

Is the Current Knowledge of Treating Caries Being Implemented in Saudi Arabia?

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Abstract Introduction: Dental caries has long been considered as an irreversible disease of hard tissues of the teeth and was treated accordingly using drill and fill technique. Extensive research work done in the field of cariology has proved it wrong. Current strategies to manage caries include assessing patients' caries risk, controlling bacterial level in saliva, using various therapeutic agents, remineralizing incipient carious lesions and finally restoring the cavitated lesions. In Saudi Arabia, dentists of various nationalities, especially from Asia and Africa come to work in the ministries of health and higher education. It is astonishingly observed that most of these dentists including Saudi national dentists continue to treat caries by traditional drill & fill technique. This study was done with an objective to assess percentage of the dentists following current pathways of caries management. **Material & Methods:** A user-friendly questionnaire was thoroughly prepared and distributed to dental schools in Saudi Arabia and to dentists working in ministry of health and in private clinics and hospitals consisting of 13 queries about clinical implication of current caries-treating strategies. **Results:** 239 Arabic speaking and 276 non-Arabic speaking dentists working in Saudia participated in the study by filling out the questionnaire sent to them. The data was analyzed using SPSS 17. **Conclusion:** Most of the participating dentists working in Saudia Arabia having different nationalities treat caries by surgical intervention and do not follow currently recommended strategies.

Keywords: caries management by risk assessment, caries preventive strategies

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1. Introduction

Caries has traditionally been treated through surgical intervention. The operating dentist uses rotary and hand instruments to remove the diseased tooth tissue and thus create a cavity. The cavity is then restored with biomaterials available for restorative purpose. The commonsensical reason behind this strategy is consideration of caries as an irreversible disease of hard tissues destruction. It has now been proved that caries is a dynamic disease having alternating phases of demineralization of hard tooth tissues followed by remineralization. The disease process involves a shift in balance between protective factors that aid in tooth remineralization and pathological factors that aid in tooth demineralization. The pathological factors have been identified as caries risk factors and caries indicators. Keeping this in mind, cariologists suggest caries to manage by medical model. The medical model treats caries as a multifactorial infectious disease caused by acidogenic bacteria found in an oral cavity. It recommends preventive strategies to manage caries which include assessing patients' caries risk, controlling bacterial level in saliva, using various therapeutic agents, remineralizing

incipient carious lesions and finally restoring the cavitated lesions. The current strategies are not only preventive but also favor the concept of minimal intervention dentistry (MID).

Caries Management by risk assessment (CAMBRA) provides a scientific and reliable procedure to identify caries risk of an individual and its prevention in future [1]. An individualized caries risk assessment is the first step and an important part of a comprehensive care clinical protocol prior to institution of any surgical intervention for dental caries management [2].

Once caries risk of an individual is established, the dentists may employ many chemotherapeutic interventions to arrest a progressing carious lesion or to remineralize it and to lower the salivary bacterial level [3,4]. There are many chemotherapeutic interventions available to a dentist. Topical application of fluoride varnish and mouth washes have been found highly effective to treat incipient caries [5,6]. Application of Chlorhexidine Varnish and mouth rinses controls the Mutans Streptococci count [7]. Use of Fissure Sealants is highly recommended for prevention and inhibition of pit fissure caries [8]. Consumption of confections incorporated with Casein phosphopeptide-amorphous calcium phosphate (CPP-ACP) has demonstrated proven anticariogenic activity [9]. Prescription of Xylitol – a sugar substitute containing gums which reduces caries

incidence [10]. Placing interim therapeutic restorations before placing a definitive restoration to control caries [11].

Moreover, physicochemical properties of saliva such as its pH, buffering capacity, flow and viscosity play an important role in caries activity and act as marker for caries activity [12]. Dairy products and nuts help to neutralize the salivary pH and their use instead of cariogenic snacks may reduce caries process in the children and adults who frequently consume the food containing sugar and carbohydrate [13].

By employing the current non-invasive strategies recommended for caries management, thousands of teeth may be saved from iatrogenic destruction caused by the practicing dentists. The non-surgical approach not only provides conservation of tooth structure by delaying intervention, it also minimizes the operative procedures.

It has been surprisingly observed that the most dentists show a mind-set towards management of the clinical caries. They treat it in the same traditional manner by drilling and filling.

Similar attitude has been shown towards caries management by dentists working in Saudi Arabia. The Kingdom not only caters its Saudi national dentists but also invites thousands of dentists from Asian and African countries to serve in its ministries of health and higher education.

This study is planned with the null hypothesis that dentists working in Saudi Arabia don't manage caries by employing current preventive strategies (medical model). This study aims to assess percentage of the dentists who follow all or any of the mentioned preventive caries-treating strategies.

2. Materials and Methods

Four – point Likert scale was utilized to meticulously prepare a thirteen item close-ended questionnaire with four options available to the respondents as 'always' 'sometimes' 'rarely' and 'never.' The questionnaire consisted of questions regarding clinical implementation by the responding dentists of currently recommended non-invasive strategies to control caries. Evaluation of respondents' attitude towards caries management includes items on assessing caries risk, assessing salivary bacterial count, using various therapeutic agents, remineralizing incipient carious lesions, prescribing Xylitol containing gums and dietary counseling.

The user-friendly questionnaire was distributed via electronic mail and as a hard copy to various colleges of dentistry in the Kingdom and to professional colleagues of various nationalities including Saudis working in ministry of health and in private clinics and hospitals. To facilitate the respondents, contact numbers and email addresses of the principal investigator were available for clarification of any ambiguity or query.

The data was analyzed using statistical package for social science 17. Descriptive analysis was obtained and frequency of distribution was calculated in percentages.

3. Results

A total of 550 questionnaires were sent to practicing dentists who very generously responded at the rate of

93.60%. All the respondents correctly filled out the entire questionnaire and thus no survey questionnaire was eliminated from the study. 239 responses were received from Arabic speaking dentists belonging to Saudia, Egypt, Sudan, Syria, Jordan and Palestine while 276 respondents were from non- Arabic speaking nations as India, Pakistan, South Africa and Phillipine.

In current preventive caries managing strategies caries risk assessment of an individual is highly mandatory but according to the findings of this study, 80 % of the dentists working in Saudia treat caries in old fashioned style without identifying the caries risk of their patients. A very low percentage (4 %) of responding dentists rarely or never treat without risk assessment and rest of 16 % revealed that they sometimes perform caries risk assessment (Table 1). Saliva plays a significant role as a tool to determine the caries risk. Its flow, pH, buffering capacity and bacterial count should be assessed and controlled in patients with high caries risk before restoring any carious tooth. As far as saliva flow is concerned, only 5 % respondents always assess patients' salivary flow while around 7 % sometimes do it where as majority of them (88 %) never or rarely do it. Same is the case with saliva pH. An ignorable percentage (2.5 %) of respondents always and 3 % sometimes check salivary pH and rest of 95 % hardly perform it. Similarly, assessment of buffering capacity is not done by 96 percent of the dentists (Table 2).

Table 1. Dentists treating cavities without caries risk assessment

Question about preventive caries control strategy	Respondents' Answers	Percentage
Do you assess patients' caries risk before drilling and filling?	Always	2.71
	Sometimes	1.74
	Rarely	16.28
	Never	79.26
Do you place interim therapeutic restoration before placing a definitive restoration to control caries?	Always	2.06
	Sometimes	1.50
	Rarely	6.0
	Never	90.43

Table 2. Dentists assessing patient's saliva

Question about current caries control strategy	Respondents' Answers	Percentage
Do you ever get patients' saliva flow rate assessed?	Always	5.04
	Sometimes	6.98
	Rarely	14.15
	Never	73.84
Do you ever get patients' saliva pH assessed?	Always	2.52
	Sometimes	3.29
	Rarely	9.50
	Never	84.69
Do you ever get patients' saliva buffering capacity assessed?	Always	2.02
	Sometimes	2.00
	Rarely	0.0
	Never	96.00
Do you ever get patients' bacterial count assessed?	Always	4.26
	Sometimes	3.10
	Rarely	9.50
	Never	83.14

Streptococcus Mutans are acidogenic caries causing bacteria. Their presence in saliva above 1000000 CFU is an indicator for high caries risk. Hardly 7 % (4 % always and 3 % sometimes) evaluate their patients' salivary

bacterial count and rest of 93 % never bothers to assess the count (Table 2).

Many therapeutic agents like chlorhexidine, fluoride, CPP-ACP are used to reduce bacterial quantity in saliva or to remineralize incipient carious lesions. The most dentist population 78 % doesn't take the advantage of antibacterial efficacy chlorhexidine as varnish. 7 % respondents always use it to lower the bacterial count and 15 % do it sometimes. As a mouthwash to reduce streptococcus count in saliva, responses reveal that its use is higher than chlorhexidine varnish. Around 32 % of them always and 19 % sometimes prescribe it while 49 % never or rarely use it (Table 3).

Table 3. Dentists employing chemotherapeutic agents for caries control

Question about current caries control strategy	Respondents' Answers	Percentage
Do you ever apply chlorhexidine varnish to reduce mutans streptococci (MS) count?	Always	7.17
	sometimes	14.92
	Rarely	14.15
	Never	63.57
Do you ever prescribe chlorhexidine mouth washes to control MS?	Always	31.78
	Sometimes	19.38
	Rarely	5.04
	Never	43.80
Do you ever apply Fluoride varnish to control incipient caries?	Always	23.06
	Sometimes	25.78
	Rarely	15.89
	Never	35.27
Do you ever prescribe CPP-ACP incorporated confections to reduce caries activity?	Always	1.20
	Sometimes	1.23
	Rarely	2.1
	Never	95.47
Do you ever prescribe Xylitol containing gums?	Always	10.08
	Sometimes	19.19
	Rarely	17.05
	Never	53.68
Do you perform fissure sealing wherever indicated?	Always	29.26
	Sometimes	27.71
	Rarely	14.53
	Never	28.49

Recommending CPP-ACP incorporated confectionary by the respondents is highly astonishing. 96% of them never ask their patients to consume this confectionary to utilize its potential of reducing caries incidence (Table 3).

Use of Xylitol also increases salivary flow and reduces caries incidence. Findings of the study show its use by the professional is not very encouraging. 10 % dentists always recommend to use it and 19 % occasionally whereas rest of around 70 % never use it (Table 3).

It is satisfying to note that use of fluoride varnish to manage incipient caries has increased as the findings show equal response for using it and not using it in their clinics. 23 % respondents always use it and 25 % sometimes but rest do not use it (Table 3).

Like Fluoride, use and role of fissure sealants seems to be accepted by dental professionals. 29 % clinicians always and 27 % sometimes perform this procedure (Table 3).

Idea of placing interim therapeutic restorations (caries control restorations) before placing a definitive restoration in order to reduce salivary streptococci and thereby controlling caries has not gained much favor from dentists.

90 % of the dentists never place such restorations in their practices (Table 1).

Dietary counseling and analysis is also very important to control caries and yet it is not much practiced. Just 3.88 % of dentists always counsel their patients for healthy/non-cariogenic diet whereas 9 % do it once in a while. A big majority doesn't perform this important step. Dietary counseling and analysis are part and parcel of each other. This helps dentists to distinguish between cariogenic and anticariogenic diets of the patients. Like counseling, very few (13 %) only analyze their patients' diet (Table 4).

Table 4. Dentists counseling patients' on diet

Question about current caries control strategy	Respondents' Answers	Percentage
Do you advise patients to consume anticariogenic diet like nuts and unsweetened dairy products?	Always	3.88
	Sometimes	9.50
	Rarely	13.57
	Never	73.06
Do you analyze patients' dietary habits?	Always	13.01
	Sometimes	18.99
	Rarely	11.43
	Never	38.57

4. Discussion

The number of dentists utilizing any of the current preventive strategies to manage caries has been found highly inadequate among the responding dental practitioners. Fissure sealing is the only preventive measure taken by a noticeable percentage of responding dentists. It too, is performed by only 30 % of the dentists on regular basis. Results of our study in this regard are in accordance with the studies from USA, Sweden, Scotland, Greece and Mangolia which show that fissure sealants are under utilized in the countries where the studies have been undertaken [13,14,15,16,17]. On the contrary, our findings contradict the findings of the Canadian and Ohio studies where dentists are shown to use fissure sealants in a statistically significant number [18,19].

Use of Fluoride varnish is also not very high among the dentists who participated in this study. Merely 23 % of dentists routinely apply it in their practices as caries preventive measure. This reflects the status of using fluoride in the respondents' respective countries. These findings are close to findings of study done in Texas where 18.8 % dentists were found using fluoride varnish [20].

The probable reason for acceptance of fissure sealing and fluoride application more than other caries preventive measures may be the interventional nature of these procedures. The other preventive measures as caries risk assessment, dietary analysis and counseling are non-interventional procedures.

The caries risk assessment is carried out by assessing salivary streptococcus count, flow rate, pH and buffering capacity. Findings of this study suggest that a substantial number of dentists don't perform risk assessment of their patients. Similar findings were achieved in a study done among members of Dental Practice-Based Research Network in USA and Scandinavia [21,22]. It is interesting to mention that authors of a Japanese study on this subject conclude that most of the participating dentists of that

study believe caries risk assessment is an ineffective step to control caries [23].

Results of a Bosnian match the results of our study. According to the study, the most Bosnian dentists involved in general dental practice do not give due importance to caries preventive measure in their practices [24]. An Indian study also show that participants of that study had least caries preventive knowledge as compared to prevention of malocclusion [25]. This is obvious that if they don't have the knowledge about caries prevention, how they can implement them in their practices.

It has been commonly witnessed that dental students possess updated pedagogic information about non-invasive caries management strategies but this cognitive knowledge is not implemented during clinical sessions in dental schools [26]. The students treat all carious lesions using drills irrespective of patients' caries risk assessment. The students are still found drilling and filling incipient lesions, arrested lesions or inactive lesions. The reason behind it may be resistance by teachers against the paradigm shift to bring the change in managing caries from surgical model to medical model. Most teachers in Operative Dentistry clinics are seen assessing their students on Black's cavity designs which involve unnecessary tooth cutting. The students therefore are forced to take more interest in developing their psychomotor skills in restorative procedures then assessing caries risk or applying preventive measures. These students in future when they become dentists continue the same practices.

It is proposed that educationalist and subject specialists in Operative Dentistry and Cariology in these countries should collaborate and critically analyze their curriculum to make appropriate amendments and alterations. They should concentrate on producing a future dentist with clinical competency to manage caries with current understanding. To implement this, traditional training style, prescribed psychomotor skills and expected competencies of dental graduates which stress on interventional, clinical and biological aspects must be discarded. They should be expanded by adding new skills capable of sustaining actions focused on promoting health based on the comprehensiveness of health care. The training should be directed towards improving diagnostic skills and treating and preventing caries, keeping in view the complexity of the microbiological and biological environment. It will ascertain that graduating dentists of these countries are aware of a multiple caries management strategies based on scientific evidence.

5. Conclusion

The majority of the dentists working in Saudi Arabia still treats caries via surgical intervention using drill - fill method and does not clinically implement pedagogic knowledge of current recommendations (medical model) for caries management.

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