



ORIGINAL ARTICLE

# A Study to assess the awareness and use of Silver Diammine Fluoride and Hall Technique among dental professionals and dental students in the Eastern Province



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**KEYWORDS**

Silver Diammine Fluoride;  
Hall technique;  
Caries arrest;  
Secondary prevention;  
Minimal invasive

**Abstract Background:** A major shift has occurred in the trend of dealing with dental caries from primary to secondary prevention, specially after SDF approval off-label by US FDA in recent years and Hall Technique (HT) in the last decade.

**Objectives:** To determine the frequency of awareness and use of Silver Diammine Fluoride (SDF) and Hall technique among dental professionals in the Eastern province of Saudi Arabia.

**Methods:** This cross-sectional study was conducted in a public hospital, metropolitan city of Middle Eastern region between March 15, 2019 & January 31, 2020. Dental practitioners were requested, with their consent, to fill up a digitally designed survey. Chi-square test on SPSS-20.0 was applied to compare frequency of awareness and use of SDF and HALL Technique among the survey participants.

**Results:** The awareness of SDF was found to be 73.6% among specialists, 54.9% among graduates and 29.6% among students whereas awareness of HALL technique for stainless steel crown in pediatric dentistry was found statistically similar in all participants groups i.e. 42.7% in students, 55.5% in graduates and 54.9% in specialist group ( $p = 0.125$ ).

**Conclusion:** The results show potential with regards to awareness of dental specialists & post-graduate residents but inadequate among general dentists and students though all were keen advocates and found committed to its use to help the community. It points towards a further need of the of education for all groups. Those non-invasive techniques are very useful tools in general but specifically during Covid-19 pandemic where they can play a major role in preventing the spread of infection, arresting decay, alleviating pain and anxiety without resorting to aggressive treatment like pulp treatment/extraction. Low response rate may be improved in future through the respondents' counselling and regular follow up.

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**1. Introduction***1.1. Silver Diammine Fluoride (SDF)*

SDF is a fluid-form material used in prevention and treatment of tooth cavities (or caries). It consists of silver, water, fluoride and ammonia (AAPD). SDF has widely been shown effective to help stop caries development after a cavity has formed. The only common side effect of SDF noted in hundreds of studies has been black staining around the area where SDF is applied. SDF can also stain surfaces it touches when being applied, such as clothing or nearby tissues in the mouth (AAPD). Silver Diammine Fluoride (SDF) has been used as non-invasive dental treatment since 1970s in Asia including Japan and China (Quock et al., 2012; Peng et al., 2012). In 2014, it was cleared by US FDA for treating dental hypersensitivity and approved off-label for caries arrest and prevention. On February 20, 2017, 38% Silver Diammine Fluoride was granted approval in Canada to treat caries in paediatric to adult patients (Government of Canada [Internet]. Canada, 2017).

*1.2. Efficacy and safety of Silver Diammine Fluoride*

Over a period of 80 years in Japan, a substantial efficacy and safety of SDF had been reported (Horst et al., 2016; Chen et al., 2012; Mei et al., 2013; Nelson et al., 2016). Research has exhibited quite encouraging results of SDF to treat both dentin and enamel carious lesions (up to 150  $\mu\text{m}$  thick) successfully (Government of Canada [Internet]. Canada, 2017). In SDF, the silver appears as an antimicrobial and the fluoride improves remineralization (Horst et al., 2016; Chen

et al., 2012; Mei et al., 2013; Nelson et al., 2016). A recently published systematic review of 2018 concluded that this approach has shown to be effective in arresting or reversing carious lesions and encouraged clinicians to use this treatment based on its effectiveness, safety and feasibility (Slayton et al., 2018).

*1.3. The Hall technique*

It is a non-invasive treatment for decayed deciduous molars in non-cooperative patients. Decay is sealed under preformed stainless steel crowns avoiding the use of injections and drilling. The technique was tied with a general dentist Dr. Norna Hall (Evans et al., 2000) from Scotland who invented and employed the technique over 15 years in her practice tenure till 2006. A pilot study done in 2000 found the Hall technique acceptable to both practitioners and their patients (Evans et al., 2000).

Later randomized clinical trials were carried out in Scotland in 2007, 2011 concluded that "for managing caries in primary molars than the control restorations place by GDPs in high caries risk group with regards to both for signs/symptoms of pulpal disease and longevity of the restorations, Hall PMCs were effective method of choice (Innes et al., 2007)."

In another study in which 45 crowns successfully fitted, the technique was equally acceptable to the dentists, patients, and parents involved. Furthermore, patients' cards records were retrieved and evaluated to estimate durability of technique revealed to be 76% for 1000 days, and 65% up to 2000 days (DR Stirrups, Dundee Dental School) (Evans et al., 2000; Innes et al., 2007).

#### 1.4. Rationale of study

The underlying principle of this study was to establish the frequency of awareness about simple, affordable, painless, minimally invasive, feasible and cost effective use of Silver Diammine Fluoride (SDF) and Hall technique among dental professionals of the Eastern region of the country in Middle East. It anticipated that this knowledge would encourage those, who are unaware/less familiar with SDF and Hall technique, to make decisions around when it is appropriate to use them.

## 2. Material and methods

This cross-sectional survey-based study was conducted in Dammam Specialized Dental Centre, Dammam Medical Complex, Ministry of Health, Saudi Arabia from March 15, 2019 to January 31, 2020 after approval from the Complex Research Ethics Committee. An online surveymonkey-based survey questionnaire was designed comprising 32 close-ended items including demographic characteristics of participants (age, gender, practicing status, rank, type of practice, year of experience and area of work), awareness of SDF and Hall techniques (general awareness, source of awareness) practice (use of SDF in practice, purpose of using SDF and Hall techniques, difficulty in application), efficacy (cost effectiveness, reduce the need of general/local anaesthesia, parents' perception about application of SDF and Hall techniques, invasiveness of techniques) and future recommendations for the use of particular techniques. The dental practitioners of either gender, age group and practice status in the Eastern province were invited via whats-app message containing web-link and consent statement about the purpose of research. Three major groups of participants were formed based on their practicing status:

**Students:** 5th and 6th year students of bachelor program of Dental Surgery.

**Graduates:** Interns and General dentists holding Bachelor of Dental Surgery (BDS).

**Specialist:** Postgraduate residents holding BDS, and fellows holding master, doctoral degree or equivalent fellowship qualifications in subspecialties of Dental Surgery.

The data were exported into spread-sheet of SPSS-20.0 (IBM product, Chicago-USA) for analysis. Cronbach's alpha reliability coefficient 0.885 reveals high-level reliability of the survey items. Categorical variables related to demographic characteristics, awareness, practice and efficacy of SDF and Hall techniques of the questionnaire were presented into frequencies and percentages; Chi-square test was applied to compare these variables among the groups of participants. P-value  $\leq 0.05$  was considered statistically significant result.

## 3. Results

### 3.1. Demographic characteristics

Out of total 1370 recipients of the survey link, total 312 participants responded the survey with response rate (22.8%). There were 98 (31.4%) undergraduate students, 142 (45.5%) graduates and 72 (23.1%) specialists. Female preponderance in each group was observed but non-significant ( $p = 0.226$ ). Demo-

graphic characteristics including age ( $p = 0.000$ ), type of practice ( $p = 0.000$ ), years of experience ( $p = 0.000$ ) and location ( $p = 0.020$ ) were significantly variant due to diversified dental practice group (Table 1).

### 3.2. Awareness and practice of Silver Diammine Fluoride (SDF)

Significant proportion of specialists (73.6%) was aware of SDF ( $p = 0.000$ ). Significant source of SDF awareness among students was undergraduate studies (33.3%), internet or self-learning in graduates (29.9%) and scientific conferences/symposiums in specialists (39.6%). Significant proportion of the specialist practicing SDF either sometimes or rarely (0.010), also 58.3% proportion of specialists took parental consent before treatment ( $p = 0.000$ ), and majority was using 38% of SDF concentration as detailed in Table 2.

### 3.3. Efficacy of Silver Diammine Fluoride (SDF)

Significant proportion of specialists and graduates described SDF application to be trouble-free ( $p = 0.002$ ). Significant majority ( $p = 0.032$ ) of specialists and graduates rated the SDF technique excellent and fair respectively, SDF technique was cost effective (33.3% vs. 18.7%,  $p = 0.007$ ), agreed that SDF reduces the need of GA/sedation to treat paediatric patients (43.1% vs. 31.7%,  $p = 0.012$ ), and SDF application does not require local anaesthesia or drilling but only proper teeth isolation (66% vs. 48.2%,  $p = 0.000$ ), detailed in Table 3.

### 3.4. Cosmetic outcome of Silver Diammine Fluoride (SDF)

Significant proportion of specialists described about perception of patients/legal guardian accept the discoloration of teeth after SDF ( $p = 0.010$ ). There was equal perception that participant did not try SDF application with SMART technique ( $p = 0.239$ ). Significant proportion of specialist was for future intention to use SDF ( $p = 0.004$ ). Significant proportion of specialist described that about 2/3rd of the parents/guardian did not well accept SDF in the anterior teeth ( $p = 0.005$ ) as detailed in Table 4.

### 3.5. Awareness and practice of Hall technique

All groups of participants were statistically consistent with regards to awareness (up to 50%), practice (< 30%) and not difficult of use (up to 30%) of Hall technique for stainless steel crown in pediatric dentistry (Table 5).

### 3.6. Efficacy of Hall technique

Statistically analogous results were seen about the Hall technique to be effective ( $p = 0.481$ ), reduce the need for general anaesthesia ( $p = 0.086$ ), acceptable perception of parents/legal guardian (0.412). Significant proportion of graduates were for future intention to use Hall technique ( $p = 0.019$ ). Significant proportion of specialists (48.6%) were aware of the fact that SDF and Hall techniques do not affect the pulp tissues ( $p = 0.000$ ). Significant awareness of SDF and Hall techniques

**Table 1** Demographic characteristics.

Demographic variables	Groups of respondents			P-value
	Students (n = 98)	Graduates (n = 142)	Specialist (n = 72)	
Gender				
o Male	30 (30.6)	48 (33.8)	31 (43.1)	0.226
o Female	68 (69.4)	94 (66.2)	41 (56.9)	
Age groups				
o 20 – 25	88 (89.9)*	48 (33.8)	1 (1.4)	0.000
o > 25 – 30	5 (5.1)	40 (28.2)	13 (18.1)	
o > 30 – 35	4 (4.1)	41 (28.9)	25 (34.7)*	
o > 35 – 40	0 (0)	4 (2.8)	6 (8.3)	
o > 40 – 45	1 (1)	7 (4.9)	14 (19.4)	
o 50 or above	0 (0)	2 (1.4)	13 (18.1)	
Type of practice				
o Academic	90 (100)*	41 (29.7)	5 (6.9)	0.000
o Non-academic	0 (0)	59 (42.8)	36 (50.0)*	
o Mixed/Unemployed	0 (0)	38 (27.6)	31 (43.1)	
Years of experience				
o 0–1	98 (100)*	60 (43.2)	7 (9.9)	0.000
o 2–5	0 (0)	34 (24.5)	17 (23.9)	
o > 5 – 10	0 (0)	34 (24.5)	13 (18.3)	
o > 10 – 20	0 (0)	7 (5.1)	21 (29.6)	
o Above 20	0 (0)	4 (2.9)	13 (18.3)	
Locality of practice				
o Main city	78 (97.5)	114 (85.7)	63 (90.0)	0.020
o Small town	2 (2.5)	19 (14.3)*	7 (10.0)	

Students: 5th& 6th year students of bachelor program of Dental Surgery.

Graduates: Interns, General practitioners of Dental Surgery.

Specialist: Postgraduate residents and fellows.

Values presented in parentheses are percentages (%).

\*P-value: Significantly higher proportion at 5% level of significance.

were minimally invasive, painless and without irritation in pulp tissues (Table 6).

## 4. Discussion

### 4.1. Comparison of study findings with reported literature

SDF was approved for use off-label in 2014 in USA (Government of Canada [Internet]. Canada, 2017), although it was not yet available in the study region at the time of that study, there were 24% of Specialist, 8.1% of graduates and 8.6% of students who managed to acquire it. In our study, the awareness of SDF was 73.6% in specialists, 54.9% in graduates and 29.6% in students, which indicates the amount of education needs for all groups. Not mentioning that 9.9% of all groups combined have their work located in a small town where sedation or GA are not available. A comparable results with the cohort of specialist group in a recent study by Antonioni et al. (2019), the majority (77%) have sufficient knowledge about the practice of SDF in dentistry (Mei et al., 2013), preferably paediatric patients to treat for caries (80%), and 62% about use of SDF in common problems (Antonioni et al., 2019).

Overall proportion of SDF use in our study was 12% which is consistent with that reported in a recent study (Vollu et al., 2020) carried out in Brazil, 13.2% used SDF, on the other hand, encouraging results of SDF professional development

were seen, 53% learning through publications, online resources 41%, training courses 38%, consistent with our study, as scientific meetings, self-learning including internet and workplace were the main source of knowledge: 31.2%, 28.1%, 21.9% respectively, with undergraduate studies the least with 18.1% in all groups combined, which indicate the need of more undergraduate academic education and knowledge regarding SDF. Our dental professionals need to be updated about the novel techniques through the recent research studies (American Academy of Pediatric Dentistry, 2017), continuous educational courses (Chhokar et al., 2017), research seminars, journal clubs and scientific conferences (Zhang et al., 2013).

In our study, 31% of Specialists found that SDF use would be easy compared to 15% of Graduates and 8.3% of Students which is understandable due to their differences of experience and skills. As regards to the results of SDF use 18.2% of all groups combined found its use was excellent or fair, compared to the results of KAP study mainstream (77%) were well-aware about the practice of SDF in dentistry, while 68% knew the advantages of SDF treatment but only those who were using it. Majority (> 90%) practitioners were working in cities in our study consistent with KAP study that reported no association between location of practice and SDF usage (Vollu et al., 2020).

In our study regarding the parents perception and acceptance of teeth discolouration in general, specialist group showed the highest acceptance percentage. These results could

**Table 2** Awareness and practice of Silver Diammine Fluoride (SDF):

Awareness & practice of SDF	Groups of respondents			P-value
	Students (n = 98)	Graduates (n = 142)	Specialist (n = 72)	
<b>Awareness of SDF</b>				
o Yes	29 (29.6)	78 (54.6)	53 (73.6)*	0.000
o No	69 (70.4)	64 (45.1)	19 (26.4)	
<b>Source of awareness</b>				
o Undergraduate studies	10 (33.3)*	17 (22.1)	2 (3.8)	0.022
o Scientific conference/symposium	7 (23.3)	22 (28.6)	21 (39.6)*	
o Internet/self-learning/article	9 (30.0)	23 (29.9)*	13 (24.5)	
o Colleague/work place	4 (13.3)	14 (18.2)	17 (32.1)	
o Patient requesting this treatment	0 (0)	1 (1.3)	0 (0)	
<b>Did you use SDF in practice?</b>				
o Usually	0 (0)	1 (0.7)	0 (0)	0.018
o Sometimes	5 (5.4)	6 (4.4)	10 (13.9)*	
o Rarely	3 (3.2)	5 (3.7)	8 (11.1)*	
o Never	85 (91.4)	123 (91.1)	54 (75.0)	
<b>Do parents/legal guardian need to sign a consent before treatment.</b>				
o Yes	31 (32.0)	61 (44.2)	42 (58.3)	0.000
o No	3 (3.1)	15 (10.9)	6 (8.3)	
o I don't know	63 (64.9)	62 (44.9)	24 (33.3)	
<b>Which concentration used?</b>				
o 20%	6 (6.2)	3 (2.2)	2 (2.9)	0.000
o 25%	2 (2.1)	5 (3.6)	0 (0)	
o 38%	0 (0)	4 (2.9)	14 (20.0)*	
o I never used it	88 (91.7)	126 (91.3)	54 (77.1)	
<b>Do you know the purpose of SDF at 38%?</b>				
o Caries	28 (29.2)	62 (44.6)	50 (70.1)*	0.000
o Teeth sensitivity	4 (4.2)	8 (5.8)	1 (1.3)	
o I don't know	64 (66.7)	69 (49.6)	21 (28.6)	

Students: 5th& 6th year students of bachelor program of Dental Surgery.

Graduates: Interns, General practitioners of Dental Surgery.

Specialist: Postgraduate residents and fellows.

Values presented in parentheses are percentages (%).

\*P-value: Significantly higher proportion at 5% level of significance.

even be better if SMART technique would have been offered (Seifo et al., 2020). Similar results consistent with our findings about parental approach as more likely lesion staining for posterior teeth (67.5%) than in anterior teeth (29.7%), while for SDF application as an alternative to GA, 68.5% and 60.3% increased rates of parental consent of SDF staining were seen on posterior and anterior teeth respectively (Crystal et al., 2017).

In our study, the awareness of HT was 51% and its use was 79.7% in all groups combined, while only 4.2% found it difficult to apply and 25.4% found it cost-effective. Also 33.6% thought that HT will reduce the need for GA for pediatrics' patients, 24.8% of all groups combined found it acceptable by the parents and only 32.1% expressed their willingness to use the technique in the future, although the appealing success rate of Hall technique was 99% instant infection free outcome (UK study), 100% after one year (Germany), 2 years or above 98% and 93% (UK and Germany) and 97% longstanding after 5 years (UK) (Innes et al., 2017; Jesmin et al., 2020).

In our study regarding the comparative efficacy of SDF and HT techniques on the pulp tissues, 31.2% agreed that they did not affect the pulp while 64.6% did not know, 4.2% thought that they would affect the pulp. Also 40.6% of all groups combined were aware that SDF and HT are minimally invasive techniques with no irritation to the pulp tissues, 3.6% dis-

agreed and 55.8% did not know. In a limited resource set up, Hall Technique may be appropriate treatment option for its easier use and approachable dental armamentarium for practitioners (Hesse et al., 2016).

#### 4.2. Limitation of study

The recent KAP study additionally reported tooth staining (90.7%) followed by parental consent (64.8%) and limited knowledge (58.3%) were the main obstacle for SDF non-users (Vollu et al., 2020). A potential demerit of KAP study design was about reluctance of participants not to publicize their level of awareness and approach due to their repute or image consciousness may be reason of low responses rate.

#### 4.3. Recommendations

The use of KI application after SDF, coupled with SMART technique, can definitely yield better outcome in all situations and according to the case selection & patient minimal cooperation requirements. It, more importantly, depends on the operator skills in behaviour management, technical skills and persuasion communication talent. Promising results can also be possible in future with use of nanotechnologies to make

**Table 3** Efficacy of Silver Diammine Fluoride (SDF).

Use of SDF	Groups of respondents			P-value
	Students (n = 96)	Graduates (n = 140)	Specialist (n = 72)	
How was SDF application?				
○ Easy	8 (8.3)	21 (15.0)	29 (31.0)*	0.002
○ Difficult	4 (4.2)	2 (1.4)	2 (2.6)	
○ I never used it	84 (87.5)	117 (83.6)	48 (66.4)	
How do you describe the results of SDF technique?				
○ Excellent	8 (8.3)	11 (7.9)	11 (15.3)*	0.032
○ Fair	3 (3.1)	14 (10.0)*	11 (15.3)	
○ Poor	1 (1.0)	0 (0)	0 (0)	
○ I never used it	84 (87.5)	115 (82.1)	50 (69.4)	
Is SDF cost effective?				
○ Yes	17 (17.7)	26 (18.7)	24 (33.3)*	0.007
○ No	1 (1.0)	11 (7.9)	2 (2.8)	
○ I don't know	78 (81.2)	102 (73.4)	46 (63.9)	
SDF reduces the need of GA/Sedation to treat pediatric patients?				
○ Agree	18 (18.8)	44 (31.7)	31 (43.1)*	0.012
○ Disagree	6 (6.2)	6 (4.3)	5 (6.9)	
○ I don't know	72 (75.0)	89 (64.0)	36 (50.0)	
SDF application does not require local anesthesia or drilling but only proper teeth isolation?				
○ Yes	23 (24.0)	67 (48.2)	48 (66.7)*	0.000
○ No	5 (5.2)	5 (3.6)	2 (2.8)	
○ I don't know	68 (70.8)	67 (48.2)	22 (30.6)	

Students: 5th& 6th year students of bachelor program of Dental Surgery.

Graduates: Interns, General practitioners of Dental Surgery.

Specialist: Postgraduate residents and fellows.

Values presented in parentheses are percentages (%).

\*P-value: Significantly higher proportion at 5% level of significance.

**Table 4** Cosmetic outcome of Silver Diammine Fluoride (SDF).

Use of SDF	Groups of respondents			P-value
	Students (n = 96)	Graduates (n = 138)	Specialist (n = 72)	
Perception of parents/legal guardian regarding discoloration of teeth after SDF.				
○ Accepting	7 (7.3)	8 (5.8)	15 (20.8)*	0.010
○ Not accepting	4 (4.2)	8 (5.8)	3 (4.2)	
○ I never used it	85 (88.5)	122 (88.4)	54 (75.0)	
Have you tried SDF application with SMART technique?				
○ Yes	8 (8.6)	5 (3.7)	6 (8.3)	0.239
○ No	85 (91.4)	130 (96.3)	66 (91.7)	
Would you use SDF in future?				
○ Yes	16 (16.7)	47 (33.8)	30 (41.7)*	0.004
○ No	1 (1.0)	4 (2.9)	2 (2.8)	
○ May be	79 (82.3)	88 (63.3)	40 (55.6)	
Did parents/legal guardian accepted SDF in the anterior teeth?				
○ Yes	9 (9.4)	11 (7.9)	8 (11.1)	0.005
○ No	4 (4.2)	9 (6.5)	14 (19.4)*	
○ I never used it	83 (86.5)	119 (85.6)	50 (69.4)	

Students: 5th& 6th year students of bachelor program of Dental Surgery.

Graduates: Interns, General practitioners of Dental Surgery.

Specialist: Postgraduate residents and fellows.

Values presented in parentheses are percentages (%).

\*P-value: Significantly higher proportion at 5% level of significance.



**Table 5** Awareness and practice of Hall technique.

Awareness & practice of Hall	Groups of respondents			P-value
	Students (n = 96)	Graduates (n = 138)	Specialist (n = 72)	
Aware of Hall technique for stainless steel crowns in pediatric dentistry.				
○ Yes	41 (42.7)	76 (55.5)	39 (54.9)	0.125
○ No	55 (57.3)	61 (44.5)	32 (45.1)	
Used Hall technique in practice.				
○ Yes	17 (17.7)	25 (18.0)	20 (28.2)	0.167
○ No	79 (82.3)	114 (82.0)	51 (71.8)	
Technique difficult to apply.				
○ Yes	5 (5.2)	6 (4.3)	2 (2.8)	0.390
○ No	20 (20.8)	44 (31.9)	22 (30.6)	
○ I never used it	71 (74.0)	88 (63.8)	48 (66.7)	

Students: 5th & 6th year students of bachelor program of Dental Surgery.

Graduates: Interns, General practitioners of Dental Surgery.

Specialist: Postgraduate residents and fellows.

Values presented in parentheses are percentages (%).

**Table 6** Efficacy of Hall technique.

Efficacy of Hall	Groups of respondents			P-value
	Students (n = 96)	Graduates (n = 138)	Specialist (n = 72)	
Hall technique effective?				
○ Yes	20 (20.8)	40 (28.8)	18 (25.0)	0.481
○ No	8 (8.3)	17 (12.2)	8 (11.1)	
○ I don't know	68 (70.8)	82 (59.0)	46 (63.9)	
Reduces the need for GA				
○ Yes	25 (26.0)	54 (38.8)	24 (33.3)	0.086
○ No	7 (7.3)	14 (10.1)	11 (15.3)	
○ I don't know	64 (66.7)	71 (51.1)	37 (51.4)	
Perception of the parental/legal guardian.				
○ Accepting	20 (20.8)	34 (24.5)	22 (31.0)	0.412
○ Not accepting	2 (2.1)	6 (4.3)	1 (1.4)	
○ I never used it	74 (77.1)	99 (71.2)	48 (67.6)	
Would you use Hall technique in future?				
○ Yes	25 (25.8)	50 (36.0)*	24 (33.3)	0.019
○ No	4 (4.1)	9 (6.5)	11 (15.3)	
○ May be	68 (70.1)	80 (57.6)	37 (51.4)	
Are you aware of SDF & Hall techniques don't affect the pulp tissues?				
○ Yes	16 (16.5)	45 (32.4)	35 (48.6)*	0.000
○ No	5 (5.2)	6 (4.3)	2 (2.8)	
○ I don't know	76 (78.4)	88 (63.3)	35 (48.6)	
Are you aware of SDF & Hall techniques are minimally invasive, painless and no irritation in pulp tissues?				
○ Yes	25 (25.8)	61 (43.9)	39 (54.2)*	0.002
○ No	6 (6.2)	3 (2.2)	2 (2.8)	
○ I don't know	66 (68.0)	75 (54.0)	31 (43.1)	

Students: 5th & 6th year students of bachelor program of Dental Surgery.

Graduates: Interns, General practitioners of Dental Surgery.

Specialist: Postgraduate residents and fellows.

Values presented in parentheses are percentages (%).

\*P-value: Significantly higher proportion at 5% level of significance.

nano-SDF (Tirupathi et al., 2019; Tirupathi, 2019) anticipating for desired aesthetic outcome, and effectiveness will be multiplied in treatment results (Magno et al., 2019). Large

scale representative sample study emphasized the importance of study, counselling of dental professionals for participation and regular follow up.

## 5. Conclusion

The results were promising with regards to awareness of dental practitioners especially for the dental specialists & postgraduate residents. However, a big gap is to be filled to provide sufficient awareness to the general dentists, interns and students. All being keen advocate and committed to the use of SDF & Hall techniques for the community service but evidence showed that more academic education and clinical training are needed on all levels, and for both techniques. Those non-invasive techniques are very useful tools in general but specifically during Covid-19 pandemic, where they can play a huge role in preventing the spread of infection, arresting decay, alleviating pain and anxiety, without need to aggressive treatment like pulp treatment/extraction.

## Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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