ORIGINAL ARTICLE

MINIMAL INTERVENTION DENTISTRY: CONCEPTUAL INTEGRATION IN THE DENTAL CURRICULUM IN CARIOLOGY

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ABSTRACT

The aim of this study was to evaluate the knowledge and practices of minimal intervention dentistry (MID) in the teaching hospitals of Lahore. The target population for this cross-sectional study consisted of fresh graduates, house surgeons and demonstrators of Restorative Dentistry in the dental schools of Lahore. The questionnaire was prepared to assess the teaching and concepts of minimal intervention dentistry being taught at the undergraduate level. The results showed that 83 % of the respondents believed that MID should replace the age old principles of GV Black. The respondents (90-95%) had sound knowledge about the caries risk assessment. However their concepts about clinical management using these techniques of MID were inadequate. In light of this study it is impervious that, a comprehensive practical training guided by the current principles of MID should be designed and implemented to improve present caries management educational program.

Key Words: *minimal intervention dentistry (MID), prevention, cariology, curriculum.*

INTRODUCTION

Dental caries in adults is a global issue with higher prevalence being in underdeveloped and developing countries. In developing countries, oral health providers are mostly present in the tertiary care hospitals of urban centres and minimal importance is given to preventive or restorative dental care. The public dental system fails to address the lifestyle and broader health issues affecting oral health and although an immediate dental problem can usually be alleviated, it is done at the cost of valuable tooth structure.[1] In children and adults suffering from severe tooth decay, teeth are often left untreated or are extracted to relieve pain or discomfort.[2] Pakistan being a developing country is suffering from a similar dilemma.[3,4] According to a survey in 1991 of dental disease and oral hygiene needs in Pakistani population, 52% of cases in the age group 12 to 15 years and 70% in the age group ranging from 35 to 64 years had dental caries. The frequency of caries increased with age and was higher in males 60.25% than in females 57.9%. Active caries was present in 45% young and 64% adult population.[5] The last oral health survey was conducted in 2003 in which almost nine thousand individuals in 21 districts of the country were examined to determine the burden of oral disease in Pakistan, dental caries (tooth decay) was the single most common chronic childhood disease in the country. Almost 50% of the 12-15 year old children had two teeth involved in the disease process. More than 50% of the children between the ages of 12-15 years were caries free however, 97% of all carious lesions in these age groups were untreated. For the 35-44 year old group half of the lesions were untreated while in more than 90% of cases the treatment offered was extraction. Moreover, preventive regimes (examination, scaling and prophylaxis) formed less than 3% of the routine procedures at public dental clinics and indicated the shortcomings in oral health education regarding preventive practices and the lack of dental health promotional programs in the country.[6]

In industrialized countries an initial investment in preventive oral care has resulted in a reduced prevalence of oral disease and savings in dental expenditures.[7,8] In most developing countries, investment in oral healthcare is low. In these countries, resources are primarily allocated to emergency oral care and pain relief if treatment were available, the costs of dental

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caries in children alone would exceed the total health care budget for children.[9] Traditionally the dentists had focused on the treatment modalities encompassing the outcomes of the carious decay. It is only in the recent few decades that the dental professionals have realized the importance of caries preventive measures. These findings highlight the importance of teaching dental students a systematic and profound education in cariology and preventive dentistry.[10]

It is the need of the hour in dental schools to encompass the concepts of early detection of caries, prevention and minimal intervention. Thereby improve the knowledge of the dental students and to bring it at par with the current concepts.[11,12] According to a study in 2005 the preventive concepts of dentists in Peshawar regarding dental caries were found to be unsatisfactory and needed improvement through various measures.[13] Better oral health care conditions for the world's populations necessitate the application of up-to-date scientific knowledge to prevent the major oral diseases. The structure and content of undergraduate dental curriculum should be based on the current trends and knowledge about the preventive care and principles of management of caries. They must also take into account the trends for change in the management of caries within and between populations, and acknowledge the impact of changes in treatment philosophies for these trends.[14]

This study focuses on the concepts and beliefs about Minimal Intervention Dentistry (MID) in cariology, of dental graduates working in the dental schools of Lahore. The aim of this study was to test the hypothesis that the knowledge and application of MID is insufficient in teaching hospitals of Lahore.

METHODOLOGY

In Lahore, there are five dental schools, affiliated with University of Health Sciences. In each dental school teaching is divided into two parts: didactic teaching where the educational process consists of lectures and tutorials, and a hospital section where students and teachers are engaged in clinical activities. The target population for this cross-sectional study consisted of fresh graduates, house surgeons, demonstrators and the teaching faculty of Restorative Dentistry in these dental schools.

The questionnaire was delivered in person in February 2014 and collected two weeks later. 261 complete performas were included in the study. The target population consisted of 425 dentists out of which 259 responded resulting in a response rate of 61%. The questionnaire was prepared to assess the teaching and concepts of MID being taught at the undergraduate level in teaching institutions of Lahore. The questionnaire had two sections. The first section referred to the perspective of the dentist regarding the quality of MID and GV Blacks concepts of cavity designs being taught and assessed in the undergraduate curriculum. The second section of the questionnaire was directed at the knowledge and beliefs of the respondents about caries and its management by MID. The returned questionnaires were coded and data entered. Data was analyzed using the Statistical Package for the Social Sciences (SPSS) 17. Descriptive statistics were used to analyze the data.

RESULTS

The first part of the questionnaire was regarding the curriculum of cariology being taught at the undergraduate level. Majority of respondents 79% agreed that they were taught MID at the undergraduate level, however 59% were assessed for it in their examination. An estimated 98.5% of the respondents agreed that both GV Blacks concepts and MID should be taught at undergraduate level (Table 1).

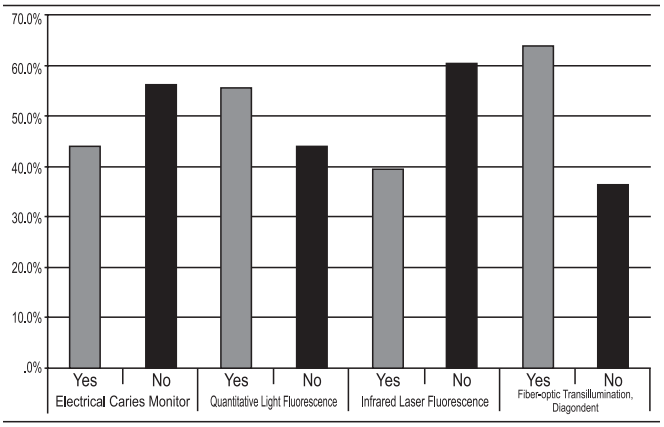

Fig 1: Knowledge about the latest techniques of caries detection

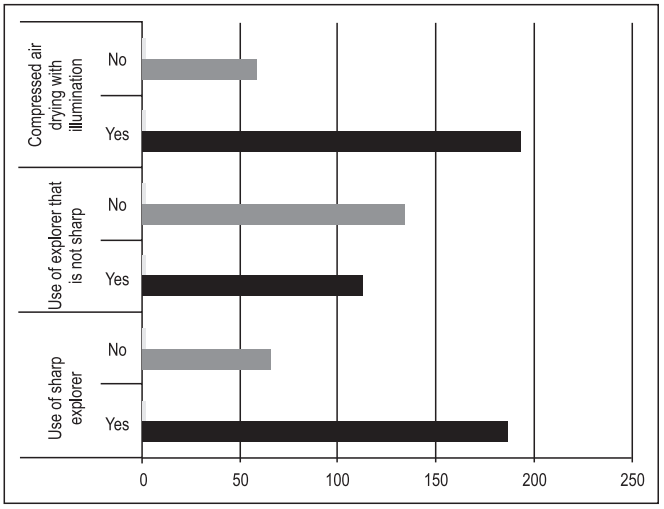

Fig 2: Knowledge about the Clinical Examination of Caries

TABLE 1

			Percentage
Q1	Teaching of MID at the undergraduate level	Yes	78.8%
		No	17.0%
Q2	Teaching of principles of GV Black at undergraduate level	Yes	96.1%
		No	3.9%
Q3	Assessment of MID in practical examination	Yes	59.5%
		No	39.8%
Q4	Assessment of GV Blacks cavity design in practical examination	Yes	93.8%
		No	6.2%
Q5	MID as the professional standard of care for primary teeth	Yes	83.8%
		No	15.8%
Q6	MID as the professional standard of care of permanent teeth?	Yes	74.9%
		No	23.6%
Q7	MID as replacement GV Blacks principles in small to moderate cavities?	Yes	83.4%
		No	16.2%
Q8	Recommended teaching strategy for undergraduate teaching	Teaching GV Blacks principles only	1.9%
		MID only	3.1%
		Both GV Black and MID	93.4%

TABLE 2: REMINERALIZATION IN PRIMARY TEETH

Remineralization with fluoride	Effective	81.3%
	Ineffective	4.3%
	I don't use this technique	14.5%
Amorphous calcium phosphate-CPP	Effective	40.2%
	Ineffective	4.4%
	I don't use this technique	55.4%
ART	Effective	75.3%
	Ineffective	8.6%
	I don't use this technique	16.1%
Sandwich technique (GIC + Composite)	Effective	89.1%
	Ineffective	5.9%
	I don't use this technique	5.1%

TABLE 3: REMINERALIZATION IN PERMANENT TEETH

Remineralization with fluoride	Effective	82.0%
	Very Ineffective	6.3%
	I don't use this technique	11.7%
Amorphous calcium phosphate-CPP	Effective	40.6%
	Very Ineffective	6.7%
	I don't use this technique	52.8%
ART	Effective	63.1%
	Very Ineffective	17.9%
	I don't use this technique	19.0%
Sandwich technique (GIC + Composite)	Effective	94.2%
	Very Ineffective	2.3%
	I don't use this technique	3.5%

TABLE 4: KNOWLEDGE ABOUT REMINERALIZATION

Fluorides and Amorphous calcium phosphate essential for remineralization	Agree	86.6%
	Neutral	11.4%
	Disagree	2.0%
Sealants: essential procedure for high caries risk children	Agree	89.5%
	Neutral	7.0%
	Disagree	3.5%
Small, minimal cavity preparations compromise materials' retention	Agree	50.4%
	Neutral	25.0%
	Disagree	24.6%

TABLE 5: KNOWLEDGE ABOUT CARIES RISK ASSESSMENT

1	The importance of preventive dentistry is more in children than adults	Agree	76.4%
		Neutral	10.5%
		Disagree	13.2%
2	Caries risk assessment should be performed for all the patients	Agree	95.3%
		Neutral	2.3%
		Disagree	2.3%
3	Dietary habits of all the patients should be assessed	Agree	93.8%
		Neutral	5.0%
		Disagree	1.2%
4	No. of carious lesions is directly related to the intake of refined carbohydrates	Agree	78.7%
		Neutral	13.2%
		Disagree	8.1%
5	High caries risk patients should receive diet counseling	Agree	97.6%
		Neutral	2.0%
		Disagree	0.4%

The second part of the questionnaire was about the respondents' knowledge of diagnosis and management of caries. When the respondents were asked about new methods of caries detection 38-58% of them were unaware the various methods (Fig 1). When asked about the clinical examination technique for caries detection an alarming level of the respondents 74% used a sharp explorer for detection of caries (Fig 2). When asked about the effectiveness of remineralization of primary and permanent teeth with fluoride 81.5% of the respondents found it effective in remineralization (Table 2, 3). More than 50% of the respondents were unaware of Casien Phosphopeptide -Amorphous Calcium Phosphate (CPP-ACP) used for remineralization of teeth (Table 2, 3). When the respondents were asked about the effectiveness of ART in primary and permanent teeth 75% and 63% of the respondents found it effective respectively (Table 2, 3). When asked about the sandwich technique (GIC + Composite) 89% and 94% found it effective in primary teeth and permanent teeth respectively (Table 2, 3). Fluorides and CPP-ACP were deemed essential for remineralization by 86% of the respondents while 89.5% agreed that pit and fissure were an essential procedure for high risk children. Fifty percent of the respondents were of the opinion that small minimal cavity preparations compromise materials retention (Table 4). Preventive dentistry was found to be more effective in children than in adults by 76% of the respondents. Majority of respondents had sound knowledge about the broad concepts of prevention, however when asked about the clinical management the responses were vague and inadequate (Table 5).

DISCUSSION

Historically dentists have been administering therapies for the consequences of carious lesions with little or no emphasis on prevention. However in the last decade it has been highlighted that prevention has a very important role in dentistry. Minimal intervention dentistry (MID) is the most contemporary approach for the management of dental caries.[15] This change from intervention to prevention is still in the process of being incorporated in a systematic and comprehensive manner in the dental curriculum. Pakistan, a third world country is still lagging behind in preventive regimes. To implement good preventive measures it is essential that the dentists be trained formally to focus more on prevention than intervention. Our findings have suggested that many dentists have not modified their operative treatment practices in the light of modern philosophies. This reluctance probably has several explanations, but an important factor may be the content of the cariology curriculum taught during undergraduate training. To achieve this goal changes need to be made in the curriculum taught and assessment methodology. This study was done to assess the disparity and shortcomings in the teaching and knowledge of MID in the teaching institutions of Lahore. Notwithstanding the limitations of the findings, the data generated provides a useful insight into the beliefs and attitudes of dental graduates.

The study targeted all dental institutions in Lahore and got a 61% response. Our findings suggest that more than 50% of the dentists are not sufficiently aware of the shortcoming in their operative treatment practices in the light of modern philosophies. As more than 95% of the participants were aware of the theory aspect of prevention, we assume that the subject was introduced in the cariology curriculum but it was not reinforced sufficiently in clinical practice. As 79% of the graduates agreed that they were taught MID at the undergraduate level, only 59% claimed that they were assessed for it too as compared to the 96% and 94% for GV Blacks concepts being taught and assessed. This comparison shows that the age old principles of extension for prevention are still predominantly being taught and assessed in terms of priority at the undergraduate level. The inadequacies of the current teaching methodologies were highlighted when the respondents were asked about the current methods of caries detection. More than 38-61% of the respondents were unaware of them.

A confused response was found in answer to the inquiry regarding clinical examination technique for caries detection, which further highlighted the inadequacy of their knowledge. An alarming level of the respondents 74% said that they used a sharp explorer for detection of caries, a questionable practice which is considered unethical in many developed countries. Studies have suggested the use of sharp explorer to be a cause of iatrogenic damage which can cause progression of initial caries.[16-18] Another alarming finding was that more than half the respondents were unaware of CPP-ACP that is used for remineralization of demineralized tooth structure.

The respondents 95% in the study seemed moderately aware of the first two core principles of MID which are recognition and reduction of caries however their knowledge was inadequate as far as repair and regeneration of tooth structure was concerned. Since so much of dental treatment is irreversible, these inadequacies in the training of undergraduates can place patients at risk of needless or inappropriate interventions. Thus, dental schools should develop evidence-based teaching in dental cariology and favor the use of standardized criteria for treatment decisions in operative dentistry.[19] Brown[20] has discussed the need for change in dental schools' curricula to incorporate the great influx of new knowledge in our profession and also to change some of the ways we teach.

The identified deficiencies call for changes in undergraduate dental curricula to improve dental care from any stakeholder's perspective. To make the right decision about surgical intervention, it's suitability, benefits and limitations and non-surgical treatment options need to be considered, such as tooth tissue preservation, restoration, longevity and costs. The wide disparity among the responses regarding MID in the results have also been demonstrated in previous surveys regarding MID. These opinions illustrate a gap in the understanding of the carious process and remineralization. There are several studies from Europe[21-23], North and South America[24-28], and Japan[29] which have reported large disparity in the teaching of cariology, its preventive and restorative aspects.

CONCLUSION

In light of this study it is suggested that, a comprehensive practical training guided by the current principles of MID should be designed and implemented to improve present caries management educational program.

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