

Factors related to oral health-related quality of life among children and adolescents in Slovenia

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Abstract

Introduction: Oral health is a part of general health. Problems with the oral cavity and/or teeth cause pain, discomfort and limitations in performing the function of the orofacial system and other daily tasks and reduce quality of life. Oral health-related quality of life (OHRQoL) can be used to assess the impact of oral health on an individual's life, self-image, social interactions and work/school performance. Understanding the demographic and socio-economic characteristics of groups of individuals with poorer OHRQoL is crucial for the preparation of successful and effective public health approaches to improve and strengthen oral health. **Methods:** In the »National Survey on Oral Health of Children and Adolescents in Slovenia in 2019« we used a questionnaire with which we also monitored 6 indicators of OHRQoL. Questions related to difficulties with eating food, tense feelings, difficulties in carrying out school work, the presence of toothache, the presence of sores/ulcers and awkwardness due to the appearance of teeth. Children aged 6–17 were included in the study. In the group of children with poorer OHRQoL we included individuals that answered at least one question with occasionally or more often. **Results:** At least one OHRQoL limitation occurred occasionally or more often in 22.5% of participants. Painful gums/sores in the mouth were the most common (10.6%), 6.6% of children and adolescents were embarrassed because of the appearance of their teeth, 6.0% felt tense because of oral cavity/teeth problems, 5.5% had toothache, 4.8% experienced difficulties with eating food due to oral cavity/teeth problems and 4.1% had difficulties carrying out school work due to problems with their oral cavity/teeth. One or more limitations were more frequent in girls (girls 24.9%, boys 20.4%). At least one of the limitations was more common in children aged 6–7 (24.5%), the proportion decreased in the age group 8–10 (19.5%) and increased to 25.2% at age 15–17 years. The proportion of children and adolescents

with one or more limitations decreased with higher levels of parental education (35.7% with primary education, 18.7% with a university degree).

Discussion and conclusions: More than three quarters of children and adolescents did not experience limitations in their daily lives due to problems with the oral cavity and/or teeth. In the youngest age group, the problems were probably related to changing teeth and still present deciduous teeth. In the oldest age group problems with teeth and the oral cavity accumulate, and at the same time, they were probably linked to psychological changes related to growing up. Children and adolescents of parents with a high level of education had a better OHRQoL than children and adolescents of parents with a lower level of education. Oral health care was higher among the more educated individuals, which was reflected in the oral health of children and also had an impact on OHRQoL. Dental public health programs and interventions should be upgraded to incorporate activities of oral health promotion for those groups of children and adolescents.

Keywords: children and adolescents, oral health-related quality of life (OHRQoL), parental education

Introduction

Modern, evidence-based references consider oral health to be an integral part of overall health. Teeth, with their chewing, phonation and aesthetic functions, contribute significantly to a better quality of life and to social interactions, and their functional impairment affects general health (WHO, 2003; Ranfl et al., 2017; Baiju et al., 2017; Sischo et al., 2011). As such, oral health is not only the absence of disease in the oral cavity, but also enables individuals to engage in everyday activities and thus participate in interpersonal relationships (Baiju et al., 2017).

Various oral health conditions represent a major public health problem due to the burden of their frequency and the social, economic and psychological consequences at both individual and societal levels (Baiju et al., 2017; Johansson and Osterberg, 2015). These conditions cause pain and limitations in everyday tasks such as chewing, speaking, laughing, and thus reduce the individual's quality of life (Paredes-Rodriguez et al., 2016).

In 1988, Locker introduced the oral health-related quality of life (OHRQoL) model, which led to the inclusion of the patient's perspective in treatment (Locker, 1988). This is important because the biomedical view of health has been upgraded to a biopsychosocial model also in the field of oral health. OHRQoL is a concept that can be used to assess the impact of oral health on an individual's daily life, i.e. self-image, social interactions, school and work performance, and more (Sischo et al., 2011; Gherunpong et al., 2006). Assessment of OHRQoL varies over the course of an individual's life and is associated with different factors: functioning (chewing, speech), pain and discomfort (acute pain, chronic pain), psychological factors (contentment with

appearance, self-image) and social factors (interpersonal relationships, communication) (Bennadi et al., 2013). Individuals usually understand their health in a broader sense - as the presence or absence of disease.

In particular, during childhood and adolescence, in addition to its effects on eating and speech, oral health has an important impact on social participation and interpersonal relationships. During this period, children and adolescents' relationships with peers become important, where self-image, physical self-image, including facial appearance and psychological well-being play an important role (Rando et al., 2018). Oral and/or dental problems can also affect a child's/adolescent's daily functioning, such as school performance. Oral and/or dental problems can have a negative impact on school performance, as pain interferes with a child's sleep, resulting in poorer academic performance (Krisdapong et al., 2013).

Subjective assessment of OHRQoL is also important because it has an impact on an individual's actions to take care of his or her own health, and are in turn reflected in their health status. Finally, the assessment of OHRQoL is important in the light of inequalities in access to dental care (Sischo et al., 2011). Research on OHRQoL is important to identify groups at increased risk of poor oral health, as poor oral health in childhood may continue into adulthood (Kragt et al., 2016).

Methods

The data were collected as a part of the cross-sectional »National Survey on Oral Health of Children and Adolescents in Slovenia in 2019«. A representative sample of 3,200 children and adolescents under the age of 18 was included. The survey was carried out using the EGOHID questionnaire. Questions related to OHRQoL were addressed to children and adolescents aged 6 years or older. The children and adolescents included in the study received an invitation to participate in the survey at a home address, with a password to access the online questionnaire. The survey took place in spring 2019, and participants received another postal reminder during the survey period. The questionnaire was completed by parents, but young people aged 11–17 were offered the opportunity to complete the survey by themselves.

The data collected from the survey were reviewed in »Microsoft Excel 2016«. The data were weighted by age and gender, taking into account one-year age groups. The analysis of the weighted data per sample and population was carried out in the computer software IBM SPSS Statistics for Windows', version 21.0 (IBM, 2020).

The OHRQoL questionnaire contained six questions on the frequency of dental problems when eating, the frequency of feeling tense, the frequency of difficulties in carrying out schoolwork, the frequency of toothache, the frequency of painful gums/sores in the oral cavity and the frequency of embarrassment with the appearance of the teeth. Respondents could choose from five

possible answers on a 5-point Likert scale (never, hardly ever, occasionally, often, very often). We defined occasional, frequent and very frequent as the most common occurrence of limitations. For further analysis, we included only the answers given by parents and only individuals who answered all 6 questions related to quality of life.

The interpretation of the results is based on the number and percentages of persons in the selected categories, according to demographic variables such as gender, age, parental/guardian education and living environment.

Results

According to the exclusionary factors taken into account in further data analysis, the final sample size was 725 persons. There were slightly more boys/men and slightly fewer adolescents aged 15 years or older. Most of the parents had at least a secondary education. The detailed data are shown in Table 1.

Table 1: Demographic data of the individuals included in the analysis (N=725).

	Total	725 (N)	100 (%)
Gender	Boys	387	53.4
	Girls	338	46.6
Age	6–7 years	159	21.9
	8–10 years	241	33.2
	11–14 years	218	30.1
	15–17 years	107	14.8
Parental education	Primary school	14	1.9
	High school	245	33.8
	College education (vocational)	209	28.8
	University degree	257	35.4
Living environment	Urban	229	31.6
	Suburban	184	25.4
	Rural	309	42.6

At least one OHRQoL limitation occurred occasionally or more often in 22.5% of the participants. One or more limitations were more frequent in girls (girls 24.9%, boys 20.4%). In the age group 6–7 years, the prevalence of at least one limitation was 24.5 % and dropped to 19.5% in age group 8–10 years. In the next age group, it rose again and was the highest in the group of youngsters 15–17 years old. Prevalence of limitations was also dropping with higher parental education; it was the highest in a group of children whose parents had only primary education and was the lowest in a group where parents had a university

degree. Prevalence of at least one limitation was also higher in more rural local environments/settlements. For detailed results see Table 2.

Table 2: Demographic data by frequency of occurrence of particular problems or limitations (N=725).

		No limitations (N)	One or more limitations (N)	Participants with limitations (%)
Total		562	163	22.5
Gender	Boys	308	79	20.4
	Girls	254	84	24.9
Age	6–7 years	120	39	24.5
	8–10 years	194	47	19.5
	11–14 years	168	50	22.9
	15–17 years	80	27	25.2
Parental education	Primary school	9	5	35.7
	High school	180	65	26.5
	College education (vocational)	164	45	21.5
	University degree	209	48	18.7
Living environment	Urban	185	44	19.2
	Suburban	152	32	17.4
	Rural	222	87	28.2

Table 3: Prevalence of specific limitations (N=725).

	Occasionally or more often (N)	Participants with limitations (%)
Having difficulty eating food	35	4.8
Felt tense	44	6.0
Difficulties with school work	29	4.1
Toothache	40	5.5
Sore gums/sores in the mouth	77	10.6
Embarrassed by the appearance of his/her teeth	48	6.6

Most of the participants had no limitations. From those who had some, most had only one limitation which was present in 13.9% of the total sample, two limitations were present in 4.9% of the total sample, three or more limitations were present in 3.7% of the total sample. There were also differences in the prevalence of specific limitations, of which the most common limitations were painful gums and mouth sores (10.6%), the second most prevalent feeling was embarrassment because of the appearance of their teeth (6.6%) and only 4.1%

had difficulties in carrying out schoolwork due to problems with their oral cavity/teeth. Detailed data are presented in Table 3.

Discussion

The results of the analysis show that almost a quarter of children and adolescents experienced at least one symptom or feeling that affected their OHRQoL occasionally (or more often). Similar results on the prevalence of limitations have also been found in cross-sectional studies on the impact of oral health problems on children's experience of limitations in everyday life (Rozier, 2008; Nuttall et al., 2003).

More serious limitations, such as difficulties in carrying out daily tasks, were not as common. Sore gums and sores in the oral cavity were more likely to occur. The proportion of participants with limitations was higher in the youngest age group, which can be linked to changes and circumstances in school entry and tooth eruption and was also high in the 15–17 age group, where aspects of growing up and socialization also play a role. Dental dissatisfaction varies by age according to the developmental characteristics of the children and is different in childhood than in adolescence. Feelings of attractiveness in relation to oral health become more important in late childhood and adolescence (Nuttall et al., 2003). In adolescence, individuals become more sensitive to social norms and ideals, and how they are perceived by their peers becomes more important (Barbosa et al., 2008).

In a survey in the United Kingdom, pain was reported as the most common limitation across all age groups (15–25% of children reported having pain). This was consistent with our findings when combining the responses to the questions on the frequency of toothache and the frequency of sore gums. Some differences in the frequency of certain limitations in daily life due to oral and/or dental problems were also observed by gender, as parents of girls/adolescents were more likely to report the presence of at least one limitation. Results from the study on the impact of oral health problems in children in the UK did not confirm significant gender differences in the frequency of limitations due to oral health problems (Nuttall et al., 2003).

We also observed some differences in the prevalence of limitations in daily life for children/young people regarding the education of their parents/guardians. Education is an important determinant of health-related behavior. While tooth-brushing with regular check-ups at the dentist is an important part of a healthy lifestyle, taking care of one's own oral health is one of the most important factors of oral health and, consequently, also an important factor in promoting health. With lower levels of education, we can expect poorer oral health care, as we know that children of parents with lower education are less likely to brush their teeth, as shown also by the results of our study (Artnik et al., 2020).

Results of our study were consistent with the research on inequalities in OHRQoL in children, which had shown that children from families with lower socioeconomic status (which includes parental education) had lower OHRQoL than children from families with higher socioeconomic status (Kragt et al., 2016; Kumar et al., 2014; Locker, 2007). The systematic review on the impact of parental/caregiver socioeconomic status on children's OHRQoL showed a direct association between parental/caregiver education level and children's quality of life. Children of parents/caregivers with high levels of education were more likely to have better OHRQoL than children of parents/caregivers with lower levels of education, and a particularly significant association was found between maternal education and child OHRQoL (Kumar et al., 2014). Family socioeconomic status, which may be related to parental educational status, has a significant impact on children's oral health through the ability of parents or caregivers to respond to children's oral health needs and habits (Chaffe et al., 2017).

Similarly, differences in OHRQoL also emerged according to the living environment. The proportion of children/adolescents who often or occasionally experienced limitations in their daily life due to oral and/or dental problems was higher among children/adolescents from a rural living environment than among children/adolescents from an urban or suburban living environment. Differences by living environment for individual limitations were also confirmed in the detailed analysis, and these were particularly evident for the occurrence of painful wounds or ulcers in the oral cavity and toothache (Artnik et al., 2020).

We decided to limit the analysis to parental responses only, because the younger age group was not expected to complete the survey themselves, and because there was some ambiguity in the responses of the adolescents who completed the survey themselves regarding their or their parents' educational qualifications. This brings some limitations for the interpretation of the data. Subjective assessment of OHRQoL, especially when reported by parents/caregivers for their children, should be seen as a complement to, and not a substitute for, dental needs assessment or clinical oral health assessment (Allen, 2003).

In order to get a precise overview of the prevalence of each limitation and to determine the proportion of the population with more than one limitation, we decided to limit the analysis to individuals who answered all six questions. For individuals who answered only one or a few questions, we could not assess whether they have other limitations.

Conclusions

Oral health is an integral part of general health and has great influence on quality of life. Children and adolescents in Slovenia occasionally feel some lim-

itations and symptoms regarding oral health. OHRQoL is lower in children of parents with lower education and in children in more rural settlements. Dental public health programs and interventions should be upgraded to incorporate activities of oral health promotion for those groups of children and adolescents.

References

- ALLEN, P. F., 2003. Assessment of oral health related quality of life. *Health and quality of life outcomes*, vol. 1, no. 40.
- ARTNIK, B., RANFL, M., BLATNIK, J., MAGAJNA, A. and ROSTOHAR, A., 2020. *Ustno zdravje otrok in mladostnikov, 2019: nacionalna raziskava o ustnem zdravju otrok in mladostnikov v Sloveniji leta 2019*. Elektronska izd. [online]. [viewed 28 June 2022]. Available from: https://www.nijz.si/sites/www.nijz.si/files/publikacije-datoteke/publikacija_otroci_ustno_zdravje.pdf
- BAIJU, R. M., PETER, E., VARGHESE, N. O. and SIVARAM, R., 2017. Oral health and quality of life: current concepts. *Journal of clinical and diagnostic research*, vol. 11, no. 6, pp. ZE21–ZE26.
- BARBOSA, T. S. and GAVIÃO, M. B., 2008. Oral health-related quality of life in children: part I. How well do children know themselves? A systematic review. *International journal of dental hygiene*, vol. 6, no. 2, pp. 93–99.
- BENNADI, D. and REDDY, C. V., 2013. Oral health related quality of life. *Journal of international society of preventive & community dentistry*, vol. 3, no. 1, pp. 1–6.
- CHAFFEE, B. W., RODRIGUES, P. H., KRAMER, P. F., VÍTOLO, M. R. and FELDENS, C. A., 2017. Oral health-related quality-of-life scores differ by socioeconomic status and caries experience. *Community dentistry and oral epidemiology*, vol. 45, no. 3, pp. 216–224.
- GHERUNPONG, S., SHEIHAM, A. and TSAKOS, G., 2006. A sociodental approach to assessing children's oral health needs: integrating an oral health-related quality of life (OHRQoL) measure into oral health service planning. *Bulletin of the World Health Organization*, vol. 84, no. 1, pp. 36–42.
- INTERNATIONAL BUSINESS MACHINES CORPORATION (IBM), 2020. SPSS Statistics 21.0 available for download [online]. [viewed 19 July 2022]. Available from: <https://www.ibm.com/support/pages/spss-statistics-210-available-download>
- JOHANSSON, G. and ÖSTBERG, A. L., 2015. Oral health-related quality of life in Swedish young adults. *International journal of qualitative studies on health and well-being*, vol. 10, no. 1, pp. 27125.
- KRAGT, L., VAN DER TAS, J. T., MOLL, H. A., ELFRINK, M. E., JADDOE, V. W., WOLVIUS, E. B. and ONGKOSUWITO, E. M., 2016. Early caries pre-

- dicts low oral health-related quality of life at a later age. *Caries research*, vol. 50, no. 5, pp. 471–479.
- KRISDAPONG, S., PRASERTSOM, P., RATTANARANGSIMA, K. and SHEHAM, A., 2013. School absence due to toothache associated with sociodemographic factors, dental caries status, and oral health-related quality of life in 12- and 15-year-old Thai children. *Journal of public health dentistry*, vol. 73, no. 4, pp. 321–328.
- KUMAR, S., KROON, J. and LALLOO, R., 2014. A systematic review of the impact of parental socio-economic status and home environment characteristics on children's oral health related quality of life. *Health and quality of life outcomes*, vol. 12, no. 41.
- LOCKER D., 1988. Measuring oral health: a conceptual framework. *Community dental health*, vol. 5, no. 1, pp. 3–18.
- LOCKER D., 2007. Disparities in oral health-related quality of life in a population of Canadian children. *Community dentistry and oral epidemiology*, vol. 35, no. 5, pp. 348–356.
- NUTTALL, N. M., STEELE, J. G., EVANS, D., CHADWICK, B., MORRIS, A. J. and HILL, K., 2006. The reported impact of oral condition on children in the United Kingdom, 2003. *British dental journal*, vol. 200, no. 10, pp. 551–555.
- PAHEL, B. T., ROZIER, R. G. and SLADE, G. D., 2007. Parental perceptions of children's oral health: The Early Childhood Oral Health Impact Scale (ECOHIS). *Health and quality of life outcomes*, vol. 5, no. 6.
- PARADES-RODRÍGUEZ, V. M., TORRIJOS-GÓMEZ, G., GONZÁLEZ-SERRANO, J., LÓPEZ-PINTOR-MUÑOZ, R. M., LÓPEZ-BERMEJO, M. Á. and HERNÁNDEZ-VALLEJO, G., 2016. Quality of life and oral health in elderly. *Journal of clinical and experimental dentistry*, vol. 8, no. 5, pp. e590–e596.
- RANDO, G. M., JORGE, P. K., VITOR, L., CARRARA, C., SOARES, S., SILVA, T. C., RIOS, D., MACHADO, M., GAVIÃO, M. B. and OLIVEIRA, T. M., 2018. Oral health-related quality of life of children with oral clefts and their families. *Journal of applied oral science: revista FOB*, no. 26, pp. e20170106.
- RANFL, M., OIKONOMIDIS, C., KOSEM, R. and ARTNIK, B., 2017. *Vzgoja za ustno zdravje: prehrana in higiena: strokovna izhodišča*. Ljubljana: Nacionalni inštitut za javno zdravje.
- ROZIER, R. G. and PAHEL, B. T., 2008. Patient- and population-reported outcomes in public health dentistry: oral health-related quality of life. *Dental clinics of North America*, vol. 52, no. 2, pp. 345–365.
- SISCHO, L. and BRODER, H. L., 2011. Oral health-related quality of life: what, why, how, and future implications. *Journal of dental research*, vol. 90, no. 11, pp. 1264–1270.

WORLD HEALTH ORGANIZATION (WHO), 2003. *The World Oral Health Report 2003. Continuous improvement of oral health in the 21st century - the approach of the WHO Global Oral Health Programme*. Geneva: World Health Organization.