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## Knowledge, Attitude and Practice Regarding Minimal Invasive Dentistry Among General Dental Practitioners in Tamil Nadu

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**Abstract:** Minimal intervention dentistry (MID) is a treatment philosophy that emphasizes the protection of existing tooth structure. It has been incorporated in dental curricula world wide in the management of dental caries. There is limited evidence that, whether the familiarity with MID principles inhibited through the curriculum is translated into clinical decision making and practice. The study was conducted to assess the knowledge, attitude, practice of general dental practitioners towards MID, registered dental practitioners in Chennai formed the sampling frame. The data was analyzed using SPSS software and chi square tests were done between knowledge and attitude scores, knowledge scores and gender. 44.4% had good knowledge and 37.9% had good attitudes towards MID. General practitioners who had 5 to 10 years of clinical experience had 47.8% knowledge. Males had 39.1% good practice while females had 60.9% good practice. More of MID must be put into practice in the dental curriculum and implementing them during their clinical practice would ensure the proper knowledge and practice of dentists in future.

**Keywords:** Attitude; knowledge, Prevention, Preserving tooth structure

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### INTRODUCTION

The traditional restorative approach in practice follows the concept of G.V. Black's (ie) Extension for prevention. This surgical approach was not tooth preserving, removing a large amount of tooth surface to accommodate the restorative material of choice (Gujjar and Sumra, 2013). So the primary focus in the minimal invasive model of caries management is identifying and eliminating the causative factors along with repairing the damage caused by carious lesions. The minimal invasive mode synthesizes knowledge of the disease process into a simple conceptual model using new technology (Gutmann, 2013). The new model addresses the carious lesion and the cause of disease process. It contrasts these philosophies. It has allowed control to dental caries via prevention and conservation of tooth structure. (Ericson, 2007) MID includes the following principles, Early Caries diagnosis and Assessment of caries activity (Christensen, 2005). (Ericson *et al.*, 2003). MID advocates the use of adhesives, dental materials that are associated with conservative cavity preparations because the material does not require mechanical retention, instead they bond to the tooth. (Murdoch-Kinch and McLean, 2003). An important factor that is governing the development of MID is the repeat restoration cycle. Instead of patch working the broken restoration, it can be removed, cleaned completely and restarted again. (Brostek, Bochenek and Walsh, 2006)

Dental pain is one of the most excruciating types of pain, which a dentist could cure in a sitting. Having wide knowledge on techniques in treating a tooth, having in mind to preserve the tooth structure, could help in treating the patients efficiently. MID addresses cure to the tooth in a minimally destructing way, which is time consuming. The basic principles / methods of MID are slot preparation, air abrasions, atraumatic restorative treatments, fluoride and remineralization. Apparently, all of these techniques are for preventing the loss of tooth structure in the name of creating a bigger size cavity. As there are lots of advantages of MID, general dental practitioners can practice MID to treat and restore a tooth in such a way that it was never decayed.

Our department is passionate about research we have published numerous high quality articles in this domain over the past years (Kavitha *et al.*, 2014), (Praveen *et al.*, 2001), (Devi and Gnanavel, 2014), (Putchala *et al.*, 2013), (Vijayakumar *et al.*, 2010), (Lekha *et al.*, 2014a, 2014b) (Danda, 2010) (Danda, 2010) (Parthasarathy *et al.*, 2016) (Gopalakannan, Senthilvelan and Ranganathan, 2012), (Rajendran *et al.*, 2019), (Govindaraju, Neelakantan and Gutmann, 2017), (P. Neelakantan *et al.*, 2015), (PradeepKumar *et al.*, 2016), (Sajan *et al.*,

2011), (Lekha *et al.*, 2014a), (Neelakantan, Grotra and Sharma, 2013), (Patil *et al.*, 2017), (Jeevanandan and Govindaraju, 2018), (Abdul Wahab *et al.*, 2017), (Eapen, Baig and Avinash, 2017), (Menon *et al.*, 2018), (Wahab *et al.*, 2018), (Vishnu Prasad *et al.*, 2018), (Uthrakumar *et al.*, 2010), (Ashok, Ajith and Sivanesan, 2017), (Prasanna Neelakantan *et al.*, 2015). The idea for this survey stemmed from the current interest in our community situation and to determine whether MID is practiced more, would match the standards of a quality treatment. As there was paucity towards knowledge and practices on MID among the general dentists, this survey was conducted to assess the knowledge of general dental practitioners on MID in this geographical population.

## **MATERIALS AND METHODS**

### **Study Design**

Cross sectional study

### **Study Setting**

It was an online based questionnaire that was given among general dental practitioners in Chennai

### **Sample Size and Sampling**

The total sample size was 132 calculated using g power software, fixing the power at 90, based on the study by jasmin rayapudi (Rayapudi and Usha, 2018) et al. The list of registered dental practitioners in Tamil Nadu was obtained from Tamil Nadu dental council online portal, which formed the sampling frame.

### **Survey Instrument**

The questionnaire contained three components, apart from the general demographic details of study participants, like name, age, gender, years of practice, affiliation and specialisation. First component was the knowledge regarding MID, which was closed ended, and depending upon the number of correct responses, they were grouped into good, fair and poor. Second component of questionnaire was attitude, likert scale type of response was obtained from all, where a statement was given and the responses range from strongly agree to strongly disagree. Last was about their current practices regarding MID. Questionnaire was administered in Google forms to general practitioners. Questionnaire validation was done giving the survey to 10% of the study population. The reliability was assessed by Cronbach's alpha.

### **Ethical Clearance**

The ethical board of clearance was obtained from the scientific review board, and institution human ethics committee of Saveetha University. Responding to the online form was considered to be a form of implied consent.

### **Data Collection and Statistical Analysis**

The responses were transferred to excel sheets where it was segregated and tabulated accordingly. The data was further transferred to SPSS software version 25 for statistical analysis

SPSS software was used; the independent variables were age, gender, education and training, year of experience and practice. The dependent variable was knowledge, attitude and practice. Chi square test was done to check association between age and attitude, gender and attitude and clinical experience. Any p value less than 0.05 was considered significant.

## **RESULTS AND DISCUSSION**

A total of 132 general dental practitioners took part in this cross sectional study, of which 55 (43.9%) were female practitioners and 74 (56.2%) were male practitioners. Their ages ranged from 20-60 years. On associating knowledge based on gender, 5.30% of females and 32.60% of males had good knowledge on MID. By associating knowledge based on clinical experience, 13.6% general dental practitioners who had clinical experience of about 0 to 2 years had good knowledge, 2.50% and 0.8% of general dental practitioners who had clinical experience of about 2 to 5 and 5 to 10 years respectively had a good knowledge on minimal invasive dentistry (MID). 2.30% general dental practitioners who had 10 and more years of clinical experience had poor knowledge.

When associated with gender and attitude 25.8% of females and 16.7% males had positive attitudes and 18.20% of females and 39.4% males had negative attitudes. On associating attitude towards MID and clinical experience, 24.2% general practitioners who had clinical experience of 2 years showed positive attitude towards MID and 18.20% had negative attitude. 8.30% of general practitioners who had clinical experience of 2 to 5 years had a positive attitude towards MID and 33.30% of GPs had negative attitudes. 9.80% general practitioners who had clinical experience of 5 to 10 had a positive attitude and 3.8% of them had negative attitudes. 2.30% of GPs who had more than 10 years of clinical experience had negative attitudes.

The principle of MID seeks to convert an active lesion into an inactive lesion or arrested lesion thus aiding the defence and healing process in dentin and pulp before restoration procedures are attempted (Oliveira, 2011). In the present study, age and gender did not seem to affect the knowledge about MID, experience did not matter about the knowledge of MID because 0 to 2 years of experienced general practitioners had a great knowledge when compared to the general practitioners who had more than 10 years of clinical experience (Natarajan and Prabakar, 2019). In this study 37.88% of the general dental practitioners had good knowledge on MID based on clinical experience, in a study by Jasmine, 81% of the general dental practitioners had good knowledge and in another study by Altaaf 51.5% of the general dental practitioners had good knowledge, which shows general practitioners had less knowledge compared to the other studies (Rayapudi and Usha, 2018). In our study 42.0% general dental practitioners had a positive attitude toward MID based on clinical experience and in a study by Altaaf 90.7% of the general dental practitioners had a positive attitude toward MID based on clinical experience. This showed that few general dental practitioners had a good attitude towards MID in our study (Shah *et al.*, 2016).

In this study, 8.7% general dental practitioners had lectures, 4.3% had hands-on training, 2.9% had demonstrations, 44.9% hands on training, 1.4% had demonstrations during their internship. 2.9% had lectures, 23.2% had hands-on training, 7.2% had demonstrations during their post graduation. and 2.9% did not receive any special training. In a study by Altaaf 60% of the dentist had received special education regarding MID. This shows that general practitioners had training on MID during their BDS curriculum. In our study 62.2% of dental interns were made aware of MID through hands on, lectures, training sessions during their BDS curriculum in another study by Gaurav Gupta, the majority (88%) of the dental interns were made aware of MID through their BDS curriculum. (Gupta, Shanbhag and Puranik, 2015)

One of the major limitations of the study is that it involved only the dental practitioners in Chennai, with a very limited sample. Hence generalisability owing to different areas of practice or different geographical locations cannot be made. Probably a study with a large population over a wider area will give an insight not only into knowledge but also into barriers and practical difficulties in practising MID.

## CONCLUSION

From the results of this study we conclude that males have better knowledge regarding the alternative techniques to preserve the tooth structure, and on minimal invasive dentistry when compared to females. Females have a positive attitude toward MID when compared to males and general practitioners with 5 years of experience had negative attitudes. Their practice of MID was found to be good and few of the dental practitioners wished to learn more on this through special training and workshops.

## Authors Contribution

Reshmi has contributed to the data collection, study design, analysis, results, tables and manuscript preparation. Dr. Sri Sakthi has contributed to the design of the study, analysis of the data, results and proofreading of the manuscript.

Dr. Arvind has contributed to reviewing articles.

## Conflicts of Interest

The research project is self funded and was not sponsored or aided by third parties. There is no conflict of interests

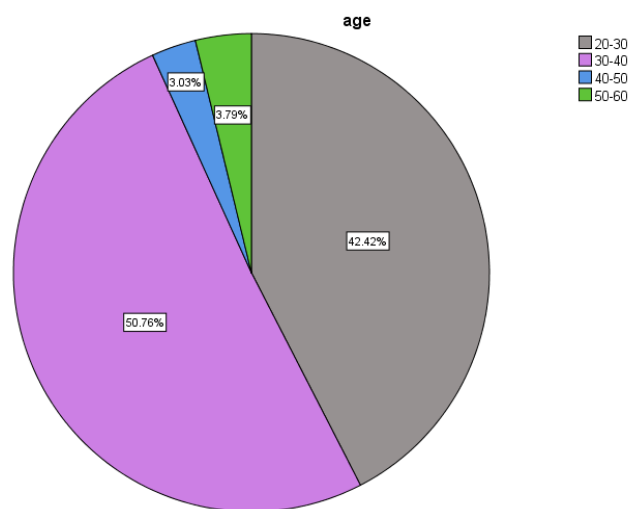
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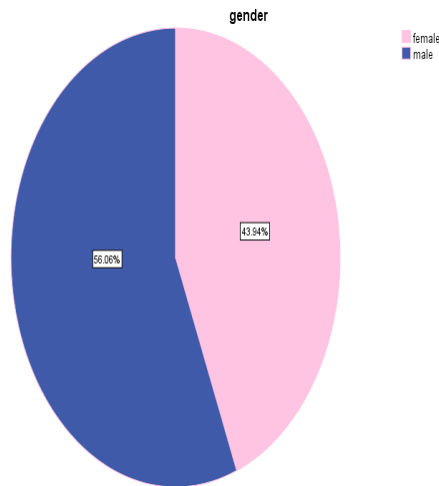
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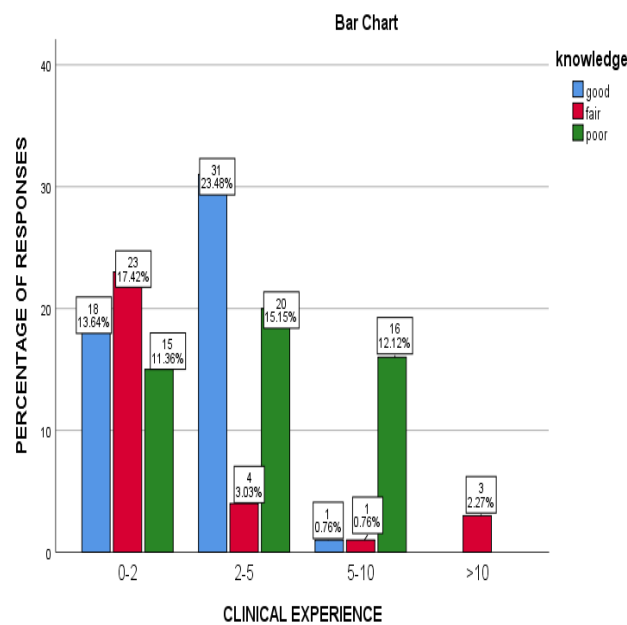
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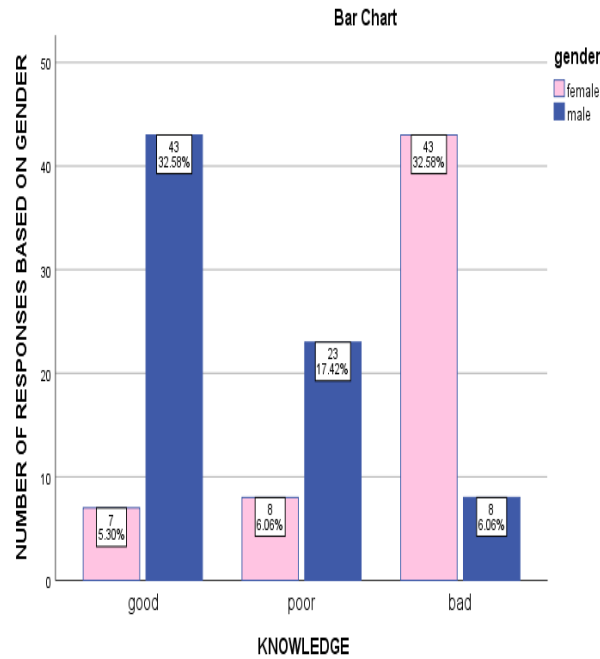
**Fig.1 : Pie chart shows the age wise distribution of study population , 42.42% belonged to the age group 20-30 years 50.76% belonged to the age group 30-40 years , 3.03% belonged to the age group 40-50 years and 3.79%5 belonged to the age group of 50-60 years.**



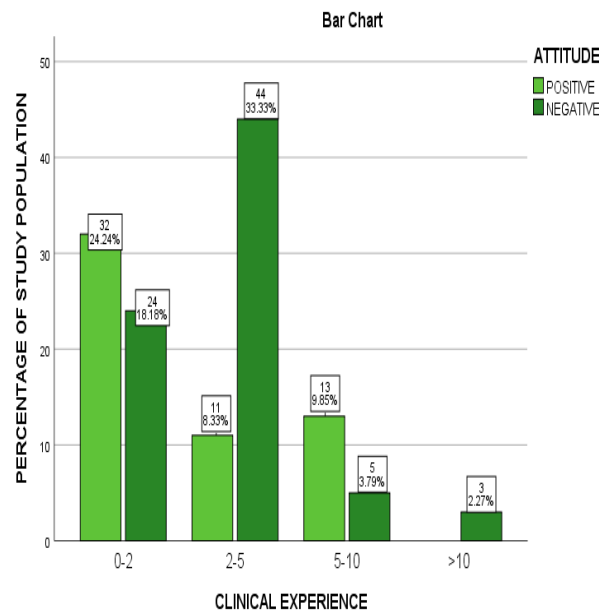
**Fig.2 :** Shows the gender wise distribution of study population .43.54% of them were females (pink ) and 56.5% were males (blue )



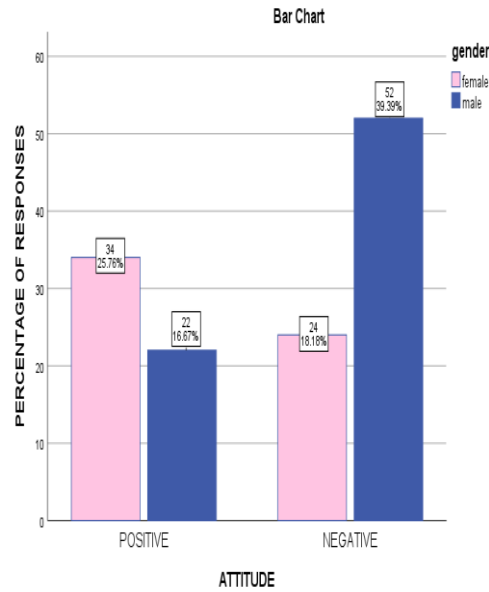
**Fig.3 :** A multiple bar chart showing knowledge based on clinical experience. X- axis represents the clinical experience and Y-axis represents the percentage of the study population. From this we can infer that 23.4% of general dental practitioners with clinical experience of 2-5 years had good knowledge (blue) when compared to other practitioners .On associating knowledge based on clinical experience it was statistically significant, ( chi square =50.055; df =6 ;p=0.000), proving that years of experience definitely had an effect on the better knowledge among study participants.



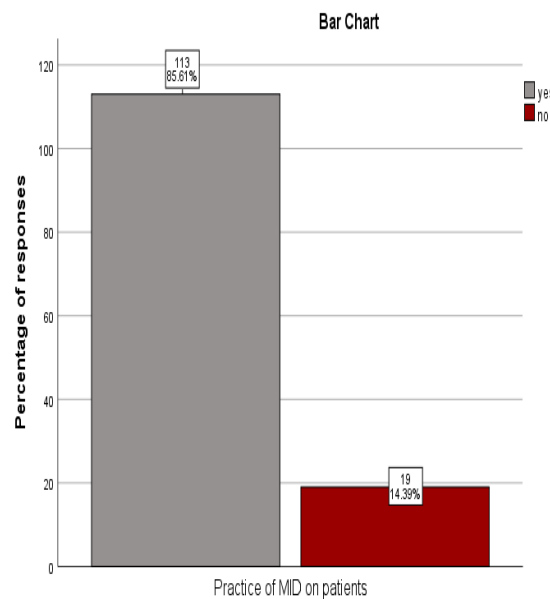
**Fig.4:** A multiple bar chart showing knowledge based on gender. X-axis represents the knowledge of general dental practitioners and Yaxis represents the number of responses based on gender. From this we can infer that males had good knowledge( blue) about MID when compared to females (pink). Association between knowledge and gender was found to be statistically significant ( Chi square value= 6.082, Df =2;P=0.000), proving the difference in knowledge between the genders was true and not due to chance.



**Fig.5:** A multiple bar chart represents attitude towards MID based on clinical experience. X axis represents the clinical experience and Y axis represents the percentage of study population based on their attitude . From this we inferred that 33.3% of general dental practitioners of 2-5 years of experience had a negative attitude (dark green ) followed by 24.2% of 2 years experienced general dental practitioners had positive attitude (light green ) towards MID. On associating attitude towards MID based on clinical experience , it was found to be statistically significant. (Chi-square value =25.043, Df =3, P= 0.00), proving that with years of clinical expertise, the attitude towards MID improved.

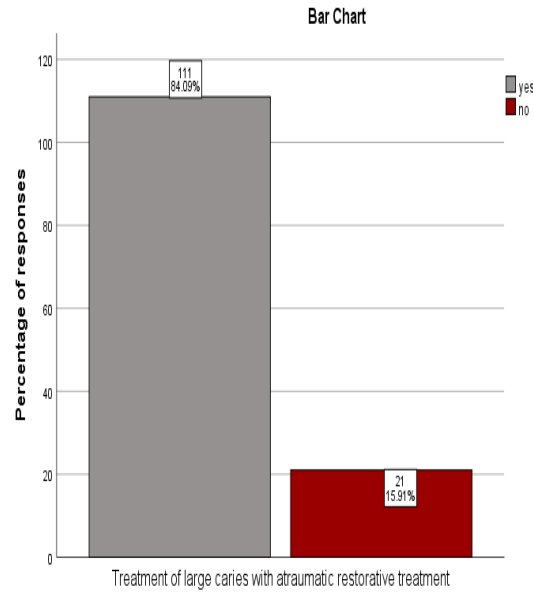


**Fig.6 : A multiple bar chart represents attitudes based on gender of the study population. X axis represents the attitude of the general dental practitioners towards MID and Y axis represents the percentage of responses. From this we can infer that 25.7% females( pink ) had a more positive attitude when compared to 16.6% males (blue) towards MID. On Association of gender and attitude towards MID it was found to be statistically significant. ( Chi-square value = 11.111; Df=1 P=0.001)**

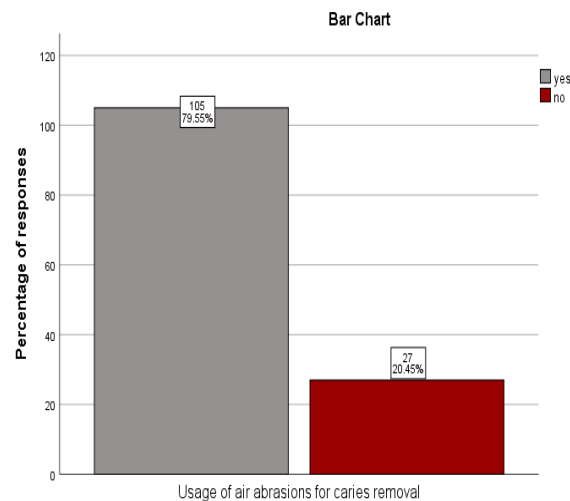


**Fig.7: A bar chart showing the responses of the general dental practitioners based on practice. X axis represents the practice of minimal invasive dentistry on patients and Y axis represents the percentage of responses. From this graph , it can be inferred that 85.61% of general practitioners have practiced MID on patients .**

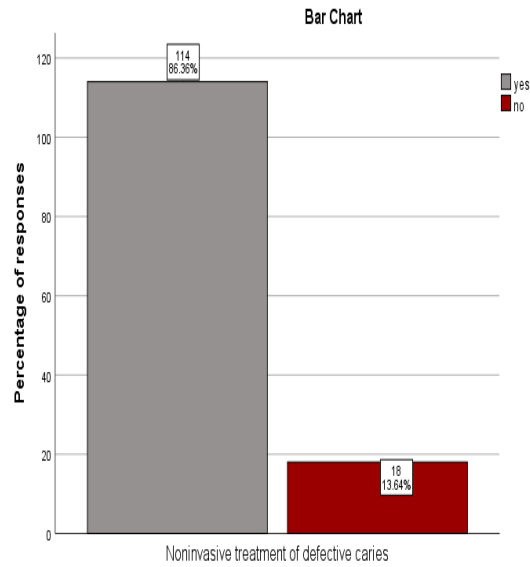




**Fig:8: A bar chart showing the response of the general dental practitioners based on practice. X axis represents the treatment of large caries with ART and Y axis represents the percentage of responses. From this , it's inferred that 64.0% practitioners had practised ART for large caries.**



**Fig:8: A Simple bar chart that shows the responses of general dental practitioners towards practice on MID .X axis represents the removal of large caries with air abrasions and Y axis represents the percentage of responses. From this graph we can infer that 79.5% of GP's have used air abrasions for caries removal.**



**Fig.9: A Simple bar chart that shows the responses of general dental practitioners towards practice on MID. X axis represents the treatment of defective restoration and Y axis represents the percentage of responses. From this graph we can infer that 86.3% of GP's have treated defective restoration instead of replacing it.**