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Perceived competency towards preventive dentistry among dental graduates: the need for curriculum change

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Background: A previous study has shown that dental practitioners in Benghazi believed that the less prevention-oriented education system is one of the barriers to applying preventive dentistry.
Objective: To assess attitudes and perceived competence of the dental graduates in Benghazi towards prevention and early management of dental caries.
Methods: A cross-sectional, questionnaire-based survey was conducted among internship students attending the Department of Community and Preventive Dentistry in Faculty of Dentistry, Benghazi, Libya. The participants were asked to provide demographic information, to respond to statements about their attitudes towards preventive dentistry, and to answer questions regarding their perceived competence in applying preventive dentistry procedures.
Results: Data from 108 Libyan dental graduates were analysed for this study, of which 64% of them were females and 42.1% of them passed their final year with grade: acceptable. The most acknowledged aspects of preventive dentistry were being useful and essential to the community (95.4 and 90.8%, respectively). The percentage of participants expressing a proficiency in providing oral hygiene instructions was the highest (95.4%). There were differences between study subgroups in their perceived competence of preventive dental practices by gender and academic performance ($p \leq 0.05$).
Conclusion: This study highlighted that the currently implemented undergraduate education programme in Benghazi dental school does not provide dentists with the required attitude and skills to fulfil their role in providing preventive-oriented health services.

Keywords: *dentistry*; *perceived competency*; *prevention*; *attitude*; *dental graduates*

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Dental caries is one of the most common childhood diseases which can have a great impact on the quality of life. However, the progression and consequences of dental caries can be reduced or eliminated by applying preventive dental practices and early intervention strategies at public and individual levels. Epidemiological data has shown that the widespread use of fluorides has accounted for the declining trends of dental caries in developed countries at the end of the 20th century (1). On the other hand, the prevalence of dental caries in developing countries remained high which might be explained by less preventive oriented dental services and adoption of a modernised life style (2). Preventive dentistry is recognized as an integral part of modern dental services and an essential component of dental curriculum (1, 3). The World Health Organization (WHO) recommended orienting dental services towards prevention and health promotion as one of priority action area for developing countries when initiating or strengthening oral health programmes (4).

However, despite the wealth of evidence supporting the application of preventive practices in primary dental care, these practices are not fully implemented (3).

New reports from Libya have has suggested a high prevalence of dental caries and unmet treatment needs among children (5, 6). The figures in these reports necessitate careful plans on how to halt and possibly reverse the deterioration of dental health in Libyan children. One of the important resources to implement preventive strategies and to meet dental treatment needs is the dental workforce. Seemingly, Libya has enough dental manpower with a dentist-to-population ratio of approximately one dentist for every 2,000 inhabitants, however, in a recently published study regarding the barriers of preventive dentistry

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in Libya, dentists blamed the dental education system for not being prevention-oriented towards public health (7). Dental education plays a vital role in providing the community with dental practitioners who are equipped with the appropriate attitudes, understanding, and competence to apply preventive dental care (8, 9). The aim of this study was to assess attitudes and perceived competence of the dental graduates in Benghazi towards prevention and early management of dental caries.

Methods

A cross-sectional, questionnaire-based survey was conducted among internship students attending the Department of Community and Preventive Dentistry in Faculty of Dentistry, Benghazi, Libya, between July and October 2012. Surveying new dental graduates is a popular method used to assess their competencies at the time of graduation (10, 11). Recently the number of dentists has dramatically increased in Libya with around 350 new dentists expected every year and thirty trainers are anticipated at the Department of Community and Preventive Dentistry on a monthly basis. A total of 125 internship students were invited to participate in this survey, of which 108 participants had completed information on all the variables selected for analysis (75%). This research has been conducted in full accordance with the World Medical Association Declaration of Helsinki. Implied consent was obtained from all participants.

A self-administrated questionnaire was used to collect data, which was distributed in-person on the last day of the training month and collected the next day. The participants were asked to provide information on their demographics (sex and age) and their performance in the final academic year (acceptable, good, very good, and excellent). Information that could identify the participant's identity was not requested, so that participants are encouraged to provide truthful information. A three point Likert scale (Agree, Not sure, Disagree) of nine qualities of preventive dentistry was used to assess the attitudes towards preventive dentistry. The qualities of preventive dentistry were: scientific, valuable, essential, useful, reputable, attractive, easy, and beneficial (12). Yes or No questions were used to assess the perceived competence of providing preventive dental care. The interns were asked whether or not they felt themselves competent in performing the following preventive dental practices: advice to quit smoking, dietary counselling, topical application of fluoride, placement of sealant in the molars, oral hygiene instructions/oral health education, and caries risk assessment. The questionnaire was piloted for clearance and understanding among a group of 15 internship students. As no modifications were needed, these questionnaires were included in the final analysis.

Data were analysed using the statistical software SPSS, version 21.0 (Armonk, NY: IBM Corp.). Information regarding the participants' grades in the final year was recoded into acceptable and good for those who have good, very good, or excellent. Frequencies and percentages were used to participants' responses to attitude statements and perceived competence questions. Chi-square test was employed to test the differences in frequencies between the participants according to their gender and academic grade in the final year, in terms of positive attitude and perceived competence.

Results

Data from 108 Libyan dental graduates were analysed for this study, out of which 64% of them were females and 42.1% of them passed the final year with grade: acceptable. Table 1 shows the percentage of participants who were positive towards the different qualities of preventive dentistry. The most acknowledged aspects of preventive dentistry were being useful and essential to the community (95.4 and 90.8%, respectively). On the other hand less than half of the participants thought of preventive dentistry as reputable, attractive, or beneficial (22.2, 29.6, and 39.8%,

Table 1. Percentages of students with positive attitudes towards preventive dentistry

	Gender				Academic degree		
Quality of preventive dentistry	All	Male	Female	*p*	Good	Acceptable	*p*
Scientific	81.5	86.8	78.6	0.286	77.6	90.6	0.117
Efficient	71.3	71.1	71.4	0.957	68.1	78.4	0.595
Easy	69.4	73.7	67.1	0.775	75.6	67.1	0.715
Attractive	29.6	21.1	34.3	0.351	31.6	25.0	0.327
Beneficial	39.8	47.4	35.7	0.288	40.6	39.5	0.913
Reputable	22.2	13.2	27.1	0.248	19.7	28.1	0.607
Useful	95.4	94.7	95.7	0.628	93.4	98.7	0.332
Valuable	77.8	84.2	74.3	0.279	73.7	83.5	0.285
Essential	90.8	86.8	92.9	0.437	89.5	93.3	0.300

Chi-squared test was used to compare study subgroups.

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respectively). Comparison of attitudes by participants' sex and final year grades revealed no statistically significant differences between the study's subgroups.

The percentages of participants who perceived themselves competent in performing preventive dental practices are presented in Table 2. While the proficiency in providing oral hygiene instructions was expressed by most of the participants (95.4%), topical fluoride application, diagnosis of initial caries, and pit and fissure sealants were the least grasped skills (12.0, 22.2, and 25.0%, respectively). There were differences between study subgroups in their perceived competence of preventive dental practices. Females were more confident than males in practicing the skills of diagnosing initial dental caries and applying pit and fissure sealant ($p = 0.043$ and 0.01, respectively). Similarly, a larger number of participants who have had grade good or higher considered themselves competent in performing preventive resin restoration, and pit and fissure sealant procedures ($p = 0.022$ and 0.004, respectively).

Discussion

This study shows that the currently implemented training programme in Community and Preventive Dentistry in Benghazi dental school does not adequately prepare dentists to fulfil their role in providing a prevention-oriented dental service. The majority of participants declared incompetence in mastering the practical skills of preventive dentistry. In addition, they do not conceive preventive dentistry as beneficial to dentists. The findings of this study are in accordance with other studies regarding the role of dental education in preventive dentistry (13, 14), all of which have blamed undergraduate curricula for inadequate preparation of dentists.

The attitude of dental practitioners towards preventive dentistry is an important factor that can influence their decision to apply preventive dental care (9) and may potentially affect their ability to motivate patients to receive preventive care measures (15). In our study, although the majority of dental graduates appreciated the merits of preventive dentistry at the community level, it was considered less reputable, attractive, and beneficial to the dentists. These results mirror previous finding among Iranian senior dental students and dental practitioners (12, 16). There are several possible explanations for this result. They might be attributed to the low monetary income from the provision of preventive dental care which may reduce the practitioners' interest in providing such care. Previous research has shown that dentists refrain from providing preventive care because of insufficient payment (17, 18). Moreover, a recently published systematic review has concluded that "despite the questionable quality of the included reports, the evidence that emerged seems to indicate that further education and training coupled with a fairer pay scheme would be a reasonable approach to change the balance in favour of the provision of dental caries preventive measures by dentists" (19). The reported attitude in this study could be a reflection of the nature of dental services, which has long been focusing on restorative treatment or tooth extraction for the management of existing disease despite the fact that most oral diseases are highly preventable (18, 20, 21). However, further research is needed to understand how such an attitude has been adopted.

It is interesting to note that, unlike previous research in this area in which females were more positive towards preventive dentistry than males (12, 16), the gender difference of our study participants did not appear to influence attitudes towards preventive dentistry. Similarly, no statistically significant differences were observed in attitudes when compared by participants' academic performance. However, socioeconomic background may explain the different results found in this study compared to other groups of dental graduates.

Apart from oral hygiene instructions, the majority of the participants in this study do not feel themselves competent in applying preventive dental care. These findings are inconsistent with previous reports in this field. According to American Dental Education Association (ADEA) in 2008, most of the senior students consider themselves prepared to provide preventive dental care (22). Holmes et al.

Table 2. Percentages of students who perceived themselves competent in practising preventive dentistry

	Gender				Academic performance		
Preventive measure	All	Male	Female	*p*	Good	Acceptable	*p*
Topical fluoride application	12	5.3	15.7	0.113	15.8	3.1	0.056
Pit and fissure sealant	54.4	31.6	52.9	0.043*	52.6	28.1	0.022*
Dietary counselling	25	31.6	21.4	0.221	27.6	18.2	0.644
Oral hygiene instructions	95.4	94.7.1	95.7	0.951	96.9	93.8	0.632
Preventive resin restoration	32.4	31.6	32.9	0.979	40.8	12.5	0.004*
Diagnosis of initial dental caries	22.2	65.7	89.5	0.01*	78.4	72.1	0.634
Caries risk assessment	46.3	44.7	47.1	0.842	50	37.5	0.292

Chi-squared test was used to compare study subgroups, *$p \leq 0.05$

surveyed the graduated alumina and found them particularly competent in treatment and prevention of dental caries (23). Another study among Mongolian dental students has reported that 68–94% were at least quite competent in practicing preventive dentistry (24).

There are several possible explanations for this finding. Considering the shortage of teaching staff available for both lecturing and clinical training in preventive dentistry, as well as limited facilities and the huge number of dental students (over 300 in a building meant to host maximum of 50), this finding could be a result of the obvious discrepancy between the resources and student numbers which has led to insufficient education and training in preventive dentistry. Previous research has shown that low priority of preventive dentistry in dental education is perceived by dentists as a major barrier to the provision of preventive dental care (15). Another possible explanation could be that students are not interested in learning clinical skills related to preventive dentistry. This study shows that the majority of participants do not consider preventive dentistry attractive, reputable, or beneficial for dentists. In addition, comparison by sex and academic performance in the final year shows that females and those with high academic grades are more likely to rank themselves as competent in applying preventive measures. This result could be affected by a larger number of female participants, but previous reports have shown that females were more positive about preventive dentistry than their male peers (12, 16). Knowledge and attitude are considered factors that can predispose to action. However, dental practice is not all about science; additional cultural, social, and financial elements can affect the provision of preventive measures (25).

In the light of recommended shift from surgical intervention to the cost-effective prevention efforts (26), the present study's findings concerning dental students in such developing country are especially noteworthy. The dental education community and stakeholders in academic institutions are required to take immediate as well as long-term actions to supply the community with dental professionals who have the necessary attitude and competence to meet the oral health needs of the public. Adoption of more effective education and training strategies, continuing education programmes, and re-assessment of undergraduate curriculum contents, as well as teaching strategies would help improve the current situation.

There are several limitations in this study. First, the findings of this study are based on a self-reported questionnaire, which, as in any other similar research, may be biased by faking the responses and social desirability by the participants. Second, this study was based on a relatively small convenience sample from Benghazi and hence may not represent Libya as a whole. The timing of this study, during the summer when there were no undergraduates, could be considered as a third limitation because during this period, dental trainers undertake more training hours than any other time in the year. On the other hand, conducting the study during this period could be an advantage as the training hours were similar for all the participants. Further research is needed to explore in-depth opinions of dental students regarding the facilitators and barriers of training in preventive dentistry as well as their view of future careers. A qualitative approach using observation of clinical training as well as content analysis of dental curriculum and its goals and structure could inform stakeholders to develop appropriate action plans to implement preventive strategies.

Conclusion

This study highlighted that the currently implemented undergraduate education programme in Benghazi dental school does not provide dentists with the required attitude and skills to fulfil their role in providing preventive-oriented health services. More efforts are required to tackle this problem and to provide more effective undergraduate education, as well as continuing dental education programmes.

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