

Knowledge and Attitude towards Atraumatic Restorative Treatment (ART) among General Dental Practitioners of Riyadh, Kingdom of Saudi Arabia

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Abstract Purpose: Atraumatic restorative treatment (ART) is a treatment technique that emphasizes maximum healthy tooth structure preservation and enamel remineralization. It has been a widely accepted technique worldwide in the management of dental caries. However, there is limited evidence data available on familiarity with ART technique amongst general dental practitioners (GDPs) of Riyadh, KSA. This study was conducted to assess the knowledge and attitude toward ART amongst GDPs of this region. **Materials and Methods:** A cross-sectional survey-based study was conducted between March 2020 to May 2020 among GDPs of Riyadh, KSA using a self-administered validated questionnaire. The structure of the questionnaire was based on literary research. Two-hundred and seventy-four GDPs were approached to participate in this study. Data were analyzed using SPSS version 21. A Chi-square test was performed to analyze a correlation between the level of knowledge about ART and gender and time since graduation (years) with a significance level set at $p \leq 0.05$. **Results:** A total of 199 questionnaires were observed to be legible with an overall response rate of 72.6%. More than 90% of study participants were aware of ART and the majority of them (74.9%) claimed that their knowledge regarding ART was achieved during graduation. The variables ART reduces dental anxiety, ART is not used in teeth with exposed pulp, and ART is a definitive restorative treatment that was observed as statistically different ($p \leq 0.05$) concerning working experience. Whereas, Composite resins or temporary fillings can be used in ART was also found statistically different among gender ($p \leq 0.05$). **Conclusion:** GDPs have sufficient knowledge and a positive attitude towards ART. However, GDPs lack knowledge of ART related to practicing this treatment approach in a clinical setting.

Keywords: Atraumatic Restorative Treatment (ART), Dental practitioners, knowledge, attitude, Saudi Arabia

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1. Introduction

A conceptual change is being seen in clinical dental practice due to technology advancements, adhesive materials, and enhanced knowledge related to cariology [1]. With the advent of minimally invasive dentistry, the early diagnosis of dental caries and interception of the carious lesions with maximum healthy tooth structure preservation and enamel remineralization was made possible [2,3]. Atraumatic restorative treatment (ART) concept is an example of a minimally invasive treatment of carious lesions [4].

Atraumatic Restorative Treatment (ART) was developed 30 years ago when researchers were challenged to manage cavitated carious lesions in an area in which rotary-driven

restorative treatment was not possible because of the lack of electricity and/or piped water [4]. In 2002, it was officially recommended by the World Dental Federation [5,6].

The American Academy of Pediatric Dentistry (AAPD) considered ART to be a means of restoring and preventing caries in populations that have little access to traditional dental care [7]. ART is based on the removal of carious tissue using hand instruments and restoration with adhesive high-viscosity glass ionomer cement [8]. ART is an affordable, patient-friendly dental procedure that does not require extensive operator training and special skills [9]. A meta-analysis in 2010 showed that survival of ART restorations over 2 years was 93 percent in single-surface restorations and 62 percent in multiple surface restorations in primary teeth [10]. In permanent teeth, survival was 80 percent over five years in single-surface restorations and 86 percent over one year in multiple-surface restorations [10].

ART is a suitable option for treating root carious lesions in elderly patients and patients with special needs [8]. Due to the efficiency and longevity of this technique, clinicians extended its use for the treatment of pediatric patients, anxious individuals, and in traditional clinical settings [11]. Thus, the treatment is no longer considered restricted to developing communities, but a contemporary minimally invasive approach for caries control [5].

However, despite the advantages discussed above, the practice of ART is not believed to be widely used in Riyadh, KSA [12]. Therefore, this study aimed to evaluate knowledge and attitude towards Atraumatic Restorative treatment among general dental practitioners in Riyadh, KSA.

2. Material and Method

Institutional Review Board of Riyadh Elm University approved the study protocol and the survey period was from March 2020 to May 2020. A questionnaire-based cross-sectional study was designed and conducted in Riyadh, Kingdom of Saudi Arabia. A pretested, structured, validated questionnaire was adopted from the study of Pierote et al. [5]. However, the questionnaire was tailored according to the accessible measures in a local dental setting. The structure of the questionnaire was based on literary research. Two-hundred and seventy-four General Dental Practitioners (GDPs) were approached to participate in this study. However, only 199 questionnaires were received as filled. All participants entered the study voluntarily following an explanation of the objectives and rationale behind this study. The study questionnaires were filled through an online link. GDPs included in the study were graduate dentists who were actively involved in dental practice. The contact details of the GDPs were obtained from the Saudi Dental Society (SDS).

The questionnaire consisted of 22 questions, out of these 22 questions, the initial first 4 questions were related to the professional profile and then 5 questions were related to the attitude and application of ART. The remaining 13 questions were meant to address specific knowledge about the ART technique. All questions were close-ended and based on multiple-choice questions.

3. Statistical Analysis

Data entry and analyses were performed using statistical software (SPSS version 21, Chicago, IL, USA). Data were described using frequency counts and percentages. Inferential statistics such as the Chi-square test were used for analyzing a correlation between the level of knowledge about ART and age, time since graduation (years) with a significance level of 5%.

4. Results

Of the 274 working practitioners approached, 75 refused to participate in the survey. Thus, 199 questionnaires were applied, obtaining a response rate of 72.6%. The data for the profile of practitioners working in

public and private sectors in Riyadh, KSA is shown in Table 1. The dominant % of practitioners were male (68.3%) and participants aged between twenty-five to thirty-five years consisted of 68.8%. It was observed that 60.3% of the participants belonged to public-sector clinics/hospitals. Moreover, the majority of the participants were having a clinical experience of 0-9 years (69.3%). The details are presented in Table 1.

Table 1. Profile of the participating dental practitioners of this study

Variable	N	%	
Gender	Male	136	68.3
	Female	63	31.7
Age	25-35 yr	137	68.8
	36-45 yr	61	30.7
	46-55 yr	1	0.5
Type of job	public	120	60.3
	private	41	20.6
	both	38	19.1
Time since graduation	0-9 yr	138	69.3
	10-19 yr	59	29.6
	more than 20 yr	2	1.0

Table 2. Knowledge about ART among the participants

Variable	N	%	
Do you know Atraumatic Restorative Treatment (ART)?	Yes	186	93.5
	No	13	6.5
Source of information?	Graduation	149	74.9
	Conferences	10	5.0
	Internet	12	6.0
	Publications	28	14.1
	Other	0	0
Do you believe in ART?	Yes	147	73.9
	No	52	26.1
Do you perform ART?	Yes	70	35.2
	No	129	64.8
Is glass ionomer cement the material used in ART?	Correct	190	95.5
	Incorrect	9	4.5
In Art, carious tissue is removed using:	Sharp excavator	188	94.5
	high-speed handpiece	2	1.0
	Low-speed handpiece	9	4.5
No anesthesia is required in ART	Correct	174	87.4
	Incorrect	25	12.6
ART reduces dental anxiety	Correct	176	88.4
	Incorrect	23	11.6
ART is used for any patient	Correct	105	52.8
	Incorrect	94	47.2
ART is used in both anterior and posterior teeth	Correct	173	86.9
	Incorrect	26	13.1
ART is effective in both primary and secondary dentitions	Correct	124	62.3
	Incorrect	75	37.7
No specific dental equipment is required in ART	Correct	179	89.9
	Incorrect	20	10.1
ART is not used in teeth with exposed pulp	Correct	189	95.0
	Incorrect	10	5.0
In ART, restoration material is pressed with a finger Pressure using a petroleum jelly	Correct	179	89.9
	Incorrect	20	10.1
In ART, removal of carious dentin is not mandatory	Correct	169	84.9
	Incorrect	30	15.1
Composite resins can be used in ART	Correct	144	72.4
	Incorrect	54	27.6
Temporary restorative material can be used in ART	Correct	97	48.7
	Incorrect	102	51.3
ART is a definitive restorative treatment	Correct	111	55.8
	Incorrect	88	44.2

Table 2 represents the knowledge of GDPs related to diverse concepts in ART including performing ART with materials and instrumentations used in ART procedure. More than 90% of study participants were aware of ART and the majority of them (74.9%) claimed that their knowledge regarding ART was achieved during graduation. Moreover, 73.9% were optimistic about ART procedure. However, only 35.2% perform ART procedures at their clinics. Among the sample, 95.5% agreed that GIC is used and 94.5% believed that carious lesion is removed using sharp excavators in ART. Moreover, 87.4% believed that anesthesia is not required in ART. Whereas, 88.4% believed that ART reduces anxiety. Regarding ART treatment in patients, 47.2% were unsure if this treatment is valid for all types of dental patients. The majority of the participants thought that ART can be performed in both anterior and posterior, primary, and secondary dentition, and no additional equipment is required to perform ART. The majority of the participants also believed that ART can not be performed in teeth with exposed pulp (95%), that restorative material needs to be finger pressed using petroleum jelly (89.9%), and that carious lesion is not mandatory to remove in ART (84.9%). 72.4% believed that composite resin may also be used in ART. Whereas 48.7% believed that temporary restorative material can also be used in ART. 55.8% suggested that ART is definitive restorative treatment.

Table 3 represents only those variables in which the association between ART knowledge concerning working experience were determined. The variable "ART reduces dental anxiety" found to have a statistical difference concerning the working experience of the practitioners. Similarly, the variables "ART is not used in teeth with exposed pulp" and "ART is a definitive restorative treatment" also found to be statistically different concerning working experience. The remaining variable found to be statistically indifferent.

Table 3. Association between ART knowledge concerning the working experience

Variable	P-value
ART reduces dental anxiety	0.051
ART is not used in teeth with exposed pulp	0.014
ART is a definitive restorative treatment	0.010

Table 4 represents the statistically different variables concerning gender. Only two variables, i.e., "Composite resins can be used in ART" and "Temporary restorative material can be used in ART" found to be statistically different among the gender.

Table 4. Association between ART knowledge concerning gender

Variable	P-value
Composite resins can be used in ART	0.038
Temporary restorative material can be used in ART	0.041

5. Discussion

Despite ART is considered a modern approach towards minimal intervention dentistry, and despite the advantages of ART, the knowledge and attitude related to ART are

still doubtful amongst GDP of Riyadh, KSA. Hence this study was envisaged using a self-administered questionnaire completed by GDP through an online link.

The influence of knowledge and attitudes toward care alternatives is immense on the dental practitioner's clinical treatment decisions. Most of the participants were male (68.3%) reflecting that dentistry is dominated by the male practitioners in this region, and mostly the participating practitioners were aged between 25-35 yrs (68.8%). This suggests that a good number of people are entering the field of dentistry in this region. In this study, 93.5% GDP informed that they were aware of ART. This suggests that age and gender did not seem to affect the knowledge possessed about ART. A significant % of the participants reported knowledge related to ART technique since their graduation. This is in line with the previous study [5,13]. An overall positive attitude toward believing and performing ART was observed amongst GDP. Those participants who were not practicing ART might be because of a lack of knowledge. Another possible factor could be the workload on practitioners. Since ART is a time-consuming job, it might be possible that practitioners avoid this restorative treatment in a clinical setting [14].

It was a positive sign that GDPs were aware that in ART, manual excavation of dental caries with excavators without infiltrating anesthesia can be performed, and that the material of choice in ART treatment is GIC, which can sustain fluoride release [15,16]. Since anesthesia is not administered in ART, so it was obvious that the level of anxiety would be less [17]. The data of this study also suggest that GDPs were aware of this fact. On inquiring the effectiveness of ART on both primary and secondary teeth also performing ART on any patient, a kind of mixed reaction was observed. However, the majority of the participants were sure that no specific dental equipment is required in performing ART. The findings are in line with the previous study [5].

Moreover, 95% of the participants were certain that ART may not be applicable in teeth with exposed pulp. Most of the practitioners were familiar with the importance of digital pressure with vaselined gloved fingers after the insertion of GIC filling in the treated tooth [18]. The initial low mechanical properties and water uptake mainly occur in the first 24 hours and may cause dimensional changes. Therefore, the protection of the GIC restoration is important [19]. However, the majority of the participants mistakenly thought that composite resin or temporary filling material may also be used to perform ART technique.

To inculcate the practice of ART technique, it is vital to update scientific knowledge and develop studies that appraise not only the GDP's knowledge but also their practice of ART in the dental setting. Further research is suggested to weigh the barriers in acquiring the theoretical knowledge that could help in clinical decision making.

6. Conclusions

This study indicated that GDPs have sufficient knowledge and a positive attitude towards ART. However, GDPs lack knowledge of ART related to practicing this treatment approach in a clinical setting. GDPs of this

region need to improve further their theoretical and practical knowledge related to ART approach.

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