

Dental Health Knowledge, Attitude, and Behaviors regarding Oral Hygiene Status among University Students at Mosul City

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ABSTRACT

Aims: The aim of the present study was to assess self-reported oral health knowledge, attitudes and behavior between the sample groups of first and final college students in Mosul and to evaluate the impact of academic stage on their knowledge, attitudes, behavior and oral health status.

Materials and Methods: The study was conducted on samples of (880) college students from University of Mosul, Iraq, which divided into four groups: Medical college students (240), Dental collegestudents (236), Economic collegestudents (197) and Education collegestudents (207). Demographic information was obtained for each student, Dental caries status was evaluated using the World Health Organization (WHO) caries diagnostic criteria for decayed, missing, and filled teeth and surfaces (DMFT and DMFS), respectively. The plaque index (Silness and Loe) was used to assess dental plaque, gingival index system (Loe and Silness) was used to assess gingival inflammation, Ramfjord periodontal disease index-calculus component was used to assess calculus. The respondents' specific oral health-related knowledge behavior and attitudes were measured using modified Arabic version Hiroshima University Dental Behavior Inventory (HU-DBI), developed by Kawamura. The data were analyzed using the SPSS version 19 using Descriptive Statistics and Student's t-test.

Results: In general, current study concluded that for Medical and Dental college's students for both first and final stages filling contributed the major part of DMFT and DMFS for first stage filling followed by decay and last missing teeth. While for final stage filling followed by missing then decay, but for Education college students, decay contributed the major part of DMFT and DMFS value, in first stage missing came next followed by filling, for Economic college students, missing contributed the major part of DMFT and DMFS values, in first and final stages decay came next followed by filling. For four college student's for PI, GI and CALI indices the higher value was observed among first stage compared to final stage. On the other hand, in all the colleges HU-DBI the higher value was observed among final stage compared to first stage except the students of Economics college.

Conclusions: With increasing years of the study, some aspects of college student's oral health Knowledge, attitude and behavior in addition to oral health status was improved or worsen. On the other hand, some aspects of dental students were improved but this improvement was limited.

Key words: Oral health knowledge, Behavior, Attitudes, College students, HU-DBI, Mosul.

INTRODUCTION

The mouth is the major gateway to the body; whatever affects oral health may also affect general health ^[1]. The oral health status of a person is usually determined by the presence or absence of dental caries and periodontal disease as well as the level of oral hygiene found in the population ^[2].

Dental caries is still considered one of the most prevalent oral diseases in the world ^[3], it results from interactions between acid producing bacteria, fermentable carbohydrates (sugars) capable of being metabolized by the bacteria ^[4]. But periodontal diseases can be defined as a wide spectrum of diseases that affect the gum and the surrounding structures of the teeth ^[5,6].

On the other hand, oral health is an essential aspect of general health, as such, oral health knowledge is considered to be an essential prerequisite for health related practice ^[7] the oral health care of an individual depends on his or her oral health attitude and behavior ^[8].

Knowledge means that the individual has all data necessary to understand what oral disease is and how it arises, as well as to understand the protective measures that need to be adopted. This knowledge will, in theory, lead to a change in attitude, which will in turn lead the individual to make changes in their daily life^[9].

Attitude is an acquired characteristic of an individual. People demonstrate a wide variety of attitudes towards teeth, dental care and dentists^[10]. Health behavior is the human action taken to maintain and enhance health. It also helps to prevent diseases^[10,11].

College life is a crucial period of transition with personal responsibility. Students in this period can be targeted for preventing dental disease and building future oral health^[12]. College students are not different from others in their age group. They are risk takers. They no longer have parents in their immediate presence to remind them to brush their teeth^[13]. In many countries, university students play a significant role in public life, eventually becoming future leaders^[14].

Knowledge is usually obtained from information which subsequently translates into an action. Attitudes toward oral health determine the condition of the oral cavity^[15]. Students of medical sciences should possess high level of awareness of self-oral health care, so that this attitude can be instilled among patients and community at large^[16].

Since knowledge and awareness are associated with oral hygiene habits and health, it is important that dental students have positive attitudes towards preventive dentistry^[17] than other college students.

Comparison between different academic years the difference in the attitude, behavior and oral hygiene status between different academic years were statically significant. 3rd year dental students shown to have better behavior level as compared to other academic years. Difference was not significant between other academic years^[18]. Other studies confirmed that dental health attitudes become more positive with increasing age and education level^[14,19-21].

The aim of the present study was to assess self-reported oral health knowledge, attitudes and behavior between the sample groups of first and final college students in Mosul using the Hiroshima University Dental Behavioral Inventory (HU-DBI), and to evaluate the impact of academic stage on their knowledge, attitudes, behavior and oral health status.

MATERIAL AND METHODS

This study was conducted during the 2017-2018 academic year, it consisted of a cross-sectional survey of two medical (Dental and Medical) and two non-medical (Economic and Education) college students attending University of Mosul - Iraq.

The study was conducted on sample of (880) college students, which divided into four groups: Medical college students (240), Dental college students (236), Economy college students (197) and Education college students (207). Demographic information was obtained for each student; caries prevalence and severity were analyzed using the DMFT and DMFS index. DMFT and DMFS index calculated according to WHO criteria for diagnosis and recording of dental caries. The plaque index^[22] was used to assess dental plaque, gingival index system^[23] was used to assess gingival inflammation, Ramfjord periodontal disease index- calculus component^[24] was used to assess calculus.

The respondents' specific oral health-related knowledge behavior and attitudes were measured using Hiroshima University Dental Behavior Inventory (HU-DBI), developed by^[25] which is a questionnaire to understand patients' perception of oral health. In current study, used the Arabic version of the modified HU-DBI, which was also used in previous studies.^[26,27] Statistical analysis was performed with the help of SPSS version 19 using Descriptive Statistics, Student's t-test.

RESULTS

This research include a total of (880) subjects whose participate in this study from four colleges (College of Dentistry 236 students which represent 26.81%, College of Medicine 240 students which represent 27.27%, College of Administration and Economics 197 student which represent 22.38% and College of Education 207 students which represent 23.5%, as shown in (Table 1)

Table (1) Number and percentage for distribution of the subjects by academic stage, gender and collages

stage	sex	Dental	%	Medicine	%	Economic	%	Education	%
1	M	17	%1.93	13	%1.07	41	%4.65	48	%5.05
	F	36	%4.09	29	%3.29	24	%2.72	12	%1.36
2	M	23	%2.61	30	%3.40	29	%3.29	41	%4.65
	F	27	%3.06	26	%2.95	11	%1.25	18	%2.04
3	M	23	%2.61	25	%2.84	34	%3.86	9	%1.02
	F	36	%4.09	31	%3.52	9	%1.02	33	%3.75
4	M	13	%1.07	17	%1.93	35	%3.97	20	%2.27
	F	36	%4.09	19	%2.15	13	%1.07	26	%2.95
5	M	8	%0.909	18	%2.04				
	F	17	%1.93	31	%3.52				
Total		236	%26.81	240	27.27 %	197	22.38 %	207	%23.5

(Table 2) illustrates the mean value of the total DMFT, DMFS and by fractions in addition to plaque index, gingival index, calculus index and HU-DBI in the Dental college students.

For both first and final stages filling contributed the major part of DMFT and DMFS value. For first stage filling followed by decay and last missing teeth. While for final stage filling followed by missing then decay

The mean value for filling showed higher value in first stage = 3.1509 in comparison with final stage =2.7600 and the difference were statically significant ($p \leq 0.05$).

The mean value of plaque (PI first = 0.2592 and PI final = 0.0833), Gingival (GI first = 0.2264 and GI final =0.1600), Calculus (CALI first = 0.1711 and final =0.0333) and (HU-DBI first = 5.1321and HU-DBI final =5.8000) were shown, for both PI and GI indices, the higher value was observed among first stage in comparison to finalstage. Statically, a highly significant difference was observed in CALI indices ($p \leq 0.01$). HU-DBI was higher in final stage but not significant ($P \geq 0.05$).

Table (2) Distribution of subjects according to academic years for Dental college students.

Variable		No.	Mean	Std. Deviation	T-value	P-value
D	First	53	2.5600	2.14112	2.12	0.979
	Final	25	1.3200	2.91147		
M	First	53	1.6981	3.79060	0.20	0.905
	Final	25	1.6800	3.37540		
F	First	53	3.1509	4.13892	0.42	0.044*
	Final	25	2.7600	2.96198		
DMFT	First	53	5.3019	3.33735	1.56	0.322
	Final	25	4.0400	3.28481		
DMFS	First	53	7.3962	5.99468	1.20	0.322
	Final	25	5.7600	4.58512		
PI	First	53	0.2592	0.44734	1.86	0.719
	Final	25	0.0833	0.21649		
GI	First	53	0.2264	0.41065	0.71	0.648
	Final	25	0.1600	0.44622		
CALI	First	53	0.1711	0.28460	2.35	0.003**
	Final	25	0.0333	0.09616		
HU-DBI	First	53	5.1321	1.78711	1.53	0.870
	Final	25	5.8000	1.82574		

** $p \leq 0.01$ highly significant and * $P \leq 0.05$; statistical significant difference

(Table 3) illustrates the mean value of the total DMFT, DMFS and by fractions in addition to plaque index, gingival index, calculus index and HU-DBI for the Medical college students. For both first and final stages filling contributed the major part of DMFT and DMFS value flowed by decay and last missing teeth. The mean value for filling shows higher value in first stage= 2.7381 in comparison with final stage= 2.5000 and the difference were statically significant ($p \leq 0.05$).

The mean value of plaque (PI),Gingival (GI),Calculus (CALI) and HU-DBI were shown, for PI index, the higher value was observed among first stage =0.1386 compared with final stage = 0.1141. Statically, asinificant difference was observed in GI at ($p \leq 0.05$) and CALI indices at ($p \leq 0.01$).HU-DBI was higher in final stage = 1.71857 but not significant ($P \geq 0.05$).

Table (3) Distribution of subjects according to academic years for Medical college students.

Variable		No.	Mean	Std. Deviation	T-Value	P-value
D	First	42	2.0000	3.43582	0.38	0.218
	Final	50	2.2200	2.03329		
M	First	42	0.4762	1.85101	0.31	0.561
	Final	50	0.6000	1.92725		
F	First	42	2.7381	4.52667	0.32	0.045*
	Final	50	2.5000	2.47642		
DMFT	First	42	3.8810	2.87294	1.178	0.474
	Final	50	4.5000	2.15946		
DMFS	First	42	5.2143	5.24770	0.02	0.138
	Final	50	5.2400	3.55459		
PI	First	42	0.1386	0.23349	0.60	0.159
	Final	50	0.1141	0.15566		
GI	First	42	0.2251	0.36863	1.32	0.011*
	Final	50	0.1416	0.23036		
CALI	First	42	0.1358	0.27767	1.33	0.002**
	Final	50	0.0782	0.11466		
HU-DBI	First	42	4.5238	1.54979	0.91	0.853
	Final	50	4.8400	1.71857		

** $p \leq 0.01$ highly significant and * $P \leq 0.05$; statistical significant difference

(Table 4) illustrates the mean value of the total DMFT, DMFS and by fractions in addition to plaque index, gingival index, calculus index and HU-DBI in the Education college students. For both first and final stage decay contributed the major part of DMFT and DMFS value, in first stage missing =2.0000 came next followed by filling =1.7231but in final stage it opposite filling = 2.1458 higher than missing = 1.7708.

The mean value for decay showed higher value in first stage = 4.7077 in comparison with final stage = 3.4167 and the difference were statically non-significant ($p \geq 0.05$). The mean value of plaque (PI),Gingival (GI),Calculus (CALI) and HU-DBI were shown, for PI index, slightly higher value was observed among first stage = 0.3160 compared with final stage = 0.3158. Statically, no significant difference was observed in GI, PI, HU-DBI and CALI indices.

Table (4) Distribution of subjects according to academic years of study for Education college stu

Variable		N	Mean	Std. Deviation	T-Value	P-value
D	First	65	4.7077	4.24162	1.61	0.495
	Final	48	3.4167	4.14541		
M	First	65	2.0000	5.71456	0.25	0.444
	Final	48	1.7708	3.17731		
F	First	65	1.7231	2.29475	0.82	0.015*
	Final	48	2.1458	3.12838		
DMFT	First	65	5.5846	2.56717	1.77	0.142
	Final	48	4.6250	3.17319		
DMFS	First	65	8.4308	6.91911	0.78	0.796
	Final	48	7.4583	5.82350		
PI	First	65	0.3160	0.42116	0.002	0.315
	Final	48	0.3158	0.35544		
GI	First	65	0.5102	0.54866	0.99	0.066
	Final	48	0.4113	0.47913		
CALI	First	65	0.1619	0.23181	0.37	0.314
	Final	48	0.1777	0.20378		
HU-DBI	First	65	4.5077	1.65947	0.76	0.777
	Final	48	4.7500	1.68220		

* $P \leq 0.05$; statistical significant difference.

(Table 5) illustrates the mean value of the total DMFT, DMFS and by fractions in addition to plaque index, gingival index, calculus index and HU-DBI for the Economic college students.

For both first and final stages missing contributed the major part of DMFT and DMFS value. In first and final stages decay came next followed by filling.

The mean value for decay in first stage = 3.0167 while final stage decay = 2.0213 and the difference were statically significant at ($p \leq 0.05$). Also missing = 3.8333 show higher value in first stage in comparison with final stage missing = 2.0213 and the difference were statically significant at ($p \leq 0.01$).

According to this study the mean value of PI, GI, CALI indices and HU-DBI have higher value among first stage = 4.8167 compared to final stage = 4.3830. Statically no significant difference was observed in GI, PI, HU-DBI and CALI indices.

Table (5) Distribution of subjects according to academic years of study for Economic college students.

Variable	No.	Mean	Std. Deviation	T-Value	P-value
D First	60	3.0167	2.99995	1.91	0.038*
D Final	47	2.0213	2.19178		
M First	60	3.8333	6.40224	1.77	0.001**
M Final	47	2.0213	3.24030		
F First	60	1.1833	2.31056	0.99	0.183
F Final	47	1.6809	2.85981		
DMFT First	60	4.8000	4.25779	1.70	0.283
DMFT Final	47	3.5532	3.00585		
DMFS First	60	7.4833	6.36061	1.49	0.314
DMFS Final	47	5.7234	5.61327		
PI First	60	0.3492	0.37796	2.29	0.218
PI Final	47	0.1960	0.29313		
GI First	60	0.4318	0.43113	1.63	0.379
GI Final	47	0.2976	0.40643		
CAL I First	60	0.1381	0.24222	0.27	0.404
CAL I Final	47	0.1265	0.17737		
HU-DBI First	60	4.8167	1.65183	1.35	0.945
HU-DBI Final	47	4.3830	1.63592		

** $p \leq 0.01$ highly significant and * $P \leq 0.05$; statistical significant difference

DISCUSSION

Health is a universal human need. It has been established that optimal health cannot be attained independent of oral health. The result of current study showed that the mean value of dental college students for total DMFT, DMFS and by fractions in addition to plaque index, gingival index, calculus index and HU-DBI for both first and final stages filling contributed the major part of DMFT and DMFS value. For first stage filling followed by decay and last missing teeth. While for final stage filling followed by missing then decay.

While Medical college students showed that for both first and final stages filling contributed the major part of DMFT and DMFS value followed by decay and last missing teeth and the difference was statically significant ($p \leq 0.05$).

This result in agreement with the Drachev *et al.*^[28] which showed high dental caries prevalence and high dental caries experience with dominance of FT among undergraduate medical and dental Russian students aged 18–25 years in North-West Russia. Our finding may be explained by the fact that dental caries is a slow disease and its development may start long before persons decide on dental or medical education also could be attributed to ineffective preventive measures and brings forward the problem of dental professionals focusing on treatment rather than effective prevention.^[10]

In the current study, FT constituted the main fraction of the DMFT index for both dental and medical students, this result is in disagreement with other study which concluded that filled component (FT), 4.11 vs. 2.04 ($p=0.001$), was significantly higher in dental students, but for medical students, the DT index showed that the medical students presented more active untreated caries. This reflecting that dental students received more dental treatment than their medical peers.^[29]

The mean value for filling showed higher value in first stage in comparison with final stage. This may be partly because students of the last stage are busy with the load of study and have no time for consulting dentist or taking care of their teeth while the students of first stage have more time for this.

For both PI and GI indices, the higher value was observed among first stage in comparison to final stage. This result is in disagreement with Ten Cate *et al.*,^[30] study which showed that final-year students had a significantly higher plaque index than in their first-year counterparts.

HU-DBI was higher in final stage than first stage, this result is in agreement with Yildiz and Dogan^[21] study which concluded that the mean HU-DBI score of the clinical students was significantly higher than the preclinical ones (7.47±1.86, and 6.00±1.86, respectively). Also in agreement with a study done in India which showed that final-year medical students had a significantly higher score for oral health knowledge, attitude, and behavior than first-year medical students (p<0.01).^[31]

The same pattern was observed in other countries where Dental students at different levels of their training were compared regarding oral health behavior and attitude.^[10,21,29,32,33] But in contrast to our result, the study from Indian Dental students showed no difference between the clinical and the preclinical students regarding to their HU-DBI scores.^[21,34]

Vangipuram *et al.*^[35] showed that the substantial differences in oral health behavior and attitudes between different levels of academic education were not observed.

For Education college students, both first and final stages decay contributed the major part of DMFT and DMFS value, in first stage missing came next followed by filling but in final stage it opposite filling higher than missing.

Östberg *et al.*^[36] reported that adolescents usually gave insufficient priority to oral health, e.g. tooth cleaning, fluoride supplements and diet habits, being unaware of their own respectively regarding oral health. On the other hand, people do not consider caries to be a serious condition and usually manage pain or swelling arising from decay through self-care strategies to a point where the carious tooth becomes grossly decayed and tooth removal remains the only option.^[37]

For PI index, the higher value was observed among first stage compared with final stage. This may be due to majority of college students more likely to have positive self-care attitudes in order to improve their appearance and self-esteem, teeth play a major role in overall facial appearance therefore they became concerned about the appearance and esthetics of their teeth.

In Economic college students, both first and final stages missing contributed the major part of DMFT and DMFS values, in first and final stages decay came next followed by filling. This in agreement with Kahar *et al.*^[37] For PI, GI and CALI indices the higher value were observed among first stage compared to final stage. This may be related to the fact that most of people are not able to achieve optimum dental plaque removal this could be attributed to the lack of oral health education. Therefore, tooth brushing recommended by most dentists in order to improve plaque control. This result is in agreement with Tanny *et al.*^[38] study which expected that as the academic year advances, students become more self-aware about their own deleterious attitudes to health. HU-DBI the higher value was observed among first stage compared to final stage. This in constant with Nigeria study result which concluded that older students had better oral health, attitude, knowledge, and practice as compared to younger students.^[39]

CONCLUSION

With increasing years of the study, some aspects of college student's oral health Knowledge, attitude and behavior in addition to oral health status was improved or worsen. On the other hand, some aspects of dental student's oral health Knowledge, attitude and behavior in addition to oral health status were improved but this improvement was limited. Thus, the students should get better comprehensive dental education and motivated to become an example of oral health for their society.

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