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Older adults' perceptions of oral health and its influence on general health: A deductive direct content analysis

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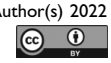

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Abstract

Oral health is a complex issue associated with social and behavioral factors and general health. Therefore, this study aims to explore Swedish older adults' perceptions of oral health and its influence on general health, based on the World Dental Federation's (FDI) definition and framework of oral health. The study adopted a descriptive qualitative design. Data were collected from semi-structured individual and focus group interviews with older adults ($n = 23$) and were analyzed with deductive direct content analysis. The study was evaluated using the COnsolidated criteria for REporting Qualitative research (COREQ) checklist. The older adults described the importance of good oral health in the physical, social, emotional, and mental aspects of their daily lives. The findings also indicate that older adults described oral health as multifaceted and agreed with the FDI's definition and framework of oral health. Therefore, the study findings might provide healthcare professionals with new knowledge and further insight into older adults' perceptions of oral health and its influence on their well-being and general health.

Keywords

deductive direct content analysis, general health, older adults, oral health, oral healthcare

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Background

Health-related behavior changes over time, such as a reduction in smoking rates, introduction of fluoride toothpaste, and positive development of dental care, have resulted in older adults (persons aged 65 years and older) now having better oral health and more retained teeth than previous generations and longstanding dental restorations.[1,2] This, however, contributes to the need for competence in oral healthcare for the growing number of older adults in society to allow them to maintain good oral health.[2,3]

The mouth is an integral part of the body, supporting and enabling essential human functions, and forms part of one's personal identity.[2] Good oral health can also be seen as a fundamental human right.[4] Diseases such as diabetes, hypertension, rheumatoid arthritis, Alzheimer's disease, Parkinson's disease, and depression are common diseases that become more prevalent among older adults and can negatively affect oral health.[5] Due to these diseases, impacts such as dry mouth, dietary changes, decreased oral function, and reduced ability to manage oral care can occur among older adults.[6–8] Issues as social and behavioral factors,[1] such as socioeconomic status[9] and health behaviours,[10] can also affect oral health. Poor oral health is often linked to poor eating, chewing immobility,[11] pain, negative general health,[12] and lack of health insurance.[13] Poor oral health can also be a sensitive marker for population health and a global health challenge due to the complexity of oral health.[2] In Sweden, the number of caries and fillings increases among older adults aged 80 years and older, mainly because they have more retained teeth than previous generations. Older adults aged 70–84 years are also the ones who visit dental care most often in a Swedish context.[9] Therefore, it is crucial to establish good oral healthcare habits early in life[1] and to evaluate each person's perceptions and wishes separately to achieve the best possible treatment choices for maintaining good oral health throughout their lifetime.[14]

Traditionally, oral health has been defined as an absence of diseases and has not accounted for a person's values, perceptions, and disabilities.[15–17] Therefore, the World Dental Federation (FDI) in the United States, together with patients, practicing dentists, academicians, researchers, third-party payers, industry partners, and medical providers, has developed a definition for oral health. The FDI's definition aims to create a shared understanding of what oral health includes[18] and is widely used to define oral health and its complexity.

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The FDI[18] defines oral health as containing both physical and psychological aspects as well as objective and subjective experiences of oral health:

> 'Oral health is multifaceted 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. Further attributes related to the definition state that oral health: Is a fundamental component of health and physical and mental well-being. It exists along a continuum influenced by the values and attitudes of individuals and communities. It reflects the physiological, social, and psychological attributes that are essential to the quality of life. It is influenced by the individual's changing experiences, perceptions, expectations, and ability to adapt to circumstances.' [18 (p. 322)]

The FDI's definition also includes a framework that includes four main categories and eight main domains (Figure 1).[18] The framework describes the complex interactions among the three core elements of oral health (disease and condition status, physiological function, and psychosocial function), a range of driving determinants (elements that influence and determine oral health), moderating factors (factors that determine or affect how a person scores their oral health), and, finally, overall health and well-being.[18] The definition and the framework aim to provide a broad and valuable definition for clinical practice and health policies created to describe oral health in various contexts.[18] The definition considers not only the diseases but also the environmental, social, and personal factors, overall quality of life, and participation in all major life areas of oral health,[19] and considers oral health an essential component of overall health.[18]

Previous studies describe, aligning with the FDI's[18] definition and framework, the association between psychological aspects,[20] health insurance,[13] health behaviours,[10] quality of life,[11,12] physiological function[21] and poor perceptions of health[2] and their correlation with older adults' oral health in mostly quantitative ways. However, these previous studies do not describe older adults' perceptions of oral health and its influence on general health in a more qualitative way, nor do they explore a definition of oral health. The FDI's definition and framework of oral health[18] states that oral health is a complex issue, but the definition is relatively new, created in the United States, and is sparsely studied in a Swedish context. Therefore, the present study explores Swedish older adults' perceptions of oral health and its influence on general health based on the FDI's definition of oral health.

Methods and design

The study employed a descriptive qualitative design inspired by Hsieh and Shannon's[22] deductive directed content analysis to explore older adults' perceptions of oral health and its influence on general health, based on the FDI's definition of oral health.[18] Data were collected in two phases: phase one

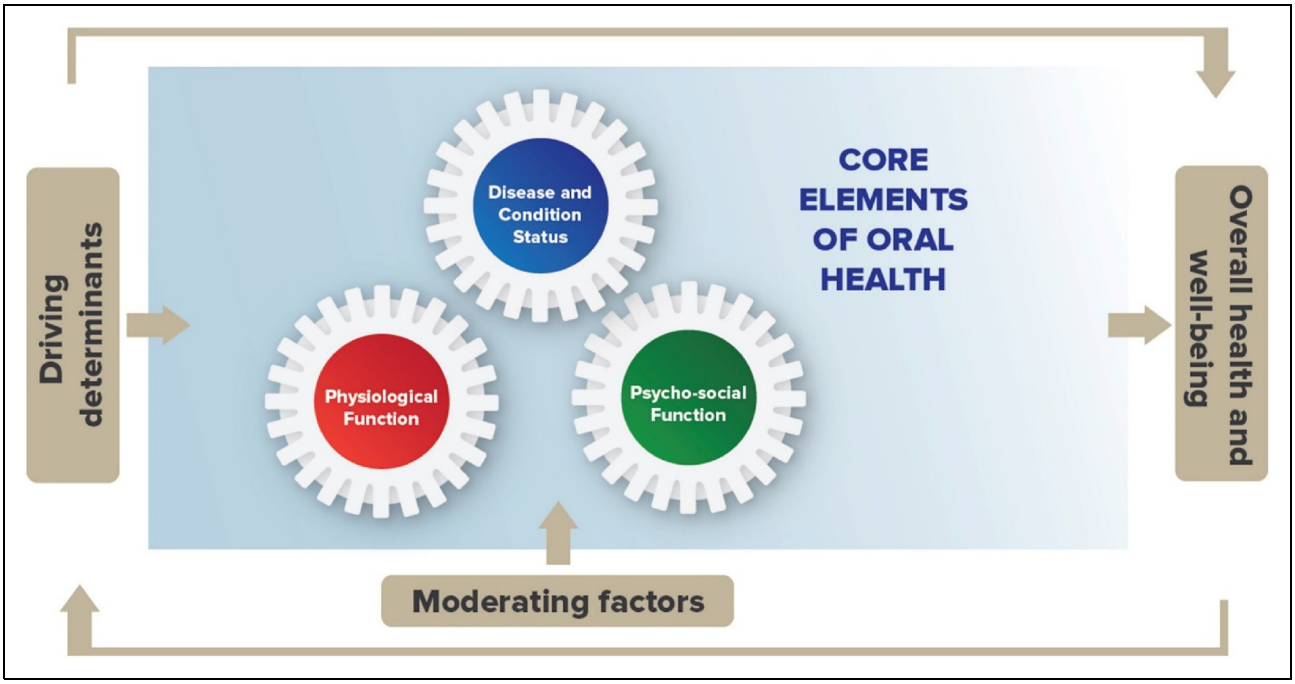

Figure 1. Framework for the FDI's definition of oral health. The core elements of oral health are as follows: disease and condition status refer to a threshold of severity or a level of progression of the disease, which also includes pain and discomfort; physiological function refers to the capacity to perform a set of actions that include, but are not limited to, the ability to speak, smile, chew, and swallow; and psychosocial function refers to the relationship between oral health and mental state that includes, but is not limited to, the capacity to speak, smile, and interact in social and work situations without feeling uncomfortable or embarrassed. Driving determinants are factors that affect oral health and cover five main domains: genetic and biological factors, social environment, physical environment, health behaviors, and access to care, and, in turn, driving determinants nest within systems that can support or serve as a barrier to maintaining and promoting oral health and managing oral diseases and conditions. Moderating factors are elements that determine or affect how a person values their oral health and include, but are not limited to, age, culture, income, experience, expectations, and adaptability.[1] (reproduced with permission from the Author, 14 February 2022).

employed semi-structured individual interviews, and phase two, semi-structured focus group interviews.[23] The study was evaluated using the COnsolidated criteria for REporting Qualitative research (COREQ) checklist to further improve the transparency of the research.[24]

Participants

Participants were recruited in February 2021 through contact with the chairpersons of two local Swedish Association for Senior Citizens (SPF) chapters in the western part of Sweden. The SPF associations have a membership of approximately 1400. The information was spread to obtain a purposive sample.[23] The SPF is a highly active social association with scheduled activities and comprises one of Sweden's most prominent facilitators of meeting places for older adults aged 65 years or older. The chairpersons provided consent for all members of the SPF association to be invited to participate, and further promoted written information throughout the association, requesting members' participation. The chairpersons were provided with the contact information of older adults who wanted to participate in the study and communicated this to the responsible researchers. A total of 24 older adults (8 men, 16 women) showed an interest in participating and were contacted via email ($n = 22$) or phone ($n = 2$). They were provided with information about the study and given the opportunity to ask questions before giving their informed consent to take part in an individual interview before agreeing a suitable time and place. The age range was 69–85 years (the women were aged 69–85 years and the men were aged 72–84 years) among the participating older adults. All participants lived in Sweden, but two were born in other countries and moved to Sweden as adults. The 24 participants from phase one (individual interviews) were invited to participate in focus group interviews in a second phase. Of them, 16 participants (11 women and 5 men) gave informed consent to participate; two (one woman and one man) could not participate (due to disease), eight declined an invitation to attend, and a total of 14 participated in three focus groups.

Data collection

In the first phase, semi-structured individual interviews[25] were conducted with 24 older adults in March and April 2021. The individual interviews were conducted using a semi-structured question guide with questions related to the FDI's definition of oral health[18] and subsequent follow-up questions based on the participants' responses and their orientation in the dialogue to obtain a deeper understanding of their perceptions. The individual interview questions included four themes: oral health; obstacles to good oral health; opportunities for good oral health; and how can it affect your general health? This was followed by question such as: *Can you tell me more about it?* Open-ended questions, followed by these prompts, were used in order to obtain a more detailed and deeper exploratory description and give the informant time to reflect and clarify their answers, as Hsieh and Shannon recommend.[22] One interview was conducted by phone to test the interview guide and was not included in the analysis due to the short interview length and poor sound recording. No changes were made to the question guide after the test interview. The individual interviews were completed in the participants' homes, by phone, or at the interviewers' workplace, in accordance with the participants' wishes. They lasted 10–26 minutes. In the second phase, three semi-structured focus group interviews (two with five participants and one with four)[23] with 14 older adults (randomly selected and allocated to a focus group) were conducted at the interviewers' workplace in June 2021. The purpose of the focus groups was to confirm experiences heard in the individual interviews more broadly and to enable participants to discuss and expand on each other's descriptions about oral health perceptions.[23] The focus group interview question guide included four themes: the importance of oral health; getting help with oral care; future oral health; and future health status. Subsequent follow-up questions were asked, based on the participants' responses and their orientation in the dialogue, such as: *Can you tell me more about it?* and *How can it affect your general health?* The focus group interviews lasted 30–60 minutes. The first author conducted all 24 individual interviews, and the first and fourth authors conducted all three focus group interviews, so all interviews were performed in the same way. The researchers have extensive experience of caring for and meeting older adults. The interviews were digitally recorded on an audio file, and support notes, taken during the interviews, were transcribed verbatim for analysis.

Data analysis

Deductive direct content analysis,[22] based on the FDI definition of oral health,[18] was used in the analysis. The initial coding of the categories was based on the FDI's definition framework of oral health and its four main categories: core elements (with three main domains); driving determinants (with five main domains); moderating factors; and overall health and well-being.[18] The data were analyzed using NVivo, a qualitative data analysis software.[26] The coding frequency of categories was calculated as descriptive evidence (quantitative data),[22] and all authors were included in all the analysis steps. The data analysis took place in two phases. In the first phase, the individual interviews were coded, as Hsieh and Shannon[22] describe, by performing multiple readings of the transcribed interviews to become familiar with the data and acquire an overview of the texts. Next, the transcripts were carefully reviewed for content. The text corresponding to the categories was highlighted, coded, and transferred into the relevant description categories and domains in the definition to study the older adults' perceptions of good oral health and its influence on general health based on the FDI's definition of oral health.[18] In a second analysis phase, the focus group interviews were analyzed in the same manner as the individual interviews to confirm the analysis from the individual interviews more broadly.[23] The text was analyzed separately to secure trustworthiness, then this was compared and discussed by all authors to reach a consensus in the analyses.

Ethical considerations

The study was conducted in accordance with the Declaration of Helsinki's principles[27] and was approved by the Swedish

Ethical Review Authority in Umeå (Dnr: 2021-00961). The older adults were informed by email (written) or by phone (oral) that their participation was voluntary and that they could withdraw at any time without stating a reason. The discomfort of participating in the study was seen as minor. If discomfort occurs, strategies included in a first step contact with the researcher who has the experience of meeting older adults in need of care were used. Finally, they signed a written informed consent form before the interview. To ensure confidentiality, the transcribed interviews and the recordings were stored where only the researchers had access and transcribed interviews were analyzed after being anonymized.

Findings

The quantitative aspects of the findings (descriptive evidence, frequency of codes) are presented in Figure 2. The qualitative aspects (description of codes) are presented below, based on the FDI's definition and framework of oral health.[18] The main domains from the FDI's definition and framework of oral health[18] are highlighted under each main category.

Core elements

The older adults described caries, infection, tooth loss, toothache, dry mouth, or tartar (disease and condition) as being difficult to experience. Taste, smell, and food intake could be affected, which was seen as vital for maintaining health. Bacteria that hide under prostheses and bridges could cause caries, and an experience of bad breath and a feeling of not being clean in the mouth could arise. Whole teeth and good chewing ability (physiological function) are prerequisites for eating, drinking, and communicating. If false teeth, bridges, and/or dental implants do not work or cause pain, oral health is adversely affected, causing discomfort, such as mouth sores, infections, and restrictions on what the older adults can eat and drink. Appearance, attitudes, treatment, and integrity (psychosocial function) affect the oral health experience. For example, having a gap between the front teeth could give a feeling of being deviant and lead to social isolation. The mouth is a central part of the body, as well as one's integrity, identity, and personality, as it sits centrally in the face and therefore affects the whole person. An older adult woman described this in the following quotation:

> 'The mouth is something that feels very central in the face, and I think most people want the teeth to be fairly intact. This thing with bad teeth characterizes the whole person […]. My mouth has to do with my integrity.'

The responsibility and attitude to oral health influenced the willingness to go to the dentist and receive advice and help with oral health. The older adults described it as being prepared to receive help. Dental fear is something that needs to be overcome to experience good oral health. Having good treatment provided by a dentist is necessary to overcome the fear of the dentist, and to feel safe in the meeting gave the older adults a feeling of confidence in the dentist

Driving determinants

Growing up with parents with poor oral health (genetic and biological factors) made the older adults aware of the importance of taking care of their oral health. Good oral health is related to daring to laugh, smile, and feel safe when eating in

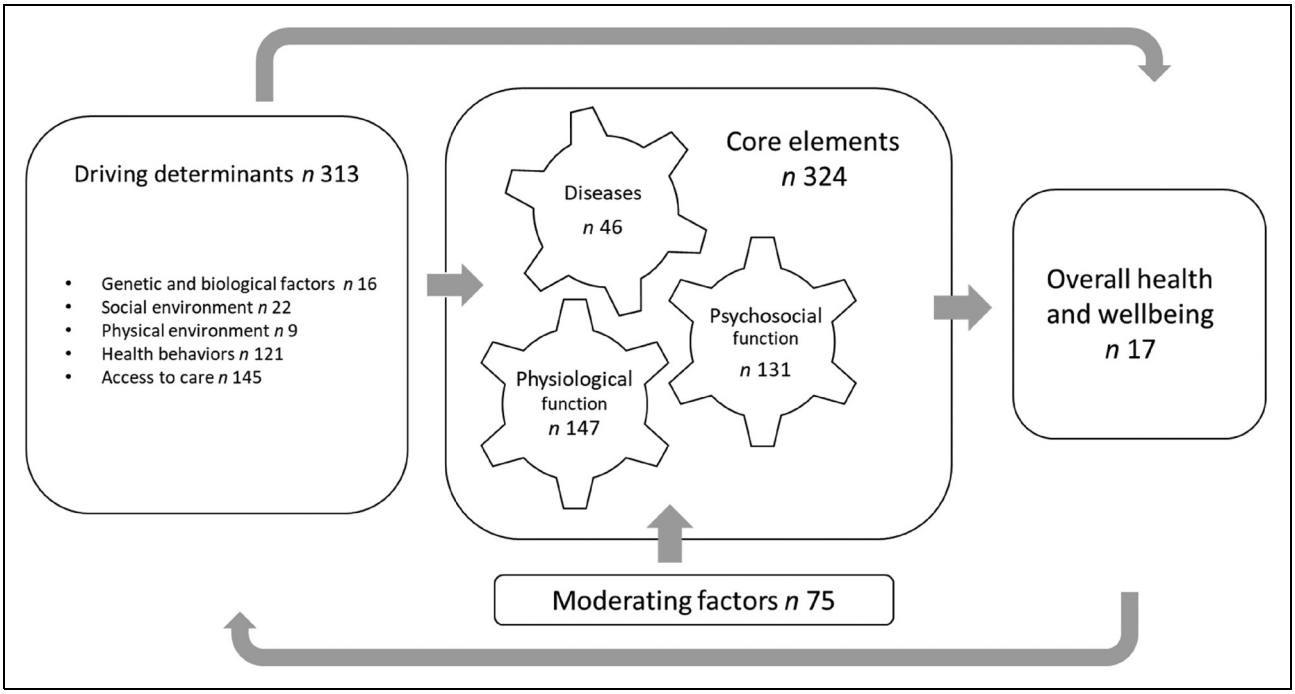

Figure 2. Quantitative findings: frequency of citations in the results from the FDI World Dental Federation's definition of oral health main category and main domains.[1] *n* = citations per category.

social contexts (social environment factors). Fear of showing teeth in public was thought to lead to insecurity in meeting other people and thereby isolation. Accessibility in the physical environment (physical environment factors), such as getting to and from the dentist with the possibility of parking close to the dentist's office, affects how and when dental visits are performed. By visiting the dentist annually and brushing the teeth daily (health behaviors), oral health is positively affected, and problems could often be prevented. Being aware of the impact of diet on oral health, such as the fact that injuries such as caries can occur on the teeth, provides knowledge about the importance of diet for oral health. An older adult man described it as:

> '[…] that you do not eat kilos of sugar and junk food at all, and I think that may also affect a positive dental health or oral health.'

The basics of good oral health are established during adolescence; habits such as using toothpicks, dental floss, mouthwash, and other aids affect how older adults prioritize and care for their oral health later in life. When needed, the ability to visit the dentist (access to care) was described as a matter of course and fundamental for maintaining oral health. Security and trust in the dentist could be obtained when the dentist possessed knowledge and sought continuity. Unpleasant treatment by the dentist promoted insecurity and fear of seeking dental care. A good response from the dentist meant that the older adults felt seen and taken seriously and therefore made sure to visit the dentist regularly and continuously.

Moderating factors

The older adults described the future need for care and saw the possibilities of digitalization with robots in healthcare as an alternative in terms of the opportunity for obtaining help with oral care and to promote independence and complement the work of healthcare professionals in the future. However, fears were also experienced with digitalization, such as the lack of personal contact and creativity in the performance of oral care received from robots. An older adult man described the future and digitalization of care as follows:

> 'If I live long enough, there will be a robot; then everyone will get, what to say, the same execution of care.'

The historical development that the older adults experienced during their upbringing since the 1940s, when oral care was developed, for example, with radiographs, was perceived to have had a positive effect on their oral health. Advertising was also seen to affect oral health, as it can be challenging to navigate what suits the individual's needs when it comes to, for example, choosing toothpaste and toothbrushes. The wrong choice of toothbrush was described as damaging the mouth, no matter how good the advertisement said it was. Living in Sweden and having financial opportunities to go to the dentist regularly was seen as necessary and very important to maintain good oral health. However, visiting the dentist can be a class issue, as the older adults are affected by their financial situation and the possibility of obtaining subsidies for dental care. The older adults experienced telling relatives how they want oral care to be performed when they cannot do it by themselves as a form of security, and emphasized that oral health is a matter of course and is considered essential for health.

Overall health and well-being

The older adults saw a connection between general health, well-being, and oral health. However, sometimes health problems/diseases should be prioritized over oral health, such as heart disease, cancer, nerve pain, cognitive disease, and other diseases. Cancer was perceived to affect oral health, for example, with dietary restrictions and drug side effects leading to dry mouth. Even a broken arm could affect how and when oral care could be performed. Cognitive diseases such as dementia were seen as an obstacle to performing oral care independently, as the understanding of the performance of oral care can be affected. An older adult woman described it as:

> '[…] say that you get a dementia disease, it is not certain that you know what a toothbrush should be for. It could be that they think they should clean the sink or something like that instead.'

The older adults described that the mouth is a part of the body, and that impaired oral health can contribute to health problems and other diseases, such as pain, infection, and inflammation. Poor oral health was therefore perceived to have a negative effect on well-being. Although the older adults felt that the mouth and body belonged together, they felt that oral health was de-prioritized when they sought care for another disease unrelated to the mouth. Traditionally, healthcare has focused on the rest of the body except the mouth. Here there was a desire that the responsibility for problems related to the mouth and dental visits were also included in the traditional healthcare offered. The fact that the mouth and the rest of the body are seen as separate parts of the Swedish healthcare system leads to oral health being de-prioritized if a disease is not directly related to the mouth. Traditional healthcare was seen to be focused on the whole body but not the mouth. Benefits were seen if oral care, such as treatment from a dentist, was included in traditional healthcare, where the mouth is seen as part of the body, and where oral care is coordinated with traditional healthcare, particularly when any other disease affects oral health.

Discussion

To explore older adults' perceptions of oral health, the FDI's definition and framework of oral health[18] and deductive direct content analysis[22] were used. The findings indicate that the participating older adults' description of oral health agrees with the FDI's definition and framework of oral health.[18] The findings show that older adults describe the importance of good oral health in the social, emotional, and mental aspects of their daily lives.

As Figure 1 shows, all main domains and main categories in the FDI definition and framework of oral health[18] are

connected and influence one another. A notable finding was that overall health and well-being was the least described main category. This can be explained by the fact that the main categories' core elements, driving determinants and moderating factors, influence overall health and well-being. Therefore, in a way, overall health and well-being are described in all main categories instead of in only the category named overall health and well-being. Another explanation can be that the analysis process only coded the codes under one category, even if another category could also be represented in the code. Therefore, overall health and well-being also are described under other categories such as driving determinants and moderating factors. The older adults described how oral health impacts the entire body, their social interaction, and performing oral care or getting help with it, and, as it is a priority area, it can therefore impact overall health and well-being. Fear/anxiety about not getting help when needed was also described. The Swedish National guidelines for dental care[9] confirm that maintaining oral healthcare for older adults is necessary, regardless of other care needs, as described in the category, overall health and well-being. Previous studies also describe the connection that oral health has to overall health and well-being by revealing how health behaviours,[1,10] diseases,[5] psychosocial aspects,[2,20] socioeconomic status,[2,10] and human rights[4] impact oral health.

Physiological function was the most described main domain among older adults. This can be explained by the fact that it is noticeable when a physiological function is not working or affected and is easy to relate to. Psychosocial function was described in the same range as physiological function by the older adults. Many older adults described the connection between the physiological and psychosocial functions by clarifying that a damaged front tooth can affect the willingness to be present in social contexts and can lead to isolation and affecting overall health and well-being. The older adult also described that the psychosocial impact could affect self-esteem and lead to social isolation The previous studies, conducted by Teng et al.[20] showed that psychological aspects have a more significant impact than physical aspects on oral health and impact a person's function and health behaviors. However, Teng et al.[20] also showed that oral health satisfaction is linked to chewing ability, as the present study confirmed. From this, it can be concluded that psychosocial functions can lead to physiological functions and vice versa in relation to oral health.

Sweden's regulations about making public buildings accessible to everyone[28] state that buildings must be accessible and usable for people with reduced mobility or orientation, which can explain the more minor described main domain, physical environment. Access to care was described in a previous study by Peres et al.[2] as being crucial, including, for example, continuously getting help if needed with oral healthcare, and is necessary and essential for oral health and can improve overall health and well-being. Health behaviors, such as how often toothbrushing was performed, were described as having a strong link to oral health. Gusdal et al.[29] support this by describing that poor oral health, such as lack of toothbrushing, is the most common cause of malnutrition among older adults living in nursing homes. A study by Moon et al.[10] describes health behaviors such as continuously visiting the dentist as a factor that significantly impacts a person's oral health, which the Swedish older adults in this study also described. Establishing a trustworthy and functional relationship with the dentist is known to be a facilitator for good oral health.[30]

Poor oral health has strong links to poor socioeconomic status[2,10] and lower income is a significant barrier to obtaining oral healthcare.[30] The older adults described this as a moderating factor and that it impacted overall health and well-being. Different economic opportunities were described as affecting their opportunities to attend the dentist. Whether you can attend the dentist can be perceived as a class issue, due to these variations in economic opportunities. However, the older adults value oral health highly, and they perceived that oral health is essential to general health and, if help is needed, it is crucial to get, as Rijt Set al.[14] also describe. A recently published study by Edman and Wårdh[31] states that including oral health education in the standard education curriculum for healthcare professionals might influence their willingness to provide oral healthcare when needed. This is more important now because, as previously described, older adults visit dental care most often due to the increased need for treatments and fillings care.[9] This might also explain the prevalence of oral health among older adults and may also be because the older adult during childhood had parents with poor oral health. The older adults also described, as do the Swedish National guidelines for dental care,[9] the importance of dental care providers working together with other healthcare professionals to meet the increased needs of care and treatment for oral healthcare among older adults. These descriptions also align with those of Tohmola et al.,[32] who advocate that it is essential for healthcare professionals to implement individual and customer-oriented care by considering older adults' expressed life experience and the current situation. This is what Ekman et al.[33] describe as person-centered care, by considering every person as an individual with their own resources and needs, and by practicing critical thinking, healthcare professionals can imagine and understand someone else's situation. These are essential qualities for allowing healthcare professionals to provide older adults the best possible care.

This study is one of the first studies to explore older adults' perceptions of oral health and its influence on general health, based on the FDI's definition and framework of oral health in a Swedish context in a qualitative way. Previous studies have used the FDI framework to identify clinical and self-reported measurements, which is applicable when designing oral health research projects,[34] and have explored the structural components of the FDI's theoretical framework.[35] Several studies have described older adults' oral health without considering a definition of oral health, and with quantitative methods.[2,10–13,20,21] The definition has previously been used to define oral health, but this has not been analyzed deductively in a Swedish context. Therefore, this study can complement earlier studies that have been conducted with more quantitative methods to broaden the picture of older adults' perceptions of oral health and its influence on general health in a Swedish context. The study adds knowledge that the FDI definition is one way for older adults to describe their perceptions of oral

health and its influence on general health. The study also provides new knowledge for healthcare professionals to use the FDI definition to define oral health in a Swedish context.

Strengths and limitations

This study's main strength is that it studies a sparsely studied area, Swedish older adults' perceptions of oral health and its influence on general health, based on the FDI's definition of oral health, with deductive direct content analysis.[22] The analysis can broaden the use of the FDI's definition and framework of oral health[18] in a Swedish context. To obtain a sample of dependability, credibility, and transferability, recruitment took place through contact with two SPF associations in the western part of Sweden. The participants were of both genders and their age range was 69–85 years and were therefore seen as a suitable sample; this therefore secured credibility in the study. However, some limitations must be considered when interpreting the results. One limitation could be that all participants came from two SPF associations in the western part of Sweden and were only 24 of the 1400 members, reducing the transferability. Another limitation can be that the majority were born and grew up in Sweden; nevertheless, two were born outside Sweden. However, the sampling sizes are seen as appropriate when performing this type of study and therefore secure the reliability. The first author's pre-understandings as a geriatric specialist nurse can be considered a strength by allowing for deeper reflection, complemented by an awareness of older adults' situations, and by providing an opportunity for reflective discussions with all authors. One researcher carried out all the individual interviews, and the focus group interviews were conducted by two of the researchers. In this way, credibility and reliability were enhanced when the same questions are asked in the same way by the same persons and by pre-testing the interview guide. Credibility and reliability were also secured by including all authors in the coding, analysis, and interpretation of the data. Authenticity was secured by including original quotations from the interviews in the result. According to the sample, transferability is seen in the study by using the FDI's definition and framework of oral health[18] in a Swedish context. The older adults agreed with the FDI's definition and framework of oral health[18] in that oral health is multifaceted. Therefore, the study can improve the importance of oral health for older adults' overall health and well-being.

Conclusion

The findings indicate that older adults agree with the FDI's definition and framework, describing it as multifaceted; and that oral health is influenced by economic, social, physical, psychological, and overall health interactions, which need to be acknowledged when healthcare professionals care for older adults' oral health in the best possible person-centered way. The findings can improve oral health, as it is essential for older adults' overall health and well-being. The study findings might also provide healthcare professionals with knowledge and insight into older adults' perceptions of oral health and its impact on general health and well-being and may offer the ability for improvements in oral healthcare.

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Author contributions

The study's original conception and design were the responsibility of all authors. The first and fourth authors were responsible for the data collection, and all authors were responsible for the analysis and draft of the manuscript. The final version was approved, discussed, and revised the interpretations of the data by all authors.

Conflict of interest

The authors declare that there is no conflict of interest.

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