

# Validating a measure of the prevalence of dental anxiety as applied to Kuwaiti adolescents

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**Objectives:** To assess self-reported dental anxiety (DA) among Kuwaiti adolescents and to test whether different dental anxiety scales are valid for measuring DA in Kuwait. **Basic research design:** Cross-sectional, structured, anonymous questionnaire survey in Arabic completed at government schools. **Participants:** 757 pupils aged 13–15 years from three schools filled the questionnaire. Useable response rate was 93.0%. **Main measures:** DA was assessed by: 1, a single-item dental fear question (DF); 2, the Modified Dental Anxiety Scale (MDAS); and 3, the Modified Child Dental Anxiety Scale: faces (MCDAS<sub>f</sub>). **Results:** A third of the girls and 6% of boys reported being very much afraid of visiting a dentist. Use of the drill and injection in the gum were the most anxiety arousing MDAS items; tooth extraction and injection of the MCDAS<sub>f</sub> items. Total mean for MDAS was 11.4 (sd 4.6) and for MCDAS<sub>f</sub> 16.6 (sd 6.5). A tenth of the children were highly dentally anxious when measured by MDAS (score  $\geq 19$ ). Girls reported statistically significantly higher DA scores with all the measures. There was a high correlation between the total score of the MDAS and the total score of the MCDAS<sub>f</sub> ( $\rho=0.855$ ). Statistically significant relationship ( $p<0.001$ ) was found between the single-item DF and the total score of the MDAS and a single item and the total score of the MCDAS<sub>f</sub>. **Conclusions:** A tenth of children were highly dentally anxious; girls reporting higher scores. A single-item dental fear question, MDAS and MCDAS<sub>f</sub> were valid tools for measuring DA among Kuwaiti adolescents.

**Key words:** dental anxiety, MDAS, MCDAS<sub>f</sub>, adolescence, Kuwait, cross-sectional study, questionnaire, validity

## Introduction

Although dental anxiety is commonly experienced worldwide, its cause is thought to vary across countries and cultures (Cinar and Murtomaa, 2007; Moore *et al.*, 1996). Recognising this possible difference, it is suggested that good assessment would assist in the development of approaches to managing dentally anxious children and to help them accept dental treatment. Most dentally anxious individuals first become fearful during childhood or in adolescence (Locker *et al.*, 1999).

The Kuwaiti population is very young with 39% being aged under 15-years. Despite the School Oral Health Program organising oral health care, preventive services and oral health education to all aged 6–15 years, the oral health of Kuwaiti children is poor (Al-Mutawa *et al.*, 2006). The potential for emergency attendance in pain and associated negative dental experiences may result in dental anxiety (Freeman, 1985). Dental anxiety states of Kuwaiti children have not been examined, but previous findings among the Kuwaiti adults have shown that one of the most common reasons for not attending for a preventive dental visit was dental fear (Al-Shammari *et al.*, 2007). In other Middle-Eastern countries, dental anxiety has been studied among school-aged individuals in Jordan, Turkey and Israel (Abu-Ghazaleh *et al.*, 2011; Cinar and Murtomaa, 2007; Peretz and Efrat, 2000).

Many methods have been developed for identifying the dentally anxious and assessing their level of dental fear/anxiety. The Modified Dental Anxiety Scale, MDAS,

has been used widely in diverse adult populations and has proved valid and reliable (Coolidge *et al.*, 2008; Humphris *et al.*, 1995; 2000; Tunc *et al.*, 2005). The Arabic version of MDAS has been used with Jordanian 15–16-year-olds (Abu-Ghazaleh *et al.*, 2011). In Kuwait, dental anxiety among university students has been assessed by an Arabic version of the Corah DAS (CDAS) (Alansari, 2004).

If the prevalence and dimensions of dental anxiety of Kuwaiti adolescents differ from those in other countries, it is necessary to develop a culture-specific measure of DA and tools to manage dental anxiety. Therefore, the aim of the study was to assess the self-reported dental anxiety among adolescents in Kuwait. It also tested whether the single-item dental fear question, MDAS and the faces version of MCDAS would be valid instruments for measuring perceived dental anxiety among Kuwaiti adolescents.

## Methods

The study population was selected from government schools from one of the six Kuwaiti governorates, Mubarak Al-Kabeer, because it has one of the lowest numbers of expatriate children in the government schools. Thus, nationality would be an unlikely confounder. The cluster sampling was followed by choosing all the classes with children who were in the grades 8 or 9 in one girls' and two boys' schools.

A power analysis to detect a precise estimate of Cronbach's alpha for the MDAS indicated that 700 or more respondents were required to give a confidence interval <0.02 on either side of a modest alpha of 0.80, with the likelihood of detecting a significant difference at 5% in mean MDAS scores between two approximately equal sized groups with a pooled standard deviation of 4.75 if applied at 80% power.

Ethical permission for the study was obtained from the Joint Committee for the Protection of Human Subjects in Research of the Health Sciences Centre, Kuwait University, and the Kuwait Institute for Medical Specialization. Permission to conduct the study was granted by the Ministry of Education, Research Department, the regional school authority of the Mubarak Al-Kabeer governorate and the school principals. No name lists of the pupils from the schools were gathered, and no children's names were sought in the questionnaire. Participation was voluntary; no written consents were sought.

A structured Arabic questionnaire was used for data collection. The questionnaire included background information of age, nationality, and education of parents. A quarter of the children did not know their parents' educational level so this variable was omitted from the analyses. Dental anxiety was measured by three methods. Firstly, a single-item dental fear (DF) question "How afraid are you of visiting a dentist? not at all / a little / very much." Secondly, the MDAS (Humphris *et al.*, 1995), which indicated the anxiety level felt in five dental situations: 1, going to a dentist for treatment tomorrow; 2, sitting in the dental office's waiting room (waiting for treatment); 3, having a tooth drilled; 4, having teeth scaled and polished; and 5, receiving a local anaesthetic injection in gum above an upper back tooth. Each item had five possible responses ranging from 1, not anxious to 5, extremely anxious giving a possible range of total scores from 5 to 25. Thirdly, the MCDAS<sub>f</sub> (Howard and Freeman, 2007), was added to assess concurrent validity for the MDAS. The MCDAS<sub>f</sub> has five faces anchored to a numeric scale from 1 to 5 assessing dental anxiety in

8 dental situations. In the MCDAS<sub>p</sub>, the respondents are asked "How do you feel about... ..going to the dentist generally? ...having your teeth looked at? ...having your teeth scaled and polished? ...having an injection in the gum? ...having a filling? ...having a tooth taken out? ...being put to sleep to have treatment? ...having a mixture of 'gas and air' which makes you feel comfortable for treatment but cannot put you to sleep?" As nitrous oxide anaesthesia is very rarely used in Kuwait, the last question in the original published scale was omitted from the MCDAS<sub>f</sub>. Each question had five response alternatives ranging from 1, relaxed/not worried to 5, very worried giving a total MCDAS<sub>f</sub> score from 7 to 35.

Arabic MDAS questions used in the Jordanian study (Abu-Ghazaleh *et al.*, 2011) were used with some adjustments for differences between Jordanian and Kuwaiti dialects. The remainder of the questionnaire was translated from English to Arabic by a Kuwaiti dentist (HA-Y) fluent in Arabic and English. Following back-translation by another bi-lingual dentist, working in the School Oral Health Program in Kuwait, a final version of the questionnaire was agreed between these two dentists. The clarity of the questionnaire was tested in one class of the 8<sup>th</sup> grade girls and one of 8<sup>th</sup> grade boys not included in the study. The introductory text of the original MCDAS<sub>f</sub> distracted the children so scale descriptors were moved from the introductory text and placed under the faces (Figure 1).

Children aged 13-15 years, 428 boys and 373 girls, were invited to participate in the study in selected three schools. Questionnaires were filled in anonymously in schools at the beginning of regular classes supervised by teachers and researchers (HA-Y, SH, EH) during April, 2011. After completing the questionnaire, every child put it into the provided envelope, sealed and returned it to the researcher. Any children wishing not to participate were to return blank questionnaires in their envelope. One researcher (HA-Y) kept the class' envelopes for data entry in separate bags labelled by gender and grade, and with a form completed by the class teacher reporting the number of children in the class and number of absentees.

For these seven questions I would like you to show how relaxed or worried you get about the dentist and what happens at the dentists. To show how relaxed or worried you feel, please use the simple scale below. For each question **tick the box** which best describes your feelings.

					
<i>How do you feel about...</i>	<i>Relaxed / not worried</i>	<i>Very slightly worried</i>	<i>Fairly worried</i>	<i>Worried a lot</i>	<i>Very worried</i>
...going to the dentist generally?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
...having your teeth looked at?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
...having your teeth scaled and polished?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
...having an injection in the gum?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
...having a filling?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
...having a tooth taken out?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
...being put to sleep to have treatment?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**Figure 1.** Version of the Modified Child Dental Anxiety Scale: faces (MCDAS<sub>f</sub>) used in Kuwait (adapted from Howard and Freeman, 2007)

Table 1 presents the sampling frame, absences and refusals. On checking the responses, 12 forms were excluded because over 20% of their items responses were blank. The final sample was 745 (387 boys, 358 girls): a useable response rate of 93.0%.

Data were entered and analysed using SPSS v.21.0. Associations between a single-item dental fear question and background characteristics were analysed by chi-square tests. The MDAS and MCDAS<sub>f</sub> items were analysed by frequencies, means, medians and standard deviations. Because the distributions in all anxiety measures were skewed, the Mann-Whitney test was used for comparing the means of the MDAS and MCDAS<sub>f</sub> anxiety items. Level of significance was set at  $p < 0.05$  (two-tailed).

The MDAS and MCDAS<sub>f</sub> item scores for each of the dental situations were summed up to give estimated total score values of dental anxiety. Out of 745 satisfactory responses, 716 (96.1%) included all MDAS items and 661 (88.7%) all MCDAS<sub>f</sub> items. The response rate for both MDAS and MCDAS<sub>f</sub> items was 85.2% ( $n=635$ ). Dental anxiety level (sum of five MDAS items) was recorded into two groups: high anxiety (sum  $\geq 19$ ) and moderate to

low anxiety (sum  $\leq 18$ ) (King and Humphris, 2010). For this study, the cut-off point for MCDAS<sub>f</sub> was determined by MediCalc™ ROC curve. Accordingly, if the sum of seven MCDAS<sub>f</sub> items is  $>22$ , the perceived anxiety can be considered high. The sensitivity of the ROC curve at this cut-off was 79% and the specificity 88%.

The internal consistency of the dental anxiety scales were measured by Cronbach's alpha with 95% confidence intervals (95%CI) for the five/seven items studied across all participants. Inter-correlations between different MDAS and MCDAS<sub>f</sub> items were analysed by Spearman's rank correlation coefficient ( $\rho$ ), to provide concurrent validity. Relationship between the single-item anxiety question and the MDAS and MCDAS<sub>f</sub> total scores were analysed by the Kruskal-Wallis test.

## Results

The mean age of the children in the 8<sup>th</sup> grade was 13.6 years (sd 0.7) and 14.5 years (0.6) in the 9<sup>th</sup> grade. Most (97.4%) of the respondents were Kuwaitis.

**Table 1.** Sample frame and respondents in the Kuwaiti dental anxiety study

School	Grade	Number of classes	Number of pupils in classes	Absent pupils	Refused to participate	Incomplete responses	Data analysed	
		<i>n</i>	<i>n</i>	<i>n</i>	<i>n</i>	<i>n</i>	<i>n</i>	%
Boys' school 1	8	5	117	9	1	5	102	87.2
Boys' school 2	8	4	99	7	0	3	89	89.9
Boys' school 1	9	5	114	10	0	2	102	89.5
Boys' school 2	9	4	98	4	0	0	94	95.9
Girls' school	8	8	194	7	0	2	185	95.4
Girls' school	9	8	179	4	2	0	173	96.6
Overall		34	801	41	3	12	745	93.0

**Table 2.** Scores for the Modified Dental Anxiety Scale (MDAS) and the Modified Child Dental Anxiety Scale: faces (MCDAS<sub>f</sub>), overall and according to gender

Dental anxiety measure	Overall ( $n=635$ )*			Boys ( $n=316$ )*			Girls ( $n=319$ )*		
	mean	median	sd	mean	median	sd	mean	median	sd
<b>MDAS items</b>									
Visit a dentist tomorrow	1.99	2.00	1.22	1.70	1.00	1.06	2.28	2.00	1.31
Sitting in the waiting room	2.05	2.00	1.10	1.82	2.00	1.00	2.28	2.00	1.14
Use of the drill	2.96	3.00	1.29	2.57	2.00	1.24	3.34	3.00	1.23
Teeth scaled and polished	1.64	1.00	0.95	1.44	1.00	0.78	1.84	2.00	1.06
Injection in the gum	2.79	3.00	1.41	2.36	2.00	1.28	3.23	3.00	1.41
MDAS sum	11.43	10.00	4.64	9.88	9.00	3.96	12.97	12.00	4.75
<b>MCDAS<sub>f</sub> items</b>									
Dentist generally	2.04	2.00	1.13	1.70	1.00	0.94	2.38	2.00	1.21
Teeth looked at/examined	1.99	2.00	1.13	1.67	1.00	0.92	2.31	2.00	1.24
Teeth scaled and polished	1.51	1.00	0.92	1.33	1.00	0.71	1.68	1.00	1.06
Injection in the gum	3.00	3.00	1.42	2.53	2.00	1.30	3.48	4.00	1.38
Filling	2.29	2.00	1.31	1.95	2.00	1.20	2.64	2.00	1.33
Tooth taken out	3.32	4.00	1.45	2.75	3.00	1.40	3.88	4.00	1.28
General anaesthesia	2.42	2.00	1.43	2.17	2.00	1.33	2.66	2.00	1.48
MCDAS <sub>f</sub> sum	16.57	16.00	6.48	14.09	13.00	5.52	19.03	18.00	6.42

Mann-Whitney test: p-value of mean for all items  $< 0.001$ . \*Replied to all MDAS and MCDAS<sub>f</sub> items

## Discussion

Prevalence of high dental fear was 18.9%. A third (32.2%) of the girls and 6.0% of the boys reported being “very much” afraid of visiting a dentist ( $p < 0.001$ ). The highest mean values of the MDAS were for “feel about to have a tooth drilled” and “feel about to have a local anaesthetic injection” (Table 2). The lowest mean was reported for “feel about to have your teeth scaled and polished”. Total mean for MDAS was 11.4 (sd 4.6; range 5 to 25). Girls reported statistically significantly higher MDAS scores in all items as well as in the total score ( $p < 0.001$ ). Between the grades, no significant differences were found in the MDAS scores. A tenth of children ( $n = 69$ ) who replied to all MDAS questions were considered highly dentally anxious (MDAS score  $\geq 19$ ); girls significantly more often than boys (14.9% vs. 4.6%;  $p < 0.001$ ), but no difference between the grades.

The highest mean values of the MCDAS<sub>f</sub> scores were “having a tooth taken out” and “injection in gum” (Table 2). The lowest mean was reported for “scaling and polishing”. Girls reported higher MCDAS<sub>f</sub> scores in all items ( $p < 0.001$ ). Total mean for the MCDAS<sub>f</sub> was 16.6 (sd 6.5; range 7–35). Older pupils reported higher MCDAS<sub>f</sub> scores for going to the dentist, having an injection in gum, and having a tooth taken out ( $p < 0.05$ ) (Table 3). Almost one-fifth ( $n = 124$ ) of those who replied to all MCDAS<sub>f</sub> questions could be determined as highly dentally anxious (MCDAS<sub>f</sub> score  $> 22$ ); girls more often than boys (28.7% vs. 9.0%;  $p < 0.0001$ ), but again no difference between the grades.

Internal consistency for the MDAS items was 0.82 (95%CI 0.80–0.86). The highest inter-correlation for the MDAS items were for “having treatment tomorrow” vs. “sitting in the waiting room (waiting for treatment)” ( $\rho = 0.684$ ) and “sitting in the waiting room” vs. “to have a tooth drilled” ( $\rho = 0.619$ ;  $p = 0.010$ ). Internal consistency for the MCDAS<sub>f</sub> items was 0.84 (95%CI=0.81–0.86). The highest inter-correlation for MCDAS<sub>f</sub> items was for “having a tooth taken out” vs. “injection in gum” ( $\rho = 0.631$ ;  $p = 0.010$ ).

A relationship was found between a single-item dental fear measure and the total score of the MDAS and a single item and the total score of the MCDAS<sub>f</sub> ( $p < 0.001$ ). The mean MDAS score for those who reported to be very much afraid of visiting a dentist (single-item DF question) was 17.2 (sd 4.0), and the mean MCDAS<sub>f</sub> score 24.2 (5.3), respectively. There was a high correlation between the total score of the MDAS and the total score of the MCDAS<sub>f</sub> ( $\rho = 0.855$ ,  $p = 0.010$ ).

In this study, a tenth of children were considered highly dentally anxious (MDAS  $\geq 19$ ). This proportion was two times lower than among Jordanian 15–16-year-olds (Abu-Ghazaleh *et al.*, 2011). When using the Corah Dental Anxiety Scale (CDAS) with four items, the proportion of highly dentally anxious (CDAS  $\geq 15$ ) children was 7.1% among 14-year-olds in Scotland (Bedi *et al.*, 1992). In our study, MCDAS<sub>f</sub> identified a higher proportion of highly dentally anxious children (18.8% with MCDAS<sub>f</sub>  $> 22$ ) than MDAS. The reason for the greater proportion of children identified as specified by the MCDAS<sub>f</sub> cut-off may be that the MDAS cut-off was determined and subsequently confirmed using adult populations (Howard and Freeman, 2007; King and Humphris, 2010). It may be that the cut-off for the MDAS is too stringent for use with adolescents. A further study with clinical samples would be indicated to determine suitable cut-offs for both MDAS and MCDAS<sub>f</sub> measures by exploring the sensitivity and specificity of the measures.

The total mean MDAS score was close to that of Jordanian 15–16-year-olds (11.4 vs. 13.9) while among 10–12-year-old Turks it was a little lower at 9.6 (Abu-Ghazaleh *et al.*, 2011; Cinar and Murtomaa, 2007). The MCDAS<sub>f</sub> ‘faces’ scores in this study of Kuwaiti adolescents were a little lower than found among Northern Ireland 12-year-olds (Howard and Freeman, 2007). However, our study used only 7 of the original 8 items of that study and scaling up our scores ( $\times 8/7$ ) the corrected value of 19.0 is almost equal to the other study’s with its somewhat younger children.

Among girls, the anxiety scores were higher than among boys for all MDAS and MCDAS items and the total scores. This confirms the findings of a MDAS study conducted among Jordanian 15–16-year-olds (Abu-Ghazaleh *et al.*, 2011) and agrees with the findings among UK university students (King and Humphris, 2010) and adults in another Middle-Eastern country (Tunc *et al.*, 2005). In studies, which have used CDAS, the mean scores have been higher among girls than boys for adolescents (Bedi *et al.*, 1992; Bergius *et al.*, 1997) and Kuwaiti university students (Alansari, 2004).

Use of the drill and injection in the gum were the highest anxiety arousing items of the MDAS, which is in accordance with the findings of a study conducted among university students in UK (King and Humphris,

**Table 3.** Scores for the Modified Child Dental Anxiety Scale: faces (MCDAS<sub>f</sub>) by grade

MCDAS <sub>f</sub> measures	Grade 8 (n=344)*			Grade 9 (n=317)*			p-value
	mean	median	sd	mean	median	sd	
Dentist generally	1.93	2.00	1.10	2.12	2.00	1.16	<b>0.010</b>
Teeth looked at/examined	1.93	2.00	1.09	2.03	2.00	1.16	0.299
Teeth scaled and polished	1.48	1.00	0.88	1.57	1.00	0.99	0.259
Injection in the gum	2.92	3.00	1.44	3.16	3.00	1.38	<b>0.022</b>
Filling	2.30	2.00	1.30	2.30	2.00	1.31	0.980
Tooth taken out	3.20	3.00	1.49	3.44	4.00	1.41	<b>0.033</b>
General anaesthesia	2.40	2.00	1.42	2.46	2.00	1.44	0.583
MCDAS <sub>f</sub> sum	16.20	16.00	6.46	16.92	16.00	6.39	0.280

Mann-Whitney test: p-value for mean. \*Replied to all MCDAS<sub>f</sub> items

2010). When using Dental Fear Scale (DFS), the most anxiety-provoking stimuli among Israeli adolescents was feeling and seeing the needle (Peretz and Efrat, 2000). Results of MCDAS<sub>f</sub> in our study revealed that “having a tooth taken out” and “injection in gum” were the most anxiety arousing items, which is in line with the study among Northern-Ireland 8–10-year-olds and Scottish 5–17-year-olds (Howard and Freeman, 2007; Turner *et al.*, 2012).

All the measures used in this study have been tested earlier in various countries but not in Kuwait. The single-item dental fear measure has shown to have a good reliability and validity, and also a good agreement with multi-item dental anxiety scales. The relationship between a single-item dental fear question and the total MDAS score has been found to be strong when using an Arabic questionnaire among 15–16-year-old Jordanians (Abu-Ghazaleh *et al.*, 2011). The MDAS has been found to be a reliable and valid measure of dental anxiety among adults (Humphris *et al.*, 1995; 2000), and the faces of MCDAS among children (Howard and Freeman, 2007; Turner *et al.*, 2012). In Kuwait, a study among university students used an Arabic version of CDAS, which showed good internal consistency (Alansari, 2006). In our study, internal consistencies for the MDAS and the MCDAS<sub>f</sub> items were high. The correlations between different anxiety total scores (MDAS and MCDAS<sub>f</sub>), and the relationship between the single dental fear item and the MDAS total and MCDAS<sub>f</sub> total were also high. The Kuwaiti population is quite small and homogenous. The majority of the Kuwaiti children attend the government schools which are covered by the School Oral Health Program. All children in all six governorates have equal access to preventive and curative oral health services. It might be expected that the self-reported dental anxiety of children living in different governorates would not differ considerably. However, future studies should explore the test-retest reliability of measures to provide more comprehensive information about the reliability of these assessments among Kuwaiti adolescents.

The MCDAS<sub>f</sub> might be more suitable for younger children than those studied here. In this study, more adolescents did not complete all the MCDAS<sub>f</sub> questions than MDAS despite the “faces” version occurring first in the questionnaire. While the faces symbols used resemble “smileys”, which are nowadays constantly used in the social media by people of all ages, faces were not felt too “childish”. But boys felt especially that the instructory text to the faces version was too distracting or time consuming, even after the modification. They wanted the researcher to explain how to reply to the MCDAS<sub>f</sub> questions rather than read the instructions themselves. This might be because all school exams are carefully explained with only multiple choice questions with short questions following by straightforward choices for replies. It could also be possible that the translation of the MCDAS<sub>f</sub> was not successful (Alghadeer *et al.*, 2011). When translating MDAS, an Arabic version of it already existed, and only small modifications (cultural adaptations) were needed. Although each MCDAS<sub>f</sub> item was simplified after testing it at the schools, most probably some further cultural adaptation and evaluation may be required.

## Conclusions

A similar proportion of Kuwaiti adolescents reported extreme dental anxiety as in the other countries and were fearful of similar items, e.g. use of the drill, injection in the gum and tooth taken out. It seemed that other issues than cultural environment explains the development of dental anxiety. Thus, the existing approaches in dentistry that are typically used in other countries, such as a tell-show-do technique, use of praise as contingent secondary reinforcer for positive behaviour, and building of the dentist-adolescent treatment alliance, might be suitable when managing dentally anxious adolescents in Kuwait. However, further studies are recommended to provide additional supportive information on the formal psychometrics (e.g. reliability) of the DA measurements among children in Kuwait.

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## NEWS

### **International Dental Public Health Conference: Dental Public Health: from theory to practice**

**Nazareth, Israel 28th -29th May 2014.**

This was the first international conference on dental public health to take place in Israel and it was organised by the Arab Dentists' Association in collaboration with the two dental schools, Division of Oral Health of the Ministry and Clalit Health Services. Keynote presentations were delivered by a variety of well-known speakers from Israel and internationally and, most importantly, it attracted a participating audience of around 500 dentists from Israel, around Europe and even from Australia.

The wide ranging dental public health themes of the keynote presentations started with Professor Eli Schwartz looking back at the past 70 years of preventive dentistry as a series of public health oriented activities aimed to improve oral health of populations. In a separate presentation he later raised the importance of oral health to older adults. Dr Georgios Tsakos focused on subjective measures of oral health and quality of life discussing conceptual and methodological issues as well as potential practical applications of these measures. Later he elaborated on the socio-dental approach to needs assessment. Presenting the WHO approach, Professor Poul Eric Petersen's keynote speech comprehensively reviewed of public health actions and how oral health fits in WHO's wider agenda.

Focusing on dental public health in Israel, Professor Harold Sgan-Cohen presented the evidence on water fluoridation and oral health, Dr Alon Livni highlighted the public health challenges of the ageing population, while Dr Shlomo Zusman talked about the recent reform of dental care. Other presentations included insights from preventive dentistry initiatives in Israel such as primary prevention in schools (Dr Lena Natapov) and prevention in private dental practice (Prof Ervin Weiss), and Dr Lene Vilstrup gave her experience of the dental public health initiatives in Denmark.

This successful and well attended first meeting in Israel encouraged the organisers to set the date for the next: 24-25 May 2017.