Original Article

CHOICE AND USAGES OF ROOT CANAL INSTRUMENTS FOR CLINICAL PRACTICE AMONG ENDODONTISTS IN TAMIL NADU

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Abstract

Introduction: Cleaning and shaping of the root canal has been really challenging for even the most experienced endodontist. Endodontic instrumentation within the basis canal is an infelicitous occurrence which will obstruct the basis canal procedure and therefore the outcome with more complication. When a new instrument or system is introduced, it's generally claimed by the manufacturer to be more efficient in preparing the canal and more immune to separation . Doing a passage treatment (RCT), for the foremost part, isn't a sophisticated task and therefore the procedure should become easier and more systematic because the clinician gains more experience. So, the present survey was aimed at doing an online questionnaire based survey to assess the choice and usages of root canal instruments for clinical practice among endodontists in Tamilnadu. Study results revealed that, Even though 70% of the population was aware of the usage of root canal instruments, the knowledge regarding the various parameters to identify the usage and choice of various root canal instruments is still lacking in the rest.
Aim: The aim of the study was to create knowledge and usage about root canal instruments in Endodontists.
Materials & Methods- A questionnaire based survey was conducted among 100 populations of experienced endodontists, academician, general practitioner and PG of random selection, the responses were collected in 'google docs' and the values were estimated in SPSS version (23.0).
Results: The respondents Endodontists have a greater and sufficient knowledge and awareness on root canal instruments , where ($p = 0.000 < 0.05$) is statistically significant.
Conclusion: From the study, we can conclude that all the population have been well educated on their knowledge and awareness on usage of root canal instruments. In particular, Experienced endodontists have shown precision and this also determines that they have immense knowledge about usage of root canal instruments.

Keywords: Eco friendly, Innovative technology, Irrigants, Root canal, Reciprocated, SAF system
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INTRODUCTION:

Endodontic instrument within the basis canal is an infelicitous occurrence which will obstruct the basis canal procedure and therefore the outcome with more complication. When a new instrument or system is introduced, it's generally claimed by the manufacturer to be more efficient in preparing the base canal and more immune to separation . Doing a passage treatment (RCT), for the foremost part, isn't a sophisticated task and therefore the procedure should become easier and more systematic because the clinician gains more experience (Carl DeJongh and Willoughby, 1975). There are, however, different components of development in becoming a more skilled clinician, and becoming technically good is merely one aspect of it. So as to be truly proficient during this field, a clinician must also improve his/her diagnostic skills and understanding of its biological principles. This guide is split into different topics and subtopics which are deemed important for understanding of these fundamental endodontic principles (Patel, 2016) . The main concern of health practitioners is the prevention of cross-contamination of infectious diseases among dental staff and patients. Spread of infectious diseases is prevented by sterilization. In dentistry, it relates to processing reusable instruments to stop cross-infection (Lambrianidis, 2017) .Mainly the Endodontic files used for cleaning and shaping of the basis canals during endodontic procedure are slender, tapered instrument with intricate topography and spiral cutting edges(Orstavik and Pitt Ford, 1998).

Procedural errors in endodontics can occur during the method of passage treatment which will be a result of factors over which the operator may or might not have control. Chrome Steel instruments usually fail by excessive amounts of torque and NiTi instruments break thanks to combined action of torsional stress and cyclic loading (Grossman, 1969) . During passage preparation procedures, the potential for instrument breakage is usually present. When instrument breakage occurs, it immediately provokes despair, anxiety, then the hope that nonsurgical retreatment techniques still exist to liberate the instrument from the canal (Choksi *et al.*, 2013).Our team has extensive knowledge and research experience that has translate into high quality publications(Sathivel *et al.*, 2008; Panda *et al.*, 2014; Govindaraju, Neelakantan and Gutmann, 2017; Johnson *et al.*, 2020; Saraswathi *et al.*, 2020) (Kumar *et al.*, 2006; Devi and Gnanavel, 2014; Varghese *et al.*, 2015; Sivamurthy and Sundari, 2016; Chen *et al.*, 2019). The aim of the study was to do an online questionnaire based survey to assess the choice and usages of root canal instruments for clinical practice among endodontists in Tamilnadu.

MATERIALS AND METHODS:

A prospective questionnaire based surgery was done. The study was ethically approved by the Scientific Review Board, Saveetha Dental College, Chennai. [Ethical approval number: IHEC/SDC/UG-1926/21/91]. The number of participants involved in this study is 100. We used a simple random sampling method. In this study, Experienced Endodontist, Academician, General Practitioners and Postgraduate students participated.

Study design and data collection

A self-designed questionnaire was prepared with the guidance of general physicians for this survey study. The reliability of the contents of the questionnaire was verified with study articles. The questionnaire complied with both the choice and usage of root canal instruments among endodontists in Tamil Nadu . The questionnaire was forwarded to the endodontists through the google form link as data collection software. Subjects were given a week's time to complete the survey. The list of output variables included the demographic information and the knowledge, attitude, and awareness of choice and usages of root canal treatment instruments and the results were recorded in google excel sheets.SPSS version 21.0 (IBM Inc, Armonk, NY, USA). Pie charts and Bar diagrams were used to represent output variables.

RESULT:

100 people participated in this survey data had been collected with help of SPSS and data had been analysed and the results for each question were plotted as graphs. This study makes us observe that more than 70% of people were aware about the root canal instruments. In this study, the bar graph represents the choice and usages of root canal instruments for clinical practice among endodontists in Tamil Nadu. First question shows responses for whether the people were about Root canal preparing instruments. In that, 73% of the respondents responded to yes and 27% responded no. Second question shows the responses for the instrument type which they prefer for clinical practice (Fig 1). 62% of people responded reciprocating instruments, 35% of people answered rotary instruments and 2% of respondents responded for the SAF system. Third question shows the reasons why they prefer such types of instruments and specify the brand of instruments. 30% of people responded depending on case difficulty, 61% of the people answered for easy to procedure and cost effective, 4% of people answered for research purposes and 6% of respondents responded for updating their practice. Fourth question shows the responses for how many times they use their root canal preparation instruments. 9% of the people responded depending on the brand, 60% of people responded more than 5 times, 24% of people responded for single use and 7% of people responded that they will update according to the technology. The next question shows the responses for the instrument frequently get separated. 63% of the people responded for rotary instruments, 25% of respondents responded for reciprocated instruments, 2% of the people answered not sure and 4% of the people responded for both A and B (Fig 2). Sixth question shows the responses for when they encounter separation of files in their practice. 39% of people responded for catastrophic fracture, 50% of respondents responded for separation at the top and 11% of people answered that it varies from each caries. The next question shows the response of the patient on which type of instrument they use and charge accordingly.72% of the people responded yes, 31% of the people responded no and 13% of the people answered sometimes. The 8th question shows the response of the information they check prior for selecting the instrument. 52% of the people responded that they will go through clinical catalogue from manufacturing, 30% of the people answered that they will go through standard articles in peer-received journals, 7% of the people answered that they randomly choose and 3% of the people responded that they will select based on their experience (Fig 3) . The ninth question shows the response to choose an instrument and the property and recognisable thing they consider while choosing an instrument. 61% of the people responded that they would prefer that the instrument should come for a supple amount of cases, 30% of the people

responded to the instrument should prepare canal soon, 6% of the people responded to the instrument should be flexible and negotiate canal and 4% of the people answered that their experience with usage of instrument (Fig 4). The next question shows the response for the reason of autoclaving their files. 66% of the people responded that they will autoclave each instrument before/after usage, 22% of the people responded that they will autoclave after usage on, 4% of the people answered they will not autoclave and they use that for single use and 7% of the people responded that they will autoclave the new instruments also. The next question shows the response of the patient and gives an opinion before selecting a specific instrument type. 71% of the people responded yes they will consider, 20% of the people responded no they would not and 8% of the people responded that they might not always translate the clinical condition, where we encounter various anatomical complexities, leading tosuitation unpredictable. The next question shows the response of the instrument design, surface, characteristic really bother in choosing a choice of instrument. 75% of the people responded yes, 22% of the people answered no and 3% of the people responded maybe.

Association of the professioners and the various parameters discussed to assess the knowledge about choice and usage of root canal instruments was analysed using chi-square test and depicted in the graphs (Figure 5-7). Though the experienced Endodontists population had a better awareness about the choice and usage, reciprocate and rotary systems etc, still lacking in some parameters. The association between professionals and root canal instruments of most parameters was statistically significant. Pearson's Chi Square test showed p value (<0.05) (Fig 5-7). Association between professionals and opinion regarding the importance of usage of root canal instruments showed the majority of endodontists were of the opinion that choice and usage of instruments is more important for treating patients.

DISCUSSION:

The cracked portion may upset cleaning and forming methods with likely effect on anticipation of treatment. Break of endodontic instruments frequently results from wrong use or abuse. On the off chance that breakage happens clinically, the patient ought to be educated regarding the episode and thought ought to be offered if to eliminate the part. When managed properly, the presence of a broken fragment may not adversely affect the outcome of root canal treatment. This article reports management of an intracanal separated instrument. Masserann kit along with gate glidden drills were used to remove the intracanal broken instrument.(Madarati, Hunter and Dummer, 2013). Instrument separation during endodontic treatment is a frequent accident with rotary instruments being more likely to separate manual ones. Ultrasonics, in combination with the operative microscope constitute the most effective and reliable tools for removing a separated endodontic instrument from a root canal. The likelihood of successful removal depends on: the level of separation (coronal, middle or apical third); location in relation to the root canal curvature; the type of separated instrument; its length; the degree of canal curvature and the tooth type. Several complications may occur during the management of a separated instrument: separation of the ultrasonic tip or file used for bypassing or removing the instrument; further separation of the fragment; perforation; ledge; extrusion of the file into periapical tissues; tooth weakening due to dentin removal, as well as excessive temperature rise in periodontal tissues. Prognosis for a tooth retaining a separated instrument depends on the presence of a periapical lesion, the microbial load of the root canal during the time of separation and the quality of the obturation(Vouzara, el Chares and Lyroudia, 2018). Contemporary endodontics has seen a phenomenal development in innovation and materials.To survey a portion of the difficulties and advances in the accompanying areas like endodontic imaging, root waterway arrangement, root trench sterilization, root canal filling, and recovery endodontic techniques (REPs). Together, these advances are pointed toward working on the best in class and study of root trench treatment(Kishen *et al.*, 2016).

LIMITATIONS: The limitations of this study are that it can be done on various culture plates and observe the specific activity of each. It can also be done with many bacterial and fungal organisms excluding those that have been studied in this research.

FUTURE SCOPE: The future scope for this study can lead to the development of dental treatments which can be induced in various best ways.

CONCLUSION: Even though 70% of the population was aware of the usage of root canal instruments, the knowledge regarding the various parameters to identify the usage and choice of various root canal instruments is still lacking in the rest. The people have to be educated about the various aspects of the choice and usage of root canal instruments in order to improve their competency and expertise to serve as an efficient Endodontist.

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CONFLICT OF INTEREST: NIL

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AUTHOR CONTRIBUTION:

Gokul G L carried out the literature search, data collection, data analysis and manuscript writing. Dr. Venkata Teja conceived the study, participated in its design and coordinated and provided guidance to draft the manuscript. All the authors have equally contributed in developing the manuscript

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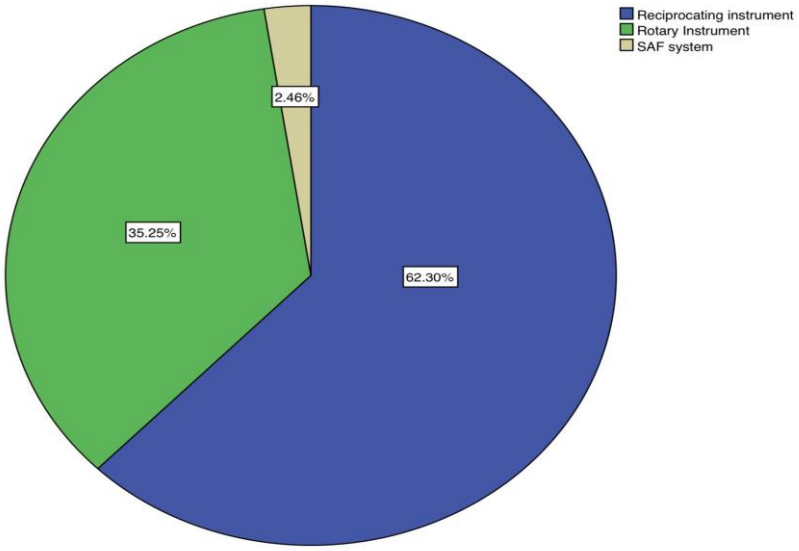

Fig 1 : Pie chart representing 62% of people responded to reciprocating instruments, 35% of people answered rotary instruments and 2% of respondents responded for the SAF system.

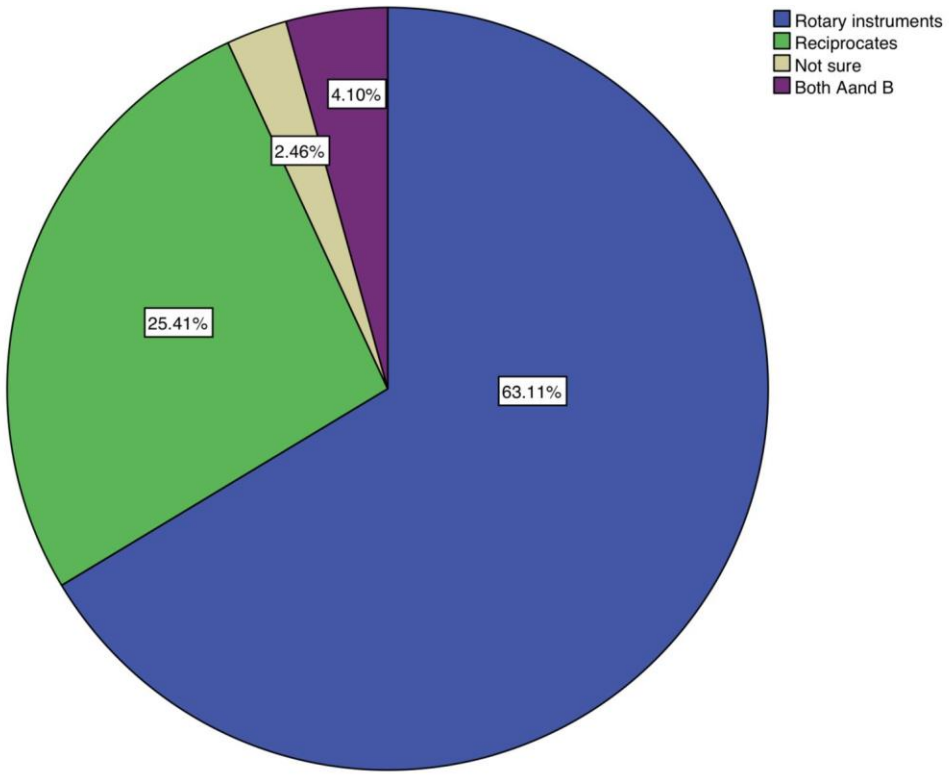

Fig 2: Pie chart representing 63% of the people responded for rotary instruments, 25% of respondents responded for reciprocated instruments, 2% of the people answered not sure and 4% of the people responded for both A and B.

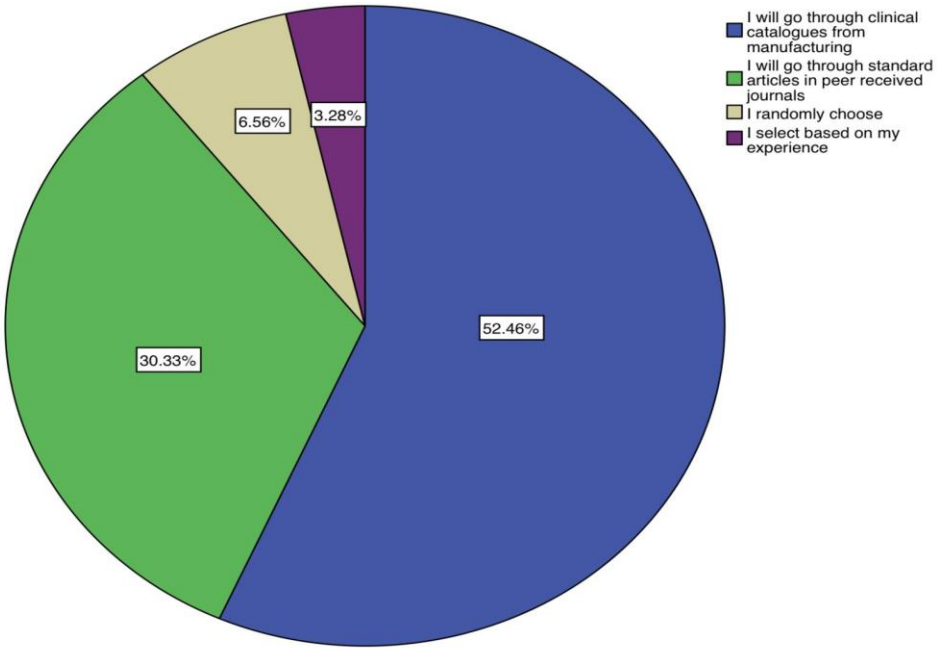

Fig 3: Pie chart representing 52% of the people responded that they will go through clinical catalogue from manufacturing, 30% of the people answered that they will go through standard articles in peer-received journals, 7%

of the people answered that they randomly choose and 3% of the people responded that they will select based on their experience.

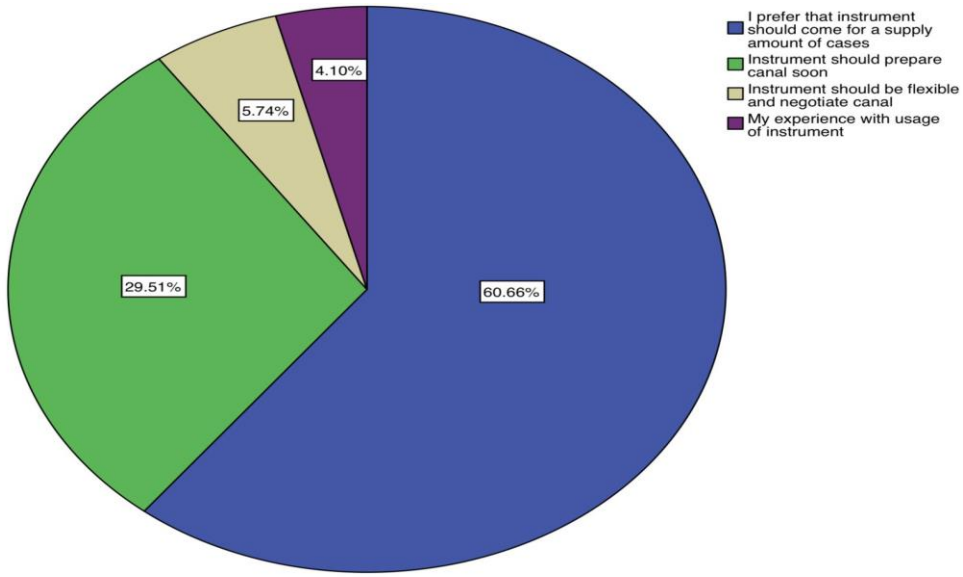

Fig 4: Pie chart showing 61% of the people responded that they would prefer that the instrument should come for a supple amount of cases, 30% of the people responded to the instrument should prepare canal soon, 6% of the people responded to the instrument should be flexible and negotiate canal and 4% of the people answered that their experience with usage of instrument.

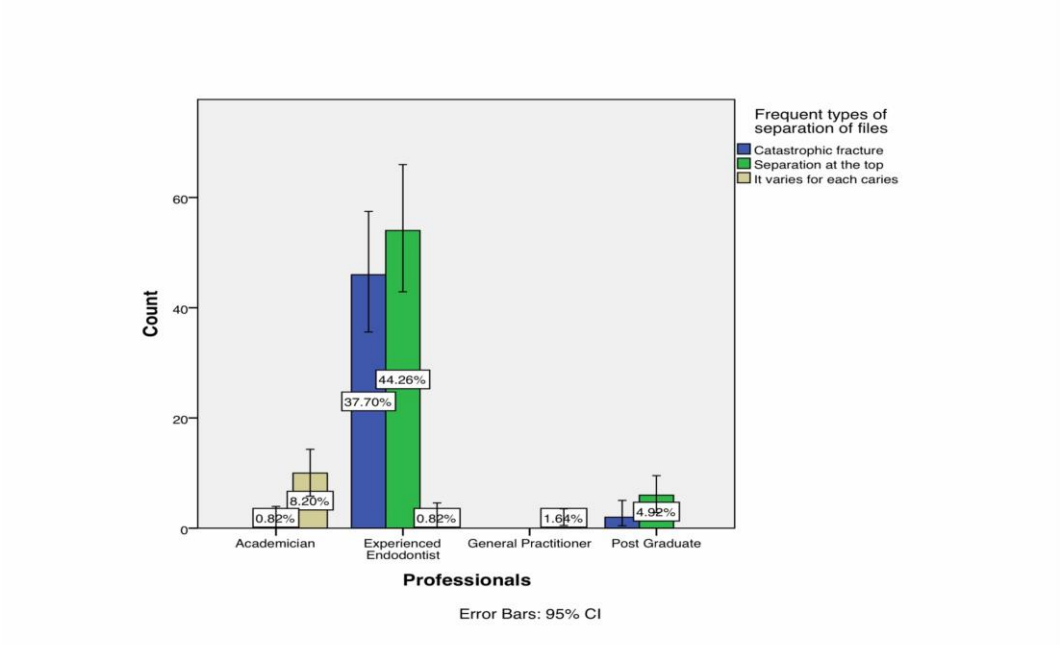

Fig 5: Bar graph depicts the association between the professionals and the percentage of responses of separation of files. X axis represents the different professionals and Y axis represents the percentage of responses. Blue colour

represents catastrophic fracture,green colour represents the separation at the top and light yellow colour represents varies from each caries. Separation at the top was the main reason for separation of files in Experienced Endodontists and Post graduates groups. This difference was statistically significant(Chi-square test, p value= 0.000 - significant)

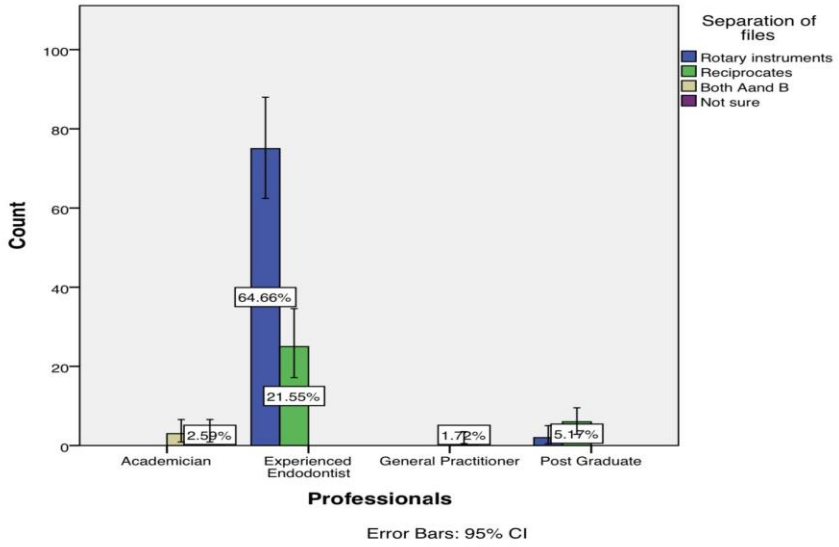

Fig 6: Bar graph depicts the association between the professionals and the percentage of responses of frequent type of separation of files. X axis represents the different professionals and Y axis represents the percentage of responses. Blue colour represents rotary instruments ,green colour represents reciprocated instruments, light yellow colour represents both A and B and purple represents not sure . The root canal instrument which is frequently separated at the top was rotary instruments in Experienced Endodontists and Post graduates groups. This difference was statistically significant(Chi-square test, p value= 0.000 - significant)

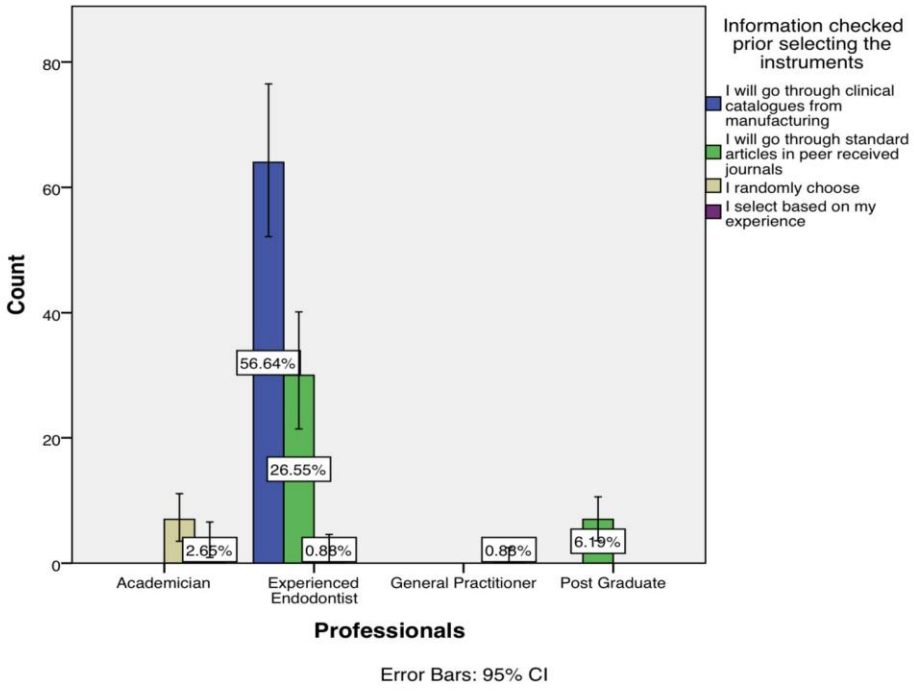

Fig 7: Bar graph depicts the association between the professionals and the percentage of responses of the information checked prior selecting the instruments. X axis represents the different professionals and Y axis represents the percentage of responses. Blue colour represents I will go through my clinical catalogues from manufacturing, green colour represents I will go through standard articles in peer received journals, light yellow colour represents I randomly choose and Purple colour represents I select based on my experience . Clinical catalogues was the main reason for the selection of root canal instruments in Experienced Endodontists. This difference was statistically significant(Chi-square test, p value= 0.000 - significant)