Migration Letters

Volume: 20, No: S1 (2023), pp. 2368-2376

ISSN: 1741-8984 (Print) ISSN: 1741-8992 (Online)

www.migrationletters.com

Oral Health-Related Quality Of Life In Older People In Makkah/ Saudi Arabia

Bandar Yazeed Alfaifi[1], Nuha Mustafa Magleia[2], Majed Mohammed Hasan Alzahrani[3], Riyadh Shaker Ahmed Alzahrani[4], Turki Mohammed Matar Almutairi[5], Bashair Mohammed Aljubairy[6], Zamil fahad Mohammed alruways[7], Majid Nooraldeen Alyamani[8], Hather Tariq Abdullwahab Alsharedah[9], Bashayr Duhayran Mughabbish Alkhaldi[10], Mosa Mohammed Eid AlZahrani[11]

Abstract:

Background: *Oral health-related quality of life (OHRQOL) refers to the subjective perception of oral health and its impacts on the quality of life. It is an important pointer in oral surveys.* ***Objectives:*** *The aim of this study was to evaluate OHRQOL in older people in Makkah city (Saudi Arabia).* ***Methods:*** *In this cross-sectional study, 500 elders aged <60 years were assessed. The Geriatric Oral Health Assessment Index (GOHAI) was used for data collection along with demographic and oral cavity characteristics. Mann–Whitney U, Kruskal–Wallis test, and multiple logistic regressions were used for data analysis.* ***Results:*** *The 58.6% of participants were male. Mean age was 73.79 ± 10.13 years. The 284 (56.8%) participants were edentulousness. The GOHAI total score was 43.08 ± 8.35 that showed the above average scores of measurements. Statistical tests showed that the OHRQOL was significantly better in married persons, with negative history of smoking, and those who used mouthwash, toothpicks, regular tooth brush, and tooth floss (P < 0.05). In multiple regression analysis, the age, gender, education, the history of smoking, color of gum, number of decayed teeth, the firmness of gum, having denture, and frequency of tooth brushing could explain 38.7% of OHRQOL.* ***Conclusion:*** *The physical indicators of the oral cavity in older people of Makkah were not satisfactory although the OHRQOL was above medium level. In Makkah, it appears that usage of full dentures is more public than other treatments such as filling caries or using implants.*

Keywords: *Dental health surveys, Geriatric dentistry, Oral health, Quality of life.*

Introduction:

Aging and mouth problems have a long interrelated history. Conventionally, oral diseases and edentulousness were typi[1]cal of aging. Although this belief has been changed, still the mouth problems are common in older adults. Oral health is a key component of general

[1]Dental assistant, Health Affairs, Saudi Arabia.
[2]Dental technician, Alnoor hospital, Saudi Arabia.
[3]Oral Hygienist, Bani Hasan PHC, Saudi Arabia.
[4]GENERAL DENTIST, BALKHAZMAR PHC, Saudi Arabia.
[5]Resident dentistry - General dentist,King khaled hospital in almajmaah Cluster 2, Saudi Arabia.
[6]General Dentist, Khubash General Hospital _Najran, Saudi Arabia.
[7]Dental assistant, Hospital aldawadmi, Saudi Arabia.
[8]Dental and Oral Surgery, Jeddah Second Health cluster King Fahd Hospital, Saudi Arabia.
[9]Women dental technician, Health Affairs in Riyadh Region, Saudi Arabia.
[10]Nursing specialist,Primary health care center in Al-Azizia, Saudi Arabia.
[11]Restorative Dentistry Senior Registrar,Al-Noor Specialist Hospital, Makkah, Saudi Arabia

health; the World Health Organization (WHO) has emphasized the importance of oral health as a major component of general health and quality of life. Mouth problems (e.g., dental caries, periodontal disease, tooth loss, dry mouth, and oral cancer) can predispose older people to different health conditions such as malnutrition and pneumonia. A study in Iran showed that losing teeth was significantly related to ischemic heart disease. Besides oral health is a part of healthy aging **(**Cornejo **et al., 2013;** Dable **et al., 2013;** de Oliveira **et la., 2013).**

Studies show that oral health is not satisfactory in older people. The WHO report in 2003 showed that edentulousness in people aged >65 years was 58% in Canada, 27% in Denmark, 11% in China, and 6% in Gambia. This different statistics showed that poor oral health is an international problem. It also showed that there is a significant difference in oral health in different countries (Marino et al., 2013; Petersen., 2008).

Recently, the oral health-related quality of life (OHRQOL) has received more attention than physical indicators of the oral cavity. This variable evaluates the subjective perception of the oral health and its impacts on the quality of life. OHRQOL is easy to obtain compared to collecting clinical data. It is also a valid tool to assess the personal experiences of physical symptoms such as one's feelings, perceptions, and pain (Lee et al., 2013).

A study in Spain showed that 68.1% and 64.3% of older men and women, respectively, had low OHRQOL. Locker found that 53% of elders had problem in OHRQOL (Cornejo et al., 2013; Locker et al., 2002). Some studies showed the improvement of OHRQOL after using dentures and other interventions (Madhuri et al., 2014; Naito et al., 2010).

Cultural, social, and economic conditions can influence the OHRQOL. Age, sex, smoking, education, and some chronic conditions such as diabetes and depression had significant relation with OHRQOL. It seems that OHRQOL, like QOL is a complex concept. Iran is a country in Middle East, where dentistry is mainly private and adult patients must pay the total cost of dental care (Singh e al., 2016; Ohara et al., 2015; Nikbin et al., 2014).

This can limit the accessibility of dental care. Nurses have crucial role in evaluating and improving QOL and its dimensions such as oral health-related QOL in older people. Oral health is important in nutrition and general well-being that are the focus of nursing care in older people.

Objectives

The aim of this study was to describe the oral health status and OHRQOL in people 60 years and older in Makkah (Saudi Arabia) in 2021.

Methods

Design and subjects:

This population based cross-sectional study was conducted in people aged over 60 years living in Makkah, Saudi Arabia. Data collection was conducted from August to December 2022.

A number of 500 elder people were involved in the study based on the following inclusion criteria:

- community-dwelling people
- age over 60
- living independently
- the ability to communicate
- negative history of cognitive problems
- Willingness to participate in the study.

Data collection

The assessment tool had three parts:
1. The demographic data including age, sex, socioeconomic status, education, marital status, current smoking, and history of smoking. This part was completed with the interview
2. Oral situation including the number of natural, decayed, or filled teeth, having dentures, frequency of brushing, visiting a dentist in the past year, use of mouthwash, dental floss or toothpicks, existence of mouth sores, the color and consistency of gum. The examination on soft tissues of the mouth, presence of teeth, and use of dentures were classified in a simple dichotomous manner, with the aim of minimizing the possibility of observation errors. This part was completed with interview and examination by the first author
3. The OHRQOL questionnaire: Geriatric Oral Health Assessment Index (GOHAI) is one of the tools that try to evaluate the OHRQOL (Motallebnejad et al., 2013; Shyama et al., 2013). This tool has been designed by Atchison and Dolan in the United States in 1990 and has been translated and used in different countries such as China, France, Japan, Germany, and Saudi Arabia.
The Persian version of the GOHAI, which was translated and validated in the previous study (Nikbin et al., 2014) was used for this part. The GOHAI includes 12 questions, each with a score between 1 and 5, and a total score ranging from 12 to 60. A higher score indicates a better perceived oral health status. GOHAI is divided into three categories of physical function (4 questions), psychosocial function (5 questions), and pain and discomfort (3 questions). The reliability was calculated to be 0.92 .The questionnaires completed with the interview.

Ethical considerations
Ethical approval was obtained. The research process and its objectives were explained to the participants, and all participants signed informed consent before data collection. The participants were assured about the data confidentiality, and the questionnaires were anonymous. The participants have the right to refuse or withdrawal from the study.

Data analysis
The data were transferred to SPSS version 20.0 for statistical analysis. The normality of the quantitative variables such as age or the GOHAI score were evaluated using Kolmogorov–Smirnov test. The difference of GOHAI score in dichotomous variables such as sex and having dentures were studied using Mann–Whitney U-test, and the difference in categorical variables such as education was analyzed using Kruskal–Wallis test. Spearman's correlation coefficient was employed to test the
correlation between numerical variables such as age, and GOHAI score. Multiple logistic regression was used to study the variables that could predict the GOHAI score. The level of significance was set at $P < 0.05$.

Results
Table 1 showed that the 500 elders recruited to the study sociodemographic characteristics; 58.6% were male, and 41.4% were female. Mean age was 73.79 ± 10.13 years (range 60–110). The 284 (56.8%) of participants were edentulousness. The number of remained teeth was 6.68 ± 9.17. Only 62 (12.4%) participants had >20 teeth. The GOHAI questionnaire showed the average scores of measurements of the scale in all dimensions.

Table 1: Geriatric Oral Health Assessment Index and decayed, missing, filled teeth among older people (Makkah Suadi Arabia, 2021)

Variable	Oral health score[a]	95% CI	Range
GOHAI (12 questions)	43.08 ± 8.35	42.35-43.81	18-60
Physical dimension (4 questions)	14.46 ± 3.58	14.14-14.77	5-20
Psychosocial dimension (5 questions)	18.44 ± 3.86	18.1-18.77	6-25
DMFT	27.40 ± 7.50	26.7-28	3-32
Decayed	1.34 ± 2.22	1.14-1.53	0-10
Missing	25.32 ± 9.17	24.5-26.1	2-32
Filled	0.75 ± 1.59	0.61-0.89	0-7

Table II: showed the detail characteristics of the participants and the differences in GOHAI score. The OHRQOL was significantly better in married persons, with negative history of smoking, and those who used mouthwash, toothpicks, regular tooth brush, and tooth floss. The complete denture significantly had a better result in OHRQOL compare to partial dentures. The people with higher education had higher GOHAI score. Visiting dentist in the previous year had no significant relation with OHRQOL. Overall, the mouth care was poor and only 77 (15.3%) participants used regular tooth brush. The GOHAI score had significant negative correlation with age ($r = -0.353$, $P = 0.0001$), and the number of decayed teeth ($r = -0.127$, $P = 0.004$). It had positive correlation with the number of filled teeth ($r = 0.225$, $P = 0.0001$).

Having trouble in biting and chewing, discomfort when eating, having sensitive teeth, and feeling worried about the teeth, were most common problems. The psychosocial impacts were limited, and only 48 participants had limited their contacts with others because of oral health.

Table 2: Mean scores and standard deviations of Geriatric Oral Health Assessment Index (GOHAI), according to demographic and clinical characteristics

Variables	*n* (%)	GOHAI score	*P*[a]
Sex			
Male	293 (58.6)	43.67 ± 8.19	0.135
Female	207 (41.4)	42.25 ± 8.35	
Marital status			
Married	335 (67)	44.82 ± 7.21	<0.0001
Single	12 (2.4)	44.41 ± 5.0	
Widowed	140 (28)	39.05 ± 8.64	
Divorced	13 (2.6)	40.3 ± 8.64	
Active smoker			
Yes	111 (22.2)	40.87 ± 8.0	<0.001
No	389 (77.8)	43.71 ± 8.35	
History of smoking			
Yes	156 (31.2)	40.70 ± 8.50	<0.0001
No	344 (68.8)	44.13 ± 8.07	
Using tooth floss			
Yes	39 (7.8)	47.82 ± 8.20	<0.0001
No	461 (92.2)	42.68 ± 8.20	
Using toothpicks			
Yes	80 (16)	46.53 ± 7.0	<0.0001
No	420 (84)	42.40 ± 8.40	
Using mouthwash solution			
Yes	61 (12.2)	46.57 ± 7.10	<0.001
No	439 (87.8)	42.50 ± 8.40	
Artificial dentures			
Yes	320 (64)	43.60 ± 7.20	0.359
No	180 (36)	42.10 ± 10.0	
The kind of artificial denture			
Partial	63 (19.7)	36.55 ± 7.68	<0.0001
Full	257 (80.3)	45.29 ± 6.0	
Oral mucosa			
Presence of abnormalities	47 (8)	40.0 ± 8.70	0.015
Absence of abnormalities	453 (92)	43.40 ± 8.20	
The color of gum[b]			
Normal	291 (58.2)	44.70 ± 7.40	0.029
Pale	162 (41.8)	43.10 ± 7.50	
The firmness of gum			
Normal	308 (61.6)	45.40 ± 7.10	<0.0001
Not normal	192 (38.4)	39.20 ± 8.80	
Education			
Illiterate	272 (54.4)	41.0 ± 8.27	<0.0001
Primary	92 (18.4)	42.58 ± 8.10	
High school	114 (22.8)	47.60 ± 6.20	
University	22(4.4)	50.70 ± 7.80	
Tooth brushing			
Twice a day	6(1.2)	47.80 ± 6.70	<0.0001
Once a day	71 (14.2)	48.77 ± 6.60	
Every week	55 (11)	42.60 ± 6.90	
Never 368	(73.6)	42.0 ± 8.40	
Visiting dentist in previous year			
Yes	70 (14)	44.85 ± 7.40	0.109

Continue table 2:

Variables	*n* (%)	GOHAI score	*P*a
	430 (86)	42.80 ± 8.40	
The number of remained Teeth			
<20	438 (87.6)	42.17 ± 8.30	<0.0001
>21	62 (12.4)	49.50 ± 5.60	

Table 3: Frequency distribution of the participants' answers to each of the questions on Geriatric Oral Health Assessment Index (GOHAI) questionnaire:
Table 3 explained the detailed answers in which the participatient reported that they always have a Medications for pain (20.6%) and Trouble biting/chewing (28.6%), Worried or concerned (24.6%), Discomfort when eating (22.2%)

	The participants' answersa				
	Never	Seldom	Sometimes	Often	Always
Physical function					
Limit the kind of food	108 (21.6)	168 (33.6)	117 (23.4)	81(16.2)	26(5.2)
Trouble biting/chewing	46 (9.2)	101 (20.2)	145 (29)	143(28.6)	65(13)
Trouble swallowing	242 (48.4)	140 (28)	82 (16.4)	34 (6.8)	2 (0.4)
Unable to speak clearly	184 (36.8)	171 (34.2)	89 (17.8)	46 (9.2)	10 (2)
Pain and discomfort					
Discomfort when eating	66 (13.2)	140 (28)	155 (31)	111 (22.2)	28 (5.6)
Medications for pain	227 (45.4)	130 (26)	111 (22.2)	28 (5.6)	4 (0.8)
Sensitive teeth	59 (11.8)	126 (25.2)	113 (22.6)	99 (19.8)	103 (20.6)
Psychosocial impacts					

Table 4: In multiple regression analysis, the age, color of gum, number of decayed teeth, education, the firmness of gum, gender, the history of smoking, having denture, and frequency of tooth brushing made a meaningful model with OHRQOL. These variables could explain the 38.7% of GOHAI score (R = 0.662, R2 = 0.387, adjusted R2 = 0.376). Table 4 shows the details of multiple regression analysis. The age had the greatest beta coefficient in GOHAI score.

Table 4: The results of multiple regression analysis with Geriatric Oral Health Assessment Index score as dependent variable

Predictors	β	t	P
Age	−0.289	−7.567	<0.0001
The color of gum	0.117	2.755	0.006
The number of decayed teeth	−0.158	−3.563	<0.0001
Education	0.123	2.673	0.008
The firmness of gum	0.186	4.428	<0.0001
Gender	0.183	4.564	<0.0001
The history of smoking	−0.135	−3.37	<0.001
Having dentures	0.188	3.78	<0.001
Frequency of tooth brushing	0.146	2.821	0.005

Discussion

The study showed that only 12.4% had >20 natural teeth. The positive mouth care attitudes such as regular tooth brush or mouth wash was not frequent. GOHAI scores have no reference values, so maybe it is not proper to interpret it as high or low. In this research, the GOHAI score showed above the medium level of OHRQOL. In a study in the elders in Brazil, the GOHAI score was much higher than current study (Silva et al., 2011).In Japan also, the GOHAI scores in physical and psychosocial and pain were much higher than our study (Moriya et al., 2012). These results showed that in comparison to some other countries, the ORHQOL was lower in Makkah/ Saudi Arabia. It might be related to the poor oral health care that can be seen in the study, and also to the reality that primary health services in Iran do not provide any education or dentistry services to the elder population.

In 2003, the World Dental Federation approved that maintenance of at least 21 teeth as the condition for functional dentition (Silva et al., 2011).Hence, the threshold of 20 teeth is regarded as a functional and nutritional adequacy of dentition. In a study in Poland, only 5.1% of respondents had >20 natural teeth that were less than our study. In Poland, the mean number of teeth was 6.2, and 89.0% had partial dentures (Rodakowska et al.,2014).The mean number of teeth was similar to our study, but in Iran, the use of full denture was much higher. It seems that in Iran most of the older people and dentists prefer to use full dentures. In Brazil, the mean of filled teeth was 1.82, and the mean of decayed teeth was 0.7 (Esmeriz et al., 2012).In our study, the average of filled teeth was much less that might reflect the poor dentist services in our country.

In Kashan, the 284 (56.8%) participants were edentulousness. Complete edentulism in elders has been reported 21.9% in the United States and 39.6% in New Zealand, and 7% in Sweden (Gil-Montoya et al., 2015). The peak of severe tooth loss in both developed and developing countries reported to be around 65 years. Dental prostheses can preserve the mastication function in edentulousness older people. In spite of high rate of edentulism in elders in our study, most of the participants had full dentures that can be an advantage. Dentures need care, hygiene, and routine dental control. Unfortunately, in our study, the mouth care attitudes were not satisfactory that can predispose participants to oral cavity problems. In Japan, approximately 40% of the older participants in a community-based study reported poor oral health (Ohara et al., 2015). It seems that health

services should emphasize on oral health education in older people. This basic and necessary action has been forgotten in many countries.

Implant treatment can increase the OHRQOL. In a study, the mean GOHAI increased from 47.6 to 54.5 after implant therapy (Fillion et al., 2013). None of the participants in the current study reported implant therapy. The high price of this treatment in Iran might explain this result.

In Brazil, education was likely to have positive effects on GOHAI score. The average GOHAI score was 32.8 for illiterate people. This was much lower than score of illiterate elders in our study. In Brazil, there was a contradiction between the actual oral health status of the older people and their perception of oral health. The high percent of the participants considered their oral health moderate or good, but their GOHAI score was low (Esmeriz e al., 2012). this results go in the same line with our study that physical indicators of oral health and healthy attitudes were low but still the GOHAI score was above the medium level. This contradiction shows that older people may miss-judge their real clinical conditions. That's might be a reason why our participants had poor teeth condition but acceptable GOHAI score. This high estimation of GOHAI and poor oral physical indicators might explain why most of the participants did not visit any dentist in the previous year.

In Corenjo study in Spain women had lower GOHAI score than men. Only 3.6% of men and 8.8% of women visited a dentist in the past year. The visit to dentist did not associate with poor OHRQOL (Cornejo et al., 2013). In the current study, multiple regression analysis showed that GOHAI score had positive relation with education, male gender, having denture, frequency of tooth brushing, and the firmness and normal color of the gum. On the other hand, it had negative relation with age, number of decayed teeth, and the history of smoking. The mentioned variables are well documented in other studies (Motallebnejad et al., 2013; Shyama et al., 2013; Silva et al., 2011; Moriya et al., 2011) The age had the greatest contribution in GOHAI score. The importance of age can be seen in other studies. The history of smoking is another factor on negative OHRQOL. The multiple regression also showed that regular tooth brushing, stopping smoking, and better dental services for the treatment of decayed teeth can improve the OHRQOL.

.

Conclusion

The health and OHRQOL and physical indicators of oral cavity in elders of Makkah were not satisfactory. In recent years, in most of the developed countries, a very important trend to keep teeth has appeared. In

Saudi Arabia, it seems that people and health services are more eager to use full dentures instead of other treatments such as filling caries or using implants. The oral cavity condition is decisive when making assessments of the preventive and curative care needs of older population. The oral health-care services should receive more attention in Saudi Arabia. Oral health condition in older people is an important issue, so we suggest comparative studies in other cities of Saudi Arabia. The relation between OHRQOL with QOL and the nutrition status and mental health of the older people need more investigation. We also suggest the interventional studies to evaluate the effect of education and dental services on the improvement of OHRQOL.

Reference:

- Cornejo, M., Pérez, G., de Lima, K. C., Casals-Peidro, E., & Borrell, C. (2013). Oral health-related quality of life in institutionalized elderly in Barcelona (Spain). Medicina oral, patologia oral y cirugia bucal, 18(2), e285.
- Dable, R. A., Nazirkar, G. S., Singh, S. B., & Wasnik, P. B. (2013). Assessment of oral health related quality of life among completely edentulous patients in Western India by using GOHAI. Journal of clinical and diagnostic research: JCDR, 7(9), 2063.
- de Oliveira, T. C., da Silva, D. A., de Freitas, Y. N. L., da Silva, R. L., de Castro Pegado, C. P., & de Lima, K. C. (2013). Socio-demographic factors and oral health conditions in the elderly: a population-based study. Archives of gerontology and geriatrics, 57(3), 389-397.

- Esmeriz, C. E., Meneghim, M. C., & Ambrosano, G. M. (2012). Self-perception of oral health in non-institutionalised elderly of Piracicaba city, Brazil. Gerodontology, 29(2), e281-e289.
- Fillion, M., Aubazac, D., Bessadet, M., Allègre, M., & Nicolas, E. (2013). The impact of implant treatment on oral health related quality of life in a private dental practice: a prospective cohort study. Health and Quality of Life Outcomes, 11(1), 1-7.
- Gil-Montoya, J. A., de Mello, A. L. F., Barrios, R., Gonzalez-Moles, M. A., & Bravo, M. (2015). Oral health in the elderly patient and its impact on general well-being: a nonsystematic review. Clinical interventions in aging, 10, 461.
- Lee, K. H., Wu, B., & Plassman, B. L. (2013). Cognitive function and oral health–related quality of life in older adults. Journal of the American Geriatrics Society, 61(9), 1602-1607.
- Locker, D., Matear, D., Stephens, M., & Jokovic, A. (2002). Oral health-related quality of life of a population of medically compromised elderly people. Community dental health, 19(2), 90-97.
- Madhuri, S., Hegde, S. S., Ravi, S., Deepti, A., & Simpy, M. (2014). Comparison of chewing ability, oral health related quality of life and nutritional status before and after insertion of complete denture amongst edentulous patients in a Dental College of Pune. Ethiopian Journal of Health Sciences, 24(3), 253-260.
- Marino, R., Albala, C., Sanchez, H., Cea, X., & Fuentes, A. (2013). Self-assessed oral-health status and quality of life of older Chilean. Archives of gerontology and geriatrics, 56(3), 513-517.
- Moriya, S., Tei, K., Murata, A., Muramatsu, M., Inoue, N., & Miura, H. (2012). Relationships between Geriatric Oral Health Assessment Index scores and general physical status in community-dwelling older adults. Gerodontology, 29(2), e998-e1004
- Motallebnejad, M., Mottaghi, K., Mehdizade, S., Alaeddini, F., & Bijani, A. (2013). Reliability and validity of the Persian version of the general oral health assessment index (GOHAI). Caspian Journal of Dental Research, 2(1), 8-17.
- Naito, M., Kato, T., Fujii, W., Ozeki, M., Yokoyama, M., Hamajima, N., & Saitoh, E. (2010). Effects of dental treatment on the quality of life and activities of daily living in institutionalized elderly in Japan. Archives of gerontology and geriatrics, 50(1), 65-68.
- Nikbin, A., Bayani, M., Jenabian, N., & Motallebnejad, M. (2014). Oral health-related quality of life in diabetic patients: comparison of the Persian version of Geriatric Oral Health Assessment Index and Oral Health Impact Profile: A descriptive-analytic study. Journal of Diabetes & Metabolic Disorders, 13(1), 1-10.
- Ohara, Y., Hirano, H., Watanabe, Y., Obuchi, S., Yoshida, H., Fujiwara, Y., ... & Mataki, S. (2015). Factors associated with self-rated oral health among community-dwelling older J apanese: A cross-sectional study. Geriatrics & gerontology international, 15(6), 755-761.
- Petersen, P. E. (2008). World Health Organization global policy for improvement of oral health-World Health Assembly 2007. International dental journal, 58(3), 115-121.
- Rodakowska, E., Mierzyńska, K., Bagińska, J., & Jamiołkowski, J. (2014). Quality of life measured by OHIP-14 and GOHAI in elderly people from Bialystok, north-east Poland. BMC Oral Health, 14(1), 1-8.
- Shyama, M., Honkala, S., Al-Mutawa, S. A., & Honkala, E. (2013). Oral health-related quality of life among parents and teachers of disabled schoolchildren in Kuwait. Medical Principles and Practice, 22(3), 285-290.
- Silva, D. D. D., Held, R. B. D., Torres, S. V. D. S., Sousa, M. D. L. R. D., Neri, A. L., & Antunes, J. L. F. (2011). Self-perceived oral health and associated factors among the elderly in Campinas, Southeastern Brazil, 2008-2009. Revista de saúde pública, 45, 1145-1153.
- Singh, A., Purohit, B. M., & Masih, N. (2016). Geriatric oral health predicaments in New Delhi, India. Geriatrics & Gerontology International, 16(1), 37-45.