

# Iraqi dentists' risk-based restorative treatment decisions

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## Abstract

**Objective:** The aim of the present study was to investigate the decision-making by Iraqi dentists concerning the use of restorations in the treatment of dental caries.

**Methods:** A cross-sectional study based on a self-administered questionnaire was conducted among 159 dentists who worked in public health sector in Baghdad during summer of 2016. A questionnaire which obtained information on age, attitude, knowledge, and barriers, in addition to two scenarios designed to investigate dentists' restorative treatment threshold, was used. Paper patient cases (PPCs) were indicated high-risk (HR) and low-risk (LR) patients were also provided. Dentists were asked to point out at when they will start restoration of the teeth according to each PPC.

**Results:** After checking for completeness, 90 questionnaires remained for data analysis. For HR scenario: Dentists with medium and high barrier scores (74.2%), and those with low- and medium preventive attitude (78.6%) showed the lower scores in restorative treatment threshold. In LR scenario, we found an interaction between age and other predictors. Dentists  $\leq 40$  years old made better preventive decisions.

**Conclusion:** The present study showed that age and good preventive attitude play an important role in making the restorative decision by dentists. Continuing education programs must be provided for Iraqi dentists to improve their preventive treatment decisions.

**Keywords:** Knowledge, Attitude, Dentist, Restorative treatment

## Introduction:

The restorative treatment threshold can be defined as the point at which dentists would begin drilling a carious tooth to make a restoration.<sup>1</sup> This process can be continued with other restorations in the earlier lesion or another, which is against the newer concept of caries prevention in dentistry. Dental caries can be remineralized in early, non-cavitated stages.<sup>2</sup> Because the demineralization is an inverse action and can shift to remineralization, it is possible to delay the operative treatment for non-cavitated lesions.<sup>3</sup> There are variations in dentists' decisions to do the restorative treatment when the caries lesion limited to enamel or at the beginning of extension to dentin. These variations are mainly related to their knowledge and working experiences.<sup>4-6</sup> Variations also depend on the opinions of the dentists in extending the restorations, where many of them tend to restore the carious teeth in the early stages. A study showed that some dentists had more propensity to replace the whole affected restorations, while dentists who prefer to delay the starting of operative treatment until the lesion developed to advanced stage, recommended repair instead of replacement.<sup>7</sup> The consideration of caries risk level in patients by dentist may differ based on the age and work experience.<sup>8</sup> Numerous epidemiological studies were conducted in Iraq concerning dental caries and its related factors; however, most of them concerned with pre-school or primary school children. The percentage of tooth decay in Iraq for the age group of 12 years is considered low, ranging from 1.2 to 2.5. However, dental treatment need is high, especially in adolescents who will make the future of country.<sup>9-11</sup> Minimal invasive restorative treatments are in

the scope of modern dentistry. To our knowledge, there is no study regarding dentists' decision on the start point of restorative treatment in Iraq and although it is influenced by caries risk level of the patients, most of the Iraqi dentists may also tend to restore the carious teeth in the early stages.<sup>12</sup> The main aim of the present study was to explore the Iraqi dentists' decision-making regarding the restorative treatment for dental caries.

## Method and Materials

### Ethical considerations

Dentists' participations were under a voluntary basis, and followed Declaration of Helsinki - Ethical Principles for Medical Research Involving Human Subjects. Tehran University of Medical Sciences Research Ethics Committee gave the ethical approval (ID number: IR.TUMS.VCR.REC.1396.1984)

### Study design and population

A cross-sectional study was performed among general dental practitioners (GDPs) who worked in Specialist Dental Centers and primary health-care centers in Baghdad based on a self-administered questionnaire in 2016.<sup>13</sup> A convenient sampling method was adopted to select the GDPs from the centers. The response rate was 94% ( $n=150$ ) from 159 questionnaires distributed.

### Questionnaire and variables

Survey questionnaire was based on a questionnaire that was previously established by Ghasemi et al.<sup>1, 11</sup> It covered

information on variables such as age, gender, type of working sector (private, governmental), duration of working as GDP, and history of previous attendance to any continuing education program. Other variables were: dentists' knowledge (5-point Likert scale answers, later scored from 0 to 4), attitude (answers in the form of adjective pairs, scored from 7 to 1) and the perceived barriers (5-point Likert scale answers, later scored from 0 to 4) about preventive dental care. There were two Paper Patient Cases (PPCs) scenarios for evaluation of dentists' restorative treatment threshold: High-Risk (HR) & Low-Risk (LR). The dentists were asked to specify for each case, when they would start drilling a carious tooth for making a restoration.<sup>1,14</sup>

### Statistical analysis

Acceptance missing level was set  $\leq 20\%$  for each question.<sup>13</sup> Knowledge, attitude, and perceived barrier were categorized into low (0–33.3), medium (33.3–66.6), and high (66.6–100) based on questionnaire scores standardized between 0 and 100. To test the associations among subgroups for evaluating the most potential predictor's, simple logistic regression was used then followed by multiple logistic regression (stepwise method) for testing the association among the dependent and independent variables, adjusted for confounders. Because of interaction between age and other predictors, we performed data analyses in each age group, separately. Significant level was set at  $p$ -value  $< 0.05$ .<sup>13</sup>

### Results

In the present study, 159 questionnaires were distributed and the response rate was 94%. However, only 90 questionnaires that contain complete data were included in the analyses. Of all the participated dentists ( $n=150$ ), 71% were female. The mean age was  $40 \pm 9.88$ , ranged from 27 to 65 years. Dentists who were  $\leq 40$  years old represent 51.1% from all the participants.

#### High risk (HR)

Dentists with medium- and high barrier scores and those with low- and medium preventive attitude showed the lower scores in restorative treatment threshold in HR patient as shown in Table 1. Multiple regression analysis confirmed the above-mentioned results regarding the association between attitude and treatment threshold (OR=0.31; 95% CI: 1.08–8.00;  $p$ -value= 0.02) and the association between barrier score and treatment threshold (OR=3.45; 95% CI: 0.10–0.77;  $p$ -value= 0.02), (Table 2).

#### Low risk (LR)

We found an interaction between age and other predictors, consequently the results are presented separately for 2 age categories. In dentists  $\leq 40$  years old, those with better preventive attitude showed better restorative treatment threshold. Conversely, those who reported they had not been attended an educational course about caries prevention got the lowest scores (Table 3).

Study result shown in Table 4. Revealed that there was no significant relationship between independent variables and restorative treatment decision regarding low risk patients in dentists  $>40$  years old. However, for those  $\leq 40$  years old multiple regression analysis confirmed that those with better preventive

attitude (OR=5.36; 95%CI: 1.26–22.83;  $p$ -value=0.02), and those who had been attended to educational course in caries prevention (OR=5.75; 95%CI: 0.998–33.17;  $p$ -value=0.05), had better restorative treatment threshold (Table 5).

### Discussion

Dentist's decision-making regarding the operative treatment is influenced by their attitude towards controlling active lesions and preventing new ones. Attitude follows their evidence based knowledge about caries progression and understanding of different stages of caries as well as risk-based caries treatment and prevention modalities. This will empower them in avoiding unnecessary treatment decisions.<sup>16</sup>

This study showed an interesting point in case of LR patient. Younger dentists ( $\leq 40$ ) who showed good preventive attitude and attended preventive educational courses, had higher restorative treatment threshold. A good preventive attitude was the same predictor of the decision of Iraqi dentists regarding HR patient.

This study revealed that one-third of the Iraqi dentists would restore carious teeth when reached the outer half of the dentin in HR patients which is in contrast with the opinion of California dentists that most of them tended to restore the carious lesion when reached dentin–enamel junction (DEJ).<sup>14</sup> In LR patient, our results were similar to the Swedish dentists' decisions regarding LR patients. They decided to delay the restorative treatment when there was no dentinal involvement.<sup>17</sup> Another important predictor that affected the Iraqi dentists' decision was their attendance to continuing educational courses regarding preventive dentistry. This is in line with the findings of Mai E. Khalaf et al. among general dentists in Kuwait.<sup>18</sup> To improve restorative treatment threshold of Iraqi dentists, dental schools should put more emphasis on the topics about preventive dentistry in general dental education. Continuing education courses will extremely help to update evidence-based knowledge and practice of dentists. This will consequently improve the oral health of the community. To give the dentists a room for preventive action, more research in provision of preventive dental care barriers is necessary.

### Conclusion:

The present study showed that age and good preventive attitude play an important role in making the restorative decision by dentists. Continuing education programs must be provided for Iraqi dentists to improve their preventive treatment decisions.

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### Conflicts of Interest Disclosure:

There are no conflicts of interest.

Table 1. Distribution (n, %) of dentists belonging to the categories of restorative treatment threshold for high-risk (HR) patient and simple logistic regression results					
	Restorative treatment threshold score		OR	95%CI	p-value
	Low and medium	High			
Gender					
Female	41 (65.1%)	22 (34.9%)	1.20	0.45-3.219	0.71
Male	18 (69.2%)	8 (30.8%)	Ref.		
Age (years)					
≤40	29 (64.4%)	16 (35.6%)	1.18	0.49-2.85	0.71
>40	30 (68.2%)	14 (31.8%)	Ref.		
Working duration					
<10 years	19 (57.6%)	14 (42.4%)	Ref.		
10-19 years	21 (75.0%)	7 (25.0%)	0.45	0.15-1.35	0.16
≥20 years	19 (67.9%)	9 (32.1%)	0.64	0.22-1.84	0.41
Working in private sector					
No	35 (70.0%)	15 (30.0%)	Ref.		
Yes	24 (61.5%)	15 (38.5%)	1.45	0.60-3.53	0.40
Education course attendance					
No	14 (66.7%)	7 (33.3%)	Ref.		
Yes	45 (66.2%)	23 (33.8%)	1.02	0.36-2.88	0.97
Attitude score					
Low and medium	33 (78.6%)	9 (21.4%)	Ref.		
High	26 (55.3%)	21 (44.7%)	2.96	1.16-7.54	0.02
Knowledge score					
Low	17 (68.0%)	8 (32.0%)	Ref.		
Medium	37 (71.2%)	15 (28.8%)	0.86	0.31-2.42	0.78
High	5 (41.7%)	7 (58.3%)	2.97	0.72-12.34	0.13
Barrier score					
Low	13 (48.1%)	14 (51.9%)	Ref.		
Medium and High	46 (74.2%)	16 (25.8%)	0.32	0.12-0.83	0.02

Table 2. Predictors of restorative treatment threshold in case of high-risk patient; results of multiple logistic regression analysis

	OR	95%CI	p-value
Attitude score			
Low and medium	Ref.		
High	0.31	0.11-0.81	0.02
Barrier score			
Low	Ref.		
Medium and High	3.45	1.27-9.34	0.02

Table 3. Distributions (n, %) of dentists' belonging to the categories of restorative treatment threshold for low risk patient and simple logistic regression results

	Restorative treatment threshold patient B (score) LR		OR	95%CI	p-value
	Low and medium	High			
<b>Dentists ≤40 years old</b>					
Gender					
Female	6(54.5%)	5 (45.5%)	2.0	0.49- 8.09	0.33
Male	24 (70.6%)	10 (29.4%)	Ref.		
Working in private sector					
No	19 (73.1%)	7 (26.9%)	Ref		
Yes	11 (57.9%)	8 (42.1%)	0.51	0.14-1.78	0.29
Education course attendance					
No	13 (86.7%)	2 (13.3%)	Ref.		
Yes	17 (56.7%)	13(43.3%)	4.97	0.95- 26.00	0.058
Attitude score					
Low and medium	19 (82.6%)	4 (17.4%)	Ref.		
High	11 (50.0%)	11 (50.0%)	1.0	0.05-0.82	0.03
Knowledge					
Low	13 (76.5%)	4 (23.5%)	Ref		
Medium	14 (60.9%)	9 (39.1%)	2.09	0.52- 8.46	0.30
High	3 (60.0%)	2 (40.0%)	2.17	0.26-17.89	0.47
Barrier score					
Low	10 (71.4%)	4 (28.6%)	Ref		
Medium and High	20 (64.5%)	11 (35.5%)	1.38	0.35-5.43	0.65
<b>Dentists &gt;40 years old</b>					
Gender					
Female	12 (42.9%)	16 (57.1%)	0.86	0.24- 3.02	0.81
Male	7 (46.7%)	8 (53.3%)	Ref.		
Working in private sector					
No	11 (45.8%)	13 (54.2%)	Ref		
Yes	8 (42.1%)	11 (57.9%)	0.86	0.26- 2.89	0.81
Education course attendance					
No	3 (50.0%)	3 (50.0%)	Ref.		
Yes	16 (43.2%)	21 (56.8%)	1.31	0.23-7.38	0.76
Attitude score					
Low and medium	8 (42.1%)	11 (57.9%)	Ref.		
High	11 (45.8%)	13 (54.2%)	0.86	0.35-3.92	0.81
Knowledge score					
Low	4 (50.0%)	4 (50.0%)	Ref		
Medium	13 (46.4%)	15 (53.6%)	1.15	0.24- 5.56	0.86
High	2 (28.6%)	5 (71.4%)	2.50	0.29- 21.40	0.40
Barrier score					
Low	8 (61.5%)	5 (38.5%)	Ref		
Medium and High	11 (36.7%)	19 (63.3%)	2.76	0.72-10.57	0.14

**Table 4. Predictors of restorative treatment threshold of young ( $\leq 40$  years old) Iraqi dentists on low-risk patient; results of multiple logistic regression analysis.**

	OR	95%CI	p-value
Attitude score			
Low and medium	Ref.		
High	5.36	1.26-22.83	0.02
Education course attendance			
No	Ref.		
Yes	5.75	0.998-3.17	0.05

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