IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)
e-ISSN: 2279-0853, p-ISSN: 2279-0861.Volume 14, Issue 8 Ver. II (Aug. 2015), PP 96-104
www.iosrjournals.org

Oral Health Literacy And Its Impact On Oral Health Status Among Institutionalised Elderly Population

Dr. SoundaryaChowdary.M, Dr. Sudhir K.M., Dr. V.ChandraSekhara Reddy, Dr. Krishna Kumar.RVS, Dr. Srinivasulu.G

Department of Public Health Dentistry,Narayana Dental College and Hospital, Nellore, Andhra Pradesh, India
Reader,Department of Public Health Dentistry,Narayana Dental College and Hospital, Nellore, Andhra Pradesh, India.
Professor and Head,Department of Public Health Dentistry,Narayana Dental College and Hospital, Nellore, Andhra Pradesh, India.
Reader,Department of Public Health DentistryNarayana Dental College and Hospital, Nellore, Andhra Pradesh, India.
Senior Lecturer, Department of Public Health Dentistry Narayana Dental College and Hospital, Nellore, Andhra Pradesh, India.

Abstract:
OBJECTIVES: *To determine oral health literacy among institutionalized elderly south Indian population and correlate the effect of oral health literacy on their oral health status.*
METHODS: *A cross-sectional descriptive epidemiological study was conducted on a sample of 450 institutionalized elderly subjects who were randomly selected from 10 institutions from two capital cities of two states selected by multistage sampling. Oral health literacy was assessed by making the subjects pronounce a list of 30 words from REALD-30. Oral health status was assessed using modified WHO (1997) proforma. Pearson's correlation was done to correlate oral health status with oral health literacy. Multiple linear regression analysis was done to assess the impact of various independent variables on oral health literacy.*
RESULTS: *The mean age of participants was 77.45±9.04 years and the majority of them were from lower middle class (35.8%). Overall the mean oral health literacy rate of participants was 21.64±4.16. High oral health literacy (OHL≥26) was reported in just 19.3% of elderly subjects. Correlation of oral health literacy scores with oral health status revealed a negative correlation with oral hygiene status (-0.23) and dental caries prevalence (-0.420).When the impact of various independent variables on oral health literacy was assessed with multiple linear regression analysis sex, socioeconomic status, education, frequency of brushing, periodontal status and DMFT showed a significant association.*
CONCLUSION: *Institutionalized elderly subjects showed an overall low oral health literacy rate and subjects with poor oral health literacy had poor oral health status.*
Key Words:*Oral health literacy, institutionalized elders, oral health status.*

I. Introduction

Oral health literacy (OHL) is defined by the NIDCR (National Institute of Dental and Craniofacial Research) HHS (Health and Human Services) working group on functional health literacy as "the degree to which individuals have the capacity to obtain; process and understand basic health information and services needed to make appropriate oral health decisions".[1] Health literacy is now recognized as an important component of health care[2].

There are many reasons why preventable diseases remain so common and why people often do not adopt practices that have been scientifically shown to be effective in maintaining health, low health literacy is one among these factors.[3] Researchers hypothesize that an individual's health literacy is represented by a constellation of skills and abilities, including word recognition, reading comprehension, communication proficiency, and conceptual knowledge. Basic health literacy is fundamental to put sound public health guidance into practice and helping people follow the recommendations. A mismatch between the literacy skills of individuals and demands of oral health services may erect a un-necessary barrier to preventive care and treatment. The primary concerns are with medication use, compliance with physician orders and with chronic condition management[4].

Health literacy, as a barrier to health-related action and a contributor to poorer outcomes, is of particular interest and concern for vulnerable populations. Amongst them are elders[4]. The size of the elderly population has risen from 12.1 million in 1901 to approximately 77 million in census 2011. According to official population projections, the number of elderly persons will rise to approximately 140 million by 2021[5].

There is scarce literature on the oral health literacy and oral health status of elders. Many older adults face barriers to oral care, to needed information, to full

participation in decision making and informed consent, and for follow-up activities[4, 6]. David H H et.al (2006)[7] found that health literacy reduced the observed difference in self-reported health by 25%. The oral health status in the general older population has been addressed increasingly in the past years, but the oral health of institutionalized older people continues to be a neglected issue[8].

Little research has been done on the role of literacy on oral health in India. The way in which a person makes decisions and takes action about health and health care is influenced by their own skills, capabilities acquired knowledge; and by the environment in which these actions are taken. Published literature on oral health literacy and its relation to oral health status among elders is scarce. This study aims to determine oral health literacy and correlate the effect of oral health literacy on the oral health status among institutionalized elderly in south India

II. Materials & Methods

Study design

A cross-sectional descriptive epidemiological study was conducted to assess oral health literacy among institutionalized elders and to co-relate the impact of oral health literacy on their oral health status.

Setting

The study was conducted among institutionalized elders residing in old age homesof south India. An old age home sometimes called an old people's home or retirement home is a multi-residence housing facility intended for senior citizens. Typically each person or couple in the home has an apartment-style room or suite of rooms. Additional facilities are provided within the building. This can include facilities for meals, gatherings, recreation activities, and some form of health or hospice care. A place in a retirement home can be paid for on a rental basis, like an apartment, or can be bought in perpetuity on the same basis as a condominium.[9]Out of four states in South India two states were randomly selected. Old age homes were randomly selected from the capital cities of the two selected states. Institutionalised elderly residing in old age homes who are fulfilling the inclusion criteria were selected to assess the oral health literacy. The duration of the study was two months. (August 11th to October 10th, 2014)

Sample size determination

The sample size was calculated based on the prevalence of periodontal diseases reported among elderly population in National oral health survey fluoride mapping 2002-2003 which was 88.3% using the formula $N = 4pq/l^2$. Finally the sample size arrived at was 430 which was rounded up to 450

Ethical clearance

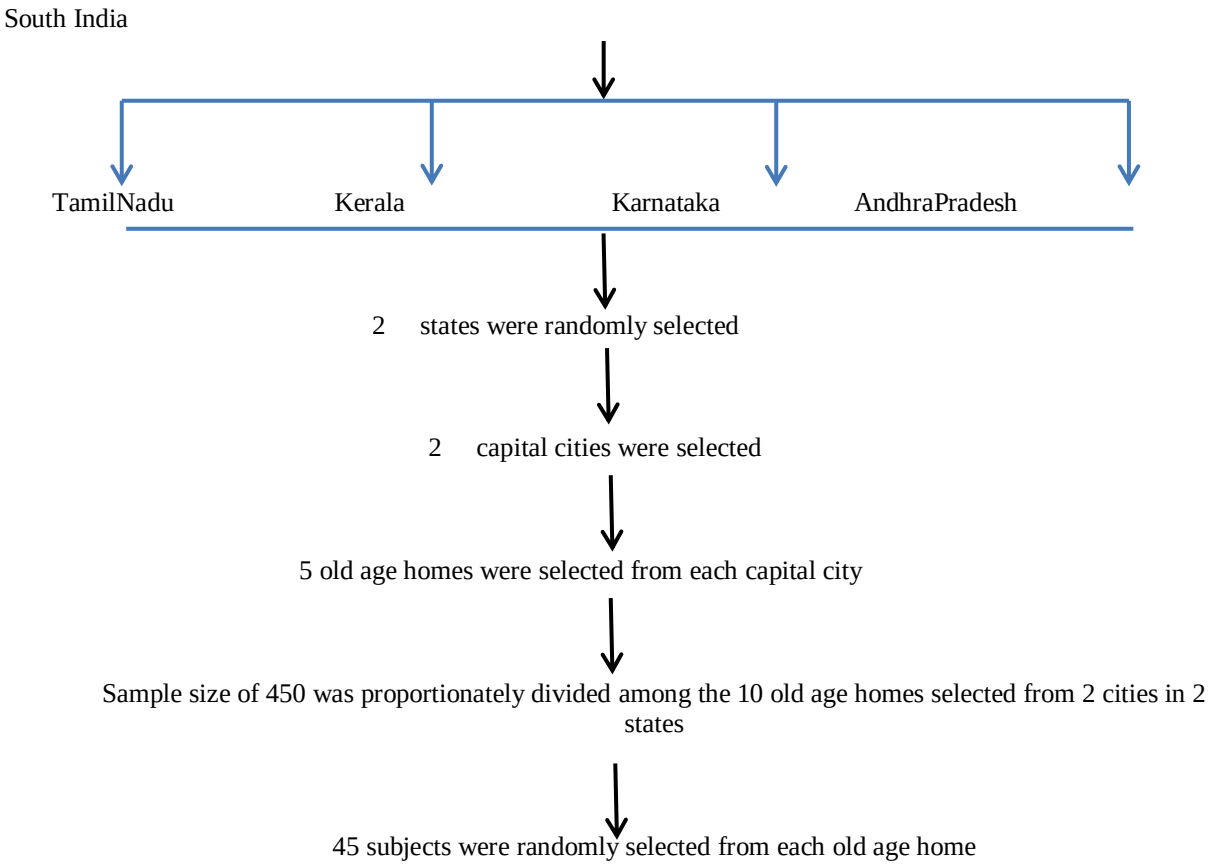
Ethical clearance was obtained from institutional review board of Narayana dental college and hospital. Permissions from the respective old age home, authorities were sought and informed consent was obtained from all the participants belonging to the institutions and where the study was conducted.

Inclusion criteria

The inclusion criteria were institutionalized elders aged 60 years and above who are literates, who are able to read and write English and who are willing to participate in the study was included in the study from selected old age homes till they reach the required sample size.

Sampling

Multistage random sampling was done to select the sample. The sample population was selected from south India. At the first stage out of four states in south India two states were randomly selected. In the second stage the capital cities of the states was selected and old age homes were randomly selected from the capital cities.There are a total of 31 registered old age homes in Chennai as per the information obtainedfrom the official website of National InformaticsCentre,Chennai Collectorate office, Chennai[10] and 19 registered old age homes in Hyderabad as per the information obtained from official website ofGreater Hyderabad Municipal Corporation(GHMC), Hyderabad.[11] 5 old age homes were randomly selected using a lottery methodfrom each city. The number of residents in each old age home varied according to the type, size and pay of the old age home. A minimum of 50 persons to a maximum of 120 persons reside in each old age home.Sample size of 450 was proportionately divided among the 10 old age homes selected from 2 cities in 2 states. 45 subjects were randomly selected from each old age home irrespective of the number of residents.



Sampling Frame(Figure 1)

Variables

The data was collected using interview and clinical examination.A questionnaire consisting of three parts was used for data collection. The first part consisted of socio-demographic details, second part consisted of assessment of oral health literacy by interview with REALD-30[12], and the third part is assessment of oral health status. The oral health status of participants was assessed with OHI-S for oral hygiene status, dental caries was assessed with the help of dentition status, periodontal status was assessed with the help of CPI Index and finally the prosthetic status and prosthetic needs of the subjects was assessed.[13]

Calibration of examiners

The investigators were trained and calibrated for data recording in the Department of Public Health Dentistry, Narayana dental college & hospital before conducting the study. Training was carried on for the examiner till she produced consistent observations. Twenty five subjects were examined and re-examined on successive days. Intra examiner reproducibility was evaluated through percent agreement and Cohen's kappa Statistics pertaining to CPI, OHI-S and DMFT indices. The examiner was calibrated for the words REALD-30 using standard pronunciations taken from the Oxford advanced learner's dictionarytill the investigators reached agreement on the content of REALD-30 and pronunciation of the words in REALD-30.

Statistical analysis

Statistical analysis was performed using appropriate statistical tests and SPSS software programme. The mean and standard deviation of different independent variables was calculated. The comparison of various independent variables with oral health literacy was done using Kruskall-Wallis and Mann-Whiney test.
Correlation of oral health literacy with oral health status was done using Pearsons correlation coefficient and multiple linear regression analysis was used to assess the impact of various independent variables with oral health literacy.

III. Results

Socio-demographic characteristics and oral hygiene practices of institutionalized elders

A total of 450 institutionalized elderly subjects selected randomly from 10 institutions participated in the study. The mean age of participants was 77±9.04 years with male to female ratio of 0.8:1. The majority of the participants were in the age range of 65 to 74 years (44.7%). 35.8% of them were from lower middle class followed by upper class (32%) and upper middle (22.4%). 88.4% of residents use a toothbrush for cleaning their teeth and 58% of participants brush once daily and 97.3% use toothpaste as cleaning material. (Table 1)

Distribution of institutionalized elderly, according to their oral health literacy levels

The mean oral health literacy score among the institutionalized South Indian elderly was 21.64 indicating an overall low oral health literacy. About 51.1% of the participants had a low oral health literacy levels (≤21) and just 19.3% of the institutionalized elderly subjects showed high oral health literacy levels (≥26). (Table 2)

Comparison of socio-demographic characteristics and oral hygiene practices of institutionalized elders with health literacy scores

Comparison of socio-demographic characteristics and oral hygiene practices of institutionalized elders with oral health literacy scores showed that there was no difference in males and females in relation to their oral health literacy levels. The participants aged 85 years and above (22.86±4.17), subjects belonging to upper socioeconomic status (25.33±2.89), subjects with higher education qualification (25.86±2.91) had high oral health literacy score which was
statistically significant. The subjects with better oral hygiene practices showed a high oral health literacy score compared to their counterparts. (Table 3)

Comparison clinical parameters of institutionalized elders with health literacy scores

Comparison of clinical parameters of institutionalized elders with oral health literacy scores revealed that subjects with good oral hygiene status showed a better oral health literacy (22.24±5.57) compared to subjects with fair (21.47±3.98) and poor (20.40±3.35) oral health status. Subjects with periodontitis (21.37±3.99) had low oral health literacy compared to subjects without periodontitis (22.65±4.91). Subjects with caries (19.67±3.46) had low oral health literacy compared to subjects without caries (24.09±3.46), wich was statistically significant.The subjects who had prostheses (21.77±4.19) had better oral health literacy than who were in need of prosthetic (20.66±3.77), wich was statistically significant. (Table 4)

Correlation of oral health literacy with oral health status

Oral health literacy scores showed a negative correlation with oral hygiene status, dental caries prevalence, periodontal status and prosthetic needs. The negative correlation of oral health literacy with dental caries prevalence and prostetic needs showed a statistically significant correlation. Sosubjects with low oral health literacy had a poor oral hygiene status, high dental caries prevalence, periodontitis, and they were in need for a prosthesis. (Table 5)

Multiple linear regression analysis of health literacy by various independent variables

Multiple linear regression analysis was done to assess the impact of various independent variables on oral health literacy. Sex, socioeconomic status, education, frequency of brushing, periodontal status and DMFT showed a significant association with oral health literacy. (Table 6)

IV. Discussion

A simple answer to the question of why health literacy is important is that poor or low health literacy contributes to disease [14]. A mismatch between the literacy skills of individuals and the demands of oral health services may erect an unnecessary barrier to preventive care and treatment. The pathways between literacy and health outcomes are being examined in the recent years, and the body of literature linking literacy to health continues to grow[4]. This cross-sectional descriptive epidemiological study was aimed to determine oral health literacy among institutionalized elderly population in south India and correlate the effect of oral health literacy on their oral health status.

The present study was conducted in English which is not the language most commonly spoken in India. However, since most of the health information provided in our health care setting is in English (Prescriptions, instructions and treatment planning) the instrument was framed in English. Oral health literacy was measured using the rapid estimate of adult literacy in dentistry-30 (REALD-30). REALD-30 is an instrument with good convergent validity and internal consistency (Cronbach $\alpha = 0.87$). One point is given to each word pronounced

correctly and an overall score between 0 (lowest literacy) to 30 (highest literacy) is generated and the REALD-30 score was categorized as low (≤21), moderate (22 to 25), or high (≥26) [15].

The elders are among the least literate groups in the society and also the most heavily dependent on medication and health services[16].The problem with limited health literacy is greatest among these older adults, those who are poor, people with limited education and minority population. Many older adults face barriers to oral care, to needed information, to full participation in decision making and informed consent, and for follow-up activities[4,14]. The elderly from

institutions were selected because they are considered to be more neglected, vulnerable than the elders living with the families[8].

The study was conducted among institutionalized elders in south India. The average literacy rate of south India is approximately 73%, considerably higher than the Indian national average of 60%,[17] with Kerala leads the nation with a literacy rate of 93.91%. So an attempt was made to assess level of oral health literacy among elderly in south Indian states which have a higher average national literacy rate.The study subjects were selected from the institutions which were randomly selected from capital cities of south India. Capital city's are the top part of a or pillars of the state they reflect the whole state, its culture, its tradition, economy and its citizens, so the institutionalized elderly from capital city were selected as they may reflect the elder population in the state.

The mean oral health literacy score for the institutionalized elderly subjects was 21.64, Just 19.3% of the subjects showed a high oral health literacy level, indicating an overall low oral health literacy among the study participants. This finding was similar to the findings of the studies conducted by Kutner M, et al, (2006)[18]; Ian M Bennet at al, (2009)[19]; Kirsch et al, (1993)[20]; Williams et al, (1998)[21]; and Gazmararian et al, (1999)[22]which have shown that reading skills worse among adults, the probable reason may be, the cognitive function which is strongly related to both age and health literacy. Studies suggest that reading ability may deteriorate with age, further reading is a complex cognitive process that requires adequate vision, concentration, word recognition, working memory, and information processing[1]. Deficits in any of these areas may affect reading comprehension.

South India males (59.75%) have higher general literacy rate than females (30%) with a literacy gap of 29.75%[3]. This is not reflected in terms of oral health literacy, in which there was not much difference in the oral health literacy scores between males (21.54) and females (21.73) in the present study.

Social class and economic well-being have been identified as important social determinants that shape health inequalities. As expected participants from upper class, who had professional education and who were professionals had a high oral health literacy level compared to other classes in the present study this finding was similar to findings of a study conducted by Paasche-Orlow M, et al, (2005)[23] who concluded that that lower levels of health literacy are commonly found in people who have low levels of education and income. Subjects with better oral hygiene practices showed better oral health literacy though not statistically significant, this finding was similar to findings of study conducted by Luciene R G et al, (2009)[8], Parker EJ et al, (2012)[24] who concluded that lower oral health literacy scores were associated with poor oral health literacy-related outcomes, including a belief that either that teeth didn't need to be brushed or only needed to be brushed once a day; and that people didn't have their own toothbrush, or that even if they owned a toothbrush had not brushed the previous day said that literacy levels are significantly associated with DMFT and oral hygiene habits. He also concluded that majority of institutionalized elders are in need of prosthesis.

Poor health status reflects chronic disease; its relationship with health literacy is presumed to be the result of negative effects of low health literacy throughout life[4]. Oral health literacy had a negative correlation with oral hygiene status, dental caries prevalence, periodontal status and prosthetic needs. People with low oral health literacy had poor oral hygiene, had more number of decayed teeth, were suffering from periodontal disease and were in need of prosthesis. These findings were in accordance with studies conducted by Jones et al, (2007)[25]; Luciene R G et al, (2009)[8], Parker EJ et al, (2012)[24]; Lee et al, (2011)[26]; and Meggan M H W et al, (2012)[15] in which there was an association of oral health literacy (REALD-30) with oral health status and a higher oral health literacy was associated with better oral health status. People with low oral health literacy have less knowledge about dental diseases and significant proportion of individuals over age 65 do not view oral healthcare as an important part of their overall health and wellbeing[27,28].

There are conflicting claims about the impact of low literacy on elders. Some suggest that low literacy interferes with daily functioning. There are arguments about whether senior's literacy merits attention and action. Some suggest that the problem is time-limited since, as the current generation is replaced by a more highly-educated group, the literacy gaps will diminish. Others conclude that with people living longer, the current generation will be with us for many years. Although education and income, arguably remain the strongest correlates of oral health and disease, and literacy is one of numerous other distal determinants, oral health literacy may be part of casual mechanisms that lead to worse oral health. Low oral health literacy levels

directly affected the oral health status. Health providers should need to become far more knowledgeable regarding oral health literacy so that social and cultural factors that influence oral health can be addressed.

V. Conclusion

Institutionalized elderly subjects showed an overall low oral health literacy rate and subjects with poor oral health literacy had poor oral health status.

Recommendations

Oral health literacy may be part of causal mechanisms that lead to worse oral health. Low oral health literacy levels directly affected the oral health status. Improving health literacy is a critical goal in improving health outcomes. Healthcare providers can make a positive impact on improving health outcomes by critically assessing practice and working to improve communication, knowledge, behavior and access. Improving oral health literacy will require intensive collaborative efforts among healthcare providers.

References

[1]. Baker DW, Gazmararian JA, Sudano J, Patterson M. The association between age and health literacy among elderly persons. J Gerontol B PsycholSciSoc Sci. 2000; 55: S368–374

[2]. Nielsen Bohlman; Health literacy: a prescription to end confusion. Washington DC. The National Academies Press. 2004; p. 31–58.

[3]. Aruna Devi M, Sugandhi S, Radha, Sushi K, Nagashree, Pallavi. Reliability and validity of a questionnaire to assess oral health literacy among college students in Bangalore City. Int J Contemp Dent 2011; 2:43–49.

[4]. Rudd R, Horowitz AM. The Role of Health Literacy in Achieving Oral Health for Elders. J Dent Educ. 2005; 69(9): 1018-1021

[5]. Situation Analysis of the Elderly in India. Central Statistics Office Ministry of Statistics & Programme Implementation Government of India. June 2011. http://mospi.nic.in/mospi_new/upload/elderly_in_india

[6]. Centers for Disease Control and Prevention. Improving Health Literacy for Older Adults: Expert Panel Report 2009. Atlanta: U.S. Department of Health and Human Services; 2009. http://www.cdc.gov/healthliteracy/pdf/olderadults.

[7]. Howard DH, Sentell T, Gazmararian JA.Impact of Health Literacy on Socioeconomic and Racial Differences in Health in an Elderly Population. J Gen Intern Med 2006; 21:857–861.

[8]. RibeiroGaiao L, Leitao de Almeida ME, BezerraFilho JG, Peter L, Heukelbach J.Poor Dental Status and Oral Hygiene Practices in Institutionalized Older People in Northeast Brazil.Int J Dent 2009; 1-6

[9]. Retirement home. Retrieved on8 March 2015. https://en.wikipedia.org/wiki/Retirement_home.

[10]. Welfare schemes, Chennai Collectorate. Retrived on 19 July 2014. http://www.chennai.tn.nic.in/schemes.htm.

[11]. Welcome to Aasara(senior citizens website). Retrieved on 17 July 2014. http://www.ghmc.gov.in/ghmcservices/oldage_homes.asp.

[12]. Lee Y J, Rozier R J, Daniel Lee S Y, Bender D, Ruiz R E. Development of a Word Recognition Instrument to Test Health Literacy in Dentistry: The REALD-30 –A Brief Communication.J Public Health Dent 2007; 67(2): 94-98

[13]. World Health Organization. Oral health surveys: basic methods, ed 4. Geneva: WHO, 1997.

[14]. Alice MH, Dushanka VK. Oral Health Literacy: The New Imperative to Better Oral Health. Dent Clin North Americ. 2008; 52: 333-344.

[15]. Wehmeyer MHW, Corwin CL, Guthmiller JM, Lee JY. The impact of oral health literacy on periodontal health status. J Public Health Dent2014; 74: 80–87

[16]. Linda Shohet. Seniors and literacy: Revisiting the issue. Literacy Across the Curriculumedia Focus.2001; 17 (2): 29

[17]. "CIA factbook". Retrieved 11 April 2006.https://www.cia.gov/library/publications/the-world-factbook

[18]. Kutner M, Greenberg E, Jin Y, Paulsen C. The health literacy of America's adults: Results from the 2003 National Assessment of Adult Literacy 2006.

[19]. Bennett IM, Chen C, Soroui JS, White S. The Contribution of Health Literacy to Disparities in Self-Rated Health Status and Preventive Health Behaviours in Older Adults. Ann Fam Med. 2009; 7: 204-211.

[20]. Kirsh I, Jungeblut A, Jenkins L, Kolstad A. Adult literacy in America: A first look at the results of the National Adult Literacy Survey. Washington, DC: National Center for Education Statistics, United States Department of Education, 1993

[21]. Williams M, Baker D, Parker R, Nurss J. Relationship of functional health literacy to patients' knowledge of their chronic disease. Arch Intern Med 1998;158:166–72.

[22]. Gazmararian JA, Baker DW, Williams MV, Parker RM, Scott TL, Green DC, Fehrenbach SN, Ren J, Koplan JP. Health literacy among Medicare enrollees in a managed care organization.JAMA.1999;281(6):545-51.

[23]. Paasche-Orlow, Ruth M. Parker, Julie A. Gazmararian, Lynn T. Nielsen-Bohlman, Rima R. Rudd. The Prevalence of Limited Health Literacy. J Gen Intern Med. 2005; 20: 175–184.

[24]. Parker EJ, MisanG , Chong A, Mills H, Thompson KR, Horowitz AM, Jamieson LM. An oral health literacy intervention for Indigenous adults in a rural setting in Australia. BMC Public Health. 2012; 12: 461

[25]. Jones M, Lee JY, Rozier RG. Oral health literacy among adult patients seeking dental care. J Am Dent Assoc. 2007; 138(9): 1199-208

[26]. Lee JY, Divaris K, Baker AD, Rozier RG, Lee SY, Vann WF Jr. Oral health literacy levels among a low-income WIC population. J Public Health Dent. 2011; 71: 152–160.

[27]. Gambhir R, Arshdeep S, Kapoor V, Parampreet P. Oral health literacy among clients visiting a rural dental college in north india-a crosssectional study. Ethiop J Health Sci. 2014; 24(3): 261-268

[28]. AsumanKiyak H, Reichmuth M. Barriers to and Enablers of Older Adults' Use of Dental Services. J Dent Educ. 2005; 69(9): 975-986

Table 1: **Socio-demographic characteristics and oral hygiene practices of institutionalized elders**

	Total n(%)
SEX	
Male	211(46.9)
Female	239(53.1)
AGE	
65-74 years	201(44.7)
75-84 years	131(29.1)
≥85 years	118(26.2)
SOCIO-ECONOMIC SCALE	
Upper	144(32.0)
Upper middle	101(22.4)
Lower middle	161(35.8)
Upper lower	43(9.6)
Lower	1(0.2)
USE OF TOOTH BRUSH	
Yes	398(88.4)
No	52(11.6)
FREQUENCY	
Once	261(58.0)
Twice	187(41.6)
After every meal	2(0.4)
Never	0
MATERIAL	
Toothpaste	438(97.3)
Tooth-powder	12(2.7)
Others	0
ORAL-HYGIENE AIDS	
Floss	40(8.9)
Interdental brush	34(7.6)
Toothpicks	25(5.6)
Mouthrinse	15(3.4)
None	336(74.7)

Table 2: Distribution of institutionalized elderly, according to their oral health literacy levels

Oral Health Literacy Levels	**Total (n)**	**%**
Low Oral Health Literacy (≤21)	230	51.1
Moderate Oral Health Literacy (22-25)	133	29.6
High Oral Health Literacy (≥26)	87	19.3

Table 3: Comparison of socio-demographic characteristics and oral hygiene practices of institutionalized elders with oral health literacy scores

Independent variables	Mean	SD	(df)	p-value
Age groups				
65 to 74 years	20.91	4.40	17.718(2)	<0.01*
75 to 84 years	21.66	3.49		
>/=85 years	22.86	4.17		
Sex				
Male	21.54	4.15	24845.30	0.788(NS)
Female	21.73	4.17		
SES				
Upper lower	17.84	2.08	229.300(4)	<0.01*
Lower middle	18.70	2.55		
Upper middle	22.71	3.52		
Upper	25.33	2.89		
Education				
Professional	25.86	2.54	69.7205	0.00001*
Graduate or PG	23.92	3.64		
Intermediate	20.62	3.31		
High School	18.29	2.42		
Middle School	17.96	2.09		
Primary School	15.75	1.50		
Profession				
Unemployed	21.87	2.80	85.2880	0.00001*
Unskilled worker	17.50	1.00		
Semi skilled worker	18.02	2.18		
Skilled worker	18.41	2.44		
Clerical or farmer	20.14	3.61		
Semi profession	23.32	2.77		
Profession	25.28	2.91		
Cleaning				
Finger	21.36	4.15	6747.00	<0.01*
Brush	23.79	3.54		
Frequency				
0nce	19.47	3.43	175.91(2)	<0.01*
Twice	24.63	3.08		
Material				
Toothpaste	21.66	4.19	2428.5	0.653(NS)
Tooth powder	21.00	2.52		
Total	21.64	4.16		
Oral-hygiene aids				
Floss	26.20	2.69	81.58(4)	
Interdental brush	23.97	3.03		<0.01*
Toothpicks	20.68	4.40		
Mouthrinse	24.73	2.43		
None	20.79	3.94		

*P<0.05 statistically significant

Kruskallwallis

Mann-Whiney

Table 4: Comparison clinical parameters of institutionalized elders with oral health literacy scores

Outcomes	Total n(%)	Mean oral health literacy		P-value
ORAL HYGIENE STATUS				
Good	25(5.6)	22.24(5.57)	1.241(2)	0.538(NS)
Fair	325(72.2)	21.47(3.98)		
Poor	15(3.3)	20.40(3.35)		
Not recorded	85(18.9)	21.77(4.19)		
PERIODONTAL STATUS				
With periodontitis	334(74.2)	21.37(3.996)	4336.50	0.134(NS)
Without periodontitis	31(6.9)	22.65(4.910)		
Not recorded	85(18.9)	21.77(4.19)		
DENTAL CARIES				
With caries	216(48.0)	19.67(3.46)	5781.00(2)	<0.01*
Without caries	149(33.1)	24.09(3.46)		
PROSTHETIC STATUS				
With prosthesis	266(59.1)	21.77(4.19)	38.53(2)	<0.01*
PROSTHETIC NEEDS With need for prosthesis	157(34.9)	20.66(3.77)		
NO PROSTHESIS	27(6.0)	26.04(2.78)		

*P<0.05 statistically significant

Kruskallwallis
Mann-Whiney

Table 5: Correlation of oral health literacy with oral health status

	READL	
	Correlation Coefficient	**p-value**
0HI-S	-0.23	0.655
CPI HIGH	-0.116	0.123
DECAY	-0.420	<0.001*
PROSTHETIC STATUS	0.118	0.01*
PROSTHETIC NEEDS	-0.214	0.00*

*P<0.05 statistically significant
Pearsons correlation coefficient

Table 6: Multiple linear regression analysis of oral health literacy with various independent variables

Independent variables	Beta	SE of beta	RegCoeffi.	SE Reg.	t-value	p-level
Intercept			17.9062	2.4406	7.3367	0.00001*
Age	0.0511	0.0399	0.0269	0.0210	1.2794	0.2016
Sex	0.1255	0.0366	1.0294	0.3003	3.4273	0.0007*
SES	-0.3391	0.0747	-1.3641	0.3007	-4.5371	0.00001*
Education	-0.1967	0.0632	-0.7054	0.2265	-3.1145	0.0020*
Profession	0.0203	0.0567	0.0439	0.1228	0.3577	0.7208
Cleaning materials	-0.0306	0.0437	-0.6287	0.8996	-0.6989	0.4851
Frequency of brushing	0.2810	0.0460	2.3236	0.3803	6.1097	0.00001*
Materials used	0.0631	0.0435	1.5064	1.0395	1.4492	0.1482
0HI-S	-0.0308	0.0389	-0.2099	0.2644	-0.7940	0.4277
CPI	0.0657	0.0360	0.5427	0.2968	1.8286	0.0483*
DMFT	-0.1468	0.0407	-0.0984	0.0273	-3.6044	0.0004*

*p<0.05