Original Article

Relationship between the Level of Education and the Awareness of Oral Health Hygiene in Al-Shaab Al- Moalem Center (5) (7) of Illiteracy and Adult Education in Atbara, Sudan, 2024

Malaz Matwakil Abdlwahab Osman[1], Sara Abu El-Gassim Mahjoub Mustafa[2], Sarah Yaseen Mustafa [3], lslam Ahmed Yassein Omer [4] , Makka Haider Mohammed Abo-Elgasim[5] , Alaa Khalid Ahmed Ali [6], Alaa Elshazali Bushra Abdalah [7], Basil Ahmed Sad Eisa[8], Tarteel Ahmed Hassan Ahmed[9], Mohaned Ahmed Edries Ahmed[10], Ahmad Almagzoub Amar Magzoub[11], Waed Montasir Hassan Adam [12], Abdelaziz Abdelwahab hassan[13], Fatma Ahmed Kuna[13*]

[1–13] Program of Dentistry, Napata College, Khartoum, Sudan.

***Correspondence author**: Dr. Fatma Ahmed Kuna Lecturer, Department of Public Health, Faculty of Dentistry, University of Khartoum, Khartoum, Sudan.
e-mail: Fatmakuna@gmail.com.

Received: 8/10/2025
Accepted: 27/10/2025

Abstract

Background: Oral health is an essential aspect of overall well-being and is influenced by various sociodemographic factors, particularly education level. This study aimed to assess the association between educational level and oral health practices among adult learners in Atbara, Sudan. **Methods**: A cross-sectional study was conducted among 50 adult learners at Al Shaab El Moalem Centre in Atbara. Data were collected using a standardized questionnaire and analyzed using SPSS version 27. The Chi-square test was applied to assess the association between educational level and oral health behavior. Results: Participants were predominantly aged 31–50 years (52%), with slightly more males (52%) than females (48%). Television was the main source of oral health information (68%). Although 74% of participants brushed once daily and all used a toothbrush and toothpaste, more than half had never visited a dentist. Overall, 50.7% of participants demonstrated positive oral health habits. No significant association was found between educational level and oral health behavior (p = 0.307, Chi-square test). Conclusion: While oral hygiene practices among adult learners in

Atbara were generally acceptable, educational level was not significantly associated with oral health behavior.

Keywords: Illiteracy, Adult education, Sociodemographic, Oral health, Hygiene behaviors.

Introduction

Illiteracy, in its most comprehensive definition, refers to the inability to read, write, speak, and listen in a way that allows effective communication and understanding of the world. As of June 16, 2024, the global literacy rate among individuals aged 15 years and above is estimated at 86.3%, with males at 90.0% and females at 82.7%.

Despite this progress, approximately 781 million people worldwide remain either completely illiterate or functionally illiterate, which significantly affects their health knowledge, attitudes, oral health, and ability to manage diseases. [1]

In Sudan, the literacy rate among adult males is 83.26% (11,249,881 individuals), leaving 2,262,353 illiterate, while the rate among adult females is lower, at 68.61% (9,465,741 individuals), with 4,331,106 illiterate. This gender disparity in literacy rates may contribute to differences in health awareness and preventive practices between men and women.[2]

There is a strong association between educational level and oral health knowledge, as individuals with higher education tend to demonstrate better awareness of oral hygiene and disease prevention. Conversely, those aged over 55 years generally exhibit lower oral health knowledge, indicating that awareness decreases with age. Women have been found to possess higher oral health knowledge than men, particularly in areas related to children's oral health, disease prevention, and periodontal health. Furthermore, oral quality of life has been shown to correlate with oral health knowledge. Individuals who report difficulty chewing food, problems with speech, concern about their teeth appearance, avoidance of smiling, or interference with daily tasks due to dental discomfort often demonstrate lower oral health knowledge.[3]

Oral health is an essential component of overall well-being, yet significant disparities in knowledge and practices persist globally. Education is considered a key determinant of health literacy, influencing preventive behaviors and overall health outcomes. In Sudan, differences in literacy levels particularly the lower rates among adult females may have direct implications for oral health awareness and hygiene behaviors. The Al Shaab Al-Moalem Center was selected for this study as it represents a diverse

ISSN: 2948-300X (print) 2948-3018 (online)

group of adult learners participating in literacy programs, providing an appropriate context to assess oral health awareness among adult learners. Previous international research has reported varying results regarding the association between education and oral hygiene practices, highlighting the importance of conducting context-specific investigations. Therefore, this study aims to explore the relationship between educational level and oral health awareness among adult learners in Atbara, Sudan, and to identify existing gaps in hygiene practices and preventive behaviors.

Materials and Methods

A descriptive cross-sectional institutional-based study was conducted at Al Shaab Al Moalem Center (5) (7) in Atbara, Sudan, in June 2024. Adults aged 18–54 years who attended the Literacy Eradication Institute and agreed to participate were included, while individuals outside this age range or who refused participation were excluded. Due to ongoing local conflict, participants present on the day of data collection were recruited, resulting in 50 participants out of 95 eligible individuals (Due to displacement and the difficulty of reaching the centers, not all participants could be present). Efforts were made to minimize selection bias.

Data were collected using a standardized, self-administered questionnaire adapted from the Comprehensive Measure of Oral Health Knowledge (CMOHK) and the WHO Oral Health Questionnaire for Adults. The questionnaire consisted of 26 multiple-choice questions covering oral health knowledge, hygiene practices, dietary habits, and oral behavior domains.

Written informed consent was obtained from all participants, and ethical approval was granted by the Technical and Ethical Committee of the Faculty of Dentistry. Data were entered into Microsoft Excel and analyzed using SPSS version 27. Descriptive statistics were presented in tables and graphs. Associations between variables were tested using the Chi-square test only, with $p < 0.05$ considered statistically‌ significant

Results

A total of 50 participants were included in this study, with males representing 52% and females 48% Table (1).

The most common age group was 41–50 years (28%), followed by 31–40 years (24%) Table (2).

Regarding marital status, 44% were single and 44% were married Table (3). Business was the most common occupation (42%) followed by housewives (34%) Table (4). The majority resided in Almawrada Alshargia (34%), followed by Om Bakol (20%) Table (5).

In terms of education, 44% had studied at Khalwa, followed by 24% who reached the second year of primary school Table (6). Most participants (64%) reported no interruption in their education. Television was the main source of health information (68%), followed by family and radio (12% each) Table (7).

More than half (52%) had not lost any natural teeth, whereas 22% lost three or more teeth. Nearly half (48%) reported oral pain or discomfort in the past 12 months. None used removable dentures (100%). Oral health perception was rated excellent by 46% and very good by 32%, while gum health was rated good by 74%.

Toothbrushing once daily was reported by 74%, and twice or more daily by 26%. All participants used a toothbrush and toothpaste, with Abu Warda being the most used brand (40%) followed by Signal (12%). Wooden toothpicks were commonly used (48%), while none used floss or other aids.

More than half (52%) had never visited a dentist. Among those who had, 44% visited due to pain, while only 4% visited for routine check-ups. Frequent consumption of sugared tea was reported by 44% (multiple times daily) and 34% (daily). Weekly intake of sweets was high (86%). Additionally, 92% consumed bread multiple times daily, while 60% never consumed soft drinks. Weekly lemon juice consumption was reported by 40%, and weekly intake of honey and jam by 68%. Cakes and biscuits were consumed weekly by 42%.

None consumed alcohol (100%), and most had never used tobacco products: 80% never smoked, 80% never used snuff, and 96% never chewed tobacco Table (8). Overall, 50.7% had positive oral health habits, while 49.3% had negative habits Table (9). No significant association was found between educational level and oral health habits ($P = 0.307$), Table (10).

Table (1): showing gender distribution of participants.

Table 1					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	26	52.0	52.0	52.0
	Female	24	48.0	48.0	100.0
Total		50	100.0	100.0	

Males (52%) were more than females (48%).

Table (2): showing age distribution of participants.

Table 2					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	18-20 years	10	20.0	20.0	20.0
	21-30 years	10	20.0	20.0	40.0
	31-40 years	12	24.0	24.0	64.0
	41-50 years	14	28.0	28.0	92.0
	51-60 years	4	8.0	8.0	100.0
Total		50	100.0	100.0	

The most common age group was found to be 41-50 years (28%), followed by 31-40 years (24%).

Table (3): showing marital status of participants.

Table 3					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Single	22	44.0	44.0	44.0
	Married	22	44.0	44.0	88.0
	Divorced	2	4.0	4.0	92.0
	Widow/er	4	8.0	8.0	100.0
Total		50	100.0	100.0	

(44%) of participants were single, and (44%) were married.

Table (4): showing occupation of participants.

Table 4					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Business	21	42.0	42.0	42.0
	Housewife	17	34.0	34.0	76.0
	Driver	4	8.0	8.0	84.0
	Employee	2	4.0	4.0	88.0
	Not working	6	12.0	12.0	100.0
Total		50	100.0	100.0	

Business (42%) was the most common occupation, followed by housewife (34%).

Table (5): showing residence of participants.

Table 5					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Almawrada Alshargia	17	34.0	34.0	34.0
	Om Bakol	10	20.0	20.0	54.0
	Knorr	2	4.0	4.0	58.0
	Eshlag algesh	2	4.0	4.0	62.0
	Aldayat	2	4.0	4.0	66.0
	Alsoug	2	4.0	4.0	70.0
	Alsayal aljadeda	6	12.0	12.0	82.0
	Mogran	2	4.0	4.0	86.0
	Hai Almatar	2	4.0	4.0	90.0
	Khaliuh	2	4.0	4.0	94.0
	Atbara	2	4.0	4.0	98.0
	Hai Alezaa Aldarajah	1	2.0	2.0	100.0
Total		50	100.0	100.0	

The most common location of residence was Almawrada Alshargia (34%), followed by Om Bakol (20%)

Table (6): showing educational level of participants.

Table 6					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Khalwa	22	44.0	44.0	44.0
	First year of primary school	2	4.0	4.0	48.0
	Second year of primary school	12	24.0	24.0	72.0
	Third year of primary school	2	4.0	4.0	76.0
	Fourth year of primary school	6	12.0	12.0	88.0
	Fifth year of primary school	2	4.0	4.0	92.0
	Sixth year of primary school	4	8.0	8.0	100.0
Total		50	100.0	100.0	

Regarding educational level, almost half of the participants (44%) studied at khalwa (44%), followed by second year of primary school (24%).

(7): showing the academic level in which participants have stopped

Table 7

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	First year of primary school	2	4.0	4.0	4.0
	Second year of primary school	6	12.0	12.0	16.0
	Third year of primary school	2	4.0	4.0	20.0
	Fourth year of primary school	4	8.0	8.0	28.0
	Eighth year of primary school	4	8.0	8.0	36.0
	None	32	64.0	64.0	100.0
Total		50	100.0	100.0	

The majority of participants (64%) did not stop studying at any point, while (12%) stopped at the second year of primary school.

Table (8): showing responses of participants regarding their oral health.

Variables	Category	Count	Percentage
Where do you receive health information?	Family	6	12%
	Society	2	4%
	Television	34	68%
	Radio	6	12%
	Social media	2	4%
How many natural teeth did you lose?	None	26	52%
	One	4	8%
	Two	9	18%
	Three or more	11	22%
During the past 12 months, have your teeth or mouth caused any pain or discomfort?	Yes	24	48%
	No	26	52%
Do you have removable dentures?	Yes	0	0%
	No	50	100%
How would you describe the health of your teeth and gums?	Excellent	23	46%
	Very good	16	32%
	Good	4	8%

	Average	7	14%
	Poor	0	0%
	Very poor	0	0%
How would you describe the health of the gum of your teeth?	Excellent	0	0%
	Very good	0	0%
	Good	37	74%
	Average	9	18%
	Poor	2	4%
	Very poor	2	4%
How often do you brush your teeth per day?	Once	37	74%
	Twice or more	13	26%
Do you use a toothbrush to clean your teeth?	Yes	50	100%
	No	0	0%
Do you use wooden toothpicks to brush your teeth?	Yes	24	48%
	No	26	52%
Do you use plastic toothpicks to brush your teeth?	Yes	0	0%
	No	50	100%
Do you use dental floss to clean your teeth?	Yes	0	0%
	No	50	100%

Do you use charcoal to clean your teeth?	Yes	0	0%
	No	50	100%
Do you use toothpaste to clean your teeth?	Yes	50	100%
	No	0	0%
If yes, what type of toothpaste?	Signal	6	12%
	Abu Warda	20	40%
	Both Signal and Abu Warda	4	8%
	Other	2	4%
	I don't know	18	36%
How long has it been since you last saw a dentist?	Never	26	52%
	Less than 3 months	2	4%
	Less than 6 months	5	10%
	More than one year and less than two years	17	34%
What is the reason for your last visit to the dentist?	Pain or problem in the teeth, gums, or mouth	22	44%
	Routine check-up	2	4%
	I don't remember	26	52%
How often do you drink sugared tea?	Never	6	12%
	Once per month	2	4%

	Every week	3	6%
	Every day	17	34%
	Multiple times per day	22	44%
How often do you eat sweets?	Never	3	6%
	Once per month	2	4%
	Every week	43	86%
	Every day	2	4%
	Multiple times per day	0	0%
How often do you drink sugared coffee?	Never	12	24%
	Once per month	0	0%
	Every week	4	8%
	Every day	18	36%
	Multiple times per day	16	32%
How often do you eat bread?	Never	0	0%
	Once per month	0	0%
	Every week	2	4%
	Every day	2	4%
	Multiple times per day	46	92%
How often do you drink soft drinks?	Never	30	60%

How often do you eat cakes and biscuits?	Never	9	18%
	Once per month	6	12%
	Every week	21	42%
	Every day	14	28%
	Multiple times per day	0	0%
Do you drink alcohol?	Yes	0	0%
	No	50	100%
How often do you use tobacco snuff?	Never	40	80%
	Multiple times	10	20%
How often do you smoke cigarettes?	Never	40	80%
	Multiple times	10	20%
How often do you chew tobacco?	Never	48	96%
	Rarely in the month	2	4%
Total		**50**	**100%**

According to Table 8, most participants (68%) reported receiving health information from television, followed by family and radio at 12% each. Just over half (52%) had not lost any natural teeth, whereas 22% had lost three or more teeth, and 18% had lost two teeth. Regarding dental discomfort, 48% experienced teeth or mouth pain within the past 12 months, while 52% did not. None of the participants used removable dentures (100%).

Nearly half (46%) described their teeth and gums as being in excellent condition, 32% rated them as very good, and 14% as average. In terms of gum health specifically, the majority (74%) considered their gums to be in good condition, followed by 18% who rated them as average, and 4% each reporting poor or very poor gum health.

Most participants (74%) brushed their teeth once daily, while 26% brushed twice or more per day. All participants (100%) reported using both a toothbrush and toothpaste. The most commonly used toothpaste brand was Abu Warda (40%), followed by Signal (12%). Additionally, 48% used wooden toothpicks for cleaning their teeth.

Table (9): showing the overall oral health and habits of participants

Impact	Mean	Percentage
Positive	25.35	50.7%
Negative	24.65	49.3%

According to Table *9,* (50.7%) of participants had positive oral health and habits, while (49.3%) had negative oral health and habits.

Table (10): showing the correlation between oral health and habits of participants and educational level.

		Oral health and habits		
Variables	**Category**	Positive	Negative	**P-value**
Educational level	Khalwa	1.22	6.13	0.307281069157
	First year of primary school	2.51	4.62	
	Second year of primary school	3.61	3.74	
	Third year of primary school	3.73	3.31	
	Fourth year of primary school	4.42	3.22	
	Fifth year of primary school	4.72	2.24	
	Sixth year of primary school	5.14	1.39	

According to Table 10, No significant association was found between oral health and habits of participants and educational level (P-value = 0.3).

Discussion

This study aimed to assess the relationship between educational level and oral health awareness among adults in Al Shaab Al Moalem Literacy and Adult Education Centers in Atbara. A total of 50 participants were included, with males representing 52% and the most common age group being 41–50 years (28%). Overall, 50.7% demonstrated positive oral health behaviors, while 49.3% showed negative behaviors. However, no statistically significant association was found between educational level and oral health habits (P = 0.307), which contrasts with several related studies.

In a study conducted in Southeast Iran (2010) involving 264 participants, 62.5% had adequate oral health literacy, and women showed significantly higher literacy levels than men (P = 0.03). Oral health literacy was also associated with oral hygiene behaviors. These findings align partially with the present study regarding the general oral health status but differ concerning the impact of education level, which showed no association in the current sample [4]

Similarly, an Indonesian study (2017) revealed significant correlations between oral health literacy and education, gender, and monthly expenses. These variables influenced oral hygiene outcomes, unlike in the current study where educational level showed no impact on oral health behaviors**.** [5]

In Bangladesh (2016), oral health literacy was significantly associated with socio-demographic characteristics such as age, sex, educational level, and occupation. Although the distribution of positive and negative behaviors in Bangladesh was similar to the findings in the present study, the significant relationship with education reported in Bangladesh was not observed in this research. [6]

A Swedish study also confirmed that lower educational levels were associated with poorer oral health outcomes, increased tooth loss, and worse periodontal health. These findings further contrast with the results of this study, which showed no such association. [7]

In Saudi Arabia (2023), a systematic review reported high awareness of oral hygiene practices among university students, with widespread use of toothbrushes and toothpaste. In the present study, all participants used toothbrushes and toothpaste, with Abu Warda being the most common toothpaste brand (40%), and wooden toothpicks commonly used (48%).

ISSN: 2948-300X (print) 2948-3018 (online)

However, flossing was absent among participants, indicating gaps in preventive oral care knowledge and access. [8]

Overall, the majority of comparable studies demonstrated a significant association between educational level and oral health literacy or practices, whereas the current study found no such relationship. This discrepancy may be explained by community-specific cultural habits, socioeconomic differences, limited access to dental services, and the small sample size.

Despite these differences, the study contributes valuable baseline data, as no previous research on this topic has been conducted in Sudan. These findings highlight the need for targeted oral health education programs, especially in literacy and adult education settings, to help improve preventive dental behaviors and overall oral health awareness.

Conclusion

Oral hygiene practices among adult learners in Atbara were generally acceptable; however, education level did not significantly affect oral health behavior. The findings emphasize the importance of targeted behavioral interventions and access to preventive care to enhance oral health outcomes in similar populations, and integrating oral health education within adult literacy programs.

Limitation

Our study focuses exclusively on adult learners at the primary education level, with no participants who have reached secondary or university education. Therefore, the limited educational range within the sample reduces the ability to compare and detect the true association between education level and oral health habits. It is recommended that future studies include participants with higher educational levels to obtain more accurate and clearer results regarding the influence of education on oral health.

Recommendations

- Strengthening educational interventions is essential to improve knowledge and awareness regarding proper oral hygiene practices among adults enrolled in literacy programs.
- Regular outreach visits by dental professionals to Literacy Eradication Centers should be encouraged to provide preventive education, early screening, and guidance on oral health care.
- Expanding the role of social media platforms as accessible and influential tools for promoting oral health awareness within the community.

• Conducting larger-scale studies with diverse populations is recommended to further evaluate oral health behavior determinants and guide future public health strategies.

Ethical Statement

This study was conducted following the approval of the Technical and Ethical Committee of the Faculty of Dentistry, Al Shaab Al-Moalem Center, Atbara, Sudan. Written informed consent was obtained from all participants prior to data collection. Participants were assured of confidentiality, anonymity, and the right to withdraw from the study at any stage without any consequences. All procedures adhered to the ethical standards of human research.

Acknowledgment

The authors express their sincere gratitude to the staff and participants of Al Shaab Al-Moalem Center (5) (7) for their cooperation and support. Special thanks are extended to the supervising faculty members for their guidance, expertise, and assistance throughout the study.

Footnotes / Credits

• All instruments and questionnaires used in this study were adapted from validated and standardized tools, including the Comprehensive Measure of Oral Health Knowledge questionnaire and the World Health Organization oral health questionnaire for adults.

• Any adaptation of previously published material has been properly credited in the references section.

References:

1. "Adult literacy rate, population 15+ years (both sexes, female, male)". UIS Data Centre. UNESCO. Retrieved 20 November 2019.

2. The estimation data for section "Sudan population literacy" is based on the latest data published by UNESCO Institute for Statistics (retrieved March 13, 2016) external link.

3. Bellamy Ortiz C. l MAA. The relationship between oral health-related to quality of life, tooth loss and removable prostheses in IMSS beneficiaries adults over the age of 50. Av Odontoestomatol. 2014;30:195–203. [Google Scholar].

4. Mohammadi, T. M., Malekmohammadi, M., Hajizamani, H. R., & Mahani, S. A. (2018). Oral health literacy and its determinants among adults in Southeast Iran. European journal of dentistry, 2018, 12.03: 439-442.

5. Kridaningrat B, Soegyanto A, Wimardhani Y. Journal of

International Dental and Medical Research ISSN 1309-100X Clinical article. J Int Dent Med Res [Internet]. 2017 [cited 2024 Aug 1]; 10:460–4.

6. Mahmud, S. Z., Amin, M. S., Tarafder, M. A., & Hossain, S. M. (2017). Measurement of Oral Health Literacy Level Among Bangladeshi Adults Seeking Dental Care and Its Relationship with Socio-demographic Characteristics. *Anwer Khan Modern Medical College Journal*, *7*(1), 34–39. https://doi.org/10.3329/akmmcj.v7i1.31611.

7. Paulander, Jörgen & Axelsson, P & Lindhe, J. (2003). Association between level of education and oral health status in 35-, 50-, 65- And 75-year-olds. Journal of clinical periodontology. 30. 697-704. 10.1034/j.1600-051X.2003.00357.x.

8. AlJasser, R., Alsinaidi, A., Bawazir, N. *et al.* Association of oral health awareness and practice of proper oral hygiene measures among Saudi population: a systematic review. *BMC Oral Health* **23**, 785 (2023). https://doi.org/10.1186/s12903-023-03522w.