Dental Health”) OR (OR (TI (Dental disease* OR Oral health OR Oral hygiene OR Dental health OR Dental hygiene OR Oral functioning OR Gingival health OR Oral disease*)) OR (AB (Dental disease* OR Oral health OR Oral hygiene OR Dental health OR Dental hygiene OR Oral functioning OR Gingival health OR Oral disease*)))) AND ((DE “Intervention” OR DE “Group Intervention” OR DE “Program Evaluation” OR DE “Health Promotion”) OR ((TI (Intervention* OR Program* OR Training OR Trial*)) OR (AB (Intervention* OR Program* OR Training))))

Part III

The development of a supportive oral health nursing intervention

Chapter 5

A Human-Centered Design Approach to Develop Oral Health Nursing Interventions in Patients with a Psychotic Disorder

Kuipers, S., Castelein, S., Kronenberg, L., Veer, J. V., & Boonstra, N. (2023). A Human-Centered Design Approach to Develop Oral Health Nursing Interventions in Patients with a Psychotic Disorder. *International journal of environmental research and public health*, *20*(4), 3475. https://doi.org/10.3390/ijerph20043475

Abstract

Introduction: In mental health, oral health is often given little attention. Mental health nurses (MHNs) are professionally the appropriate target group to support maintaining and increasing oral health.

Aims: We aimed to develop and validate personas that reflect the attitudes and needs of MHNs regarding oral health in patients with a psychotic disorder.

Design and Methods: We used a human-centered design with contextual interviews (n = 10) to address the key issues of the problems and needs of MHNs working with patients with a psychotic disorder. We analyzed the data thematically and reflected on insights into unique personas, which were then validated by conducting semi-structured interviews (n = 19) and member checking. Four personas were found based on attitudes and perspectives, barriers, needs, suggestions for interventions, and site conditions regarding practicing oral care in this patient group.

Results: Our findings were as follows: the attitudes and perspectives differed from not feeling any responsibility to a holistic obligation, including oral health; suggestions for interventions for MHNs ranged from interventions focusing on improving skills and knowledge to using practical tools; most MHNs recognized themselves within a persona that had a holistic obligation that included oral health; in addition, the MHNs indicated that they considered the issue of oral health in this patient group important, but, in practice, took little responsibility for that role.

Conclusion: These findings suggest that a toolkit with interventions for MHNs that are tailored to the personas that emerged from our research should be developed by MHNs in co-creation with designers. The differences between the perceived role and MHNs' practice in oral health highlighted the need for role clarification and professional leadership of MHNs regarding oral health, which should be considered when developing interventions.

Introduction

Since the World Health Organization emphasized that oral health is integral and essential to general health and wellbeing [1,2], oral health has improved in the general population; however, vulnerable patients are an exception to this [3]. For instance, poor oral health in patients with a psychotic disorder may lead to poor self-image, low self-esteem, decreased self-confidence, social phobia, loneliness, depression, and suicidal intent; these people are ashamed and are afraid to go outside, and therefore, participate less in society [4,5]. Epidemiological studies showed that the lifespan of patients with a psychotic disorder is shorter than that of the general population without mental illness. The gap in mortality was estimated to be a 15–25 year shortened life expectancy in patients diagnosed with a (severe) mental illness, including in countries where the quality of healthcare is acknowledged to be good [6,7]. An unhealthy lifestyle is an important cause of the gap in mortality. Several studies among patients with (severe) mental illness showed that oral health and oral-health-related quality of life are substandard within the unhealthy lifestyle domain [8–13].

Inadequate oral health self-management, a lower tooth-brushing frequency, a lack of motivation for proper oral hygiene, and poor psychosocial functioning are known as other barriers to adequate oral health in this patient group [14–17]. From a holistic perspective [18], supporting the general health of patients with a psychotic disorder, including oral health, is one of the tasks of a mental health nurse (MHN), which is one of the main health professions at the forefront of everyday care services [13,19]. MHNs indicate that they hesitate to take action and would like to be more attentive in this area [13]. MHNs state that they lack the relevant expertise, and there is a lack of practical interventions for MHNs to use when supporting patients regarding oral health. Happell et al. [19] discussed the importance of this topic being included on the agenda in mental health organizations, which are often only focused on psychiatric and psychological problems. One of the barriers reported was that when patients express concerns regarding their physical health, these concerns tend to be given little importance by the healthcare professional [19]. Furthermore, MHNs in general have to provide more input on needs and barriers in mental health services.

Dutch and British guidelines regarding people with mental health problems [14,20] do not meet the needs of the MHNs due to the lack of intervention options. Therefore, MHNs feel that it is inconvenient to uphold what these guidelines prescribe. A recent scoping review examined the educational, behavioral, and physical interventions to improve oral health among patients diagnosed with a mental health disorder [11]. An important conclusion of this review was that, despite the importance of good oral hygiene, few interventions have been developed for MHNs. Although the interventions that do exist were shown to be effective in the short term (< 1 year), these interventions were developed without the involvement of the end users of these interventions (i.e., mental health professionals). It is unclear what has been missed while developing these interventions. An important reason the development of new interventions is often unsuccessful lies in the fact that developers of (medical) interventions do not thoroughly understand the perspective of the end users. Interventions are often developed on a theoretical basis without actively involving the target group [21]. Many organizations fail to consider the MHNs as end users of interventions, and therefore, the starting point of the design process [22]. Thus, interventions to support patients with a psychotic disorder should address the needs of MHNs as end users. Therefore, MHNs, as well as experts by experience, should be involved in the development of interventions. The involvement and engagement of MHNs as end users will increase the chances of developing effective interventions [23].

The current research project was undertaken as a first step in a longer design-oriented project that aims to design mental health nursing intervention(s) for oral health care in patients with a psychotic disorder. Specifically, we sought to increase clarity regarding the attitudes, barriers and needs, and suggestions of MHNs to provide support for maintaining and increasing oral health in patients with a psychotic disorder. The outcomes of this study might lead to validated personas with useful insights into MHNs regarding maintaining and increasing oral health. These personas can serve as an empathic handover in the development of oral health nursing interventions [24].

Methods

Study Design

For this study, a qualitative, descriptive, interpretative design was conducted to gain insight into the attitudes, barriers and needs of MHNs regarding oral health in patients with a psychotic disorder. To determine the contributions to practice, a human-centered design (HCD) approach was adopted. An HCD approach is a co-creative, iterative, and creative approach with non-linear steps to problem-solving to provide tailor-made solutions for severe problems [25]. This participatory and iterative HCD approach differed from other methods by empathizing with MHNs from the start of the project and working in co-creation with MHNs to develop a deeper understanding of their needs and, therefore, design more suitable interventions and give them a decisive voice in solution directions [26,27]. One widely applied HCD approach for innovative design projects is the Double Diamond (DD) framework, which was developed by the Design Council [28]. This DD framework guides problem-solving thinking in the HCD design process. The current study focused on the first, exploratory, steps in this process (the "discover" and "define" phases of the DD framework) aimed at one major task: the intervention must address the key issues of the problem, and thus, the needs of the end users [28]. The iterative stages in the research process are shown in Figure 1. The participation of MHNs throughout the design process has several purposes: (a) at the start, the participation of MHNs helped us to explore the context of mental health professionals, including their worldviews and needs; (b) the MHNs could participate in constructing and/or utilizing prototypes; (c) the MHNs could give feedback in user tests; and (d) the MHNs could give insight into the system in which an intervention should be implemented and the needs of MHNs in caring for patients with a psychotic disorder [29–31].

Population

In one of the first steps (step 1a), we conducted contextual interviews (Figure 1). To achieve maximum variation in our sample, a representative sample of participants was selected by the research team [32] based on their knowledge, years of experience with patients with a psychotic disorder in all stages [33], and affinity with oral health. In this step, various levels of MHNs were included: bachelor's-level mental health nurses, bachelor's students of mental health nursing, master's-level advanced nurse practitioners, students of the master's degree of advanced nurse

practitioners, experts by experience, and oral health hygienists. Participants were approached face-to-face.

In the second step (step 2a), we conducted semi-structured interviews with MHNs (Figure 1). A convenience sample was obtained using snowball recruiting based on experience (in working years) with patients with psychotic disorders, availability, and willingness to participate. Participants were approached by email or face-to-face. Participants were recruited from the KieN Early Intervention Service in Leeuwarden, students of the Bachelor of Nursing program in their last year (University of Applied Science NHL Stenden, Leeuwarden, The Netherlands), and students of the Master Advanced Nursing Practitioner program (University of Applied Science GGZ-VS Utrecht).

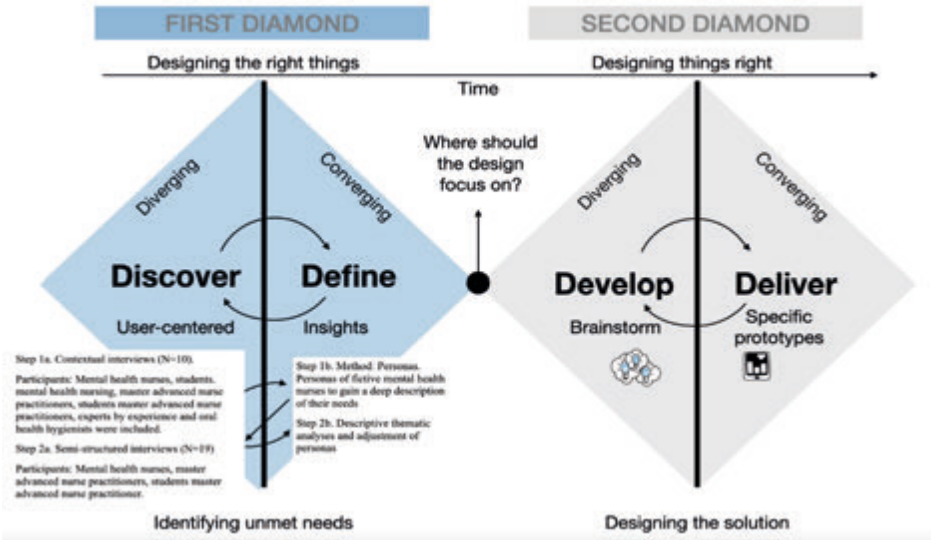

Figure 1. *The iterative HCD stages and activities used in the first diamond of the Double Diamond model from the Design Council [28], adapted with permission from van 't Veer, Wouters, Veeger, van der Lugt, 2021 [34]. Copyright 2020 by publisher Coutinho, Bussum, the Netherlands. Note: HCD (human centered design) stages and activities in the two diamonds of the Double Diamond model [28]. Steps 1a-2b describe each stage of our project (discover and define). As HCD is an iterative process, the arrows describe how the results of each step impact the next step, leading to a detailed description of four different personas regarding oral health and adjustment of the personas in the last step (step 2b).*

Data Collection

Contextual Interviews

For the contextual interviews (step 1a), we aimed to deeply understand (1) the attitudes and daily practices of MHNs regarding oral health, (2) the obstacles and barriers MHNs experienced related to oral health in daily practice, (3) what suggestions MHNs had in terms of oral health nursing interventions, and (4) what conditions are required, according to MHNs, to support their patients with a psychotic disorder by interviewing them in the context of their work [35]. The data were collected by a trained research nurse (S.K.) between January 2021 and June 2021. All interviews were audio-recorded and transcribed verbatim.

Semi-Structured Interviews

The purpose of conducting semi-structured interviews in step 2a was to gather information from participants who had experiences, attitudes, perceptions, and beliefs related to the topic of interest. These semi-structured interviews were used to (ecologically) validate the findings in the personas (step 2b) (see analysis, Section 2.4.2.). In this case, ecological validity referred to the realism with which the persona matched the MHNs or their team members' real work context and how accurately the personas reflected the relevant characteristics and their context in the world or environment [36]. Personas were characterized as valid when nurses recognized themselves or team members in a persona. The semi-structured interviews included a shortlist of "guiding" questions [37] (e.g., with which persona (or elements of the persona) do you identify most? Looking at the team of nursing colleagues you work with, which persona or elements are most recognizable? With which suggestions for interventions do you identify? Are these interventions relevant and useful in your work with patients with a psychotic disorder and why?) (Appendix C).

The personas (created in step 1b) were presented to MHNs and served as a compass during the semi-structured interviews. Participants were asked to read the persona descriptions, identify personal connections with the personas and characteristics, describe additional barriers and needs that influenced their opinion, and generate ideas for interventions and site conditions that would be useful to other mental health professionals that share their characteristics, barriers, and needs.

The semi-structured interviews were conducted between January and April 2022. The interviews were audio-recorded and transcribed verbatim by the first author (S.K.). The iterative process of sampling, data collection, and analysis was continued until data saturation was reached.

Analysis

A thematic analysis [38] was used as a guiding procedure for the analysis of the data from the contextual interviews (step 1b) and the semi-structured interviews (step 2b). We analyzed the data using both a deductive and inductive thematic analysis approach [38]. In the discovery phase, structures and patterns became visible through fragmentation. The fragments were given open codes. The reduction phase was devoted to identifying coherent themes based on the codes. The themes were then revised and refined. In the last phase, we reflected on the themes and the analysis process [38,39]. All data were analyzed in Atlas TI Version 9 (Atlasti.com). To improve the credibility of the results, we used member checking, where following a participatory and qualitative approach, the verbatim transcripts were returned to the participants to validate the data from the contextual interviews. Quotes were added to the themes to provide a rich description.

The key themes of attitudes and perspectives, barriers, needs, interventions, and site conditions were defined a priori for the analysis in step 1b, as they related to our research questions. Data coding facilitated the identification of patterns within the data and group statements with thematic similarities [39]. The themes and codes that emerged from the contextual interviews were used for persona creation.

In step 2b, the semi-structured interviews were analyzed using thematic analysis [38] as a guiding procedure to ecologically validate the findings in the personas. Data were analyzed inductively in terms of three themes: (1) identification with personas; (2) evaluation of barriers, needs, interventions, and site conditions; and (3) current oral care and the future of oral care in mental health care to validate the personas and to find additional information.

Persona Construction

In step 1b, the user insights provided through the contextual interviews were converted into four authentic and lifelike personas of MHNs working with patients with a psychotic disorder. According to Grudin and Pruitt, the creation and use of

personas have extraordinary potential [27,40]. Personas are seen as a powerful tool for true participation in design, and they also force designers to consider social and political aspects of design that otherwise often go unexamined. In contrast to Grudin and Pruitt [27,40], Chapman et al., [41] has more skepticism about the persona method and discusses several methodological and practical limitations. For example, they point out the problem that it is hard to verify to what extent a persona can represents a larger (parts of) population [41]. In this research, personas were a part of the data-synthesis activity since it serves designers better have a specific person to empathize with when designing new interventions [42]. Pictures and background information were added to help designers to create an elaborate and relatable image of this person. Therefore, personas have the function of an "empathic hand-over" [24] by giving a living insight into the MHNs through their reading of the personas.

To translate insights into useful design implications, personas are a useful method to present them. From the themes, patterns, and associated descriptive phrases in the transcripts, the researcher S.K. developed personas of typical MHNs related to oral care in collaboration with the research team (S.C., J.V., L.K., N.B.). The data within the contextual interviews were organized within five larger categories to highlight the MHNs' (1) unique attitudes and perspectives regarding oral care, (2) barriers regarding oral health, (3) needs regarding oral health, (4) suggestions for interventions, and (5) site conditions needed to provide oral health to patients with a psychotic disorder. Based on the data, four types of nurses could be described as personas. Each persona was a composite portrait that incorporated representative data from participants. Relatable names and photos, illustrative quotes, and a description of their professional context based on the codes and patterns identified were also given to the personas [27,40].

Persona Validation

In step 2b, the five-step Synthesized Member Checking (SMC) [43] was used for ecological validation and further development of the personas. SMC enabled the participants to add comments, which were then searched for confirmation or disconfirmation of engagement with the personas, enhancing their credibility [43]. Discussion about participants' feedback and changes were incorporated into the personas.

To improve dependability and confirmability, an audit trail was conducted whereby the raw data and memos generated during the study were saved in a log file. Data analysis of nine semi-structured interviews was performed independently by two researchers (S.K. and S.S.). Differences between both researchers while interpreting and coding the data were discussed until a consensus was reached.

Ethical Considerations

Standard rules for good clinical practice and ethical principles that have their origin in the Declaration of Helsinki were followed by informing all participants about the study and their rights, and all subjects gave oral informed consent [44]. For this study, according to the Dutch Medical Research with Human Subjects Law, we did not require ethical approval since professionals were included in the study. The recordings of the interviews were retained according to the international safety regulations for the storage of data at the NHL Stenden University of Applied Sciences and were accessible to three researchers of this project (S.K., N.B., J.V.).

Results

Contextual Interviews

We interviewed ten experts: four MHNs, two master's advanced nursing practitioners, one student master's advanced nursing practitioner, one student bachelor's mental health nurse, one expert by experience, and one oral health hygienist. The group consisted of eight women and two men; the ages ranged between 23 and 52 years (mean age: 38 years). The number of years of work experience varied between 0 and 34 (mean: 9.3 years). Participant characteristics (profession, gender, age, educational level, and years of working experience) are given in Appendix A. It is important to notice that themes were linked to each other (e.g., needs appeared from barriers, interventions were associated with needs, and site conditions also referred to needs and barriers).

The Attitudes, Perspectives, and Daily Practices of MHNs Regarding Oral Health.

The attitudes and perspectives of oral health in mental healthcare and what a mental health professional is supposed to do about oral care varied enormously among the teams of participants. Of the participants, four stated that MHNs should

include oral health in their repertoire of actions. Out of the ten participants, two participants discussed oral health care in their team and stated that their colleagues did not consider oral health care to be part of their job and that the role of the family should be more prominent. The expert by experience supported this finding:

> "Because in my own experience with my bad teeth in health care, it was sometimes signalled by MHNs, but then nothing was done about it. And that is because, well, people (MHNs), do not think that is their job. And that is a wrong way of thinking" (Participant 9).

The other participants did not feel responsible for maintaining and increasing oral health as part of their daily work.

Barriers to Providing Oral Health Care

The barriers participants experienced were quite diverse. The MHNs stated that when patients were admitted with a psychotic disorder, they acknowledged that there was a lack of materials (no toothbrush or toothpaste) or the MHNs did not know what was available. Sometimes, this was noticed after six days of care and patients were not asked. When patients are admitted with a psychotic disorder, care is focused on clinical recovery (e.g., reduction or cessation of symptoms). Oral health care is not considered part of recovery, and there is no focus on physical issues (e.g., oral health).

In mental healthcare, it is felt that every patient should perform their activities of daily living, and little attention is paid to personal care at all. Participants often did not know whether there was an assurance for oral health care. Additionally, participants reported not having the time to provide oral health care.

> "We have about 30 min with a patient. In that time, we also must check on medication, and symptoms. After 30 min, we should go to the next patient. There is no time for MHNs to do something with oral health" (Participant 2).

Most participants stated that the attitude of "a lack of attention for oral health" is not good. Participants stated that there was a lack of knowledge on what to do and why. Participants also indicated a lack of knowledge regarding what kind of

information patients should have. It is well-known that salivation is a side-effect of anti-psychotic medication; the participants told patients that they must drink a lot of water. However, this also contributes to caries and dental erosion, which was not known, as reported by two participants, and therefore, not told to patients.

One participant said that she had a patient with an oral health burden. Sometimes, due to the negative symptoms of psychosis, the patients are not motivated, are lethargic, and there is a lack of initiative. The participants saw that patients often felt insecure about their oral health (e.g., by talking with a hand in front of the mouth), but the participants did not know how to incorporate this into daily care. All participants indicated that there was too little knowledge and awareness about oral care within the teams and that this was the main reason they did not know what to do.

One participant stated that she really did not know how to motivate and stimulate patients. Mental health staff downgraded these problems because oral health problems are physical, and their patients are admitted for psychological or psychiatric problems.

The oral hygienist named the high costs for patients when there is no additional oral health insurance as the most important barrier. When patients contact an oral hygienist, there is often a lot of burden and treatment is only reactive; regular appointments and prevention were noted as important.

> *"The cost of treatment of severe symptoms is too high for patients and a barrier to make an appointment. We see patients too late"* (Participant 6).
> *"In practice, at the time of intake, we know what medication patients are taking and we can respond accordingly. But if something changes in the meantime and we are not informed, it becomes difficult"* (Participant 10).

Needs of MHNs for Providing Oral Care

Within the theme of needs, we found the subthemes of knowledge, which contained statements about the knowledge that the participants needed, and skills, which contained statements about the practical competencies the participants needed.

Overall, some participants (MHNs and the expert by experience) seemed to be unconsciously incompetent. Participants acknowledged their lack of knowledge regarding oral health. Half of these participants finished the Bachelor of Nursing without any education on oral health care. Most frequently mentioned in terms of lack of knowledge were the importance of oral health, oral health in mental health, oral health diseases and symptoms, and medication and oral health.

> "I know that oral care is important, but I do not know why. Well, brushing twice a day, I think that when I have more background information and underpinning information, I will also do more with it in practice" (Participant 3).

All participants stated that the need for skills stemmed from a knowledge deficit. Some participants indicated that observing oral health, being able to ask questions, explaining properly, and assuming a coaching role are important skills, but they are not always applied. In terms of skills, all participants agreed that effective communication skills are needed. Half of the participants confirmed that these skills were needed to talk to patients about oral health. Motivational interviewing is an important part of this, but according to one participant, MHNs have mastered the skill of motivational interviewing but do not know how to apply this to oral health. Some of the participants indicated that they felt the need to know how best to start a conversation about oral health. Other participants stated that they can start a conversation but are unsure of what actions to perform afterward.

> "Good communication skills are essential, because the shame and the fear of stigmatization play a crucial role, so you must be able to empathize with patients" (Participant 9).

Interventions for MHNs for Providing Oral Health Care

During the interview, the participants were asked what they needed in terms of interventions regarding oral health. Less than half of them said they needed training as an intervention. Training can occur in the form of a continuing education course, refresher course, or peer review to gain more knowledge and create more awareness about oral health. Participants indicated that a one-day training could contribute to more knowledge and create awareness.

Some participants would like to give patients an information sheet or flyer (e.g., after the intake or during a care plan meeting), or hang leaflets above the sink in rooms. Three participants (MHNs and the oral hygienist) introduced the importance of including oral health in an intake/anamnesis/somatic screening (e.g., an oral health screening) and care planning (and care coordination meetings) for patients. The integration of an oral health screening during patient admission would allow MHNs to include oral health care in treatment plans.

> "I see that also that fellow MHNs do not concern themselves with this, and when patients are admitted to an outpatient-team (e.g., early intervention psychosis team or assertive community treatment teams), no attention is paid oral health, and a somatic screening is done and patients were physically examined, except in the mouth" (Participant 3).

One participant mentioned the importance of lifestyle within mental health. Lifestyle was seen as highly prioritized in organizations. The MHNs gave training and education to patients regarding lifestyle, but these were related to tobacco, alcohol, drugs, and physical activity; the education was less focused on hygiene and oral health as part of lifestyle training.

Participants proposed that an app could be used to provide oral health advice. Additionally, the oral hygienist advised the MHNs to develop a digital decision tool for oral health that contained all the required information in it.

> "A digital decision app with knowledge on oral health (e.g., importance, risk factors) and an advice nurses can give to their patients (e.g., based on oral health screening) could be appropriate, like a decision tree" (Participant 10).

Site Conditions to Provide Oral Health Care

Some participants indicated that not all patients have the right tools to take care of their oral health properly. It would be nice if tools were available and within easy reach. Tools, such as toothpaste, a toothbrush, and mouthwash, would be nice to have within reach for some participants. Two participants (a mental health nurse and an expert by experience) suggested that patients received a welcome pack when they are admitted, which could include a small tube of toothpaste and a toothbrush.

Almost all participants stated that interventions should be facilitated by the organization. In this way, an intervention is better secured, and all patients have the same starting point. Organizations must support MHNs and make it clear that it is a part of MHNs' day-to-day work. Participants felt they needed to have more time to observe patients and give good oral health information or education within an organization.

Personas

From the contextual interviews (n= 10), four unique personas of MHNs were identified: three women and one man (Figures 2–5). These persona descriptions contained interpreted data from the contextual interviews. The results were related to the nurses' (1) attitudes and perspectives on oral health, (2) barriers, (3) needs, (4) suggestions for interventions, and (5) site conditions.

Anna

1

ELEMENTS	
Background	Anna is a 27-year-old mental health nurse specialist working in psychiatry. She is married and has a 2-year-old daughter. Anna lives in a small village in the northern Netherlands. Anna is creative, assertive, and extroverted, and she enjoys being involved in the village and neighborhood associations.
Context	Anna has been working in a psychiatric clinic where patients with psychotic disorders are treated for five years. She works in the clinic four days per week. Anna often attends conferences concerning mental health, both domestic and international. She prefers to remain aware of new developments in her field, especially those she could implement in her practice.
Oral care attitude and perspective	Anna's view on oral care: "It is important to look at oral care from a holistic perspectives." Anna wants to involve colleagues in her ideas, and to improve oral health awareness in her field. Anna attends a dentist twice a year.
Main barriers for Anna	Anna's patients have told her that they are not motivated to engage in oral care. Some do not have a toothbrush or toothpaste. Anna suspected that many patients do not have supplementary insurance for oral care, and their immediate family members were not engaged in the process. Anna acknowledged that neglecting oral care could have a negative impact on a patient's health; in addition, her nursing education did not include the topics of oral care and oral health. Currently, Anna cannot provide a complete oral health education for her patients due to time constraints and the focus of her practice. Anna states that she does not know how to motivate and encourage clients into oral health.
Anna's needs	Additional information, such as key factors, highlights, and instructions on motivational interviewing, could assist Anna in motivating her patients to care for their oral health. Focused campaigns, including literature and an oral care screening list, could increase awareness among MHNs. Anna would also like to know what information is important to include in psychoeducation for clients. Anna believes it is important for MHNs to start the conversation about maintaining and increasing oral health within the team of MHNs.
Suggestions for oral health interventions	Anna stated that oral health screening should be included in patients' medical histories and then immediately integrated into the treatment plan. In addition, she suggested creating a digital decision tree. Leaflets and posters with information for nurses and patients could assist MHNs in educating their patients regarding the importance of oral health and how to integrate it into daily routines.
Site conditions	Materials such as toothbrushes and toothpastes should be available for patients. Anna suggests that peer consultation within the team is important in order to add oral health to the agenda.

Figure 2. Persona Anna

Figure 2. *Persona Anna.*

Monica

2

"The focus of my work is on mental health care and vulnerabilities. I just want to do my thing."

ELEMENTS	
Background	Monica is a 23-year-old nurse working in psychiatry. She lives alone in a large city in the northern Netherlands. Monica enjoys sports and plays tennis every day.
Context	Monica has been working in psychiatry for one year. She works five days per week in a clinic with patients diagnosed with serious mental illness. Monica does not prioritize continuing education or awareness regarding the latest developments in her field. She does not attend conferences focused on mental health.
Oral care attitude and perspective	According to Monica, oral health care is not a significant concern in her field. Monica stated that patients should go to the dentist or the dental hygienist for oral health care, but oral health and routine maintenance were not part of her education. Monica attends a dentist annually for check-ups and when she has any oral health issues.
Main barriers for Monica	Monica said that the MHNs were not concerned with maintaining and increasing oral care; psychological and psychiatric care are prioritized and, oral health was not included in patient treatment plans. She did not view it as necessary for treatment. Monica is not aware of the importance of oral care, the risk factors for oral diseases, or what information should be offered to patients. Monica said she was not interested in, nor did she need to be concerned with, the oral care of her patients.
Monica's needs	Despite Monica's current attitudes towards oral care, raising awareness concerning oral health and providing educational opportunities for MHNs, as well as providing easily shared methods for better oral health, may assist in shifting Monica's view on oral health care and her role as a nurse.
Suggestions for oral health interventions	Not being aware of the importance of good oral care, Monica should receive training in oral care for nurses. Leaflets and posters with information for nurses and patients, as well as an oral care screening list, could provide opportunities for MHNs to educate and support patients in their oral care routines.
Site conditions	Monica has limited experience in psychiatry; therefore, integrating oral health care into general care and nursing education is crucial to increase awareness among MHNs at all levels. It should also be promoted by the organization. Peer consultation within the team is important in order to add maintaining and increasing oral health to the agenda.

Figure 3. Persona Monica.

Figure 3. *Persona Monica.*

3

Julia

"Oral health care should be integrated into the daily care of patients."

ELEMENTS	
Background	Julia is 41-years-old and works three days per week as a psychiatric nurse in a FACT team. She is married and has two daughters. She trains two days per week at her children's hockey club and is the captain of their team. Julia is enthusiastic and promotes activities.
Context	Julia obtained her bachelor's degree in nursing 10 years ago. She works with patients diagnosed with psychotic disorders. Julia frequently attends conferences and is aware of the latest developments in her field. Julia recently applied for a position as a nursing specialist-in-training. Julia could not remember whether she had any training in oral care; however, she was interested to learn more about it.
Oral care attitude and perspective	From Julia's perspective, oral care should be integrated into patient daily care. Julia herself attends a dentist and an oral hygienist twice a year.
Main barriers for Julia	As Julia tends to patients, she notes if they have oral hygiene issues, such as bad breath or particles trapped between their teeth, and she and the patient integrate oral care into the patient's treatment plan. Julia said that she may be the only member of the nursing team who is concerned with patient oral health, as there has not been any coordination among the team. Julia indicated that, despite her concerns and actions regarding oral health, she is uncomfortable discussing oral care.
Julia's needs	Julia needs support for discussing oral health and oral care with her patients. Increased concern and continuity of oral care in the field would promote and elevate Julia's current approach.
Suggestions for interventions	As there appeared to be a lack of coordination among the nursing team, additional education and awareness would promote better oral health and oral hygiene for psychiatric patients. Leaflets and posters with information for nurses and patients, as well as an oral care screening list, could provide opportunities for MHNs to educate and support patients in their oral care routines. Short 2 min videos regarding oral health can provide practical information for MHNs
Site conditions	Integration of oral healthcare into MHNs' daily patient care. Peer consultation within the team is important in order to add the topic of oral health to the agenda.

Figure 4. Persona Julia.

Figure 4. *Persona Julia.*

4

Paul

"I think oral care is very important, but I do not know what to tell my patients."

ELEMENTS	
Background	Paul is 45 years old and works as a psychiatric nurse in an outpatient team. Paul lives alone in a large city in the northern Netherlands. Paul plays volleyball, loves cooking, and is very social.
Context	Paul has worked in psychiatry for almost 20 years, and for the last 7 years, he has been part of an outpatient team for patients after early psychosis. He works four days a week. During his study at HBO-V, Paul was trained in oral care. Paul is not consistently aware of new developments in his field; although, he prefers to be involved in new developments when possible. Paul is not interested in a pioneering role within his organization.
Oral care attitude and perspective	Paul indicated that oral care was important, and that patients' teeth should look good to prevent insecurity. He visits the dental hygienist annually, and when he has any oral issues, he attends a dentist as well.
Main barriers for Paul	Paul indicated that patients often felt unsure regarding their oral health. Paul is aware of the importance of oral care and the risk factors, but he does not know how to integrate this into patient care or how to advise patients. Paul stated that his colleagues were not concerned with patient oral care.
Paul's needs	Training in oral health care, such as the importance of oral health care, risk factors, and screening for oral health, would increase awareness in the field and support Paul and his colleagues in their holistic work with patients.
Suggestions for interventions	Paul indicated that he appreciates being involved in new developments in the field. A digital screening app focused on oral care including advice on oral care in different situations (e.g., applying a decision tree) would support his work and allow him to integrate the advice into the patient treatment plans.
Site conditions	Integration of oral care in patient treatment plans and in the organization.

Figure 5. Persona Paul.

Figure 5. *Persona Paul.*

Ecological Validation of the Personas

Subsequently, semi-structured interviews (n = 19) were conducted with MHNs (n = 6), master's advanced nursing practitioners (n = 5), student master's advanced nursing practitioners (n = 7), and a student mental health nurse (n = 1). We interviewed fifteen women and four men; the ages ranged between 22 and 54 years (mean age: 37). The number of years of working experience varied between 0 and 34 years. All participants worked in a clinical or outpatient center with patients with a psychotic disorder in various stages. The participant characteristics (profession, gender, age, educational level, current team working, current patient category, and years of working experience) are given in Appendix B.

Identification with Personas

We found a resemblance between the participants' attitudes and perspectives regarding oral health in patients with a psychotic disorder, barriers, needs, suggestions for interventions, and site conditions, as presented above, and their origins in the personas. When participants looked at their role in the context of their work, the MHNs identified with Anna (n = 9), Julia (n = 6), or combinations of elements in Anna and Julia (n = 8), and with Julia and Paul (n = 1), indicating that most nurses supported the holistic perspective of oral care and the integration of oral care in daily care (Appendixes D–F). All the participants felt that addressing the oral health of patients with a psychotic disorder was important. Participants perceived oral health activities to be within the role of MHNs. However, there was a lack of consensus within participant teams; colleagues did not always perceive oral health to be the role of MHNs.

An often-shared perspective on oral health was Anna's view on oral care: "It is important to look at oral care from a holistic perspective." According to participants, this perspective suits recovery-oriented mental health practice and person-centered services. Julia's perspectives were in line with Anna's perspectives, i.e., the integration of oral health care in general care is part of a holistic perspective.

> "But we, as MHNs, do not practice oral health" (Participant 5).

The participants unanimously stated that Monica's perspectives were not appropriate for a mental health professional. Almost half of the participants did slightly agree with this persona in that they expected that a shift in attitude could be the

result of proper training in oral health. In addition, a beginning nurse needs to have a good example when starting a career in mental health care. If this is the attitude of the whole team, this might explain the attitude of a beginning nurse.

> "Monica's perspective is based on the medical model, which focuses on (the absence of) psychiatric complaints. That is not how it works. But also, her limited experience might be an underlaying reason for her current attitude. That means she requires a proper role model" (Participant 7).

When the participants looked at the team of nursing colleagues they worked with, most participants recognized all personas. One of the participants stated that almost half of their team was made up of people like Monica, but the participants did not recognize themselves as a Monica.

Evaluation of Barriers, Needs, Interventions and Site Conditions

Overall, the participants recognized almost all barriers, needs, interventions, and site conditions experienced in the different personas, in themselves, or in the teams they worked in (Appendix G). This indicated that there was no one-size-fits-all method for MHNs to maintain and increase oral health in patients after a psychosis admission.

Barriers are often linked to site conditions. Following an episode of psychosis, patients are often not motivated to maintain or increase oral care. It is difficult for MHNs to motivate patients in terms of maintaining their oral health, partly because patients expect to be treated for mental health problems. To start talking about oral care is perceived by patients as strange because they do not consider it as part of their treatment. This makes it challenging to initiate a conversation about oral care with patients.

The participants stated that since oral care is not asked about during intake, the MHNs acted only reactively when problems arose and were not proactive enough to prevent problems.

> "This is so recognizable. Not all patients have a toothbrush and toothpaste. I had a patient who had three tubes of toothpaste and no toothbrush, our team found this

> out three months after the patient's admission. Nobody does anything about this" (Participant 2).
> "Today, I had a 28-year-old boy who came to me because he had gum problems. He had not brushed his teeth for a long time. He did not have any materials with him, but we have them. We must show more initiative in an earlier stage because he had already been on admission with us for 9 days" (Participant 18).

Participants stated that short videos should be added to the interventions in the persona of Julia.

> Short, 2 min videos would be useful. If I must do something at home (e.g., adjust a derailleur for a bicycle), I quickly look at YouTube, then you can see what needs to be done. And it is relevant to quickly see an example (Participant 1).

Current Oral Care and the Future of Oral Care in Mental Health Care

All participants indicated that they currently do nothing to improve or maintain oral health in patients with a psychotic disorder. When oral health is discussed with patients, participants perform these activities on an individual basis, but follow-up is lacking. When looking at the future of oral care, the participants mentioned educating students in nursing and mental health professionals in knowledge and skills to raise awareness, integrating screening into the anamnesis so that the dialogue can also be about oral health, ensuring there is a follow-up in treatment plans, and that organizations should facilitate oral care by ensuring that materials are available. Maintaining and increasing oral health should be a topic of conversation within MHN teams.

Discussion

The current study aimed to gain insight into the attitudes and needs of MHNs regarding support for maintaining and increasing oral health in patients with a psychotic disorder to guide the development of interventions for this population. Our main findings were as follows: (1) there was diversity in attitudes and perspectives on oral health from MHNs; (2) there were differences in barriers, needs, and suggestions for interventions from MHNs; (3) in contrast with the fact that almost no attention was given to oral health in daily practice, MHNs recognized themselves

in a persona that encouraged a holistic perspective that included oral health; and (4) in line with the MHNs' holistic professional profiles, most MHNs indicated that they considered the issue of oral health in patients with a psychotic disorder important, but in practice, they took limited responsibility for that role.

To elaborate on the first finding, we found that the attitudes and perspectives of the MHNs regarding oral health in patients with a psychotic disorder varied enormously. Although some MHNs suggested that oral health in mental health is important, the findings suggested a difference between these expressed beliefs and the actual behavioral follow-up in daily practice. There is still a struggle for MHNs to take responsibility for oral health as part of general health in patients with a psychotic disorder. The literature shows that MHNs' attitudes toward addressing physical issues are positive in general, but MHNs need more education to effectively include physical health promotion in their activities [45]. A recent study [46] showed that existing psychiatric care needs were well discussed by psychiatrists, psychologists, and MHNs, but physical care needs and social-wellbeing-related care needs remained untreated in psychosis care. Happell et al. [18] showed the need for education and training for MHNs to improve physical health care, but oral health as part of physical health was not included. The results of this study showed that some MHNs felt responsible to act on oral health issues, and several MHNs in certain situations felt responsible but were still uncomfortable acting on oral health. Oral health issues are important, as related risk factors are known to contribute to a lower quality of life and reduced life expectancy [8–13]. Since the MHN profession is underpinned by the concept of a holistic vision of care [18,47,48], it is important that the integration of physical issues, such as oral health, is addressed as a matter of priority.

To elaborate on the second finding, there were differences in the barriers, needs, and suggestions for interventions among MHNs. The most important barriers acting against the MHNs to play an active role in oral care for their patients were a lack of information (e.g., what is proper oral health care? What is the benefit of proper oral health care for patients? What are the risk factors? What do MHNs have to look out for?), a lack of practical skills (e.g., how to carry out oral health care in patients), and a lack of practical facilities (e.g., an oral health screening form). However, the most important barrier was reported to be the patients, since they

are often not capable of improving their oral care. This is in line with the literature [19,49]

The MHNs suggested the development of a wide range of different interventions for the MHNs to practice oral health in patients with a psychotic disorder, including interventions focusing on improving knowledge, improving skills, practical tools, and improving motivation in patients.

For MHNs with personas like Monica, Julia, and Paul (who reported a need for educational interventions to increase knowledge and awareness, as well as practical skills regarding oral health in their patient group), oral health training should be developed. A pre–posttest and a scoping review [11] showed that educational interventions were effective at improving oral health knowledge in MHNs of patients with SMI. The results of these studies are promising and can serve as a rationale for the development of educational interventions in the future. Furthermore, an appropriate method needs to be found to substantiate, disclose, and valorize good interventions.

MHNs like Anna, Julia, and Monica need more information on oral health (e.g., the influence of different anti-psychotics on oral health for MHNs like Anna and Julia, and information about the advantages and disadvantages of oral hygiene for Monica); it was suggested that leaflets and posters could be tools to provide oral care information to MHNs and patients with a psychotic disorder. A systematic review of oral health promotion in a general community setting showed that traditional health promotion tools, such as leaflets and posters, are useful, especially for adults [19]. MHNs like Julia need additional practical information (e.g., an example of how to brush). This systematic review was focused on the effectiveness of interventions; the content (e.g., topics or development in co-creation) of oral health promotion was not known. Therefore, oral health promotion tools, such as leaflets and posters, should be developed for patients with a psychotic disorder in co-creation with MHNs. Leaflets and posters are more effective when combined with other media, such as videos [50], and thus, the suggested 2 min videos could be supplementary to such tools. Patients and MHNs can profit from these short videos by embedding these videos as micro-learning intervention in a mobile application [51].

The presence of MHNs like Anna suggested the need for oral health psychoeducation for patients with a psychotic disorder because this would allow MHNs to educate their patients on the importance of oral health and to engage patients in how to integrate oral health care into daily routines. A Cochrane systematic review showed that psychoeducation is effective for knowledge provision in patients with SMI [52]. In mental health, psychoeducation is widely deployed. To date, however, there has been no psychoeducation available on oral health in patients with a psychotic disorder.

MHNs like Monica, Julia, and Paul probably need an oral health screening form to screen a patient's oral health status because they need a tool to integrate oral health outcomes into daily care to support patients with a psychotic disorder. A recent systematic review of oral health assessments for non-dental healthcare professionals discussed 18 different screening forms [53]. This review found that the Oral Health Assessment Tool (OHAT) is the best validated and most complete tool for use by non-dental professionals (such as MHNs) assessing oral health [53–55]. The OHAT was validated for use among senior care dependents in community dwellings [53]. This means that the OHAT is potentially appropriate, and it might be preferable to specifically validate an OHAT for patients with a psychotic disorder. The development of a digital oral health screening tool can fit in the needs of MHNs. A recent review shows that the use of mobile health (MHealth) is promising for patients with a psychotic disorder [56]. However, considering this, it is important to discuss the impact of mobile technologies on the professional relationship between MHNs and patients with a psychotic disorder. Here, the findings of Schneider-Kamp and Fersch [51] demonstrate that technological solutions such as mHealth can improve some care processes for mentally vulnerable groups, such as patients with a psychotic disorder, and show how MHNs can get and stay involved in patients' lives and everyday practices. Thus, the use of MHealth can support the reinvestment of time savings into the improvement of the MHN-patient relation. Additionally, it is important to point out that, for the positive effects of detached co-involvement to emerge and to avoid repercussions, a fine balance must be struck between face-to-face and MHealth [51]. MHNs like Anna need more information on motivation and engaging patients in oral health because her patients have told her that they are not motivated to engage in oral care, and Anna did not how to act. MHNs with these needs should use interventions that combine behavioral sessions (brief motivational interviewing sessions) and education sessions.

This combination of interventions was shown to be effective for oral health (Q.H. plaque index and oral health knowledge) in patients with severe mental illness [11,57]. Therefore, the development of interventions that combine behavioral and educational elements to support MHNs to motivate and encourage patients with a psychotic disorder should be prioritized.

Moreover, interventions suggested by the MHNs were shown to be effective, but there are important differences in context and population. This means that insights from these studies, while respecting differences, should take them into account during the design process when developing oral health interventions in co-creation with this patient group, MHNs, and designers.

Providing oral care to patients with a psychotic disorder to maintain and increase oral health is an important role for MHNs, as oral health in mental health is part of the holistic perspective of nursing [18]. However, the availability of tools alone does not automatically encourage a behavioral change in MHNs regarding maintaining and increasing oral health in patients with a psychotic disorder. Therefore, it is important to develop interventions in co-creation with MHNs to obtain input on the appropriate content, timing, and scope of these interventions so that they fit into their workflow as well as possible.

We also found that, in contrast with the fact that almost no attention is given to oral health in daily practice, the MHNs recognized themselves in a persona that encourages a holistic perspective that included oral health. We asked participants about which persona they identified the most with. The MHNs frequently reported that they recognized the persona of “Monica” (e.g., not concerned with oral health, focus on psychological or psychiatric issues, no awareness) in colleagues, demonstrating its validity and the significant prevalence of this type of colleague. We did not find any MHNs who recognized themselves as a “Monica” and were able to formulate the needs of “Monica” (e.g., raising awareness and gaining more knowledge). It remains unclear whether no Monica-type professionals exist, or whether participants felt too uncomfortable to associate themselves with a person that represents a rather negative attitude. Due to the high variation in participants and the results of this study, there were no indications this affected the results.

Lastly, in line with MHNs' holistic professional profiles [18], most MHNs indicated they considered the issue of oral health in patients with a psychotic disorder important, but in practice took little responsibility for this role. These personas show nuanced differences that should be considered when developing interventions because they will encourage MHNs to reflect on what they are doing and to take professional leadership. The results of this study showed the need for role clarification [45] and professional leadership. Professional behavior is defined as personal leadership, such as acting proactively, role modeling, taking initiative, self-reflection, showing assertiveness or courage, and being focused on good cooperation [58]. Each MHN should be able to recognize and reflect from their professional leadership on what kind of information or skill needs they have to act better. This fits into the professional nursing profiles. The question of how MHNs can take a professional leadership role and take responsibility for their role as MHNs is highly relevant in this regard, but this question cannot be answered based on this study alone. Further research among MHNs regarding MHN professional leadership related to maintaining and increasing oral health in patients with a psychotic disorder is indicated.

Strength and Limitations of this Study

A strength of our study was the use of an HCD approach with a rigorous yet flexible research process, leaving ample room for adaptation; this provided an in-depth understanding of the attitudes and perspectives, and the barriers, needs, and suggestions, of MHNs. Therefore, the MHNs were engaged in the entire process and all stages of this project. Our personas are the first personas regarding oral health in MHNs that were validated and can be used to serve as an empathic handover in the following phases of the design process to develop oral health interventions. Additionally, these personas can serve as stand-ins for MHNs when team members have to make design decisions [59].

Within this design, we used two iterations (the first iteration was to develop the personas, while the second iteration was to validate the personas), and we used various populations and methods for triangulation, which helped to validate the findings by combining different methods, which is important to prevent fundamental biases that arise from the use of a single method (as in more traditional qualitative research). The wide variety of sources we used in this study, as well as the persona validation which provided a rigorous check on personas, increased the ecological

validity. Additionally, Salminen et al. [60] discusses a lack of transparency as one of the challenges of creating personas, but we are confident that the rigorous described iterations show how the personas were generated and therefore decrease the lack of transparency. Our findings described the development and validation of four personas that can be used as an empathic handover and communicate with designers of management staff about the needs of MHNs regarding oral health. Based on data from a variety of sources, including the literature, contextual interviews, and semi-structured interviews, we identified and presented unique oral care perspectives, the main barriers, needs, suggestions for interventions, and site conditions, which were synthesized through four personas. These four personas were manually created because there are no average or stereotypical MHNs [60].

From a strict scientific point of view, we recognize a possible issue with external validity [41]. However, persona creation may be considered more like a data-synthesis activity rather than a data-analysis activity. This means that, based on data, (design) researchers build personas to display relatable and authentic members of a target group, since it serves designers better to have a specific person to empathize with when designing new interventions [42]. Thus, although personas should be based on accurate data, ultimately, they serve a design process; they are not tools to meticulously represent a whole population in all its characteristics.

Furthermore, our results showed that people recognized Monica in their work, but nobody recognized themselves as Monica. This can be explained as evidence that working with personas has added value: this may allow for the collection and interpretation of data in a way that reveals insights beyond social desirability.

This study was carried out among a sample of MHNs distributed in various parts of the Netherlands (north, east, west, and south). The participants were representative in terms of sex, age, and educational level in nursing. While the number of interviews was modest, we were confident we reached data saturation, as no new information was retrieved in the last four interviews. The ecological validity of the personas and their elements was confirmed in this sample of participants after the second session of semi-structured interviews (n= 19), which meant that we were confident that widely recognized profiles of MHNs were established. One related issue in the creation of personas is that there are no empirically validated guidelines (e.g., as to how many personas should be created) [60]. For this research, we

created four personas, data saturation and member checking showed that this was enough to give an answer on the research question in our population. Although we are confident that these profiles can be widely recognized, it is possible that we have missed profiles. However, these personas give an indication for the next step.

The methods used in this study did not lead to the degree of empathizing that is required to achieve a greater understanding of the behavioral components of this problem, namely, professional leadership and taking responsibility. Further research regarding this behavioral component is required and should take professional leadership into account. For this, it would be preferred to use more generative methods (e.g., by deploying scenarios, having MHNs do things, or through observations) to get MHNs to think even more concretely about how they would act in each situation. Furthermore, the interventions suggested by MHNs were rather basic and the MHNs did not go beyond general interventions. The thoroughness of this research may have limited the speed of design-oriented research, but it was important to find out the content of these interventions. However, if we want to design effective, innovative interventions, it will be important to rely on MHNs and patients with a psychotic disorder in co-creation with a designer (educational, communicational) to broaden the scope in interventions.

Conclusions

When caring for patients with a psychotic disorder, physical care underpins psychosis care, and mental health professionals need to consider oral health care as an essential role in their daily tasks and provide necessary nursing support. MHNs need knowledge and awareness, screening forms, posters and leaflets, and access to short videos about oral care practices. MHNs need oral health psychoeducation and posters on oral health care to improve oral health in patients with a psychotic disorder. However, the development of interventions alone will not solve this problem. It is important to empower nurses and make sure that they collectively feel responsible for what is part of their job.

The validated personas in this study can serve as an empathic handover while developing a toolkit with different interventions for MHNs and patients with a psychotic disorder. The next step in the HCD process should be, in co-creation

with MHNs, patients with a psychotic disorder, and designers, the development of different oral health interventions in an oral health toolkit and an assessment of how this toolkit matches the attitudes and perspectives, needs, barriers, and suggestions expressed by the participating MHNs. However, within the concept of holism, the professional identity of MHNs and role identification are not independent of these factors.

Last, in this study, we described different strategies for MHNs to increase oral health in patients with a psychotic disorder. It is important to take these strategies into account while writing new guidelines (or editing existing guidelines) regarding oral health in patients with a psychotic disorder.

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Appendix A

Table A1. *Characteristics of Professionals Included in the Contextual Interviews (n = 10).*

	Profession	*n*	Male/Female	Age in Years	Educational Level	Years of Working Experience
1	Mental health nurse	1	Female	46	Bachelor of Nursing	21
2	Mental health nurse	1	Female	51	Bachelor of Nursing	15
3	Mental health nurse	1	Female	25	Bachelor of nursing	4
4	Mental health nurse	1	Male	53	Bachelor of Nursing	7
5	Master advanced nurse practitioner	1	Female	31	Master advanced Nursing Practice	9
6	Master advanced nurse practitioner	1	Female	43	Master advanced Nursing Practice	15
7	Student Master advanced nurse practitioner	1	Female	27	Master advanced Nursing Practice	4
8	Mental health nursing student	1	Female	23	Student Bachelor of Nursing (last year)	1
9	Expert by experience	1	Male	46	Associate degree for Experts by Experience	5
10	Oral health hygienist	1	Female	37	Bachelor Oral Health Hygienist	12

Appendix B

Table A2. *Background Characteristics Participants Semi-Structured Interviews (n = 19).*

Characteristics|Participant	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
Gender M/F	M	F	F	F	F	F	M	M	F
Age	38	28	30	45	46	38	37	31	31
Education	Nurse sciences and MANP	HBO-V	HBO-V	HBO-V	MANP	MANP	HBO-V, MSc EBP	HBO-V	HBO-V
Current job position									
Mental health nurse									x
Mental health nurse specialist	x				x	x			
Mental health nurse specialist i.o.		x (2nd)	x (1st)	x (2nd)			x (1st)	x (3rd)	
Student nursing									
Current team working									
HIC				x					
VIP					x				
FACT			x				x	x	x
Other	Clinical long-term care	IHT				Poli-clinic			
Current population working									
FEP	x	x	x		x	x	x	x	
Several psychotic episodes	x		x	x	x	x	x	x	x
Chronic course afterpsychosis	x		x		x	x	x		x
Other	Persona-lity disorder	Youth 12–18 years							Illicit drug related psycho-ses

Table A2. *Background Characteristics Participants Semi-Structured Interviews (n = 19). (continued)*

Characteristics|Participant	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
Years of work experience with this population									
0–4 years	x	x	x						x
5–9 years								x	
10–14 years							x		
15–19 years				x		x			
20–24 years					x				
Other									
Characteristics|Participant	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**
Gender M/F	F	F	F	F	F	F	F	F	M
Age	33	46	36	22	48	29	36	54	24
Education	MANP	HBO-V	HBO-V	MBO-V	HBO-V	MANP	HBO-V	MANP	HBO-V
Current job position									
Mental health nurse		x	x		x				x
Mental health nurse specialist	x							x	
Mental health nurse specialist i.o.						x (2nd)	x (2nd)		
Student nursing				x					
Current team working									
HIC	x								x
VIP				x	x	x			
FACT		x	x				x		
Other						Autism		Poli-clinic	
Current population working									

Table A2. *Background Characteristics Participants Semi-Structured Interviews (n = 19). (continued)*

Characteristics|Participant	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
FEP	x	x	x	x	x	x		x	x
Several psychotic episodes	x	x	x	x	x		x	x	x
Chronic course after psychosis	x	x	x	x		x	x	x	x
Other									
Years of work experience with this population									
0–4 years			x	x		x			x
5–9 years	x						x		
10–14 years		x						x	
15–19 years					x				
20–24 years									
Other									

Appendix C. Short List of 'Guiding' Questions for Semi-Structured Interviews

1. Looking at your role in the context in which you work, in which persona (or elements the persona) do you most identify? (Please circle as appropriate, you may circle more than one)
2. Which elements from this persona are most identifiable for you and why? Can you substantiate this with examples per element?
3. Looking at the team of nursing colleagues you work in, which persona is most recognizable? (Please circle as appropriate, you may circle more than one).
4. Which elements from this persona are most identifiable for you and why? Can you substantiate this with examples per element?
5. Which persona does not fit a mental health nurse at all? (Please circle as appropriate, you may circle more than one).
6. Can you also explain why this persona is not representative for a mental health nurse?
7. The personas describe the barriers experienced by MHNs. Which barriers do you recognize most and why? Go back to the personas. What would you like to add to (or change) the barriers and why?
8. The personas describe what that mental health nurse needs. Which needs do you most identify with? And why? Go back to the personas for this. What would you like to add to (or change) the needs? And why?
9. In the personas, several suggestions for interventions are described. Which suggestions for interventions do you most identify? And why? Are these interventions relevant and useful in your work with clients with a psychotic disorder, and why? Go back to the personas for this. What would you like to add to (or adjust) the interventions? Are these interventions relevant and usable in your work with clients with a psychotic disorder and why?
10. The personas describe various site conditions. In which site conditions do you recognize yourself the most? And why? To do this, go back to the personas. What would you like to add to (or change) the site conditions? And why?
11. What do you currently offer in terms of oral health care within your team? If nothing is available, what would you like to start with?
12. What would you personally need in terms of knowledge, skills, or tools to pay more attention to oral health?
13. What would you like to see happen so that in a few years, all MHNs will be paying attention to the oral care of their clients?

Appendix D

Figure A1. *Looking at Your Role in the Context in Which You Work, in Which Persona Do You Most Identify (n = 19)? Note: option to choose more than one answer.*

Appendix E

Figure A2. *Looking at the Team of Nursing Colleagues You Work in, Which Persona Is Most Recognizable (n = 19)? Note: option to choose more than one answer.*

Appendix F

Figure A3. Which Persona Does Not Fit a Mental Health Nurse at All (n = 19)? Note: option to choose more than one answer.

Appendix G

Table A3. *Prevalence of Answers on Elements of Personas Given by MHNs.*

Questions	Anna		Monica		Julia		Paul	
The personas describe the barriers experienced by MHNs. Which barriers do you recognize most? *	Patients not motivated Patients have no dental aids and insurance No focus on oral health Time constraints	n = 14 n = 11 n = 9 n = 9	Psychiatric care is prioritized Oral health is not included in patient treatment plans Not aware of the importance of oral care Not knowing what information should be offered to patients	n = 13 n = 14 n = 2 n = 15	There has not been any coordination regarding oral health (or any physical issues) Feeling uncomfortable discussing oral care	n = 12 n = 9	Patients often felt unsure Not know how to integrate this into patient care Not know how to advise patients	n = 9 n = 6 n = 9

Table A3. *Prevalence of Answers on Elements of Personas Given by MHNs. (continued)*

Questions	Anna		Monica		Julia		Paul	
The personas describe what the mental health nurse needs. Which needs do you most identify with? *	Additional information, such as key factors and highlights on oral health Instructions on motivational interviewing A focused campaign, including literature An oral care screening list Psychoeducation for clients Know how to start the conversation about maintaining and increasing oral health	n = 12 n = 12 n = 14 n = 8 n = 4	More awareness concerning oral health Educational opportunities for MHNs Easily shared methods for oral health	n = 5 n = 2 n = 3	How to discuss oral health and oral care with patients How to increase concern and continuity of oral care	n = 5 n = 6	Training in oral health care, such as the importance of oral health care, risk factors, and screening for oral health	n = 15

Table A3. *Prevalence of Answers on Elements of Personas Given by MHNs. (continued)*

Questions	Anna		Monica		Julia		Paul	
With which suggestions for interventions do you most identify? *	Oral health screening should be included in patients' medical histories and then integrated into the treatment plan. A digital decision tree Leaflets and posters with information	n = 13 n = 2 n = 7	Training in oral care for nurses Leaflets and posters with information for nurses and patients Oral care screening list	n = 11 n = 13	More coordination among the nursing team Additional education to promote better oral health and oral hygiene Leaflets and posters with information for nurses and patients An oral care screening list Short 2 min videos regarding oral health	n = 10 n = 5 n = 7 n = 13 n = 2	A digital screening app focused on oral care including advice on oral care in different situations (e.g., applying a decision tree)	n = 2

Table A3. *Prevalence of Answers on Elements of Personas Given by MHNs. (continued)*

Questions	Anna		Monica		Julia		Paul	
In which site conditions do you recognize yourself the most? *	Materials such as tooth-brushes and toothpastes should be available Peer consultation within the team	n = 16 n = 7	Integrating oral health care into general care nursing education to increase awareness Peer consultation within the team	n = 7 n = 7 n = 3	Integration of oral healthcare into the MHN's daily patient care. Peer consultation within the team is important in order to add the topic of oral health to the agenda.	n = 8 n = 5	Integration of oral care in patient treatment plans and in the organization	n = 17

* option to choose more than one answer.

Chapter 6

The Development of an Oral Health Nursing Tool in Patients with a Psychotic Disorder: A Human-Centered Design with a Feasibility Test

Kuipers, S., Castelein, S., Kronenberg, L., Veer, J. V., & Boonstra, N. (**2024**). The Development of an Oral Health Nursing Tool in Patients with a Psychotic Disorder: A Human-Centered Design with a Feasibility Test. *International journal of environmental research and public health*, *21*(4), 492. https://doi.org/10.3390/ijerph21040492

Abstract

Introduction: Patients with a psychotic disorder frequently report oral health problems, while mental health nurses (MHNs) seem not to be fully aware of these problems and the risk factors.

Aims: this study aims to develop supportive tools for MHNs regarding oral health to increase sensitization among MHNs and to provide MHNs with knowledge to recognize (potential) oral health problems in patients with a psychotic disorder.

Design and methods: we used a human-centered design in which the user, MHNs as well as experts by experience, were placed in the centre of the research process. Problems and needs in MHNs working with patients with a psychotic disorder were addressed. To identify key issues of problem as well as the needs in terms of resources, we started with focus groups (n = 9). We analysed the data thematically based on context of patients and MHNs in practice regarding oral health, preferred oral health tools focused on MHN, and intended outcomes of tools. A Multi Criteria Decision Matrix was developed and analysed (n = 9) to identify the most optimal and viable solution based on established criteria and issues that are prevalent in the work of MHNs.

Results: most promising result was the development of a brochure with an awareness screener. The brochure with awareness screener was developed as a low-fidelity prototype for MHNs regarding oral health in patients with a psychotic disorder, based on the latest scientific evidence. After testing it, the feasibility was tested through semi-structured interviews (n=19). MHNs and experts by experience were satisfied with the tool and provided recommendations for adjustments to the content. Significant augmentations to the brochure include a clinical lesson and a toothbrush with toothpaste for patients.

Conclusion: we can conclude that a brochure with an awareness screener is feasible for MHNs. Future steps aiming to further refine and optimize care processes for oral health tools in MHNs, should take refining eligibility criteria for psychiatric populations and the language level of the target group of a tool into account.

Introduction

Since the World Health Organization emphasised that oral health is integral and essential to general health and well-being [1,2], oral health has improved in the general population; however, vulnerable patients are an exception [3]. Epidemiological studies have shown that the lifespan of patients with psychotic disorders is shorter compared to that of the general population without mental illness. An unhealthy lifestyle is an important cause of the 15-to-25-year shortened life expectancy for patients diagnosed with (severe) mental illness. Several studies of patients with (severe) mental illness have shown that oral health and oral health-related quality of life are substandard among those with an unhealthy lifestyle [4–9].

Inadequate oral health self-management, lower tooth-brushing frequency, and a lack of motivation to perform proper oral hygiene are known barriers to adequate oral health for patients with psychotic disorders [10–13]. Roebroek et al. [14] demonstrated that psychiatric care needs were well discussed by psychiatrists, psychologists, and mental health nurses (MHNs), but treatment plans paid little attention to physical care needs and needs related to social well-being. This was supported by Happell et al. [15], who reported that when patients express concerns regarding their physical health, health care professionals tend to pay little attention to them [15]. The literature shows that a healthy lifestyle and behavioural changes are difficult to initiate and even more challenging to sustain over time [16]. This highlights the disconnection that can occur in mental health care settings between patients' concerns and responses from MHNs, as well as the inherent difficulties in altering one's lifestyle to become healthier, both in the initiation phase and in maintaining these lifestyle changes permanently. One explanation is that psychiatric treatment and care have historically been provided mainly based on the medical model, which focuses on alleviating the symptoms of illness (e.g., by giving medication), despite the fact that nursing should be provided from a holistic point of view. In the 19th century, when nursing was defined for the first time, Florence Nightingale articulated the concept of the science of holistic nursing [17,18]. This concept of a holistic vision of care underpins the profession of MHNs; it is important that the integration of physical issues, such as oral health, is further addressed. Unfortunately, we see this too little in clinical practice.

Since 2011, health has been defined as “the ability to adapt and self-manage, in light of the physical, emotional and social challenges of life” [19]. In this definition, which is widely accepted, health is no longer seen as the absence or presence of disease but as the ability to deal with (changing) physical, emotional, and social life challenges and manage oneself as much as possible. This implies a vision that fits with holistic nursing. From a holistic perspective [20], supporting the general health of patients with psychotic disorders, including their oral health, is one of the tasks of MHNs. MHNs are at the forefront of everyday care services [9,15]. However, MNHs indicate that they would like to be more aware of the oral health of their patients [9,21], but they hesitate to take action in this regard due to a lack of both relevant expertise and the practical tools necessary for supporting patient oral health [9]. Relevant expertise is lacking, and there is also a lack of practical tools for MHNs to use when supporting patients with their oral health. Oral health issues are important for everyone; however, patients with psychotic disorders are known to have related risk factors (e.g., smoking) that contribute to a lower oral health-related quality of life and are possibly associated with a shorter life expectancy [4–8].

Recent studies [7,21] show that a wide range of interventions must be developed for MHNs to support patients with psychotic disorders in maintaining and improving their oral health. Initially, MHNs must increase their sensitivity and alter their behaviour concerning oral health. To our knowledge, no studies have yet been conducted on the sensitisation of MNHs regarding maintaining and improving the oral health of patients with psychotic disorders. There are many models in the field of behavioural change, and Prochaska and DiClemente’s transtheoretical model of change is particularly suitable here because it shows the different phases of behavioural change [22]. The transtheoretical model’s broad applicability and focus on individual readiness make it a valuable model for understanding and facilitating change in MHNs, with a supportive tool to increase their sensitisation and provide them with the knowledge to recognise potential oral health problems in patients with psychotic disorders. Prochaska and DiClemente developed this model as a way to integrate the stages and processes of behavioural change by dividing it into six stages. Our previous study showed that MHNs act mainly in the first two stages of the model [21,23]: (1) pre-contemplation stage: MHNs do not intend to make behavioural changes in the foreseeable future; (2) contemplation stage: MHNs consider a behavioural change but do not yet make a firm commitment to change. To promote behavioural changes among MHNs, it is important to

first increase their sensitisation regarding oral health care in their patients. Developing a supportive tool based on the Prochaska and DiClemente model involves understanding the nuances.

The aim of this study was to develop a supportive tool for MHNs regarding oral health to increase their sensitisation and provide them with the knowledge to recognise potential oral health problems in patients with psychotic disorders.

Methods

Study Design

For this study, a qualitative human-centred design (HCD) approach was used to develop a tool that serves the dual purpose of raising sensitisation among MHNs and providing them with the knowledge to recognise oral health problems in patients with psychotic disorders. One widely recognised HCD framework for innovative design projects is the double diamond (DD) framework (Figure 1), originally devised by the Design Council [24]. This double diamond framework directs problem-solving thought processes within the HCD methodology. In the context of the present study, the focus was primarily on the "develop" and "deliver" phases of the DD framework, with the overarching objective of creating a tool that would effectively address key problem area [26], i.e., increase sensitisation and knowledge among end users, in this case, MHNs. The HCD approach utilised in this initiative, characterised by its participatory and iterative nature, departs from conventional methodologies by involving close collaboration between MHNs and experts by experience to gain a better understanding of patients' specific needs, which enables the design of tailored tools and provides MHNs with a significant role in guiding the development of solutions. Tools targeting MHNs were also indirectly linked to tools targeting patients with psychotic disorders. Therefore, the involvement of experts by experience was imperative to represent the patient perspective. Within the framework of this study, we employed three iterations (the first focused on developing the multi-criteria decision matrix (MCDM), the second aimed at creating an oral health tool for MHNs, and the third aimed at evaluating the feasibility of the oral health tool for MHNs).

The iterative stages and data collection activities within the DD research process are depicted in Figure 1.

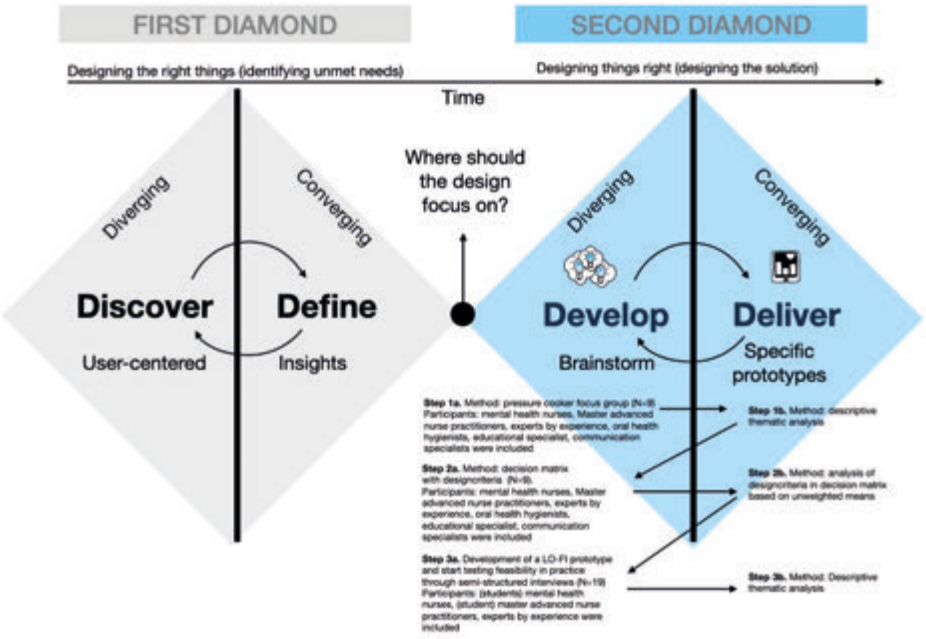

Figure 1. *The iterative human-centred design stages and data collection activities used in the second diamond of the double diamond model from the Design Council [24], adapted with permission from van 't Veer et al. [25].*

Study Population

For step 1a in our research process (pressure cooker focus group session), we recruited nine participants (four MHNs and five experts). To achieve maximum variation in our sample, participants were selected based on purposive sampling by the research team based on their knowledge and experience with patients with psychotic disorders and/or oral health problems. Participants were approached by e-mail, telephone, or face-to-face. For this focus group session, we included four professionals: one master's-level advanced nurse practitioner and three bachelor's-level MHNs, based on their knowledge of and experience with patients with psychotic disorders. Furthermore, we included five other specialists: an oral health hygienist who also had a master's in health innovation was included based on her knowledge of and experience with oral health and human-centred design;

another expert was included based on their experience with psychotic disorders and oral health problems; an education specialist was included based on her expertise in and experience with how to best transfer knowledge; and, finally, it was important to include a communication specialist based on their knowledge of and experience with conveying messages for the purpose of encouraging behavioural changes in MHNs.

In step 2a, the participants included in step 1a were invited to score the 15 prototype tools of the MCDM.

In step 3a, we included professionals: master's-level advanced nurse practitioners, bachelor's-level MHNs, and experts by experience based on convenience sampling. Participants were included based on their experience (in working years) with in- or outpatients with psychotic disorders, availability, and willingness to participate. The iterative process of sampling, data collection, and analysis was continued until data saturation was reached; no new codes were found in the last four interviews. Participants were approached by e-mail and recruited from the KieN Early Intervention Service (Leeuwarden), Lentis Psychiatric Institute (Groningen), Dimence psychiatric services (Zwolle), and Friesland Mental Health Care Services (Leeuwarden) in the Netherlands.

Data Collection

Step 1a: Pressure cooker focus group session

Before the start of the pressure cooker focus group session, participants were split between two groups (focus groups 1 (n = 5) and 2 (n = 4)), in which the research team ensured an even distribution of knowledge and experience. In terms of content, both groups discussed the same topics at the same time.

First, in step 1a, the session was divided into two parts. The first part was aimed at brainstorming around the question, "how can we make MHNs more sensitive of the urgency of paying attention to the oral care of patients with psychotic disorders?"

Because rapidity adds value to the creative process, we used the format of a pressure cooker session [26,27]. A pressure cooker session is a brief intensive session targeting essential topics in limited time**.** The benefits of a pressure cooker session

are that it can provide (1) a concrete plan and actions, (2) substantial time savings, (3) a concrete plan with actions, and (4) greater support for and commitment to the choices and actions [26,27]. To stimulate creativity, the pressure cooker session was divided into two subgroups. The input for the first part of the session was eight inspiration cards based on metaphors created by the research group (Appendix A). Casakin [28] noted that metaphors can help to identify and capture design concepts, as well as define goals and requirements and stimulate creative thinking. The inspiration cards were based on public campaigns in the Netherlands to raise sensitisation among people.

The second part of this brainstorming session aimed to identify solutions based on personas, as developed in our previous article [21]. These personas (Anna, Monica, Julia, and Paul) showed a diversity in attitudes and perspectives on oral health from MHNs. Furthermore, in the personas, there were differences in barriers, needs, and suggestions for interventions from MHNs. The personas were prepared by the research team and sent to participants prior to the session, and we asked them to empathise with each persona. The main question was, "considering the characteristics and circumstances of this person, which main problem should be solved and what needs do they have? And, if the MHNs were to meet the person in practice, what should they do and why?" Every session was audio-recorded and transcribed verbatim.

Step 2a entailed prioritising insights and concepts for prototypical tools aimed at enhancing the decision-making process utilising a multi-criteria decision matrix (MCDM) [29]. The MCDM involved a procedure for identifying the optimal and most viable solution based on established criteria and prevalent issues in the work of MHNs in the context of oral health care for patients with psychotic disorders. The input (15 possible tools) for the MCDM was derived from the analysis of the focus group results in step 1a. Using an MCDM [29] can enhance participants' decision-making ability by facilitating knowledge transfer, ensuring that all factors relevant to a decision are comprehensively considered and that the rationale behind decisions is clearly communicated. During the initial phase, the 15 possible tools were discussed, and seven criteria were formulated. These criteria, based on the work of Prochaska and Di Clemente (criteria 1–3) [22] and key critical success factors in implementation (criteria 4–7) [30], were that the tool should (1) enhance knowledge pertaining to oral health care among MHNs (not oral health

care specialists); (2) contribute to raising the sensitisation of MHNs regarding the importance of oral health; (3) motivate MHNs to engage in specific behaviours (call to action); (4) encourage the adoption of sustainable behavioural changes; (5) integrate seamlessly into existing operational work; (6) be positive; and (7) be implemented rapidly and with ease within organisations. The MCDM was sent to participants by e-mail. Subsequently, all participants (n = 9) were asked to assess each tool based on the design criteria using a numerical scale ranging from 1 (low criterion score) to 5 (excellent criterion score). Additionally, participants provided reasons for their scores for each criterion.

In step 3a, the tool was developed as a low-fidelity prototype based on the latest scientific insights from the literature (by SK, NB, and SB). This entailed creating a basic prototype to concretise ideas and facilitate testing [25]. Low-fidelity prototyping is a swift and efficient method by which to convert design ideas into tangible and testable artefacts. The primary and most critical function of low-fidelity prototypes is that they can evaluate and examine functionality, rather than focusing on the visual aesthetics of the product [25]. Participants were asked to critically review and identify areas for improvement in the low-fidelity prototype over 2 weeks. We conducted semi-structured interviews to explore the feasibility of the tested low-fidelity prototype in the field of mental health in a sample of participants who had not yet been involved in this study. Our objective was to evaluate the feasibility of the first low-fidelity prototype and investigate whether the individuals who were expected to be impacted by it were receptive to the tool and whether it would be pragmatic to contemplate its deployment in specific contexts. This could prevent the implementation of an intervention that does not apply to the target population or is, for example, too costly to implement [31]. For this purpose, a six-item topic list was developed based on a study by Bowen et al. on designing a feasibility study [30]. Six factors were identified that could be considered different aspects of feasibility: acceptability, demand, implementation, practicality, integration, and efficacy. Acceptability assesses people's reactions to a tool, like its suitability and their satisfaction; demand gauges estimated use and interest; implementation examines the scope, likelihood, and methods of comprehensive execution; practicality evaluates feasibility under resource, time, and commitment constraints; integration looks at the extent of systemic changes needed for incorporation; and efficacy focuses on the likelihood of success and the intended effects of the tool [30].

The semi-structured interviews were conducted online utilising Microsoft Teams, business version (Microsoft.com). Every session was audio-recorded and transcribed verbatim. The data were collected by a trained research nurse (SK).

The steps of data collection and analysis are visualised in Figure 2.

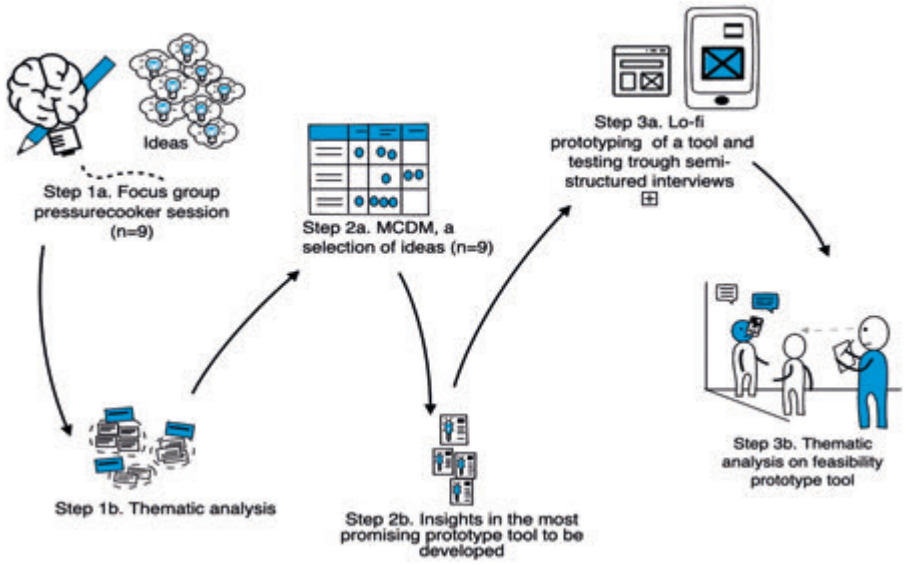

Figure 2. *Visualisation of the steps of data collection and data analysis employed in this study.*

Analysis

In step 1b, a thematic analysis [32] was employed as a guiding framework for the analysis of the transcripts. Data analysis was carried out utilising deductive and inductive thematic approaches to affirm or refute the conclusions [32]. During the development phase, structures and patterns emerged through the process of fragmentation, with open codes being assigned to these fragments. Data coding facilitated the identification of patterns within the data and group statements with thematic similarities [33]. In the reduction phase, the focus was on identifying coherent themes based on the assigned codes, followed by a process of revising and refining these themes. In the final phase, we engaged in critical reflections on the identified themes and overall analysis process [32]. The key themes of the context of patients and MHNs in practice regarding oral health, preferred oral health tools focused on MHNs of patients with a psychotic disorder, and the intended outcomes

of tools were discussed as they related to our research questions. Quotes were added to the themes to provide a rich description. The outcomes that emerged from the focus group were used for the MCDM. All data were analysed using Atlas TI version 9 (Atlasti.com).

In step 2b, a quantitative descriptive analysis of the numerical data derived from the MCDM was performed. Unweighted means were calculated for each participant and each design criterion. Ultimately, these were calculated for each tool. Finally, the full range of options and their cumulative scores were thoroughly discussed (by SK, JV, and NB), culminating in decisions made regarding the tool to be developed.

In step 3b, the results of the semi-structured interviews were deductively analysed using the steps of the thematic analysis (see step 1b) [32]. The results were presented based on the different aspects of feasibility. The key themes of acceptability, demand, implementation, practicality, integration, and efficacy were defined a priori for the analysis in step 3a.

Ethical Considerations

Standard rules governing good clinical practice and ethical principles, originating from the Declaration of Helsinki, were adhered to by informing all participants about the study and their rights and obtaining written informed consent from all subjects [28]. This study was conducted in accordance with the Declaration of Helsinki and approved by the independent Ethics Committee of the Medisch Centrum Leeuwarden (RTPO1173, 21 December 2023)

Permission for this research was obtained from the scientific research committees within the organisations KieN Early Intervention Service (Leeuwarden), Lentis Psychiatric Institute (Groningen), Dimence psychiatric services (Zwolle), and Friesland Mental Health Care Services (Leeuwarden), the Netherlands. In compliance with international safety regulations for data retention, all data from the design sessions will be stored for a period of 10 years at NHL Stenden University of Applied Sciences and will only be accessible to three of the authors (SK, NB, and JV).

Results

Participants and Outcome Focus Groups: Step 1

Step 1a took place in September 2023. For this first design session, we included four professionals and five specialists (*n* = 9). The total group consisted of seven women and two men; their ages ranged between 25 and 53 years (mean age: 40.5 years). Participant characteristics (profession, gender, age, educational level, and years of working experience) are given in Table 1. The pressure cooker session for focus groups 1 and 2 had a duration of 100 min (or 200 min in total).

The following key themes were mentioned in both focus groups: patients and MHNs in practice regarding oral health; preferred oral health tools, particularly for MHNs working with patients with psychotic disorders; and intended outcomes of tools. It is important to note that themes were interlinked (e.g., context was related to tools; tools were related to context and outcomes).

Key theme 1: Patients and MHNs in practice regarding oral health

Participants in both focus groups indicated that patients frequently experience dental issues. The expert by experience stated that many patients with psychosis do not pay much attention to oral health at all. Patients do not contemplate oral care (or self-care) and are genuinely focused on other matters.

The expert by experience indicated that when patients have oral problems (e.g., bad breath), nobody comments on them.

> "A patient is not aware of it himself; patients live in their own reality and if patients are ill, they simply are not always aware of it. MHNs need to bring this up for discussion." (Participant 9, MHN)

MHNs indicated that many patients with psychosis use medication. The influence of medication on oral health is known by some MHNs, but this is not always communicated to patients, suggesting that this should be considered when developing a tool. Participants stated that when patients need to visit the dentist, it incurs a significant cost, and they often do not have dental insurance. Consequently, patients are left with expensive bills, and they often do not have the necessary funds available.

Table 1. *Characteristics of professionals and experts included in steps 1 and 2 (n = 10).*

Part	Profession	Male/ Female	Age in Years	Education	Years of Working Experience	Focus Group
1	Communication specialist/content maker/expert by experience [1]	Male	31	Central Institute for Training Sports Leaders	5–9	1
2	Mental health nurse (flexible assertive community treatment)	Male	27	Bachelor of Nursing	0–4	1
3	Education and research consultant	Female	48	Bachelor of Nursing, Master of Educational Sciences	0–4	1
4	Lecturer in nursing research and mental health nurse	Female	53	Ph.D. student, Bachelor of Nursing, Master of Social Work, Master of Health Care	10–14	1
5	Oral health hygienist	Female	25	Bachelor of Oral Health Hygiene, Master of Health Innovation	0–4	1
6 *	Master's-level advanced nurse practitioner	Female	47	Ph.D., Master of Advanced Nursing Practice	>24	2
7	Team leader of Academy of Health and Out of the Box Thinking	Female	52	Bachelor of Movement Sciences	5–9	2
8 *	Mental health nurse (outpatients)	Female	50	Bachelor of Nursing	>24	2
9	Expert by experience	Female	32	Student, Bachelor of Social Work	0–4	2
10 *	Expert by experience [2]	Male	48	Associate degree for Expert by Experience	5–9	N/A

[1] This expert by experience (5) did participate in the focus groups but did not participate in the decision matrix. [2] This expert by experience (10) did not participate in the focus groups but did participate in the decision matrix. * Participants were also engaged in earlier studies [21].

Participants asserted that MHNs do receive information about toothbrushing during their education, but it ends there. The dental hygienist pointed out the importance of background information. It is crucial for MHNs to have background knowledge.

Furthermore, MHNs reported not always being aware of what to do in case of a dry mouth or when patients are unwilling or unable to brush their teeth.

MHNs indicated that they are caught up in daily routines and pay little attention to patients' dental health. Some MHNs did encounter issues but found it challenging to discuss them with patients.

> "For example, I also have a patient, and when I speak with her, I can see that she has a lot of dirt and plaque on her teeth. I discuss it with her every time, but she keeps saying, 'No, it's going well, and I will go to the dentist,' and I find that challenging. I try to bring up the topic of oral care again. However, I notice that she gets annoyed when I discuss it repeatedly." (Participant 6, MHN)

Key theme 2: Preferred oral health tools, focusing on MHNs working with patients with psychotic disorders

Participants discussed the tools that should be developed for MHNs to be sensitive in their support of patients maintaining and improving their oral health. However, they also mentioned that tools targeted at MHNs are also indirectly linked to tools aimed at patients with psychotic disorders and vice versa.

> "If MHNs do not have a clear understanding of the background of tools targeting patients with a psychotic disorder, MHNs cannot address, advise, or monitor them effectively." (Participant 4, MHN/lecturer)

In both focus groups, a wide range of tools to support MHNs in maintaining oral health in patients with psychotic disorders was suggested.

MHNs stated that it is their responsibility to remind patients about daily routines, as mere verbal reminders may not prompt action from patients. Participants suggested developing a reminder in the form of a sticker that patients can place on a mirror (tool 3). Indirectly, MHNs will also see this and then address the issue. Par-

ticipants stated that it is important for patients with psychotic disorders to have at least a toothbrush, toothpaste, and interdental brushes (tool 2). They suggested providing these in a nice toiletry bag (focus group 2) or a small box (focus group 1). This applies to both inpatients and outpatients.

> "If we provide this to every patient when they start receiving care, it also prevents us from discovering too late that the materials are not available. This is crucial because patients with a psychotic disorder often do not think to bring these items. If we routinely include this during the anamnesis, it will not be forgotten by MHNs." (Participant 2, MHN)

The dental hygienist emphasised the importance of patients having mouthwash (tool 2). This is especially significant as the 2-minute toothbrushing routine can sometimes be a significant task. If it proves to be genuinely challenging at any time, they can use mouthwash. However, it is important to note that mouthwash is not a substitute for toothbrushing; bad breath is caused by the presence of bacteria in the mouth that produce odours.

> "Mouthwashes can aid in combating these bacteria and temporarily freshening the breath. Additionally, it is important for the toothpaste to contain fluoride, as fluoride is known to protect the teeth against acids and sugars."(Participant 5, oral health hygienist)

Participants discussed the importance of narrative stories (e.g., on problems with oral health or the benefits of good oral health), as provided by experts by experience (tool 1). Members of both focus groups suggested that these narrative stories could be recorded in a video or be part of a tutorial in which an MHN engages in a conversation with an experienced expert. The discussion should focus on the details of what happened and what the expert did to improve a patient's oral health.

> "Yes, that's a great idea, and let's especially emphasize the benefits of good oral health to keep it positive." (Participant 1, experienced expert/communication specialist)

The participants in both focus groups emphasised that the videos are also beneficial for MHNs as these direct experiences can lead to increased sensitisation and

knowledge. Members of both focus groups suggested organising clinical lectures (tool 8) for students in nursing education programmes in which experts by experience could share their narratives. Allowing these individuals to elucidate the significance of proper oral care and its impact on patients' lives could raise the sensitisation of prospective nurses regarding the importance of addressing this matter.

Participants in both focus groups stated that posters (tool 12) may increase awareness among MHNs as well as patients. Posters could be hung up in the Waiting Room/Office Living Room/Hallway/Drop-in Centre for Homeless Individuals. Here, a limitation was seen: they often have to be replaced to attract attention.

Participants in both focus groups proposed developing daily schedules with patients (tool 9); MHNs and patients with psychotic disorders could create a schedule together. In addition to activities such as bathing, dressing, and eating, oral care could also be scheduled within this routine. This daily schedule would ensure that both patients and MHNs have a reminder, making them both aware of its importance. The dental hygienist emphasised the importance of reintegrating dental care into patients' daily routines.

Members of both focus groups suggested that it would be beneficial to develop a brochure to provide to patients with psychotic disorders upon admission (tool 4). When asked about the content of the brochure, participants indicated that it should contain information about the importance of oral care, risk factors, oral complaints, physical symptoms, psychological symptoms, shame, fear, medication side effects, and dental consequences, as well as nutrition. Additionally, members of focus group 2 suggested that the brochure should include a detachable awareness screener (tool 5) for MHNs to revisit later. This awareness screener should include questions about patients' satisfaction (or dissatisfaction) with their oral health, what changes they would like to make, and what they would need in order to make those changes.

> "In the hospital, you would also have an awareness screener to verify if the brochure has been distributed and discussed, enabling a later follow-up. These are the focal points." (Participant 8, MHN)

Furthermore, participants in focus group 2 indicated that an engaging, positive, light-hearted, and humorous video (tool 6) could potentially motivate MHNs to place greater emphasis on oral care.

Participants in focus group 1 deemed it essential for nurses to have an instrument that provides insight into the current oral care of patients with psychotic disorders (e.g., OHAT) (tool 14). Additionally, participants in focus group 1 discussed OHIP (tool 13) as a brief assessment tool where oral health-related quality of life is assessed. This might give MHNs insight into patient experiences and impacts.

Participants indicated that it would be important to have all the information gathered in one place on a website (tool 15) (focus group 1). It would be advantageous to have a QR code on a card, enabling scanning for quick access to the information. Participants stated that this might also contribute to the sustainability of integrating tools to help MHNs focus on oral health care. The website could also incorporate supplementary videos, such as instructional videos pertaining to oral care (tool 7). Participants (focus group 1) also noted that there already exists online information on tooth brushing, such as a reference card on not overlooking the mouth (tool 10) (in Dutch: Zakkaartje de mond niet vergeten; in English: Pocket card: Do not forget oral care) and a reference card on brushing techniques (tool 11) (in Dutch: Zakkaartje poetsen doe je zo; in English: Pocket guide: How to clean properly).

Key theme 3: Intended outcomes of tools

All participants in both focus groups expected behavioural changes in MHNs regarding their focus on oral health care and oral disease prevention. The intended outcomes of the tools were discussed in both focus groups. Participants noted that the tools outlined in the paragraph above would enhance the sensitisation and knowledge of MHNs due to the availability of information and materials and would enable MHNs to engage in conversations with patients with psychotic disorders. Participants stated that these should serve as the primary outcome measures. Furthermore, participants said that it is essential that the tools be sustainably implemented and not intended for one-time use.

MCDM Results: Step 2

Step 2 took place in October 2023. The participants (*n* = 9) assessed all 15 tools derived from the pressure cooker focus group session (Table 1). Table 2 shows the unweighted total mean scores of tool prototypes in the MCDM (ranked high–low).

The results in Table 2 indicate that participants preferred that multiple tools be developed within a toolkit for oral health. The results demonstrate that a brochure for MHNs and patients (prototype 4) achieved the highest unweighted mean score (mean 4.0). Although the awareness screener received slightly lower scores (mean 3.7), the research team elected to incorporate an awareness screener into the brochure as this could provide a tangible way to facilitate dialogue (Table 2).

Table 2. *Total of unweighted mean scores of prototypes of tools in the MCDM ranked based on highest mean (n = 9).*

Tool	Prototype	Mean	Focus Group
4	Brochure for MHNs and patients: Importance of Oral Care Risk Factors Oral Complaints Physical/Psychological Symptoms Shame/Anxiety Medication Side Effects Dental Consequences Nutrition	4.0	1 and 2
8	Clinical Education Session involving the presentation of experiential narratives to students by experiential experts (successful stories).	3.9	1 and 2
15	A website where you can access all information easily and conveniently through a QR code.	3.9	1
5	Awareness screener as an insert in the brochure (prototype 4) for future reference: Assessing your satisfaction (or dissatisfaction) with your oral health, identifying desired changes, and determining the necessary steps.	3.7	2
11	Pocket Card: This Is How You Brush Your Teeth. A compact card illustrating oral care practices.	3.6	1
13	Assessment of the Impact of Oral Health Care on Quality of Life (OHIP 14): A brief, validated questionnaire comprising 14 questions regarding perceived oral health over a one-month period.	3.6	1

Table 2. *Total of unweighted mean scores of prototypes of tools in the MCDM ranked based on highest mean (n = 9). (continued)*

Tool	Prototype	Mean	Focus Group
14	Oral health screening: (validated for non-dental professionals in Dutch).	3.5	1
7	Instructional Video for Patients and MHNs on How to Brush and Floss Teeth.	3.5	1 and 2
1	Video: Nursing Professional and Expert by Experience: A Discussion of Personal Narratives Concerning Oral Health Care. This encompasses an exploration of first-hand experiences relating to oral health care. Queries addressed include the nature of these experiences, the methodologies employed for managing them, the status of the involved individuals' oral health, and the outcomes or benefits that have been realised.	3.4	1 and 2
3	Mirror-Based Dental Care Reminder Sticker.	3.4	1 and 2
9	Daily Schedule for Patients: In this daily schedule, patients, and nursing staff collaboratively document activities such as waking up, breakfast, medication, and toothbrushing.	3.4	1 and 2
2	A toiletry bag or box (M/F) containing the following items: Toothbrush Toothpaste (containing fluoride) Dental floss picks Mouthwash Plaque-disclosing tablets (a literature-supported pill that highlights dental plaque)	3.3	1 and 2
12	Poster for Waiting Room/Office Living Room/Hallway/Drop-in Centre for Homeless Individuals.	3.3	1 and 2
10	Pocket Card: Do not Forget Your Oral Health. This card facilitates discussion about current oral care practices (self-care, dental visits, dental condition).	3.2	1
6	Toren C Instructional Video on Toothbrushing that is light-hearted, positive, and very humorous.	2.9	2

Development of the Brochure with Awareness Screener and the Outcomes of the Feasibility Test: Step 3

Development of the Brochure with Awareness Screener

As part of a larger toolkit, and based on the highest mean scores, the research team decided to start developing a brochure for MHNs, and the research team elected to incorporate an awareness screener into the brochure as this could provide a tangible way to facilitate dialogue. The brochure with an awareness screener was developed as a low-fidelity prototype based on the latest scientific insights from the literature (by SK, NB, and SB). The brochure was developed after the MCDC.

The content of the brochure covered the following: 1. Introduction: The Importance of Good Oral Health; 2. Psychological and Social Complaints | Stigma; 3. Physical Complaints; 4. Risk Factors; 5. Nutrition; 6. Medications, Side Effects, and their Impact on Dental Health; 7. Problems in the Mouth; 8. Advice: What Advice Can You Give Your Patients?; 9. Awareness Screener (Appendices D and E).

The perceived advantage of a brochure is that it can provide a foundational knowledge base which creates sensitisation, enabling MHNs to engage in conversations with patients with psychotic disorders. Furthermore, it is beneficial for MHNs to go through and complete the awareness screener together with their patients. By incorporating a visual analogue scale (VAS) [34] into the awareness screener, care actively involves patients, potentially enhancing the integration of oral health care into routine nursing practices.

Outcomes Feasibility Test

Step 3a took place in November 2023. For the semi-structured interviews (n = 19), 12 professionals and seven experts by experience were included. The total group consisted of 12 women and five men; their ages ranged between 27 and 58 years. Participant characteristics (gender, age, profession, educational level, years of working experience, working with in- or outpatients) are given in Appendix C. Each session had a duration of 30–90 min.

The results were analysed in terms of different aspects of feasibility: acceptability, demand, implementation, practicality, integration, and efficacy [30].

Acceptability

All participants expressed high satisfaction with the brochure (Appendices D and E). The feedback characterised it as clear, engaging, pertinent, aesthetically pleasing, well organised, and informative, particularly regarding aspects previously unknown to nursing professionals. Participants said it was commendable that this now exists and receives attention.

All participants thoroughly scrutinised the brochure along with the awareness screener. Most of them also reviewed the brochure and screener with their colleagues, and two participants reviewed them with a patient. The discussions covered their findings and, based on their input, the content of the brochure was revised accordingly (Appendices D and E). The brochure included the following sections: (1) Introduction: The Importance of Good Oral Health; (2) Psychological and Social Complaints | Stigma; (3) Physical Complaints; (4) Risk Factors; (5) Nutrition; (6) Medications, Side Effects, and their Impact on Dental Health; (7) Problems in the Mouth; (8) Advice: What Advice Can You Give Your Patients?; and (9) Awareness Screener.

Participants held various views regarding the language that should be used in a brochure. Two participants thought that the brochure was written in an overly complex manner and thus might be inaccessible to MHNs. They indicated that it primarily concerns others and not themselves. Two participants thought that the language was too simplistic. Other participants found the language to be well tailored to their needs.

All participants said the brochure was highly effective at fostering sensitisation. In particular, the visual analogue scale (VAS), part of the awareness screener, was well suited for this purpose. The VAS is a psychometric measurement tool comprising a linear scale with opposing statements at each end. By asking patients about their satisfaction with their oral care and how they perceive their dental hygiene practices, the scale offered opportunities to initiate dialogue.

Participants stated that the brochure could prompt reflection and moments of realisation among nursing professionals.

> "Content-wise, the brochure is exceptionally strong for MHNs. It is a comprehensive brochure covering diverse topics, including general oral care. For myself, it is also beneficial to read. This prompts consideration of personal application... This brochure is useful for everyone to look through. It particularly emphasizes the risks, underscoring the importance of proactive engagement with these issues." (Participant 9, MHN and somatic screening practitioner)

Participants deemed the brochure suitable for implementation and practical use. The brochure aligns with the norms and values of organisations, notably in terms of recovery-supportive care. It also resonates with the autonomy-enhancing mission of these organisations, where motivational interviewing also plays a significant role.

Demand

The participants acknowledged that, currently, there is no actual demand for this brochure as oral health care is not a consideration for many MHNs, nor for many physicians. They perceived a consistent pattern of the profession reacting slowly to emerging issues. Therefore, participants emphasised the importance of effectively implementing the brochure.

> "There is no explicit demand for this; we conduct our work without adequately focusing on oral care. However, this neglect is intrinsically related to the demographic with psychotic disorders. Although the demand might not be apparent, if we as nurses provide the service and remain attentive, then such a brochure, I surmise, would be beneficial in enhancing our alertness to these needs." (Participant 3, MHN and somatic screening practitioner)

Some participants indicated that the lack of demand is not at all unusual. If no one considers it, then no demand arises. Almost all participants suggested that the brochure, now that it is available and has been modified in terms of content, will attract considerable interest. Furthermore, all participants expressed their intention to actively utilise it in their professional practice.

Implementation (expected issues)

All participants said that the brochure was suitable for implementation and, consequently, for practical application. They asserted that effective implementation will be critical for its success. However, some participants indicated that it might

be challenging to implement in a high intensive care (HIC) environment, where patients often have short stays and return home as soon as their most severe symptoms subside. When patients transition to a different department following a crisis, the brochure could be helpful as they commence their recovery process. Participants had varying opinions regarding the department where the brochure could be implemented. Some participants thought it would be suitable for HIC units, others only for clinical treatment wards. Conversely, a few believed it is not appropriate for long-term care units and should be limited to the HIC setting. However, all participants agreed that the brochure would certainly add value in the outpatient setting.

In discussions with participants, the tools needed for implementation were explored. Participants suggested that the topic of oral care and the brochure should be included in routine somatic screenings, which occur monthly or sometimes annually, to ensure follow-up. Some participants proposed integrating it into patients' daily schedules, akin to medication routines. They also mentioned its compatibility with the WHO's International Classification of Functioning, Disability and Health (ICF) framework, though this model has not yet been implemented [35]. Furthermore, all participants agreed that merely placing the brochure in a department is insufficient. They stressed the importance of providing a simultaneous clinical lesson so that the brochure can serve as a reference. Additionally, an eye-catching factsheet could be created to spark curiosity among MHNs.

Participants indicated that there are circumstances for patients that make it more challenging for them to address their oral care. These include the following: (1) Some patients, due to traumatic experiences or re-experiencing a trauma, may find it intolerable to have a toothbrush in their mouth. (2) Patients with psychotic disorders often use medication that leads to frequent thirst and hunger. They tend to compensate for this by consuming excess sweet beverages and making poor dietary choices. MHNs do not always have control over this, especially in a home setting. Therefore, employing motivational interviewing as a technique with patients is crucial. (3) Patients who are not insured for dental care must bear the costs of treatment themselves. They are often financially incapable of doing so. This also applies to simpler materials such as mouthwash. (4) For MHNs, it is essential to ascertain whether patients possess basic oral hygiene items such as a toothbrush

and toothpaste. Participants reported that it is not uncommon for patients to lack these essentials due to their illness.

Almost all experts by experience perceived a distinct role for themselves in initiating discussions about oral care with patients. Experts by experience could also serve as intermediaries between patients and MHNs. In the context of recovery-oriented care, once a patient's initial crisis has passed, it would be feasible for experts by experience to broach the topic.

Practicality

Most participants indicated that there are likely to be no negative effects. However, two participants acknowledged that some MHNs might express reluctance; one remarked, "Oh, now there's something else added to our plate, as if we don't have enough to do already" (Participant 1, social psychiatric nurse).

All participants believed that the brochure was not complex in content and could effectively inform patients. It is expected that MHNs will be able to translate the information from the brochure to meet the specific needs of individual patients.

> "Precisely because the brochure effectively emphasizes the importance of oral care, it leads to an increased sensitization among nursing professionals about their role in oral health, making it difficult for them to overlook this aspect any longer." (Participant 8, mental health nurse and somatic screening practitioner)

The costs were discussed with the participants. No participants (MHNs and experts by experience) expected the implementation of this brochure to incur a high cost. One participant said the following:

> "Health insurance providers should ideally include preventative oral care in their basic coverage plans. It is peculiar that while lifestyle programs for overweight individuals are offered at no cost, dental care does not receive the same treatment. This is a significant issue, as proper oral care is equally vital for overall health." (Participant 5, advanced nurse practitioner)

Among the participants, three had a Bachelor of Business Administration in business economics (participants 6, 12, and 17). As the costs were discussed, these

participants asserted that oral care should be an integral part of the daily responsibilities of mental health nurses (MHNs) and that they should actively engage in it. When it comes to training personnel, such as with a clinical lesson, this does involve some staff hours.

> "Another important consideration involves key stakeholders, e.g., health insurers. Given the significant costs associated with oral care, particularly for uninsured individuals, it may be prudent to seek contributions from them. Addressing oral care is relevant not only from a health perspective but also from a business standpoint. Additionally, poor dental health can lead to embarrassment and social withdrawal, hindering participation in society and employment opportunities. This is where local governments can also play a role, potentially by subsidizing costs." (Participant 12, master's student in advanced nursing)

Integration

The sustainability of the brochure was a recurrent theme in all discussions. To ensure enduring impact, it is crucial to have an accompanying clinical lesson. Furthermore, participants deemed it important to have a staff member (or innovator) within a department or organisation acting as a driving force to conduct the clinical lessons and ensure that the topic is discussed during team meetings. During the discussions, the concept emerged of developing a "train the trainer" programme for oral health in mental health. Ownership of a topic is important for motivation and stimulation and can be a point of contact.

> "Nurses who take ownership of a specific topic tend to work with greater dedication and enthusiasm." (Participant 12, master's student in advanced nursing)

Efficacy

All participants agreed that the brochure, accompanied by an awareness screener, contributes to MHNs' sensitisation and knowledge regarding oral health. Additionally, it can help provide education to patients, thereby facilitating discussions about oral care. Whether this will be achieved depends on the implementation, which is the foundation for everything else.

More than half of the participants stated that it is crucial to discuss the brochure with patients so that MHNs can tailor the content of the education to meet the

needs of the individual patient. This implies that, with adequate attention paid to implementation, a certain degree of efficacy might also be anticipated. All participants acknowledged a renewed sensitisation of the importance of oral care and affirmed that they will certainly incorporate and apply this knowledge from now on when the situation requires it.

Discussion

This study is part of a larger research project aimed at developing a toolkit comprising various tools for MHNs and oral care. To the best of our knowledge, this is the first study with a human-centred scientific approach involving a collaboration between MHNs and experts by experience to develop a tool that serves the dual purpose of (1) raising sensitisation among MHNs and (2) equipping them with knowledge on maintaining oral health in patients with psychotic disorders.

The results of the discussions with MHNs show the following: (1) Of the 15 suggested tools, a brochure with an awareness screener regarding oral health in patients with psychotic disorders is considered the most feasible that would contribute to the sensitisation and knowledge of MHNs. (2) Significant additions to the brochure would include a clinical lesson and the provision of materials (such as a toothbrush and toothpaste) to ensure that all patients are able to follow up on the given advice. (3) There are diverging opinions concerning the applicability of the brochure among various populations of patients. (4) There are different preferences regarding the level of the language in which the brochure for MHNs should be written. (5) The costs of oral health prevention (e.g., materials and dental hygienist visits) might be significant, and usually fall to patients who, in many cases, cannot afford it.

To elaborate on the first finding, in the pressure cooker session, MHNs and experts by experience identified 15 tools as essential to have in a toolkit for initiating oral care activities. Based on the MCDM, a brochure with an awareness screener regarding oral health in patients with psychotic disorders was the most appropriate tool to start with. This is in line with our earlier research, in which we found that MHNs need more education to effectively include physical health promotion (such as oral health) in their activities [21]. Barik et al. [36] found that traditional health promotion media such as brochures are useful, especially for adults. As part of a

larger toolkit, the brochure with an awareness screener was found to be feasible and could contribute to the sensitisation and knowledge of oral health among MHNs. The results indicate that MHNs will engage with the brochure's content and intend to take action to change their behaviour around patients' oral health. This suggests that the brochure with its awareness screener could help MHNs progress from pre-contemplation (stage 1) and contemplation (stage 2) to preparation (stage 3) and action (stage 4), according to Prochaska and DiClemente's behavioural change model [22].

Furthermore, implementation within organisations is indispensable as the next step of the Prochaska and DiClemente behavioural change model (step 5) [22] so that MHNs will adhere to their change of behaviour. Here, it is important to note that insufficiently implemented interventions are less effective, causing MHNs to regress to their previous behaviours. The Fogg behavioural model [37] states that people can only achieve behavioural change when three elements are present simultaneously: motivation, ability, and a trigger. This means that when MHNs are motivated to actively change, as shown in this study, they need a trigger, which is something or someone that encourages individuals to act when their motivation is high but their ability is low. These triggers could be innovators or early adopters [38] who prompt action by modelling the behaviour, making it easier for others to initiate. MHNs could be those facilitators when they take professional leadership. In the literature, professional leadership is defined in terms of personal leadership, such as being proactive, being a role model, taking initiative, being self-reflective, showing assertiveness or courage, and focusing on good cooperation [39]. The question of how MHNs can take a professional leadership role and take responsibility for their role is highly relevant in this regard [21]. On the one hand, this starts with sensitisation, knowledge, responsibility for acting, and actual implementation, and the brochure provides a foundation for this purpose. On the other hand, it also requires individuals who demonstrate professional leadership to actively engage with the brochure, specifically concerning the topic of oral health. To improve ability, the suggested clinical lesson should be developed in an easy and accessible way to make it a worthwhile investment in terms of both content and time [37]. The adequate implementation of interventions in organisations is a highly relevant issue but was not within the scope of this study. Regarding the expected effects, definitive statements cannot be made, but the research can be continued to explore this further.

To elaborate on the second finding, notable enhancements to the brochure would include providing a clinical lesson and offering patients a toothbrush and toothpaste. This suggests that additional tools and materials in a toolkit are needed to facilitate the implementation of interventions in a manner that is both actionable and potentially sustainable. Based on the present study, we cannot (yet) say anything about the actual effectiveness of these tools regarding knowledge and awareness about oral health among MHNs. Further research into the design of a more comprehensive toolkit to help MHNs with maintaining and improving oral health in patients with psychotic disorders is indicated.

The third finding was that there are diverging opinions concerning the applicability of the brochure with the awareness screener when considering various populations. The content of the brochure was developed for MHNs who care for patients with psychotic disorders. A recent review shows that PTSD is a common problem among people with psychosis, with a prevalence of 14–47% [40]. The prevalence of trauma focused on the face or mouth is not known. When trauma is focused on the face or mouth, it might be important to develop alternative strategies in collaboration with oral care specialists. This also applies to patients with, e.g., eating disorders who frequently regurgitate and have other needs regarding oral health [41]. The prevalence of anorexia nervosa in patients with psychotic disorders has been approximated to be between 1 and 4% [42]. However, even though this pertains to relatively small groups, the expectation is that the brochure will be useful in most cases.

The fourth finding was that there are diverging views concerning the level of language proficiency at which a brochure ought to be composed. A general recommendation is to write a brochure at the CEFR B1 level, which means using language that is understandable to virtually everyone [43]. This presents a complexity, however. The brochure is tailored to a target group: MHNs. In the Netherlands, MHNs operate at three distinct levels: secondary vocational education in nursing, bachelor's level in nursing, and master's level in nursing. Given these three distinct levels, for the purposes of this study and in the absence of explicit guidelines, it was decided to align the text with the demographic for whom it should be most easily comprehensible (i.e., CEFR B1).

Despite the fifth finding of our study, that oral health care comes with financial costs that patients may not be able to meet, oral health management (e.g., dental visits, dental hygienist visits, materials to maintain oral health) is nevertheless important to prevent problems in later stages of illness as well as physical problems (such as problems in diabetes type 2). During admission, patients should be more adequately evaluated and supplied with essential items (such as toothbrushes, toothpaste, and mouthwash). Currently, these costs fall to patients, unless they have dental insurance (in the Netherlands). Previous research has demonstrated that many patients are unable to afford additional dental insurance [8,23]. This seems to be a bigger social problem that needs more attention. Policy- and decision-makers should consider providing free dental care for people with psychotic disorders, given the importance of oral health to overall health. The government, municipalities, and mental health organisations—together with health insurance agencies—should work on adjusting services regarding insurance plans and alleviating the financial problems of this vulnerable group of young patients.

Strengths and limitations of this Study

Within this study, we applied various populations and methods for triangulation, which enhanced the validity of the findings by combining diverse methods. This approach is crucial for mitigating the inherent biases that can arise when relying solely on a single method, as is often seen in more conventional qualitative research. The broad range of information sources utilised in this study, coupled with the application of the MCDM methodology, provided a robust means of scrutinising tools and enhanced the ecological validity.

The methods used in this study and the results contribute to the pragmatic validity of the brochure with an awareness screener. Pragmatic validity refers to the extent to which it can be expected that the respective action will yield the intended outcome, rather than the actual effectiveness of actions taken [44]. Thus, the outcomes of this research indicate the need for further research.

During the decision-making process in this study, the MCDM approach was adopted. Within the MCDM framework, weights are assigned to various criteria upon which scoring is based [29]. Criteria such as sensitisation and knowledge could potentially be counted twice. However, this was deemed to be not conducive to

the decision-making process in this research. Additionally, it was presumed that this approach did not have any influence on the outcomes.

This research was focused on developing and refining a tool. Although numerous professionals and specialists participated in this study, financial experts were not included; but, had they been, they might have provided valuable advice regarding the cost implications. In our feasibility test, costs were discussed; however, the depth of this discussion was limited due to a lack of expertise in this area. Consequently, it is not clear whether this might have biased the results, which means that cost could be considered in future steps building on this research.

All participants expressed enthusiasm for the topic of oral health and promptly responded to the invitation to participate. However, until now, their engagement with the subject has been limited. It is therefore possible that we did not include participants who are not interested in engaging with the topic.

This study was conducted among a sample of MHNs and experts by experience distributed throughout the northern and eastern parts of the Netherlands. While the number of semi-structured interviews in the third phase was modest (n = 19), we were confident that we reached data saturation as no new information was retrieved in the last four interviews.

Conclusions

This study shows the importance of starting with increasing sensitisation among MHNs and providing them with the knowledge necessary to recognise oral health problems in patients with psychotic disorders. MHNs need a toolkit with a combination of different interventions. To start, a brochure with an awareness screener was developed. The brochure is an accessible tool that was developed in collaboration between MHNs and experts by experience and it is immediately applicable in practical settings. The content of the brochure is tailor-made and demonstrates what MHNs require, and it matches the most relevant stages of readiness for behavioural change in MHNs. Future steps to build upon this research, with the aim of further refining and optimising the process by which oral health tools are to be

used by MHNs, should refine the eligibility criteria for psychiatric populations and the language level of the target group.

The human-centred design (HCD) process, involving an intensive collaboration between mental health professionals and experts by experience, yielded meaningful results. This study shows that actively involving MHNs and experts by experience in the development process can initiate change. Many MHNs and experts by experience were motivated to test the brochure, which also demonstrates a significant level of engagement with the issue of oral health and that MHNs are willing to act but lack the necessary tools.

The overall procedure of the research methods used in the development process can be used to develop a variety of tools and demonstrates that not all tools need to be overly complex. This approach provides a foundation upon which to begin implementation and allows MHNs and experts by experience to provide input and feedback to promote engagement, responsibility, and professional leadership, which could enhance the sustainability of the tool.

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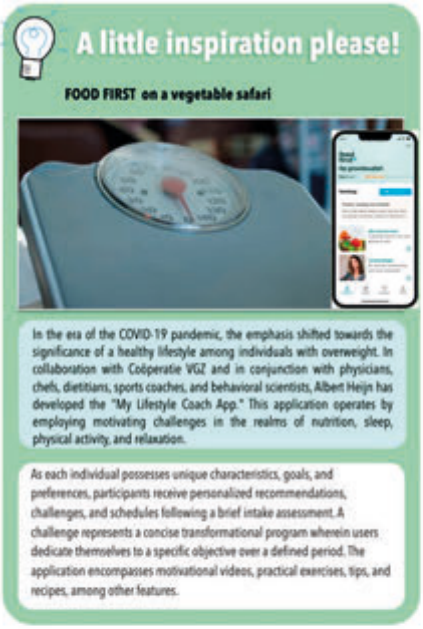
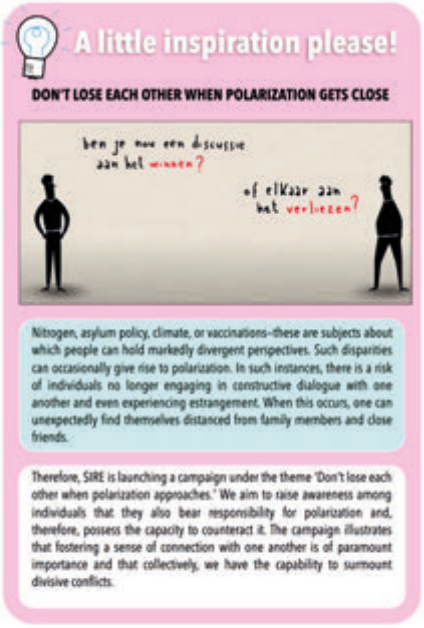
Appendix A A selection of the Inspiration Cards used to inspire creativity in MHNs during the focus group.





Appendix B Topic list feasibility semi-structured interviews

Gender _____

Age _____

Educational level _____

Profession _____

Years of working experience with patientswith a psychotic disorder _____

Working with in- or outpatients _____

Topics	Sample questions
Acceptability	To what extent is the brochure with awareness screener judged as suitable, satisfying, or attractive to MHNs? Participants satisfaction and intention to start using? Does it fit within organisational norms and values? What substantive changes or additions are there?
Demand	To what extent is this brochure with awareness screener likely to be used (i.e. How much demand is likely to exist?). Is there any expressed interest?
Implementation	To what extent can this brochure with awareness screener be successfully delivered to MHNs in care for patients with a psychotic disorder? What Success or failure or can we expect? Are there resources or tools needed to implement? Which factors can possibly affect implantation?
Practically	To what extent can this brochure with awareness screener be carried out with MHNs using existing means, resources, and circumstances and without outside intervention? Do you have examples? Are there any positive or negative effects expected? Can you tell something about expected costs?
Integration	To what extent can this brochure with awareness screener be integrated within the context of work? Do you have examples? Perceived sustainability? Costs to organisation?
Efficacy	Does this brochure with awareness screener show promise of being successful with MHNs? What intended effects do you expect?

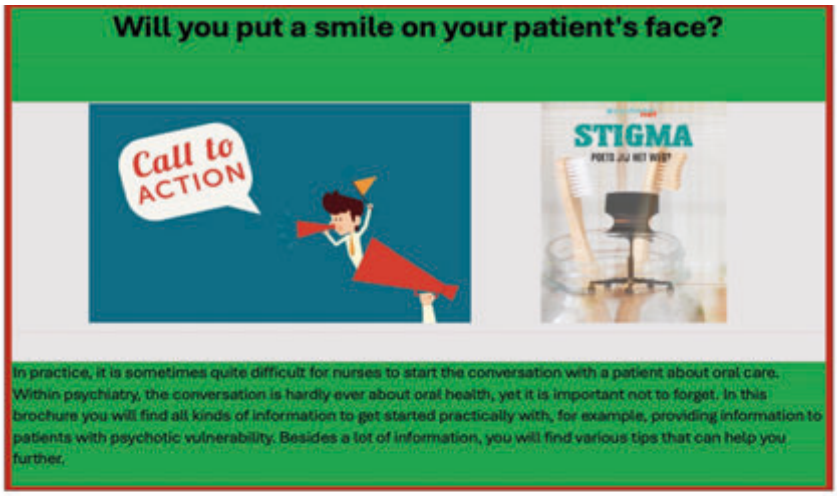
Appendix C. Characteristics of Professionals and Experts Included in the semi structured interviews (n = 19).

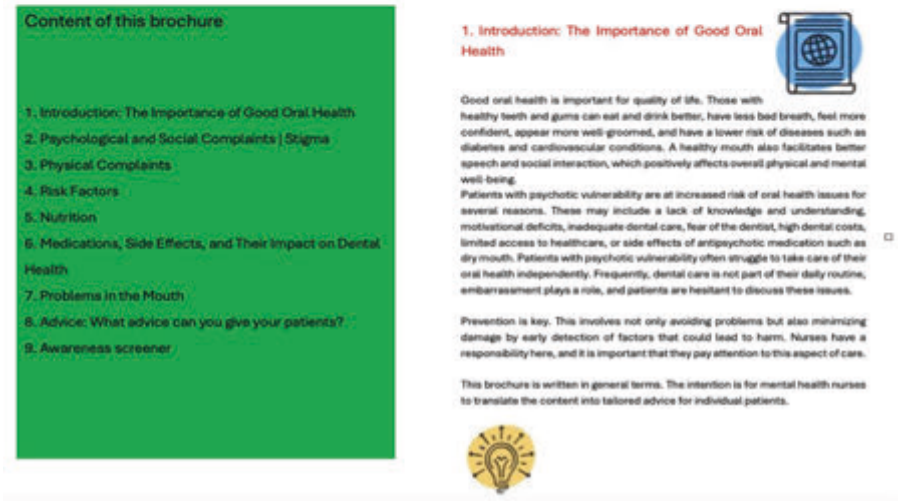
	Male/ female	Age in years	Profession	Education	Years of Working experience	In- or outpatients
1	Female	27	Social psychiatric nurse	Bachelor of Nursing, Social Psychiatric Nursing	5	Outpatients
2	Female	26	Student Bachelor of Nursing	Last year student Bachelor of Nursing	2	Outpatients
3	Female	34	Mental health nurse and somatic screening	Bachelor of Nursing	2	Outpatients
4*	Female	50	Mental health nurse	Bachelor of Nursing	28	Outpatients
5	Female	35	Master advanced Nursing Practitioner	Master advanced Nursing Practice	12	Outpatients
6	Female	39	Master advanced Nursing Practitioner and manager of treatment affairs	Master advanced Nursing Practice |Bachelor Business Administration	18	Outpatients
7*	Female	30	Master advanced Nursing Practitioner	Master advanced Nursing Practice	5	Inpatients
8	Female	48	Master advanced Nursing Practitioner	Master advanced Nursing Practice, PhD	20	Inpatients
9	Female	58	Mental health nurse and somatic screening	Bachelor of Nursing	20	Outpatients
10	Female	45	Mental health nurse	Master advanced Nursing Practice	13	Outpatients

	Male/ female	Age in years	Profession	Education	Years of Working experience	In- or outpatients
11	Male	44	Mental health nurse	Secondary vocational education in Nursing	3	Outpatients
12	Female	45	Student Master advanced Nursing Practice	Student Master Advanced Nursing Practice| Bachelor Business Administration	14	Outpatients
13	Female	32	Expert by experience	Associate degree for Expert by Experience, Bachelor Social work	5	Inpatients
14	Male	35	Expert by experience	Associate degree for Expert by Experience	5	Inpatients
15	Male	32	Expert by experience	Associate degree for Expert by Experience	3	Inpatients
16	Female	37	Expert by experience and client participation representative	N/A	20	Inpatients
17	Female	44	Expert by experience	Associate degree for Expert by Experience, Bachelor Business Economics	2	Inpatients
18	Male	33	Expert by experience	Associate degree for Expert by Experience	2	Inpatients and outpatients
19	Male	34	Expert by experience	Associate degree for Expert by Experience	4	Outpatients

*Participants were also engaged in earlier studies [25]

Appendix D. Preview of the lay out of the brochure.





Appendix E. Content of the brochure with awareness screener for MHNs (translated from Dutch).

Introduction: The Importance of Good Oral Health

Good oral health is important for quality of life. Those with healthy teeth and gums can eat and drink better, have less bad breath, feel more confident, appear more well-groomed, and have a lower risk of diseases such as diabetes and cardiovascular conditions. A healthy mouth also facilitates better speech and social interaction, which positively affects overall physical and mental well-being.

Patients with psychotic vulnerability are at increased risk of oral health issues for several reasons. These may include a lack of knowledge and understanding, motivational deficits, inadequate dental care, fear of the dentist, high dental costs, limited access to healthcare, or side effects of antipsychotic medication such as dry mouth. Patients with psychotic vulnerability often struggle to take care of their oral health independently. Frequently, dental care is not part of their daily routine, embarrassment plays a role, and patients are hesitant to discuss these issues.

Prevention is key. This involves not only avoiding problems but also minimizing damage by early detection of factors that could lead to harm. Nurses have a responsibility here, and it is important that they pay attention to this aspect of care.

This brochure is written in general terms. The intention is for nurses to translate the content into tailored advice for individual patients.

Psychological and Social Complaints | Stigma

Oral health is a significant aspect of quality of life, influencing comfort, appearance, and social acceptance. Given that many psychiatric issues are related to self-esteem and self-confidence, oral health quality is a particularly important factor for patients with psychotic vulnerability.

Poor oral health can disrupt self-identity and the ability to form relationships with others. The interplay between oral health and psychotic vulnerability is seen in the literature as a negative spiral. In this downward spiral, psychotic vulnerability affects oral care behaviour, leading to poor oral health, which then negatively impacts mental health.

For patients with psychotic vulnerability, stigma plays a significant role. They fear negative judgments from others regarding their oral health, leading to continued social avoidance. They experience reduced self-esteem due to poor oral health, which affects how they see themselves and how they expect others to perceive them. To mitigate the effects of poor oral health in social situations, patients often conceal their oral health to avoid embarrassment or shame.

Another phenomenon in patients with mental health vulnerability is “diagnostic overshadowing” by healthcare providers, where physical problems are overshadowed by mental health conditions. This results in patients not receiving adequate or appropriate somatic care, further reinforcing self-stigmatization. This underscores the need for a holistic approach to oral care for patients with mental health vulnerability, making it an important responsibility for nurses. Ensure that you stay connected and discuss these matters together.

Physical Complaints

Oral health impacts overall health and should be examined in the same way as other physical health issues. An unhealthy mouth, especially if someone has gum disease, can increase the risk of serious health problems such as heart attack, stroke, and poorly controlled diabetes.

The mouth provides indications of what is happening in the rest of the body and offers insights into early signs and symptoms of systemic disease (illness that affects or touches the entire body, not just a specific part). Systemic conditions like diabetes often first become apparent through damage to the gums or other oral issues.

Patients with psychotic vulnerability often have more complaints and experience a lower quality of life. Since many dental conditions, such as periodontitis, cavities, and tooth erosion, often stem from dietary habits and smoking, this leads to a higher prevalence of dental disease in this population. Furthermore, psychotic vulnerability, especially as it becomes more severe, leads to a decline in self-care, and oral health often has lower priority.

It is frequently asserted that poor oral health is related to an unhealthy lifestyle. However, the connection between improving oral health by improving lifestyle has not been scientifically proven.

Risk Factors

Caring for teeth involves more than just brushing, flossing, and visiting the dentist regularly. Understanding the risk factors that affect oral health is also important. General health is linked to oral health, and vice versa. There are many risk factors that can arise from both physical and mental health conditions.

Common risk factors for oral health include:

- Mental health (such as stress or anxiety). Stress or anxiety can contribute to serious oral health conditions. Stress and anxiety suppress the immune system, making people more susceptible to disease and infection. Stress affects oral health, leading to a dryer mouth more quickly.
- Fear of the dentist? Talk about it. Dentists and dental hygienists are there to help and are willing to discuss the situation. There are many options available, including taking anti-anxiety medication before an appointment or using conscious sedation.
- Medication. Side effects of antipsychotics (e.g., clozapine, olanzapine, quetiapine) can cause dry mouth (xerostomia) or insufficient saliva (hyposalivation). This is covered in more detail in the “Medication” chapter.
- Smoking and cannabis use. When people smoke, harmful substances like nicotine and tar are released into the mouth. Nicotine reduces the blood flow to the gums, making them less accessible to immune cells. It also prevents the gums from bleeding quickly, so someone may not notice if there is something wrong with their gums. Smoking also reduces saliva production. With a shortage of immune cells and saliva, there will be fewer defence agents in the oral cavity, increasing the risk of plaque, cavities, and subsequently gum inflammation. Smokers have more plaque than non-smokers. If not carefully removed, plaque develops into tartar and cavities. Tartar causes gum problems such as gum inflammation. As the blood vessels narrow due to smoking, inflamed gums are noticed later, and by then there may already be penetration into the jawbone, potentially causing teeth to become loose and fall out.

- Diabetes. It is well known that antipsychotics often have side effects, but they can also lead to the development of type 2 diabetes (metabolic problems). People with diabetes are more susceptible to mouth inflammation. Healing of inflamed gums often proceeds less well in these people. With both types of diabetes, blood sugar is often high, which can affect the mouth, leading to earlier cavities, dry mouth, fungal infections, and extra plaque, increasing the chance of gum inflammation (gingivitis and periodontitis). Inflammation in the mouth can also lead to complications in overall health.
- Alcohol use. Alcohol is known to decrease saliva flow. As a result, the mouth becomes drier, and in a drier mouth, caries (tooth decay) and gum inflammation can develop more quickly. To add a fresh taste to drinks, citric acid is often added. With frequent use, food acids (both natural and added) cause tooth erosion, which is the wearing away of the tooth surface.

Nutrition

Many foods can affect the enamel of the teeth and molars. This is not a problem. The teeth naturally recover over time, with saliva playing a crucial role. Saliva neutralizes acids, providing protection. However, if someone eats too frequently in a day, the teeth do not have enough time to recover. Therefore, it is detrimental to dental health to eat or drink certain beverages all day long.

Some antipsychotics (e.g., olanzapine and clozapine) are known to cause a feeling of hunger, leading patients to eat more. This often results in unhealthy eating habits, such as consuming a lot of soda and fast food.

Foods like vegetables, fruits, nuts, and fish contain healthy nutrients, but many patients do not consume sufficient amounts. Deficiencies in these nutrients can cause symptoms in healthy individuals like the positive, negative, and cognitive symptoms seen in those with psychotic vulnerability.

Medications, Side Effects, and Their Impact on Dental Health

As previously mentioned, side effects of antipsychotics (e.g., clozapine, olanzapine, quetiapine) can cause dry mouth (xerostomia) or insufficient saliva (hyposalivation). The most common cause of xerostomia is the use of medication with an anti-cholinergic effect (antipsychotics). Adjusting the medication can reduce or even eliminate the symptoms, but this is not always possible. Patients with a dry mouth can also experience problems with chewing, swallowing, speaking, teeth grinding, and/or sleeping. Therefore, it is important to be extra alert for these symptoms. However, recognizing them is not easy, as patients are often unaware of reduced saliva production. Before patients experience related problems, saliva production is often already reduced by half and damage may have already occurred. See the tips for what to do!

Problems in the Mouth

Many issues can arise in the mouth, including cavities, irritated or inflamed gums, periodontitis, bad breath, and tooth erosion.

- Cavities. The formation of cavities is a significant side effect of medication that can cause lasting damage to the teeth. Cavities from medication can sometimes develop within weeks to months after starting the drug. The primary cause of medication-induced cavities is reduced saliva secretion. Nearly 90% of antipsychotic medications lead to a dry mouth due to reduced saliva. Tablets (such as XyliMelts) can help to reduce dry mouth symptoms.
- Inflamed gums (Gingivitis). Healthy gums are pink. Inflamed gums are redder in colour, more swollen, and bleed more easily during brushing and when using floss/toothpick/interdental brush. A bad taste or bad breath can also indicate inflamed gums. Inflamed gums rarely cause pain. The inflammation at the edge of the gums is caused by bacteria in plaque, to which the gums react. Plaque calcifies into tartar and adheres firmly to the teeth and molars, forming a new layer. This cannot be removed by an individual and requires a dentist or dental hygienist. If not treated, the inflammation can damage the jawbone, leading to bone loss. Inflamed gums are preventable and curable with good oral hygiene. Bleeding gums means there is inflammation. This signal should not be ignored,

and those affected should take action to get the gums healthy again. The cause of inflamed gums is plaque, so keeping the mouth clean is crucial.

- Gum inflammation (Periodontitis). Periodontitis is an advanced stage of gum inflammation. Because the inflammation has been in the mouth for some time, it easily spreads from the gums to the jawbone beneath. This results in the loss of jawbone around the teeth and molars. Deep spaces form under the gums where plaque and tartar accumulate, known as pockets. These pockets need to be cleaned by a dental hygienist to heal the gums.
- Bad breath (Halitosis). In most cases, bad breath originates in the oral cavity, usually due to insufficient oral hygiene and gum inflammation. Sometimes, certain bacteria remaining on the back of the tongue can cause bad breath. Brushing or scraping the tongue with a tongue scraper can be a solution, supplemented with a special antibacterial mouthwash. Chewing gum, mouthwash, or mouth spray can mask the odor, but beware, they do not remove the cause of the bad breath.
- Tooth enamel erosion (tooth erosion). All foods and drinks contain acids that can harm the teeth, like soft drinks, energy drinks, fruit juices, and iced tea. Black coffee, unsweetened tea, water, and milk contain less acid. The acids from our food soften the enamel and cause tooth and gum erosion. Unfortunately, tooth erosion only becomes visible in an advanced stage when the teeth are already severely damaged.

Advice: What advice can you give your patients?

- Brush the teeth twice a day. This can be done with a regular or electric toothbrush. Use a soft brush head. Brushing should be done before going to bed and at least once during the day.
- Use fluoride toothpaste. Fluoride helps prevent tooth decay and makes the enamel less soluble. This better protects the teeth against acids and sugars from food and drinks, reducing the likelihood of cavities.
- Brush thoroughly. It is important to brush thoroughly without damaging the teeth or gums. Ensure that all parts of the teeth (back, front, sides, and top) are cleaned.
- Clean daily between teeth and molars using floss/interdental brushes/toothpicks. It is important to make time for this daily. Daily flossing/use of interdental

brushes helps fight tooth decay and gum disease. It removes not only plaque but also any food particles left during the day. Avoid mouthwash directly after brushing, as it washes away the fluoride from the toothpaste.

- Limit the number of eating and drinking moments. Moderating the frequency of eating and drinking is important to prevent tooth damage. Bacteria convert sugars, causing enamel dissolution and cavity formation. If someone chooses to enjoy something sweet, they should eat it during lunch or dinner when the mouth has more saliva. Saliva can break down acids and remove leftover food from the mouth. It is also important to limit the number of sweet/acid attacks per day to a maximum of six or seven times.
- Visit a dentist or dental hygienist regularly. To prevent problems and keep the mouth and teeth in good condition, it is wise to schedule regular appointments with a dentist or dental hygienist. Typically, this means visits twice a year, but the exact frequency depends on the condition of the teeth.
- Ask your patient if they have brushed their teeth. Link this to medication times.

Is your patient afraid of the dentist?
Advise your patient to take a buddy to the dentist. This could be a buddy or volunteer or someone from ambulatory care if the person is undergoing treatment at FACT.

Dry mouth from medication? Give the following additional advice to patients:

- Regularly drinking small amounts of water and rinsing food with water can provide relief.
- Good oral hygiene, adequate fluid intake, and the use of (sugar-free) products that stimulate saliva flow can alleviate dry mouth symptoms and prevent complications.
- Artificial saliva or tablets like XyliMelts (there are many other brands), self-adhesive tablets that stick to the gums, inside the cheek, dissolve slowly and completely and counteract dry mouth symptoms by slowly releasing xylitol, which stimulates the production of natural saliva and helps reduce the formation of plaque and cavities.
- They can be used four to eight times a day and are available online as an over-the-counter product.

It is important to mention that symptoms resulting from medication side effects should be discussed with the treating physician and dentist. There are other medications they can prescribe.

What if brushing teeth is not possible? For example, for patients admitted in a crisis, consider using chlorhexidine mouthwash can be used daily for a brief period of 1 to 2 weeks. Note that this is an alternative only when nothing else is possible and does not replace toothbrushing.

It is important to keep motivating and encouraging your patients. Motivational interviewing is a good technique for this.

Does your patient lack dental insurance and cannot afford to go to the dentist? Many municipalities have special health insurance for patients. On this website (in Dutch), you can check if this is arranged in your area. https://www.gezondverzekerd.nl

This website lists several solutions where you as a nurse can search for alternative options with your patients. If they cannot afford the dentist, check practical solutions here (in Dutch). https://www.berooid.nl/geen-geld-voor-de-tandarts-check-mogelijk-oplossingen/#

Awareness screener **Date to fill in: --/--/----**

With this awareness screener, you can revisit the brochure with your patient later and discuss individual dental care needs together.

The content of the brochure has been reviewed, based on the needs of the individual patient.

Ask your patient: Can you rate on a scale of 1-10 how satisfied you are with your oral health now? (1 being the worst imaginable and 10 the best imaginable)

1	2	3	4	5	6	7	8	9	10
Worst imaginable				Average					Best imaginable

Ask your patient: Can you rate on a scale of 1-10 how well you think you take care of your teeth? (1 being the worst imaginable and 10 the best imaginable)

1	2	3	4	5	6	7	8	9	10
Worst imaginable				Average					Best imaginable

What would you like to change? _____

What do you need for that? _____

Chapter 7

General discussion

Discussion

This dissertation aims to contribute to nursing knowledge regarding oral health problems in patients with psychotic disorders. In this general discussion, there will be a reflection on the most important findings for current nursing care, oral health, and lifestyle interventions, mental health nurses (MHNs) as lifestyle role models, as well as for national policy. In this dissertation, we used various research designs (qualitative, quantitative, design-based). In the methodological considerations, lessons learned will be explored. We reflect on design-oriented research, and we reflect on applying the Double Diamond framework within design-oriented research. We explain why this research design adds value, what this added value is. Furthermore, we give recommendations for further research on oral health care and MHN, recommendations for policy and practice, and a recommendation for education will be provided. At the end, implications of the case that prompted this dissertation, that of Joshua and MHN Maaike, will be outlined.

Current nursing care

From our research (chapter 2 and 5), we can conclude that oral health care activities do not currently seem to be an integral part of mental health nursing care [1]. Fragmentation in nursing care, as well as in the healthcare system, contributes to the suboptimal provision of oral health care within the mental health care sector. However, this is not surprising in an organization where care provision is predominantly centered on current pathology and not on risk factors. This complexity renders the identification of somatic issues and their risk in patients with psychotic disorders challenging for MHNs. However, this is in profound contrast to the foundational tenets of a holistic care philosophy of the nursing profession, as put forward by luminaries such as Florence Nightingale [2], Dorothea Orem [3], Virginia Henderson [4], and Mieke Grijpdonck [5]. Therefore, the question arises: “Has the role of MHNs significantly changed over the past 160 years?” A shift is occurring. Poor physical outcomes in patients have contributed to an increased emphasis on lifestyle and somatic care within mental health services. This shift has also fostered an emphasis on a holistic approach. Furthermore, the introduction of recovery-oriented care and a revised definition of health have promoted a new perspective on healthcare. This encourages working from a holistic viewpoint, aligning with the training that MHNs receive. Consequently, MHNs are better equipped to assume

leadership roles, which currently might be only partially influenced by adherence to the medical model.

Oral health and lifestyle in psychiatry

According to Koomen et al. [6], lifestyle psychiatry involves scientifically supported interventions like healthy eating, physical activity, adequate sleep, substance use avoidance, stress management, and positive social connections under professional guidance to prevent and treat psychiatric disorders. Patients with FEP exhibit significantly more risk factors that negatively affect their oral health and OHRQoL, with an almost tenfold higher impact compared to the general population [7]. Despite the growing emphasis on lifestyle in both the general society and psychiatric care in the Netherlands, oral health is notably underemphasized. Specific guidelines addressing lifestyle or oral health for patients with FEP are lacking. Research is limited and focuses predominantly on nutrition and diet [8], exercise [9], cardiovascular fitness [10], and increasing awareness [11]. Some patients with FEP belong to the SMI group, in which various lifestyle interventions have been shown to be effective in hospital settings [12–14]. The multidisciplinary guidelines for somatic screening in individuals with SMI [15] and the multidisciplinary guidelines on lifestyle for individuals with SMI [16] report that patients with SMI experience dental issues as a consequence of medication side effects (e.g., dry mouth). Hence, it is crucial to conduct somatic screening and dental examinations, and to inquire about oral hygiene during a lifestyle assessment. We know that lifestyle and oral health outcomes for patients with SMI are poorer, which highlights the importance of early screening in patients' with FEP.

A new initiative in the Netherlands, "Healthy in Body and Lifestyle" (Gezond in Lichaam en Leefstijl (GILL)), includes a nurse-led digital application that facilitates somatic screening and promotes a healthy lifestyle among SMI patients. This nurse-led intervention aims to detect, treat, and promote healthy living, including through the management of cardiometabolic risks [17]. In GILL, oral health is assessed by two questions: When was the last time you went to the dentist? How many days a week do you brush your teeth? Based on the responses, recommendations are made for both the patient and the MHN.

Thus, research on lifestyle interventions in outpatient settings for patients with FEP is scarce, although these patients could benefit greatly from early preventive

measures. However, no practical guidance is provided on how to apply this, with the result that little action is taken in this area even though an increased risk of poor oral health has been demonstrated [7]. Therefore, the insights gained from treating people with SMI should be used in the establishment of guidelines for FEP to enable preventive measures.

Mental health nurses as lifestyle role models

MHNs are recognized as vital role models in imparting knowledge about risk factors leading to decreased oral health in patients with psychotic disorders, as elucidated in Chapters 3 and 5 of this dissertation. MHNs play an important role in promoting healthy behaviours such as physical activity, stress management, and a nutritious diet, and in encouraging patients to avoid illicit substances to enhance overall health and quality of life [18,19]. The behaviour and personal conduct of MHNs might influence patient outcomes. MHNs are closely connected with patients, positioning them to serve as role models. However, MHNs may not yet be fully aware of this responsibility. As role models, they can significantly influence their patients' health promotion efforts, either positively or negatively. This proximity and visibility to patients underscore the potential impact MHNs have on patient behaviour and health outcomes, highlighting the importance of MHNs' awareness of their influential role in health care settings[20]. Overall, there are 18,500 registered MHNs and 1,600 MH nurse specialists in the Netherlands. They all have the potential to be a role model and improve oral health in mental healthcare.

Research indicates that the lifestyle habits, gender, and professional roles of MHNs affect their clinical practices and the application of lifestyle psychiatry, thus impacting patient care [21]. Although MHNs are aware of the importance of health-promoting activities, they often do not know how to translate this knowledge into practice. MHNs are crucial in educating patients about healthy lifestyles, implementing tailored interventions, monitoring progress, and working in multidisciplinary teams to provide comprehensive care. They also contribute to research and advocate for the integration of lifestyle psychiatry into mental health policies [22]. Despite these roles, there is a need for MHNs to be more conscious of their responsibility in integrating physical and oral health within mental health care. A small intervention like a brochure with an awareness screener has proved feasible [23] (chapter 5 and 6). In addition to MHNs becoming aware of the importance of oral care, clinical reasoning remains a core aspect of nursing practice. Here, the North

American Nursing Diagnosis Association (NANDA) risk diagnoses and readiness diagnoses can be utilized [24], as we stated in the introduction of this dissertation. However, to establish a precise nursing diagnosis effectively, it is crucial to perform a comprehensive data collection and critical assessment of data.

From our qualitative and design-oriented studies (chapter 2, 5 and 6), we can conclude that oral health care activities do not seem to be an integral part of mental health nursing care and MHNs have received relatively limited training in this area during their education. [1]. Training for MHNs starts in educational programs [25]. The American Association of Colleges of Nursing (AACN) considers different domains essential for nursing practice, but three domains are specifically related to lifestyle interventions [26]. These three domains are 1) person-centered care (holistic, individualized, respectful, compassionate, coordinated, evidence-based, and developmentally appropriate), which builds on a scientific body of knowledge that guides nursing practice regardless of specialty or functional area; 2) population health (which includes population management through systems thinking, including health promotion and illness prevention [27]); and 3) personal and professional nursing leadership (the advancement of the MHN as a leader). The development of these dimensions necessitates a commitment to personal growth, the continuous expansion of professional knowledge and skills, and strong leadership engagement across diverse situations [26]. Thus, although oral health is not sufficiently integrated into nursing education, the new training profile for MHNs offers many opportunities to incorporate oral health care (e.g., in lifestyle or prevention dimensions). We recommend incorporating this into the curricula of all MHN education. It is crucial that students and beginning professionals are knowledgeable and aware that they play a role in this matter across various contexts. Furthermore, it is advisable to emphasize prevention, lifestyle management, and person-centered care in educational programs, integrating practical interventions to equip healthcare providers with comprehensive patient care skills. The fundamental principle should be that the focus should not only be on learning a skill but also on applying the learned knowledge in various contexts.

National policy: prevention is better than cure, the job is not yet finished

This dissertation has revealed that individuals with psychotic disorders are not receiving adequate care concerning their oral health (chapter 2, 3, 5). However,

current policy has the potential to establish a foundation for forthcoming developments.

The World Health Organization (WHO) describes mental health institutions as poorly equipped to truly meet the care needs of individuals experiencing psychological distress. The WHO has recognized oral health care as an essential component of overall health and well-being. Within the WHO, the significance of integrated care is underscored, with prevention and control, accessibility, policy, and research being key focal points. This dissertation demonstrates that oral health care remains insufficient on all these key points. Our research supports these findings. The World Health Organization has formulated global objectives and solutions aimed at improving oral health such as reducing tobacco use, reducing alcohol use, and encourage healthy eating habits [28].

In the Netherlands, within the Integral Care Agreement [integraal zorgakkoord] (in Dutch) [29], agreements have been made between the Ministry of Health, Welfare and Sport and several large healthcare parties. The ambition of the Integral Care Agreement [29] is to maintain accessible, high quality, and affordable healthcare for everyone. At present, various regional and national working groups are engaged in the implementation of this initiative. The Integral Care Agreement [29] is a significant step towards achieving appropriate care, and is based on four fundamental principles: 1. Appropriate care is value-driven, and thus demonstrably effective with a limited deployment of finances, personnel, and resources. 2. Appropriate care is established in collaboration with and around the client (shared decision-making). 3. Appropriate care provides the right care in the right place and is organized to be as close to the patient as possible and 4. Appropriate care focuses on health rather than illness. These four principles offer a framework that can promote the inclusion of oral health care by emphasizing healthy lifestyles and preventative health. Efforts are ongoing to develop specific agreements that should incorporate oral health considerations. This also complements the further implementation of holistic perspectives on health. The Integral Care Agreement places a renewed emphasis on prevention and lifestyle. This indicates that MHNs are currently in a favourable position, and it is now the time for them to maximize the opportunities within their role, demonstrate leadership, and integrate lifestyle considerations into their nursing routines.

Our research (chapter 2 and 3) has demonstrated that patients with psychotic disorders exhibit numerous risk factors for decreased oral health care. Our case–control comparison (chapter 3) indicated that nearly 15% of FEP patients reported a negative impact on their oral health-related quality of life (OHRQoL) due to risk factors, versus 2% in the general population [7]. The possession of dental insurance and the financial capacity to afford treatment are closely connected to the quality of life related to oral health. Patients after FEP state that they significantly lack the financial means to cover dental expenses [30,31], and moreover, face more risk factors than a comparable group within society [7]. In the Netherlands, beyond the standard basic health insurance, supplementary dental insurance is necessary for oral healthcare. Vulnerable individuals, particularly those with mental health issues, may not always have such coverage [1,32,33]. This dissertation highlights the importance of preventing oral health issues and argues for the inclusion of preventive interventions in dental insurance packages. This is not the case in current practice. However, there are arrangements for users of the Long-Term Care Act (In Dutch: Wet Langdurige Zorg), but therefore patients must reside in a psychiatric hospital for treatment for more than three years; from that point onward, the responsibility for their care shifts to this act. From 2024, it has been arranged that dental care should be reimbursed for these people. For patients with FEP who have regular health insurance without dental coverage, the situation is more complex. The basic health insurance does not cover routine dental care, such as check-ups, fillings, or preventative treatments. Early dental care is crucial to prevent worsening conditions. The Integral Healthcare Agreement lays the foundation for making healthcare universally accessible. Therefore, the accessibility of oral care should be improved, e.g. through an additional insurance or through an expansion of existing dental insurance.

Methodological considerations

Design-oriented research: using a human-centered design

In this dissertation, we used different study designs, such as qualitative, quantitative, and a design-oriented approach, and noted the potential strengths of applying design-oriented research within mental health nursing (chapter 5 and 6). The co-creative, iterative, and creative approach with non-linear steps can be used to solve problems and to provide tailor-made solutions for severe issues [34]. We found

that this method is highly effective because the cyclical nature of design-oriented research allows for the continual refinement of interventions using real-world feedback and data, making solutions practical and effective [34]. The user-centered design increases usability and acceptance, while multidisciplinary collaboration enriches the process, providing diverse perspectives of end-users and leading to solutions [34,35]. Developed in real settings with end-users, the findings from this research have high ecological validity. Some lessons were learned. Whereas qualitative research predominantly focuses on understanding human experiences, perceptions, motivational factors, and the cultural and social contexts within which individuals operate, emphasizing the 'why' behind the data, design-based research is primarily focused on solving specific problems and helped us with the development of a brochure with screener through designing and adapting with end-users. Here, the iterative nature of the design helped us to align the design more closely with the needs of MHNs and their patients, and the context of their work, which ensured us that the outcomes were practical and effective [36]. This iterative and co-creative approach with end-users ensured that the design is grounded in practical realities and benefits from diverse perspectives, which enhances both the relevance and applicability.

Applying the double diamond framework in human-centered design: a methodological approach for enhanced problem solving

This dissertation incorporated inputs from a diverse range of end-users involved in oral health care within mental health settings, spanning multiple chapters (2, 3, 5, 6). These end-users provided various perspectives and helped to establish a solid evidence base. This approach necessitated additional efforts to engage a wide array of stakeholders in the research, but we did achieve a greater progress [37] .

Studies in both chapters 5 and 6 utilized the Double Diamond (DD) framework from the Design Council to guide problem-solving within a human-centered design methodology [38]. The DD framework is a structured problem-solving approach with four main stages: discover, define, develop, and deliver [35,38]. It begins with a thorough understand of the problem through the discover and define stages, ensuring that solutions are well-tailored and effective. The develop stage encourages creativity and innovation by exploring various potential solutions without constraints. User feedback is crucial throughout, particularly in the research and prototyping phases, to ensure that the final product meets actual user needs,

enhancing satisfaction and engagement [34,38]. Our research has indicated the need for the development of various tools for MHN [23]. The ideas for tools have been assessed using Multi-Criteria Decision Analysis (MCDA) based on seven design criteria identified from the literature [35,39,40], such as 'contributing to increased sensitization' and 'integrating seamlessly and rapidly'. It was crucial that these design criteria served as a foundation in the ongoing development of these tools. Additionally, the development and testing of the brochure involved co-creation with MHNs to ensure that the content was specifically tailored to their needs and those of their patients.

One of the key lessons learned from the Double Diamond model is the iterative nature of the design process. The iterations within each phase helped us to refine both problem understandings and solutions. This iterative process allowed us to build on what worked and to make informed adjustments.

The second learned lesson is the value of balancing divergent and convergent thinking. During the Discover and Develop phases. Divergent thinking allowed us to explore a wide range of possibilities and ideas with end-users without constraints. Conversely, convergent thinking in the Define and Deliver phases helped us to narrow down options and focus on feasible and impactful solutions.

The third lesson learned was that this design approach not only fostered behavioural changes among MHNs but also built foundational support for the use of the developed tool in the near future and for the use of design-oriented research methods. In co-creation with end-users, we developed a tool for oral health, which they received positively, and revealed high levels of enthusiasm and engagement. Notably, one organization integrated the awareness screening questions into their Routine Outcome Monitoring (ROM), which systematically assesses treatment effectiveness and enhances clinical practices for better outcomes.

Recommendations for future research

To fill evidence gaps, several recommendations can be made for future research:

Further research on oral health care and MHNs

1. Research should implement oral health care into existing preventive lifestyle interventions targeting patients with psychotic disorders.
2. MHNs require additional tools to effectively integrate oral health into the care of patients with a psychotic disorder. This holistic approach necessitates a broad set of skills and knowledge, encompassing both mental and physical health aspects, to provide comprehensive care that meets the multifaceted needs of MHNs and their patients. This should be considered during the further development of the toolkit.
3. In Chapter 6, we demonstrated that multiple tools need to be developed, focusing on the needs of MHNs. The evaluation of these tools was based on criteria derived from the literature and key critical success factors in implementation. It would be beneficial for MHNs to further investigate this area.
4. For a more robust assessment, the effectiveness of the brochure with awareness screener should be studied, considering outcomes such as awareness and behavioural change in MHNs as well as in their patients. In addition, it is imperative to conduct further qualitative research into the effective elements of the brochure with awareness screener. This approach will facilitate a deeper understanding of the underlying mechanisms and interactions that contribute to the observed outcomes.

Recommendations for policy and practice

1. This dissertation shows that oral health is important for everyone, and especially for target groups, such as people with FEP. For patients with FEP, this is currently not well organized. The financial accessibility of oral care should be improved, e.g. through an additional insurance. Therefore, preventive measures (i.e., check-ups with dentists and dental hygienists) should be included as standard in health insurance plans.
2. The findings of this dissertation show the importance of integrating oral care into the care of patients with FEP. To ensure that oral care is discussed, it is important to include the awareness screener in lifestyle screening or in routine outcome monitoring.

3. It is essential that MHNs not only believe in a holistic approach to care but also actively practice and demonstrate it through continual personal and professional development to show leadership in their field.
4. Oral healthcare should have a clear place in guidelines for FEP, including practical tools aimed at preventing serious problems.
5. It is important to establish learning networks in which knowledge and experiences are shared about oral health care as part of broad-based holistic care for people with FEP.

Recommendation for education

1. It is important to include terms such as prevention and lifestyle in the learning outcomes of educational programs for MHNs related to psychotic disorders and oral health. Furthermore, in the educational sector, there must be a transfer of learning to other contexts besides psychosis.

Implications for Maaike and Joshua

In the introduction, we introduced Maaike, who observed that young patients with a psychotic vulnerability in the clinic, like Joshua, pay little attention to their oral health. Additionally, she struggles with MHNs who do not feel responsible for their patients' oral health.

What might have been the significance of this project for them? Did our research help Maaike in her mission? Did Joshua receive any advantages from our findings? We believe that young patients like Joshua could indeed benefit from our findings. First, the brochure with the awareness screener would have facilitated a discussion about oral care with Joshua, enabling him to express his experiences with oral health and his preferences for potential changes. Based on this feedback, Maaike and her colleagues were able to tailor the treatment plan accordingly. Finally, this treatment plan led to a higher oral health related quality of life of Joshua who suffered more frequently from psychoses in later life.

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Chapter 8

Summary

Samenvatting in het Nederlands
(Summary in Dutch)

Dankwoord
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Curriculum Vitae

Publications & Presentations

Summary

Practice-based research

The impetus for the creation of this study stemmed from a case observed in the routine practice of a nurse specializing in the care of individuals with psychosis sensitivity. Maaike, a psychiatric nurse practitioner, encountered Joshua, a 22-year-old man admitted to her department for psychosis. She noticed that Joshua was neglecting his dental hygiene. After discussing this with a colleague and being surprised by the response that dental care was not the responsibility of mental health nurses (MHNs), Maaike brought up the issue during a team meeting. During this meeting, it was discovered that many MHNs shared this view, and Maaike emphasized the need to consider the role of MHNs in dental care. This case was not isolated and ultimately formed the basis for this dissertation.

Oral health within psychosis care

Individuals with psychotic disorders face significant challenges across various life domains. Psychosis can be described as a state in which a person's perception of the world is influenced by intense emotions (such as fear or spiritual emotions), creating an overwhelming experience that is difficult for others to understand or follow.

Psychosis can be described as a state in which a person's perception of the world is colored by the hallucinations and delusions people experience. This can make the experience so overwhelming that it is difficult for others to understand or follow. Psychoses can come in many forms, with some being more or less severe than others. Psychotic disorders typically manifest in adolescence and early adulthood, with a notably higher risk in young men. Psychotic symptoms often lead individuals to neglect caring for themselves, also impacting their oral health, and this can have detrimental long-term effects. This dissertation underscores the need for appropriate guidance and support by MHNs in the area of dental care during this early life stage for individuals experiencing their first psychotic episode. The MHN, who is close to the patient in daily care, could also play a role in preventing issues in this area. However, oral health is not a standard part of the comprehensive healthy lifestyle guidance provided by MHNs. This deficit in self-care is not currently being addressed by MHNs, primarily because it is not considered part of their remit. Additionally, this form of self-care is seldom discussed in educational

settings, and there are no practical tools relevant to this issue available in the mental health care sector.

This dissertation consists of three parts: firstly, the needs of patients and risk factors are mapped; secondly, a review of existing interventions reported in the literature is provided; and, finally, the development of a nursing tool that MHNs could use to support patients with their oral health is described.

Part I: Experiences of oral health in patients experiencing a first psychosis

How is patients' oral health following their first psychotic episode, and what are their needs with respect to this area? (Chapter 2)

Chapter 2 presents findings from semi-structured interviews conducted with 30 patients who have recently experienced their first psychotic episode, focusing on their personal experiences and specific needs regarding oral health. This qualitative study found that patients were initially satisfied with their oral health but noticed a decline from the onset of their first psychotic symptoms. Four main themes emerged from the interviews, reflecting the experiences and needs of such patients with respect to oral health: 1) general experiences with dental care, 2) risk factors, 3) experiences with dentists/dental hygienists, and 4) specific needs regarding oral health. Theme 1 showed that, after initial psychosis, patients were more likely to have difficulty taking good care of their teeth and needed help remembering how and when to take care of their teeth. The risk factors mentioned in theme 2 included smoking, drug use, and a lack of insurance and/or financial resources. Examining theme 3, it emerged that financial problems lead to patients often not having dental insurance and often forgetting dental appointments (despite receiving reminders). Finally, it was found that patients find it important that MHNs actively contribute to improving oral health (theme 4).

The main conclusions from the study were the need for education on the importance of good oral care and the risk factors associated with oral care in order to raise awareness. It also proved important to conduct follow-up research on risk factors and the extent to which young adults with psychotic disorders are at greater risk of poor oral health than other young adults.

What are the risk factors regarding oral health among patients undergoing their first psychotic episode, and how do they perceive their oral health-related quality of life (OHRQoL) compared to individuals without a history of psychotic disorders? (Chapter 3)

In Chapter 3, we report a case–control study comparing 81 patients who have experienced their first psychotic episode with 166 individuals without a psychotic disorder from the general population (control group). The groups were matched by age, gender, and education level to examine differences in their oral health-related quality of life. This quantitative methodology allowed us to investigate whether oral health constitutes a public health issue among young adults or if it disproportionately affects patients following their first psychotic episode, thus falling under the purview of mental health services.

The results indicated that patients who had experienced a psychotic episode had significantly more risk factors for poor oral health, including smoking, greater consumption of sugary foods and drinks, less frequent or inadequate teeth brushing, and insufficient funds to afford dental care products or services (such as visiting a dentist when issues arise). In total, 15% of patients who had experienced a psychotic episode reported poor quality of life due to their oral health compared to only 2% in the control group. The likelihood of the risk factors negatively impacting on quality of life was almost ten times higher in patients post-first psychosis than in the control group.

These findings highlight the importance of taking (additional) preventive measures to improve the oral health of these patients. MHNs have an important role in supporting and improving patients' oral health, as they can motivate patients or provide guidance. However, currently, there are no standardized or in-use interventions available for mental health services to adopt. Thus, an investigation of potentially effective interventions reported in the literature aimed at improving the oral health of patients with psychotic disorders was defined as the crucial next step in light of these findings.

Part II: State of the art

What interventions aimed at improving oral health in patients with psychotic disorders are described in the existing literature? (Chapter 4)

A systematic exploratory review was conducted to identify interventions focused on the oral health of patients with psychotic disorders. Eleven studies were included: four randomized controlled trials, six quasi-experimental studies, and one cohort study. These studies targeted interventions directed at patients (n=8) or both patients and their caregivers (n=3). We identified four types of interventions for oral health in mental health care: I) educational interventions; II) physical interventions; III) interventions that combined behavioral and educational elements; and IV) interventions that combined educational and physical elements. Nine studies demonstrated short-term (≤12 months) positive effects on oral health knowledge, behaviors, or physical outcomes (such as reduced dental plaque). Based on the literature, it can be concluded that, currently, there is no gold standard regarding the type of intervention (types 1-4) or the observed effects, particularly the lack of long-term effects which are relevant to our target population. Given the potential effects reported in the included studies, developing a toolkit with interventions focused on oral health may be of great interest to the mental health sector. However, it is still unknown what MHNs need. Because it is important to involve both MHNs and experts in the follow-up research, a design-oriented study was chosen for the follow-up study. The follow-up question therefore focused on what MHNs need, what barriers they experience, and what they need in terms of interventions focused on oral health. Part 3 of the thesis focused on addressing these uncertainties and the development of a tool for MHNs and other stakeholders.

Part III: Development of a supportive nursing intervention for oral health

What are the attitudes, barriers, needs, and suggestions for interventions of MHNs regarding oral health in psychosis? (Chapter 5)

In this design-oriented study, efforts were made to gain a deeper understanding of the attitudes, barriers, and needs of mental health nurses concerned with the oral health of patients with psychotic disorders. Additionally, participants provided suggestions for potential interventions. The findings are derived from contextual interviews with mental health nurses and peer specialists (N=10). These outcomes

were translated into four different personas, which were subsequently validated through semi-structured interviews with additional mental health nurses and peer specialists (N=19).

This research indicated that in terms of the attitudes and perspectives of mental health nurses, some feel no responsibility, while some embrace a responsibility to ensure a holistic approach that includes oral health. The main barriers identified were a lack of knowledge and a deficiency in practical tools. The most significant needs highlighted were a lack of knowledge about oral care (such as the importance of good oral health and the type of advice that can be offered to patients) and risk factors (such as medication use and smoking), as well as a lack of tools to facilitate discussions. The latter was perceived as the most substantial barrier.

This research showed that the majority of MHNs could identify with a persona that seeks a holistic approach to care, including attention to oral health. However, despite recognizing the importance of oral health within their patient group, they tended to take little responsibility for these aspects of care in practice. These findings underscore the need to subsequently develop a specific toolkit of interventions tailored to all four personas identified through the research.

What supportive tool could be developed for MHNs to enhance their awareness and knowledge about oral health in psychosis patients? (Chapter 6)

Building on the results of the first study presented in Chapter 5, this second part of the design-oriented, human-centered research involved a focus group consisting of nine participants and was aimed at identifying the main problems and needs of MHNs. From the analysis, fifteen different tools that could support MHNs emerged, ranging from a brochure, oral care screener, or clinical lessons to a video featuring expert experience.

The tool that was seen as promising by the participants was a brochure, including a screener, intended to raise awareness and MHNs' knowledge about oral health in patients with psychotic disorders. The addition of a screener was important, as it could help to start the conversation with patients. The brochure contains information about oral care, risk factors, nutrition, and advice to be given and also includes a screener that stimulates conversation about oral care between the nurse and the

patient. This screener includes questions such as 'Can you indicate on a scale of 1 to 10 how satisfied you are with your oral health?' (1 = worst imaginable, 10 = best imaginable) and 'What would you like to change?' The brochure was designed as a 'low-fidelity prototype', i.e., a first draft was made so that the feasibility of the idea could be tested.

How feasible is the implementation of the developed brochure in the context of caring for patients with a psychotic disorder? (Chapter 6)

The screener was tested over a 14-day period in daily practice by both MHNs and experts. After this testing phase, the feasibility of the brochure was evaluated through semi-structured interviews with 19 participants from different backgrounds.

The feedback from the MHNs and experts on the brochure was mostly positive; they were very satisfied with the prototype and gave several recommendations for minor improvements to the sequencing of the content. Both the experts and MHNs felt it was important to start the brochure with a discussion of psychological complaints and the stigma regarding oral health after the introductory section.

Based on the data collected and feedback provided, we can conclude that implementing a brochure with a screener that raises awareness is a viable strategy for MHNs. This tool could potentially contribute to improving MHNs' awareness and thus potentially improve the oral health of patients with psychotic disorders. To increase the practical applicability of the brochure, it is important to develop more tools, such clinical lessons and the provision of a toothbrush and toothpaste for patients.

Conclusion

This dissertation demonstrates that oral health in patients with psychosis requires greater attention. Young adults with psychotic disorders exhibit poorer oral health and increased risk factors, making this issue more significant within this population than among young adults in the general population. This highlights a responsibility for mental health services, not only public healthcare services, to address these needs. In particular, this is a task for MHNs, who are trained to use a holistic approach and are the closest to patients in daily care. Despite their holistic training,

MHNs often do not view providing oral care support as part of their duties. Due to the lack of clarity on what interventions MHNs can employ, a literature review was conducted. The findings indicate that there is no 'gold standard intervention' available, but they could guide the development of interventions in the future. We also explored the attitudes, barriers, and needs of MHNs, as well as suggestions for interventions that MHNs could use and developed four different personas of hypothetical MHNs. Based on these personas, we examined tools that could be developed to enhance MHNs' knowledge and awareness of oral care. The most optimal solution, a brochure with an awareness screener, was selected based on the findings from a decision matrix. This brochure with an awareness screener was developed as a low-fidelity prototype. The feasibility of the brochure was confirmed through interviews with professionals and experts.

The realization of this project mainly contributed to the development of nursing knowledge regarding oral care in patients with psychotic disorders. In addition, herein, an initial outline of how to provide a tool has been provided. It is important to further investigate what the active elements are in this nursing tool. Examining the short- and long-term effects of this nursing tool for patients with initial psychosis is the next step in oral health research.

Nederlandse samenvatting (summary in Dutch)

Praktijkgericht onderzoek

De aanleiding voor dit onderzoek was een casus in de dagelijkse praktijk van een verpleegkundige in de zorg voor mensen met een psychosegevoeligheid. Maaike, een verpleegkundig specialist GGZ, kwam op haar afdeling in contact met Joshua, een 22-jarige jongeman die vanwege een psychose was opgenomen. Het viel Maaike op dat Joshua zijn gebit niet goed verzorgde. Zij besprak dit vervolgens met haar collega. Verrast door de reactie van haar collega dat mondzorg niet tot de verantwoordelijkheden van GGZ-verpleegkundigen behoorde, bracht Maaike het onderwerp ter sprake tijdens een teamvergadering. Ze ontdekte tijdens deze teamvergadering dat veel GGZ-verpleegkundigen deze mening deelden en benadrukte de noodzaak van aandacht voor de rol van GGZ-verpleegkundigen ten aanzien van mondzorg. Deze casus blijkt niet op zichzelf te staan en vormde uiteindelijk de basis voor dit proefschrift.

Mondgezondheid binnen de psychosezorg

Mensen met een psychotische aandoening ervaren behoorlijke uitdagingen op verschillende levensdomeinen. Een psychose kan worden omschreven als een toestand waarin iemands perceptie van de wereld wordt gekleurd door de hallucinaties en wanen die mensen ervaren. De belevingswereld kan daardoor zo overweldigend zijn dat het voor anderen moeilijk te begrijpen of te volgen is. Psychoses kunnen in meer en minder ernstige vormen voorkomen. Een psychotische aandoening openbaart zich doorgaans in de adolescentie en jongvolwassenheid, met een opmerkelijk hoger risico bij jonge mannen. Psychotische klachten maken dat mensen vaak minder aandacht besteden aan hun verzorging, inclusief de mondgezondheid, met nadelige gevolgen op latere leeftijd. In dit proefschrift wordt de noodzaak voor passende begeleiding en ondersteuning door GGZ-verpleegkundigen op het gebied van mondzorg onderstreept in deze vroege levensfase bij mensen met een eerste psychose. De GGZ-verpleegkundige staat in de dagelijkse zorg dicht bij de patiënt en zou vanuit de kern van het verpleegkundig beroep een rol kunnen spelen bij het voorkomen van klachten op dit gebied. Echter, mondgezondheid is geen standaard onderdeel van de brede focus van GGZ-verpleegkundigen op een gezonde leefstijl van de patiënt. Dit potentiële zelfzorgtekort van de patiënt wordt nu niet bewust opgepakt door GGZ-verpleegkundigen, in beginsel omdat men leefstijl, waaronder mondzorg, niet als zijn/haar taak lijkt te zien. Maar

ook omdat het weinig in de opleiding aan bod komt en er geen praktische tools voorhanden zijn in de GGZ.

Dit proefschrift bestaat uit drie delen, waarin 1) de behoeften van patiënten en de risicofactoren in kaart worden gebracht, 2) bestaande interventies uit de literatuur in beeld worden gebracht en 3) de ontwikkeling van een verpleegkundige tool wordt beschreven, waarmee patiënten ondersteund kunnen worden ondersteunen bij hun mondgezondheid.

Deel I: Ervaringen met mondgezondheid bij patiënten met een eerste psychose

Hoe ervaren patiënten met een eerste psychose hun mondgezondheid en welke behoeften hebben zij op dit gebied? (Hoofdstuk 2)

In hoofdstuk 2 worden de resultaten beschreven van persoonlijke ervaringen en specifieke behoeften die patiënten met een eerste psychose rapporteren op het gebied van mondgezondheid. Er werden semigestructureerde interviews gehouden bij 30 patiënten. Uit dit kwalitatieve onderzoek bleek dat patiënten in eerste instantie tevreden waren over hun mondgezondheid, maar dat ze een achteruitgang bemerkten ten opzichte van het begin van hun eerste psychotische symptomen. We hebben vier belangrijke thema's gevonden in de interviews, die samen de ervaringen én behoeften van de patiënten rondom mondgezondheid weergeven: 1) ervaringen met mondzorg in het algemeen, 2) risicofactoren, 3) ervaringen met de tandarts/mondhygiënist en 4) behoeften ten aanzien van mondzorg. Uit thema 1 bleek dat patiënten na een eerste psychose vaker moeite hebben met het goed verzorgen van hun gebit en dat ze hulp nodig hebben om te onthouden hoe en wanneer ze hun tanden moeten verzorgen. Risicofactoren die genoemd werden in thema 2, waren bijvoorbeeld roken, drugsgebruik, geen verzekering of te weinig financiële middelen. In thema 3 kwam naar voren dat financiële problemen ertoe leidden dat het vaak voorkomt dat patiënten geen tandverzekering hebben en ook vaak de afspraken vergeten met de tandarts (ondanks de herinneringen die ze krijgen). Tenslotte bleek dat patiënten het belangrijk vinden dat GGZ-verpleegkundigen actief bijdragen aan het verbeteren van de mondgezondheid (thema 4).

De belangrijkste conclusies uit het onderzoek waren de behoefte aan voorlichting over het belang van goede mondverzorging en welke risicofactoren daarin mee-

spelen, om zo de bewustwording te vergroten. Ook bleek van belang om vervolgonderzoek te doen naar risicofactoren en de mate waarin jongvolwassenen met een psychotische aandoening een groter risico hebben op slechte mondgezondheid dan andere jongvolwassenen.

Welke risicofactoren voor mondgezondheid ervaren patiënten met een eerste psychose die daarvoor in behandeling zijn? En hoe ervaren zij hun mondgezondheid gerelateerde kwaliteit van leven (OHRQoL) vergeleken met mensen zonder een voorgeschiedenis met een psychotische aandoening? (Hoofdstuk 3)

In hoofdstuk 3 rapporteren we de bevindingen van een case-control studie. In dit onderzoek hebben we 81 patiënten die een eerste psychose hebben gehad, vergeleken met 166 mensen uit de algemene bevolking zonder een psychotische aandoening. De groepen zijn gematched op leeftijd, geslacht en opleidingsniveau om nader te bestuderen in hoeverre er verschillen waren in hun mondgezondheid en in de levenskwaliteit gerelateerd aan mondgezondheid. Door deze kwantitatieve onderzoeksmethode kon onderzocht worden of mondgezondheid een probleem onder jongvolwassenen was (en dus horend bij de publieke gezondheid) of dat dit verhoudingsgewijs vaker voorkomt bij patiënten na een eerste psychose (en dus horend bij de GGZ).

Uit de resultaten bleek dat de patiënten met een eerste psychose meer risicofactoren hadden voor een slechte mondgezondheid, zoals roken, veel suikerhoudend eten en drinken, minder vaak of minder lang tandenpoetsen, of onvoldoende geld om mondzorg te betalen (zoals een bezoek aan de tandarts wanneer er klachten zijn). Van de patiënten met een eerste psychose ervoer 15% een slechte levenskwaliteit door hun mondgezondheid, ten opzichte van 2% in de groep zonder psychose. De kans op een negatieve impact van de risicofactoren op de kwaliteit van leven was bij patiënten na een vroege psychose bijna 10 keer hoger dan in de groep zonder psychose.

De bevindingen benadrukken hoe belangrijk het is om (extra) preventieve maatregelen te nemen om de mondgezondheid van deze patiënten te verbeteren. GGZ-verpleegkundigen hebben een belangrijke rol in het ondersteunen en verbeteren van de mondgezondheid van patiënten, zoals het motiveren van patiënten om aandacht hiervoor te hebben of het geven van voorlichting. Echter, er zijn op

dit moment geen (gestandaardiseerde dan wel geïmplementeerde) interventies voorhanden binnen de GGZ. Het onderzoeken van mogelijk effectieve interventies in de literatuur, gericht op de mondgezondheid van patiënten met psychotische stoornissen, werd door deze bevindingen een belangrijke vervolgstap.

Deel II: State of the art

Welke interventies gericht op het verbeteren van de mondgezondheid bij patienten met een psychotische aandoening worden beschreven in de bestaande literatuur? (Hoofdstuk 4)

In een systematisch verkennende review is gezocht naar interventies gericht op mondgezondheid bij patiënten met een psychotische aandoening. Elf studies zijn geïncludeerd: vier gerandomiseerde gecontroleerde studies, zes quasi-experimentele studies en één cohortstudie. De studies richtten zich op interventies voor patienten (n=8) of op patiënten samen met hun zorgverleners (n=3). We identificeerden vier soorten interventies voor mondgezondheid in de GGZ: I) educatieve interventies; II) fysieke interventies; III) interventies die gedrags- en educatieve elementen combineerden en IV) interventies die educatieve en fysieke elementen combineerden. Negen studies toonden op korte termijn (≤12 maanden) een positief effect aan met betrekking tot kennis over mondgezondheid, gedrag rondom mondgezondheid of fysieke uitkomsten van mondgezondheid (zoals minder tandplak).

Op basis van de literatuur kan er geconcludeerd worden dat er op dit moment nog geen gouden standaard is waar het gaat om het type interventie (type 1-4) en ook niet wat betreft de gevonden effecten (vooral geen lange termijneffecten voorhanden welke relevant is voor onze doelgroep). Gezien de potentiële effecten gerapporteerd in de geïncludeerde studies, kan het ontwikkelen van een toolkit met interventies gericht op mondgezondheid van groot belang zijn in de GGZ. Echter het is nog onbekend waar GGZ-verpleegkundigen behoefte aan hebben. Omdat het belangrijk is om zowel GGZ-verpleegkundigen als ervaringsdeskundigen bij het vervolgonderzoek te betrekken is er voor het vervolgonderzoek gekozen voor een ontwerpgericht onderzoek. De vervolgvraag was dan ook gericht op de vraag waar GGZ-verpleegkundigen behoefte aan hebben, welke barrières zij ervaren en wat ze nodig hebben aan interventies gericht op de mondgezondheid. In deel 3 van het proefschrift stond deze vraag en de ontwikkeling van een tool samen met GGZ-verpleegkundigen en andere betrokkenen centraal.

Deel III: Ontwikkeling van een ondersteunende verpleegkundige interventie voor mondgezondheid

Wat zijn de houdingen, barrières, behoeften en suggesties voor interventies van GGZ-verpleegkundigen als het gaat om mondgezondheid bij een eerste psychose? (Hoofdstuk 5)

In dit ontwerpgerichte onderzoek is getracht meer inzicht te verkrijgen in de attitudes, barrières en behoeften van GGZ-verpleegkundigen met betrekking tot de mondgezondheid van patiënten met een psychotische aandoening. Tevens geven zij suggesties voor mogelijke interventies. De bevindingen komen voort uit contextuele interviews met GGZ-verpleegkundigen en ervaringsdeskundigen (N=10). De uitkomsten zijn vertaald naar vier verschillende persona's die vervolgens zijn gevalideerd door middel van semigestructureerde interviews met GGZ-verpleegkundigen en ervaringsdeskundigen (N=19).

Uit het onderzoek is gebleken dat de houding en het perspectief van GGZ-verpleegkundigen uiteenlopen van het 'niet voelen van verantwoordelijkheid' tot 'het zich verantwoordelijk voelen voor een holistische benadering', inclusief mondgezondheid. De belangrijkste barrières voor GGZ-verpleegkundigen waren het tekort aan kennis en het tekort aan praktische hulpmiddelen. De belangrijkste behoeften die naar voren kwamen waren een gebrek aan kennis over mondzorg (zoals het belang van een goede mondgezondheid en welk advies gegeven kan worden aan patiënten) en risicofactoren (zoals medicatiegebruik en roken), maar ook een gebrek aan hulpmiddelen om het gesprek aan te kunnen gaan. Laatstgenoemde werd ervaren als de grootste barrière.

Uit het onderzoek bleek dat het merendeel van de GGZ-verpleegkundigen zich kon identificeren met een persona die een holistische benadering van zorg nastreeft, inclusief aandacht voor mondgezondheid. GGZ-verpleegkundigen erkennen het belang van mondgezondheid binnen hun patiëntengroep, maar geven tegelijkertijd ook aan dat zij daar weinig verantwoordelijkheid voor nemen. Eén van de suggesties voor interventies die naar voren kwam, was een brochure voor GGZ-verpleegkundigen gericht op kennis en risicofactoren.

Deze bevindingen onderstreepten de noodzaak voor het ontwikkelen van een specifieke tool die is afgestemd op alle vier persona's die uit het onderzoek naar voren zijn gekomen.

Welke ondersteunende tool kan worden ontwikkeld voor GGZ-verpleegkundigen om hun bewustwording en kennis te vergroten over mondgezondheid bij psychose? (Hoofdstuk 6)

In het tweede deel van het ontwerpgerichte onderzoek is er voortgebouwd op de resultaten van de eerste studie, zoals gepresenteerd in hoofdstuk 5. Aanvankelijk zijn de voornaamste problemen en behoeften van GGZ-verpleegkundigen, gericht op de mondgezondheid bij hun patiëntengroep onderzocht, middels een focusgroep bestaande uit negen deelnemers. Op basis van de analyse werden vijftien verschillende tools uitgewerkt die GGZ-verpleegkundigen kunnen ondersteunen, variërend van een brochure, screener om het gesprek aan te gaan, een klinische les tot een filmpje met ervaringsdeskundigen. Deze vijftien tools werden vervolgens voorgelegd aan de negen deelnemers die individueel aangaven welke tool voor hen het meest optimaal en meest haalbaar zou zijn aan de hand van een 'multi criteria decision matrix'. Een 'multi criteria decision matrix' kan gebruikt worden wanneer er meer dan één optie voor een te ontwikkelen tool is én er met meerdere criteria rekening gehouden moet worden om tot een beslissing te komen. De tool die door participanten als veelbelovend werd gezien was de ontwikkeling van een brochure, inclusief een screener, bedoeld om bewustwording en het kennisniveau van GGZ-verpleegkundigen over mondgezondheid bij patiënten met een psychotische aandoening te vergroten. Daarnaast was de toevoeging van een screener van belang als instrument om het gesprek aan te gaan met patiënten. De brochure bevat informatie over mondzorg, risicofactoren, voeding, te geven adviezen en bevat daarnaast ook een screener die het gesprek over mondzorg tussen de verpleegkundige en de patiënt stimuleert. In deze screener zijn vragen opgenomen zoals: 'Kun je op een schaal van 1 tot 10 aangeven hoe tevreden je bent met je mondgezondheid?' (1 = het slechtst voorstelbaar, 10 = het best voorstelbaar) of 'Wat zou je graag willen veranderen? De brochure is ontworpen als een 'low-fidelity prototype', dit wil zeggen dat een eerste ontwerp gemaakt is zodat de haalbaarheid van het idee getest kan worden.

Hoe haalbaar is de implementatie van de ontwikkelde brochure in de zorg voor patiënten met een psychotische aandoening? (Hoofdstuk 6)

De screener is gedurende een periode van 14 dagen getest in de dagelijkse praktijk, door zowel GGZ-verpleegkundigen als ervaringsdeskundigen. Na deze testfase is de haalbaarheid van de brochure geëvalueerd door middel van semigestructureerde interviews met 19 deelnemers met een verschillende achtergrond bij hun cliënten? De feedback van de GGZ-verpleegkundigen en ervaringsdeskundigen op de brochure was overwegend positief; zij waren zeer tevreden met het prototype en gaven diverse kleine aanbevelingen zoals voor de volgorde van de inhoud. Zowel ervaringsdeskundigen als GGZ-verpleegkundigen vonden het belangrijk om na de inleiding in de brochure te starten met psychologische klachten en stigma als gevolg van mondgezondheid in de brochure.

Op basis van de verzamelde data en de geleverde feedback kunnen we concluderen dat de implementatie van een brochure met een screener die bewustwording vergroot, een haalbare strategie is voor GGZ-verpleegkundigen. Deze tool kan mogelijk bijdragen aan de bewustwording van GGZ-verpleegkundigen en daarmee mogelijk ook aan het verbeteren van de mondgezondheid van patiënten met een psychotische aandoening. Om de praktische toepasbaarheid van de brochure te vergroten, is het mogelijk van belang om meer aanvullende tools te ontwikkelen, zoals een klinische les en het beschikbaar stellen van een tandenborstel met tandpasta voor patiënten.

Conclusie

Dit proefschrift heeft laten zien dat mondgezondheid bij patiënten met een psychose meer aandacht nodig heeft. Jongvolwassenen met een psychotische aandoening hebben een slechtere mondgezondheid én rapporteren meer risicofactoren. Bij deze populatie is dit een groter probleem dan bij de jongvolwassenen in de algemene bevolking. Daardoor is het een taak van de GGZ is om dit op te pakken en is deze taak niet alleen voorbehouden aan de publieke gezondheidszorg. In het bijzonder zou het een taak moeten zijn voor de GGZ-verpleegkundigen, juist omdat zij worden opgeleid om aandacht te hebben voor een holistische aanpak én het dichtst bij de patiënt staan in de dagelijkse zorg. Ondanks dat GGZ-ver-

pleegkundigen holistisch opgeleid zijn, zien zij mondzorg niet als hun taak. Er is literatuuronderzoek gedaan, omdat het niet duidelijk was welke interventies GGZ-verpleegkundigen kunnen inzetten. De uitkomsten laten zien dat er geen 'gouden standaard interventie' voorhanden is qua effectiviteit, maar geven wel handvatten ten aanzien van de richting van de te ontwikkelen interventies. Vervolgens is onderzocht wat de houdingen, barrières, behoeften én suggesties voor interventies van GGZ-verpleegkundigen zijn, leidend tot vier persona's van fictieve GGZ-verpleegkundigen. Op basis van deze persona's is vervolgens gekeken welke tools ontwikkeld kunnen worden voor GGZ-verpleegkundigen zodat zij meer kennis en bewustwording zouden krijgen ten aanzien van mondzorg. De meest optimale oplossing, een brochure met een screener, werd geselecteerd op basis van de bevindingen uit een decision matrix. Deze is ontwikkeld als eerste prototype. De haalbaarheid van de brochure werd bevestigd door interviews met professionals en ervaringsdeskundigen.

Met de uitvoering van dit project is vooral bijgedragen aan de ontwikkeling van verpleegkundige kennis op het gebied van mondzorg bij patiënten met een psychotische stoornis. Daarnaast is een eerste handreiking gedaan voor het bieden van een tool. Het is het van belang verder te onderzoeken wat de werkzame elementen waren in deze verpleegkundige tool. Het onderzoeken van de korte- en langetermijneffecten van deze verpleegkundige tool voor patiënten met een eerste psychose, is een belangrijke volgende stap in het onderzoek naar mondgezondheid.

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Curriculum Vitae

Sonja Annette Kuipers was born in 1970 in Groningen, the Netherlands. Sonja is married to Peter Knot and has three children: Thijs (1998), Lars (2000), and Joost (2006).

She obtained her bachelor's degree in nursing in 1996 at NHL University of Applied Sciences in Leeuwarden. In 2013, she finalized the Master Social Work at the Hanze University of Applied Sciences in Groningen. Subsequently, she graduated at the Master of Health and Social Care (with commendation) at the Birmingham City University in the United Kingdom in 2014. She then pursued her research interest by starting a PhD programme at the University of Groningen and NHL Stenden University of Applied Sciences in 2017 on the project: oral health nursing in patients with a psychotic disorder. The efforts of this project resulted in the research work presented in this thesis. Prior and parallel to her studies and research, she worked as a nurse with several patient groups and organizations. Since 2013, she works as lecturer at Bachelor of Nursing of the NHL Stenden University of Applied Sciences in Leeuwarden.

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