International Journal of Early Childhood Special Education (INT-JECSE)

DOI: 10.9756/INT-JECSE/V14I2.072 ***ISSN:*** *1308-5581* *Vol 14, Issue 02 2022 PP:2080-2090*

Knowledge, Attitude and Practice on Hydrophilic Pit and Fissure sealant among dental practitioners- a survey

Type of manuscript: Survey

Running title: Knowledge, Attitude and Practice on Hydrophilic Pit and Fissure sealant among dental practitioners

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ABSTRACT-

INTRODUCTION-

One of the most frequently occurring oral health problems among is dental caries.It is a microbial disease that is caused by the activity of the bacterial biofilm due to the breakdown of food particles and the production of acid, which in turn leads to the dissolution of tooth enamel.A pit is a hollow or an indentation found at the junction of developmental grooves.A fissure is a

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deep opening or slit between adjacent cusps.Ninety percent of the carious lesions occurring in permanent posterior teeth involve the pit and fissures. Hence, the study was conducted with the aim to determine the Knowledge, Attitude and Practice on Hydrophilic Pit and Fissure sealant among dental practitioners

MATERIALS AND METHOD-

A set of 16 questions were circulated among the Dental practitioners which was done in an online forum Google Forms to avoid discussion and false results, thereby no bias is evidenced in the study. A total of 100 responses were collected and data were entered into an Excel sheet followed by statistical analysis done in SPSS by IBM. The statistical test used is Chi-square test.

RESULT-

From the survey we obtained that 29% of the Dental practitioners are grouped under the age 23-30 years ,37% under 31-45 years and 34% under <40 years. 55% of the dental practitioners who attended the survey were Females and 45% of them were Males. 54% were BDS graduates and 46% were MDS graduates.42% of them had clinical experience less than <5 years, 36% had clinical experience of 5-10 years and 22% of them had clinical experience more than 10 years. Responses received from BDS graduates (26%) students seem to be comparatively not significant with association of higher level of education and types of sealants used in clinical practices($p>0.05$). 28% of the BDS graduates are aware Dental sealants are used to prevent caries, there is no significant association of the highest level of education with the advantage of Dental sealants ($p>0.05$).

CONCLUSION-

The study concludes that Dental practitioners were aware of hydrophilic sealants . There was a significant association between the highest level of education and usage of hydrophilic sealants in clinical practice ($p<0.05$).

KEYWORDS-Pit and fissure, Hydrophilic sealant, micro leakage,resin, retention.

INTRODUCTION-

One of the most frequently occurring oral health problems among is dental caries.It is a microbial disease that is caused by the activity of the bacterial biofilm due to the breakdown of food particles and the production of acid, which in turn leads to the dissolution of tooth enamel[1]A pit is a hollow or an indentation found at the junction of developmental grooves[2]A fissure is a deep opening or slit between adjacent cusps.Ninety percent of the carious lesions occurring in permanent posterior teeth involve the pit and fissures.Surfaces of the tooth having deep pits and fissures are more likely to develop occlusal caries.Food particles are trapped within the deep grooves which subsequently leads to the formation of dental caries[3]

Hence, such pits and fissures need to be sealed with a dental material that seals them completely[4].The discovery of etching of enamel with phosphoric acid to increase the retention and marginal integrity of resin restorative materials led to the development of pit and fissure

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sealants[5]. It was Michael Buonocore who published the first paper on the application of sealants to pits and fissures, which led to a major breakthrough in preventive dentistry[6]. Pit and fissure sealants when introduced into the pits and fissures of caries susceptible teeth form a micro mechanically bonded protective layer, cutting access of caries-producing bacteria from their source of nutrients[7].While the traditional sealants are hydrophobic, the unique moisture tolerant sealants are hydrophilic in nature. Hence, they are miscible with water and flow into moisture-containing etched enamel creating a strong bond for better retention.success depends on adequate moisture control during application and their long-time retention[8] It evaluates both the technical process and the outcome of care delivered.

Moreover, the effectiveness of sealants in preventing caries is also known to depend on their retention. Inadequate isolation and saliva contamination during the procedure are the main reasons for failure of fissure sealants in their first year of application[9] The conventional resin sealants require an isolated, completely dry work field for their clinical success; this decreases their success rate in semi-erupted permanent first molars since complete isolation of such teeth is difficult[10] .Efficient cleaning of occlusal grooves, application of a low viscosity hydrophilic bonding agent beneath the sealant and complete isolation of tooth improve the efficacy of sealants [11]. Dental sealants are effective in preventing dental caries in the occlusal and other pitted and fissured surfaces of the teeth [12]. The important properties of an ideal sealing material include ability to seal and penetrate into the depth of the pits and fissure as well as retention and resistance to abrasion and wear [13][14]Lack of sealing or insufficient penetration of the material in the deep fissures allows the occurrence of marginal leakage through the tooth-material interface, which can promote caries lesion progression underneath the restoration leading to treatment failure.As moisture control in children is a big challenge, and which is the key factor for success of the preventive treatment regime, hydrophilic sealants are now introduced in the market [15]. Our team has extensive knowledge and research experience that has translate into high quality publications[16–24],[25],[26],[27,28],[29],[30],[31–35]

MATERIALS AND METHODS

Study design- Cross sectional study

Study setting- The present study was conducted in Saveetha dental college

Study population- Dental Practitioners

Sample size- 100 participants

Sampling- Convenience sampling

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Data collection- Data was collected using a structured questionnaire. The first part of the questionnaire consisted of demographic details which includes age, gender,qualification and second part of the questionnaire consisted of questions related to Knowledge and practice towards the use of hydrophilic pit and fissure sealants.The questionnaire consisted of 16 questions, and was distributed in the online forum "Google form"

Ethical Approval- Ethical Approval was obtained from Institutional Review Board, Saveetha University.

Statistical Analysis- All the datas was analysed by multiple logistic and tabulated in MS excel sheet and variables were added and imported to SPSS. Using SPSS Version 20.0, descriptive statistics were carried out and figures were plotted to arrive at final inference. Chi Square test was used to find the association between the variables.

RESULTS AND DISCUSSION-

From the survey we obtained that 29% of the Dental practitioners are grouped under the age 23-30 years ,37% under 31-45 years and 34% under <40 years(Figure 1). 55% of the dental practitioners who attended the survey were Females and 45% of them were Males(Figure-2). 54% were BDS graduates and 46% were MDS graduates (Figure-3). 42% of them had clinical experience less than <5 years, 36% had clinical experience of 5-10 years and 22% of them had clinical experience more than 10 years(Figure 4). Responses received from BDS graduates (26%) students seem to be comparatively not significant with association of higher level of education and types of sealants used in clinical practices($p>0.05$)(Figure-5). 28% of the BDS graduates are aware Dental sealants are used to prevent caries, there is no significant association of the highest level of education with the advantage of Dental sealants ($p>0.05$)(Figure-6). 22% of the BDS graduates believe that the back drawback consists of all that is moisture contamination, retention, and flowability showed association of highest level of Education with the drawback of sealant which is not significant ($p>0.05$)(Figure-7). 33% of the UG students brush their teeth twice or more a day showed significant association of year of study with how often they brush their teeth($p<0.05$)(Figure-8). 37% of the BDS and MDS graduates are aware of hydrophilic dental sealants with association of highest level of education with the awareness of hydrophilic sealants and Y-axis represents the number of dental practitioners who filled the survey which is not significant ($p>0.05$)(Figure-9). 21% of the BDS practitioners are aware of hydrophilic sealants by education, with association of highest level of education with source of information regarding hydrophilic sealants which is not significant ($p>0.05$)(Figure-10).36% of the BDS practitioners believe hydrophilic sealants adhere to teeth in presence of moisture with association of highest level of education with hydrophilic sealants adhere to teeth in presence of moisture contamination which is not significant ($p>0.05$)(Figure-11). 38% of the MDS

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practitioners have used hydrophilic sealants in their Clinical practice with a significant association of highest level of education with the usage of hydrophilic sealants in clinical practice($p<0.05$)(Figure 12).19% of the BDS practitioners use Conseal F sealant in their Clinical practice with association of highest level of education with the name of hydrophilic sealants used which are not significant ($p>0.05$)(Figure-13). 25% of the BDS practitioners believe an important factor is thixotropic with a significant association of highest level of education with factors of Dental sealant which are not ($p>0.05$)(Figure-14).46% of the BDS practitioners recommend using hydrophilic sealants instead of hydrophobic sealant in their Clinical practice with a significant association of highest level of education with recommendations on usage of hydrophilic sealants over Hydrophobic sealant ($p<0.05$)(Figure-15)

Figure 1-The bar chart represents the distribution of study subjects based on age were distributed in the age group between 23-30 years which is about 29% and 31-45years of age group which is about 21.9% and constitute to the age group between <40years 34%.

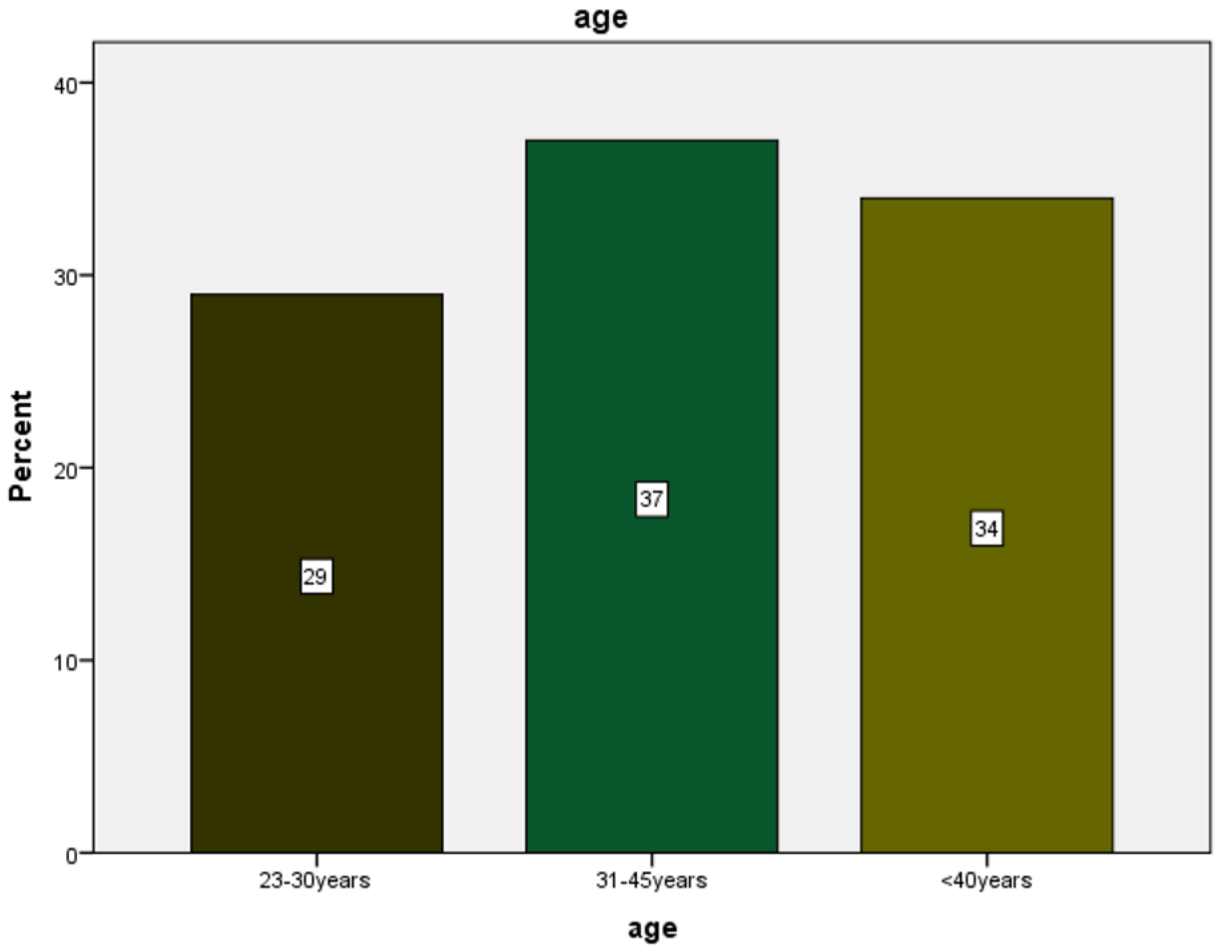

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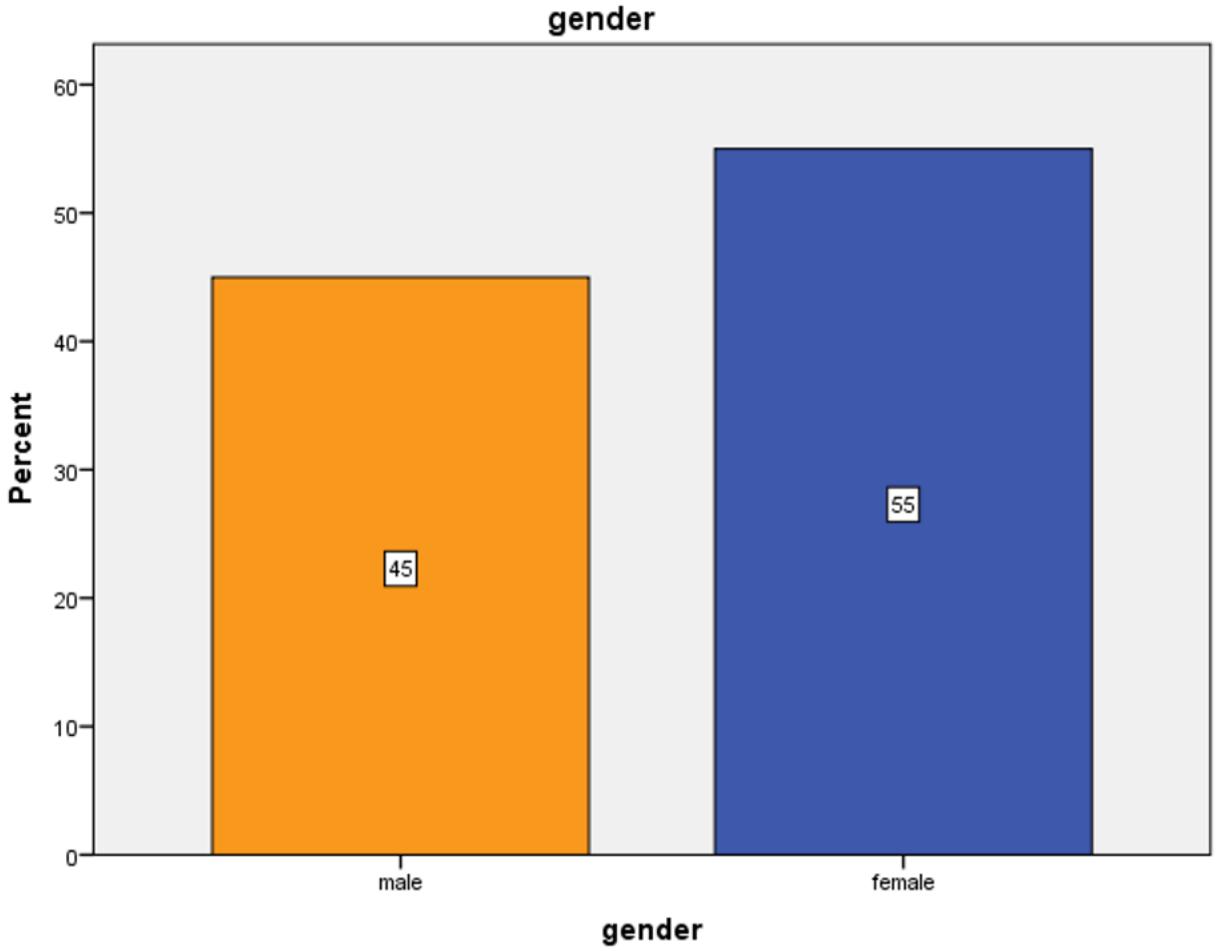
Figure 2- The bar chart represents the distribution of study subjects based on gender were distributed in the group between male and female. Males are about 46% and females are about 54%.



DOI: 10.9756/INT-JECSE/V14I2.072 ***ISSN:*** *1308-5581* *Vol 14, Issue 02 2022 PP:2080-2090*

Figure 3-The bar chart represents the distribution of study subjects based on high level of education. BDS is about 54% and MDS 46%.

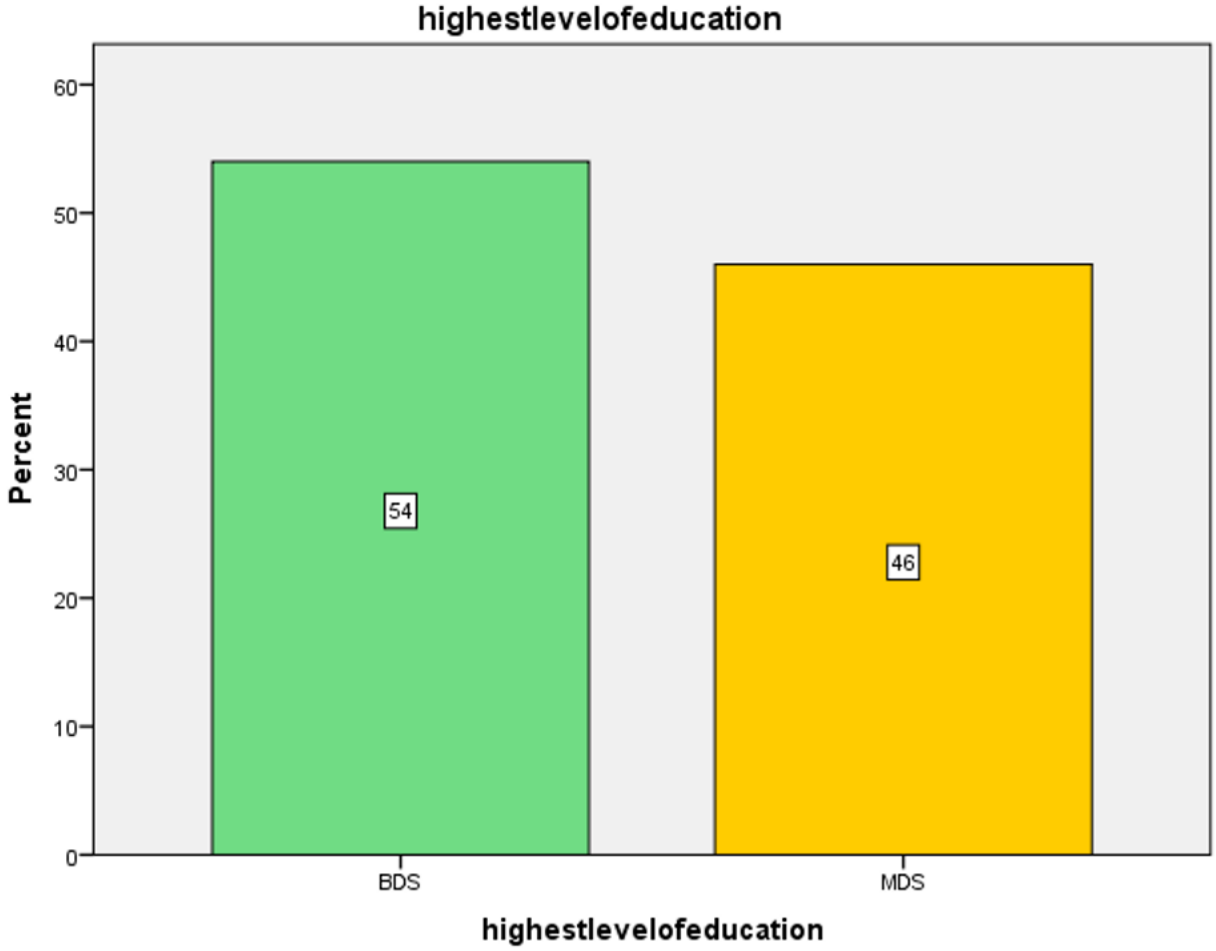


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Figure 4-The bar chart represents the distribution of study subjects based on clinical experience, 42% has clinical experience less than >5%, 36% had clinical experience 5-10years and 22% of them had <10 years of clinical experience.

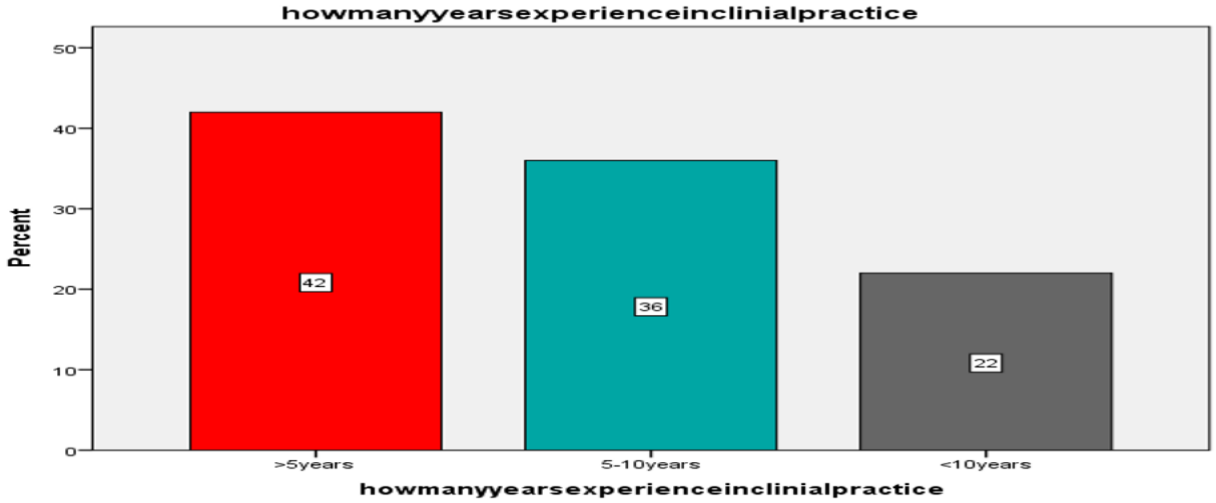

Figure 5- Bar graph shows the association between the highest level of education and type of sealant used in clinical practice where, X-axis represents the highest level of education of students and Y-axis represents the number of dental practitioners who filled the survey. 26% of the BDS practitioners use self cure sealant in their Clinical practice. Chi-square test was performed(Chi-square value - 0.251 ,p=0.977) which doesn't show a significant association of year of study with the type of sealant used in clinical practice ($p<0.05$).

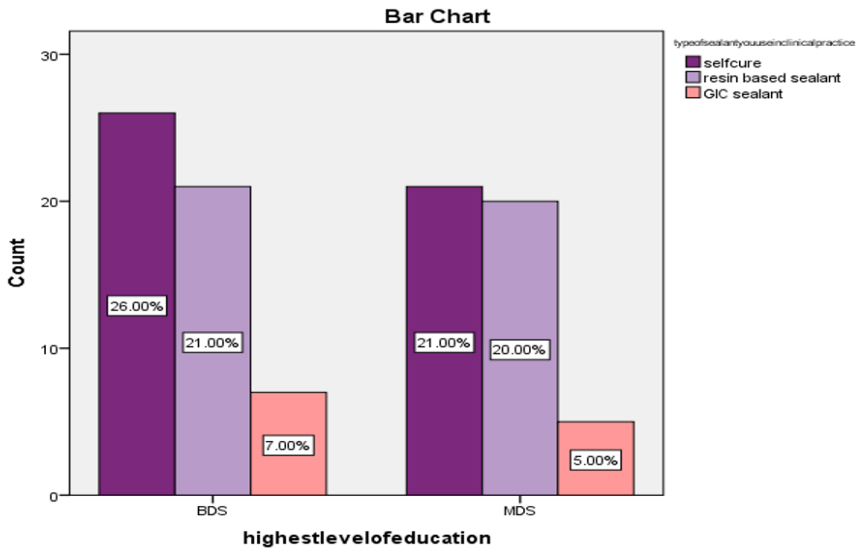

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Figure 6-Bar graph shows the association between the highest level of education and main advantage of dental sealant where, X-axis represents the highest level of education of students and Y-axis represents the number of dental practitioners who filled the survey. 28% of the BDS practitioners believe their advantage is to prevent the caries. Chi-square test was performed(Chi-square value - 4.818,p=0.734) which doesn't show a significant association of year of study with the main advantage of dental sealants ($p<0.05$).

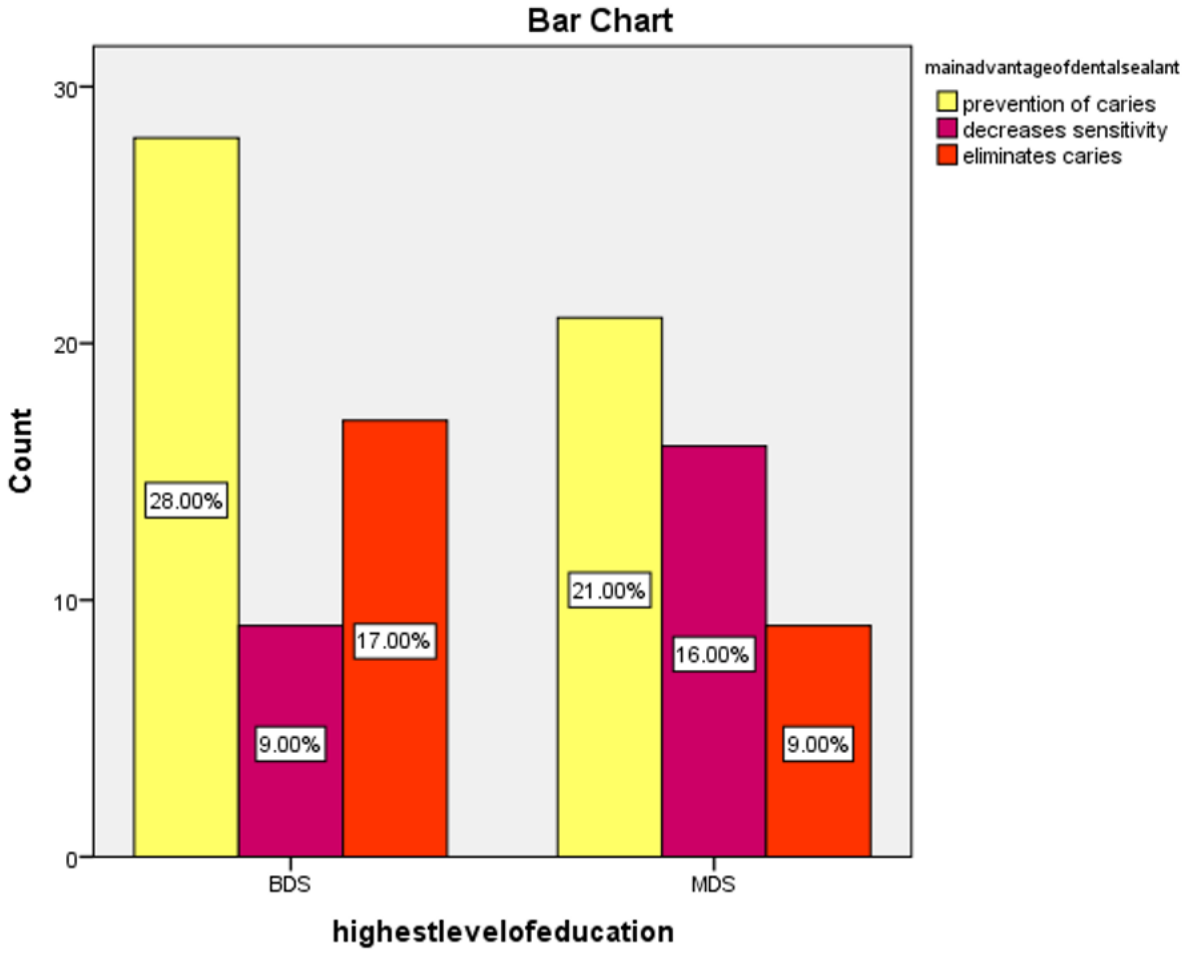

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Figure 7- Bar graph shows the association between the highest level of education and main drawback associated with resin based hydrophobic sealant where, X-axis represents the highest level of education of students and Y-axis represents the number of dental practitioners who filled the survey. 22% of the BDS practitioners believe the main drawback is all of the above which is moisture contamination,retention,flowability.Chi-square test was performed(Chi-square value - 15.685 ,p=0.001) which show's a significant association of year of study with main drawbacks associated with resin based hydrophobic sealants ($p<0.05$).

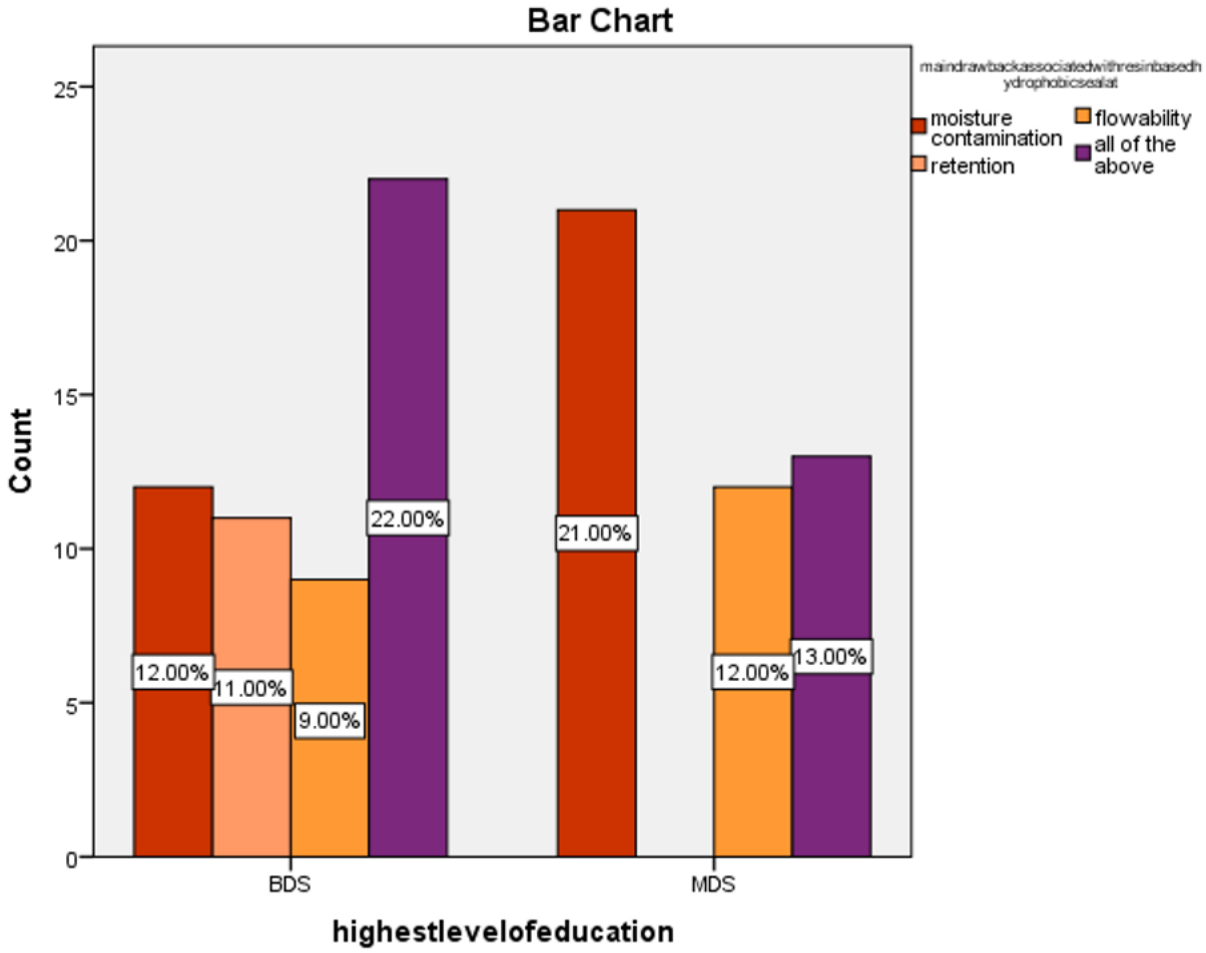

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Figure 8- Bar graph shows the association between the highest level of education and awareness on hydrophilic sealants where, X-axis represents the highest level of education of students and Y-axis represents the number of dental practitioners who filled the survey. 37% of the BDS and MDS practitioners are aware of hydrophilic sealants.Chi-square test was performed(Chi-square value - 1.833,p=0.176) which doesn't show a significant association of year of study with awareness of hydrophobic sealants($p<0.05$).

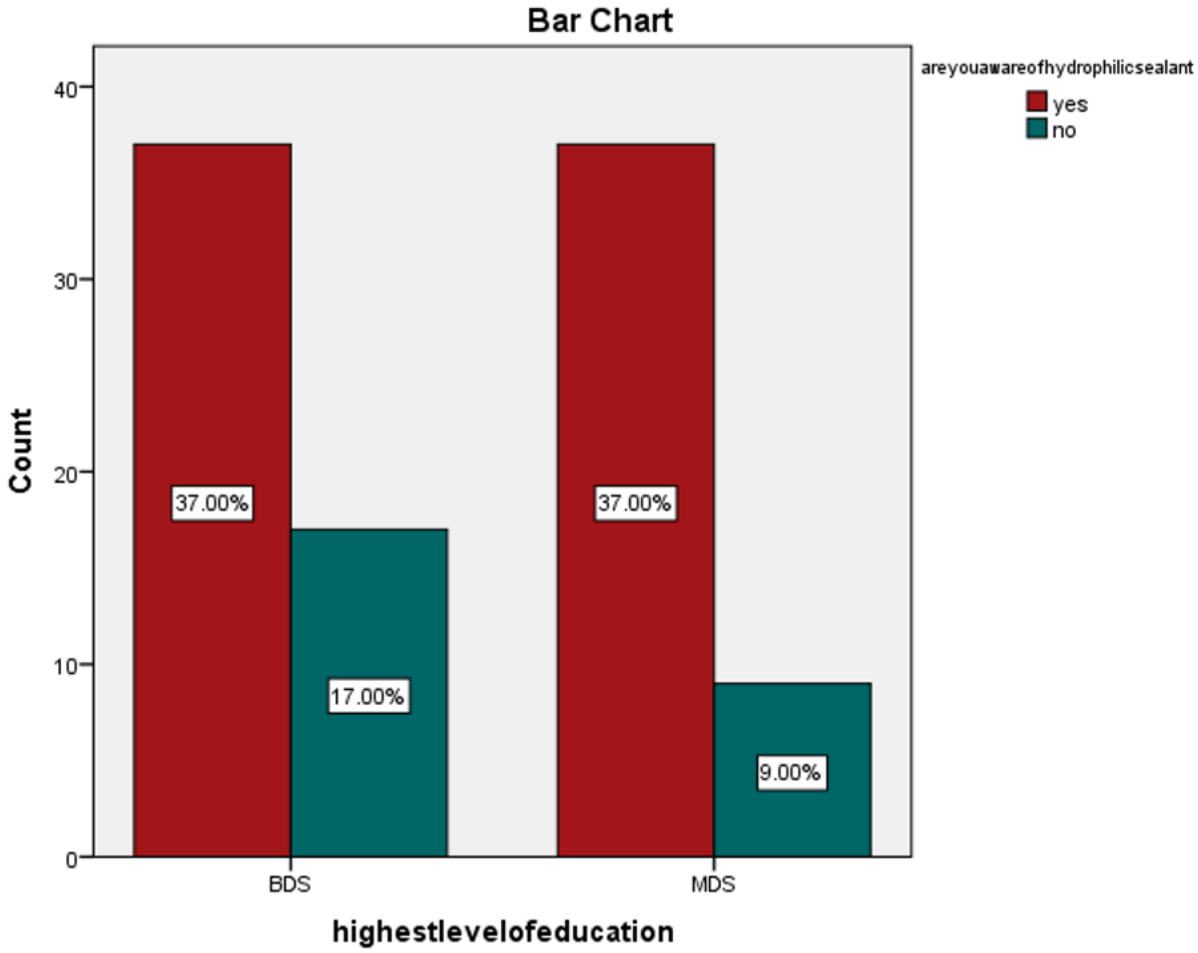

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Figure 9- Bar graph shows the association between the highest level of education and source of information regarding hydrophilic sealants where, X-axis represents the highest level of education of students and Y-axis represents the number of dental practitioners who filled the survey. 21% of the BDS practitioners are aware of hydrophilic sealants by education.Chi-square test was performed(Chi-square value - 7.066,p=0.70) which doesn't show a significant association of year of study with source of information regarding hydrophilic sealants ($p<0.05$).

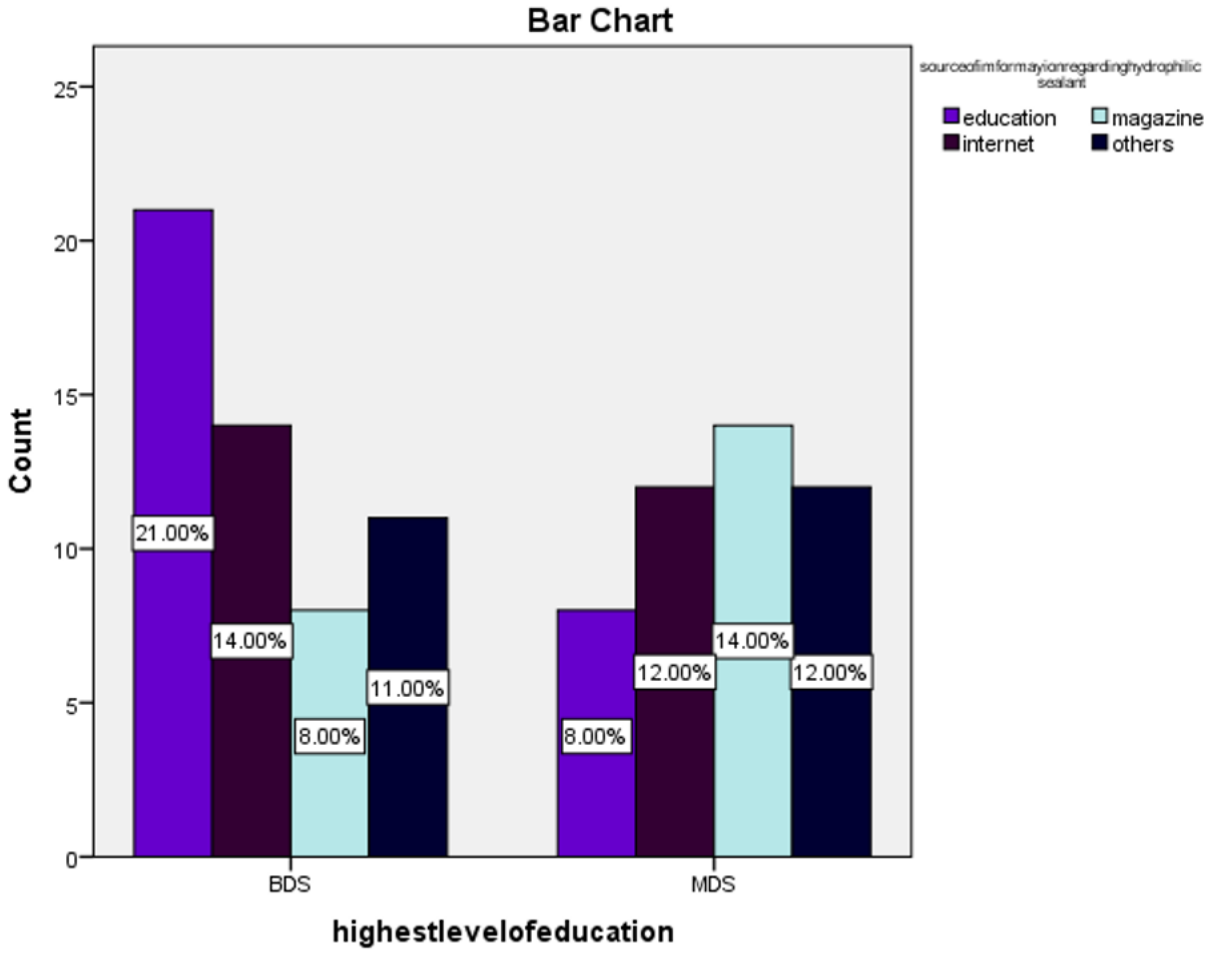

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Figure 10- Bar graph shows the association between the highest level of education and names of hydrophilic sealants used where, X-axis represents the highest level of education of students and Y-axis represents the number of dental practitioners who filled the survey. 19% of the BDS practitioners use Conseal F sealant in their Clinical practice. Chi-square test was performed(Chi-square value - 0.947 ,p=0.614) which doesn't show a significant association of year of study with names of hydrophilic sealants used ($p<0.05$).

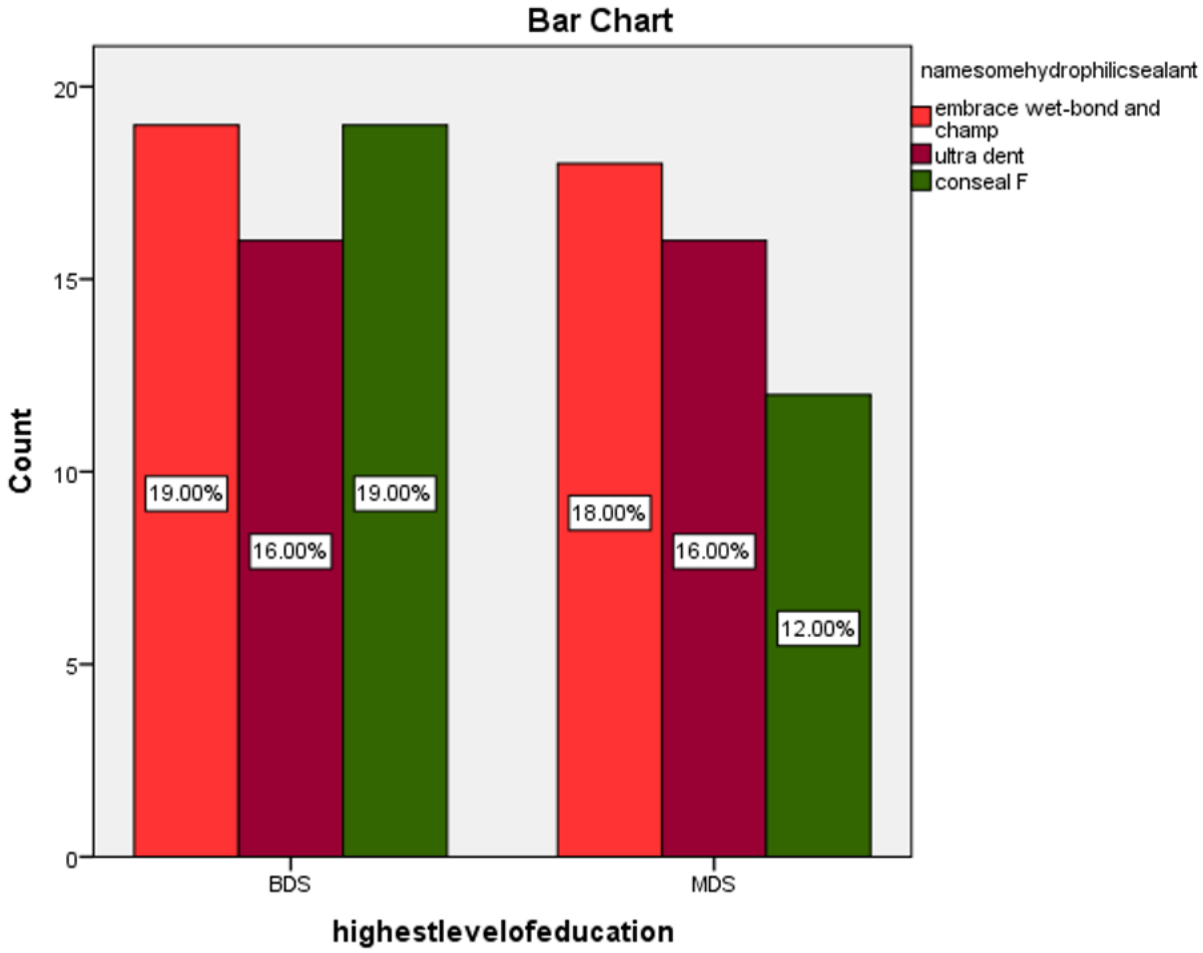

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Figure 11-Bar graph shows the association between the highest level of education and hydrophilic sealant adheres to teeth in presence of moisture where, X-axis represents the highest level of education of students and Y-axis represents the number of dental practitioners who filled the survey. 36% of the BDS practitioners believe hydrophilic sealants adhere to teeth in presence of moisture. Chi-square test was performed(Chi-square value - 0.299 ,p=0.585) which doesn't show a significant association of year of study with hydrophilic sealant adhered to teeth in presence of moisture ($p<0.05$).

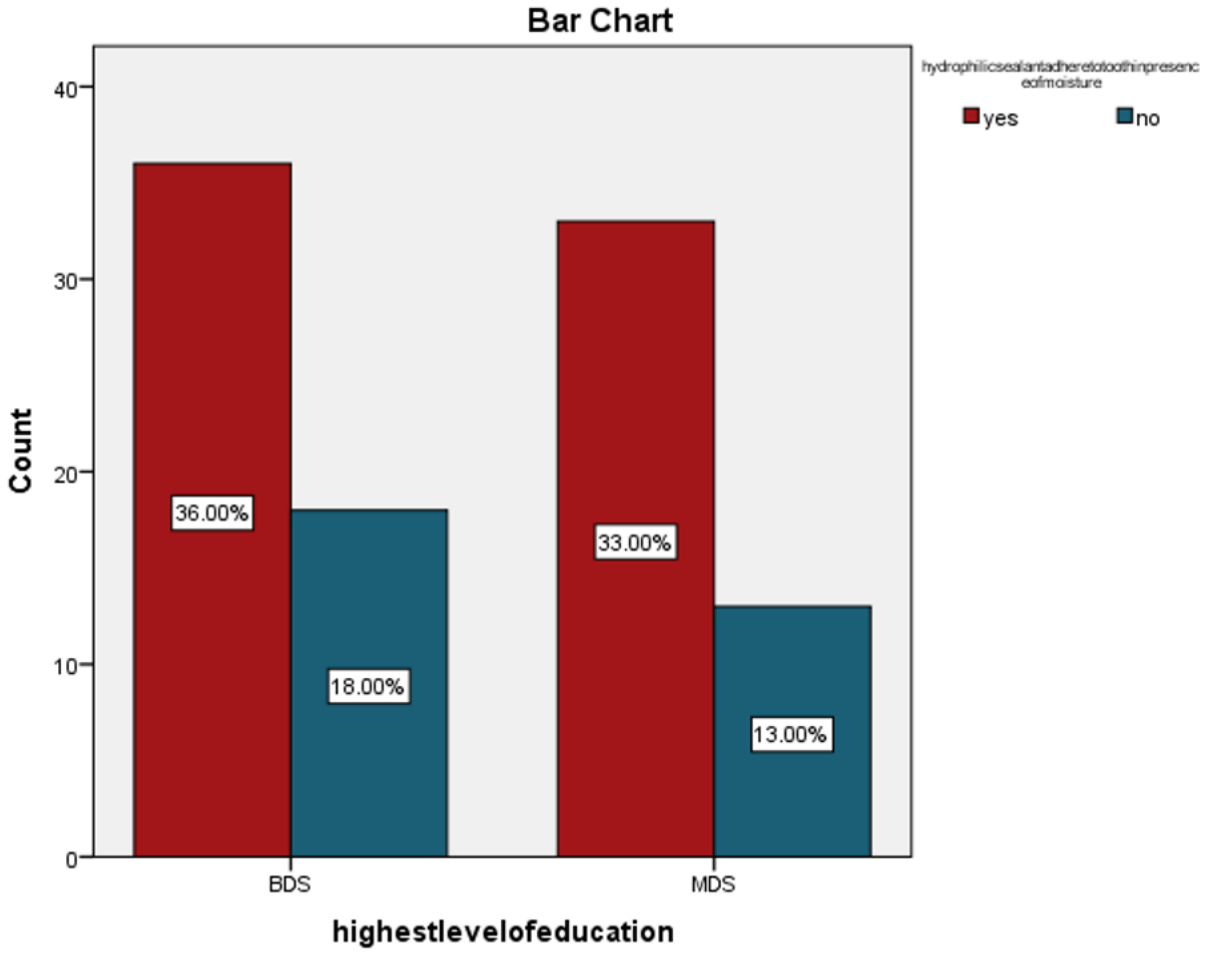

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Figure 12- Bar graph shows the association between the highest level of education and have you used hydrophilic sealants in clinical practice where, X-axis represents the highest level of education of students and Y-axis represents the number of dental practitioners who filled the survey. 38% of the MDS practitioners have used hydrophilic sealants in their Clinical practice. Chi-square test was performed(Chi-square value - 8.553 ,p=0.004) which show's a significant association of year of study with hydrophilic sealants used in clinical practice ($p<0.05$).

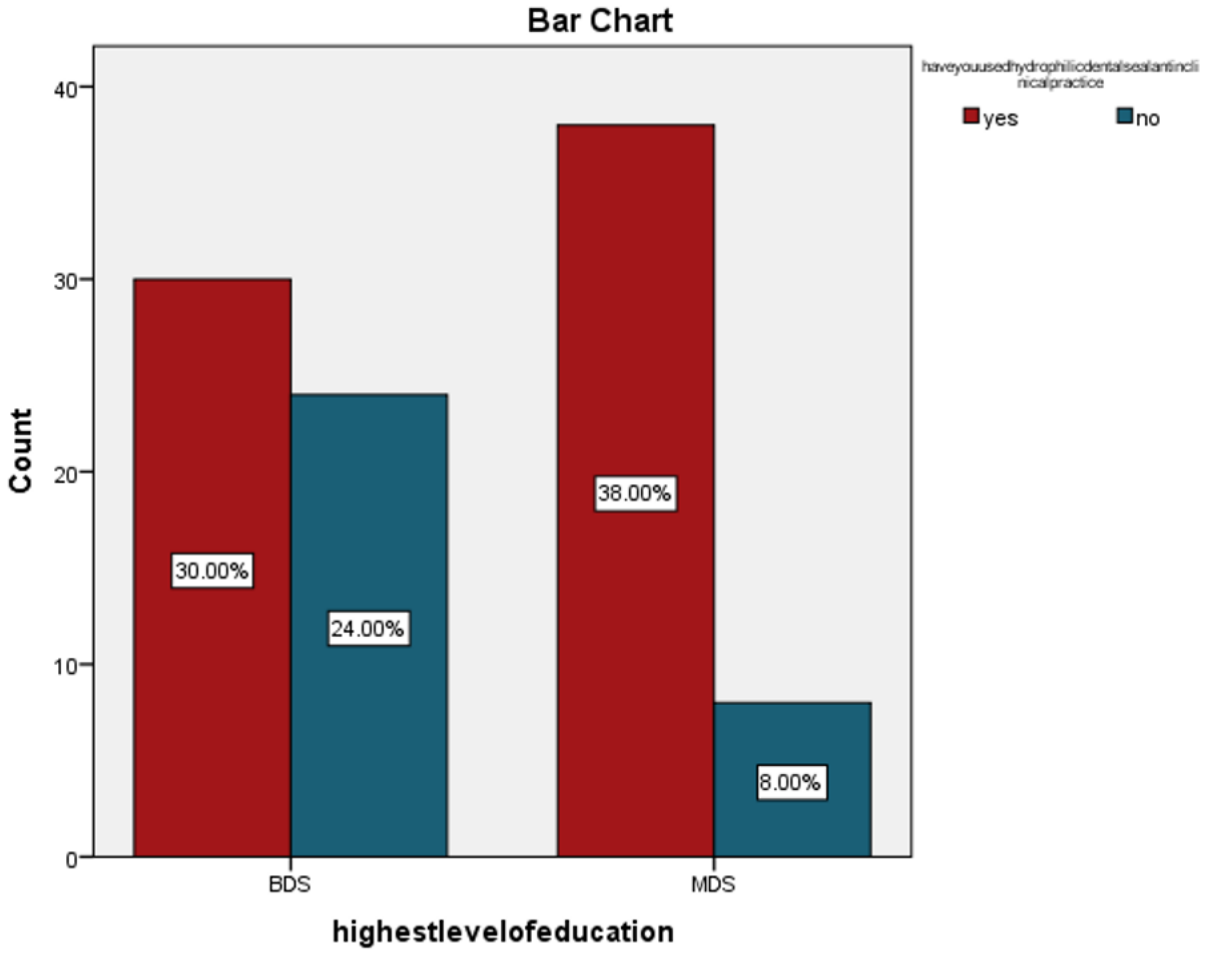

Figure 13-Bar graph shows the association between the highest level of education and do you recommend partial or total loss of sealant where, X-axis represents the highest level of education of students and Y-axis represents the number of dental practitioners who filled the survey. 31% of the BDS practitioners recommend not to reapplication the sealant. Chi-square test was performed(Chi-square value - 0.231 ,p=0.726) which doesn't show a significant association of year of study with recommendation of partial or total loss of sealant ($p<0.05$).

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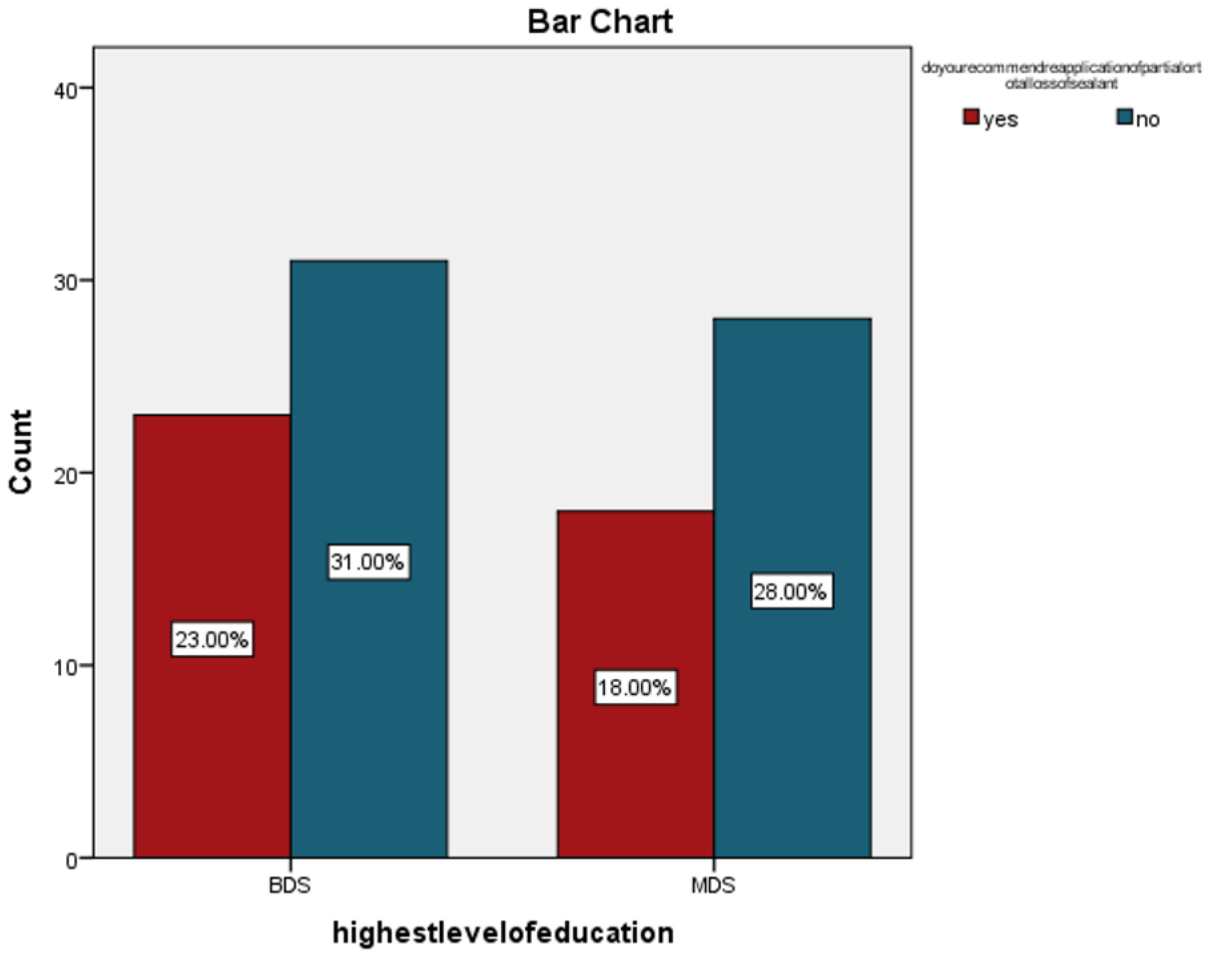

Figure 14- Bar graph shows the association between the highest level of education and most important factor on adhesion of hydrophilic dental sealant where, X-axis represents the highest level of education of students and Y-axis represents the number of dental practitioners who filled the survey. 25% of the BDS practitioners believe an important factor is thixotropic. Chi-square test was performed(Chi-square value - 3.008 ,p=0.222) which doesn't show a significant association of year of study with an important factor on adhesion of hydrophilic dental sealant ($p<0.05$).

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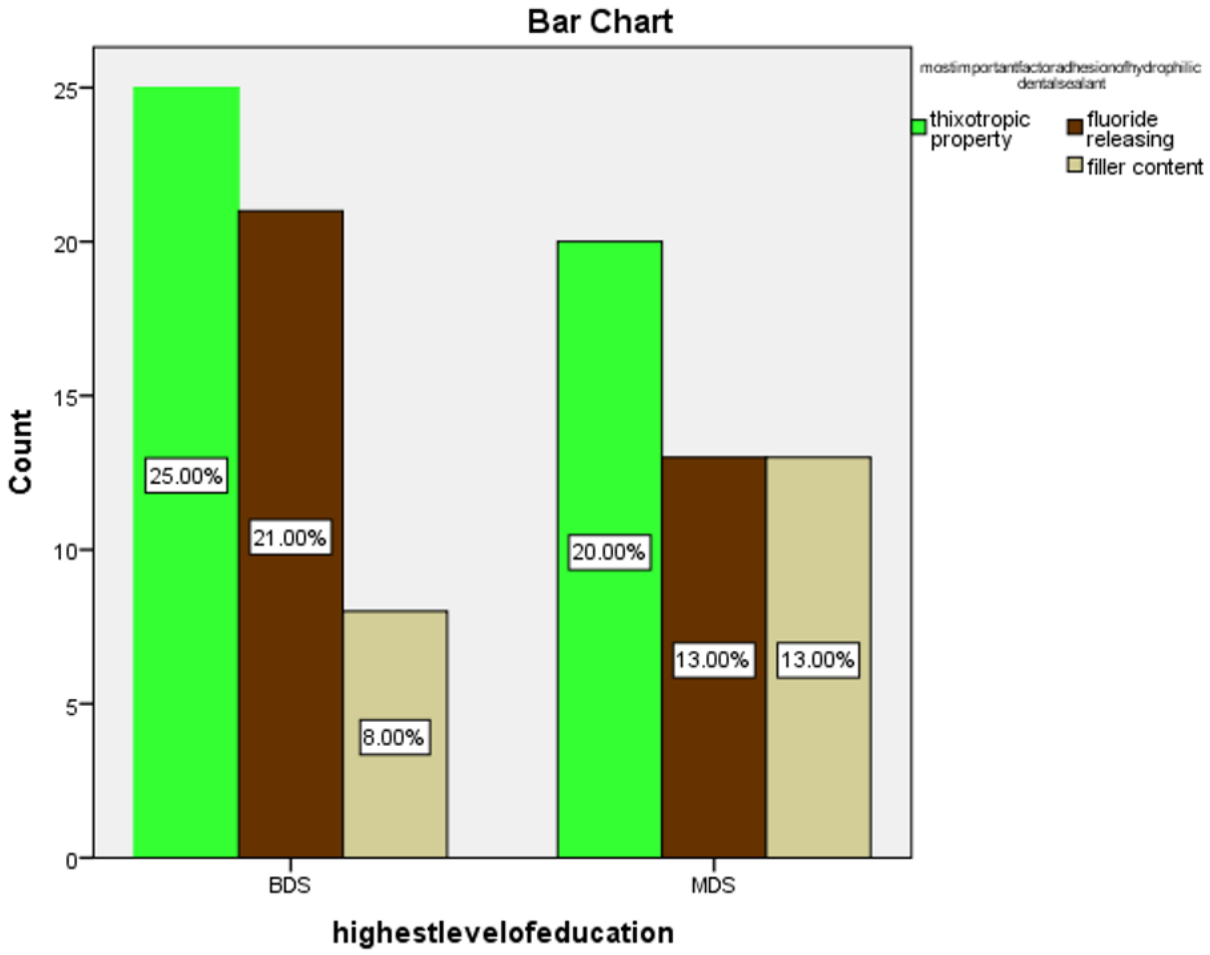

Figure 15-Bar graph shows the association between the highest level of education and do you recommend to use hydrophilic sealants over hydrophobic sealants where, X-axis represents the highest level of education of students and Y-axis represents the number of dental practitioners who filled the survey. 46% of the BDS practitioners recommend using hydrophilic sealants instead of hydrophobic sealant in their Clinical practice. Chi-square test was performed(Chi-square value - 5.430,p=0.020) which show's a significant association of year of study with recommendation on using hydrophilic sealants over hydrophobic sealant ($p<0.05$).

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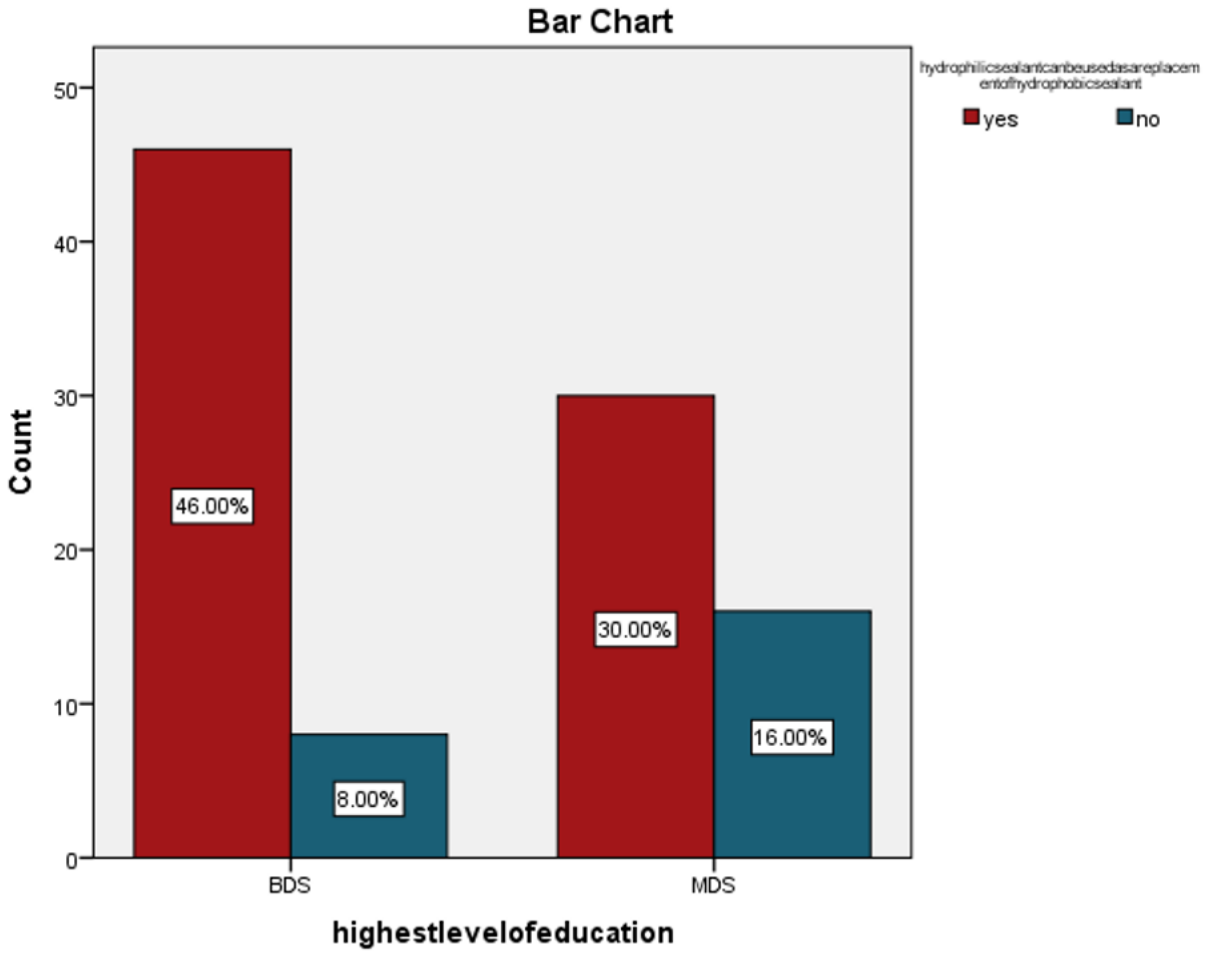

According to Ratnadithya et al.,[36] It can be concluded that hydrophilic sealant may be used as effective pit and fissure sealants especially in children with high risk of caries, excessive salivation, mentally and physically challenged, very young children, uncooperative child and partially erupted molars and community care programs. According to Eliades et al.,[37]the surface energy of hydrophilic sealants is lower than water because of which they cannot penetrate completely to the bottom of the fissures.According to Eskandarian et al.,[38].The new generation of fissure sealants containing hydrophilic monomers appears to have lower technical sensitivity since it is moisture-tolerant. Also, it does not require a bonding agent for wet bonding. It decreases the treatment time and enhances patient cooperation. Moreover, other properties of Embrace such as its fluoride release potential, water sorption, microleakage and compressive strength must be evaluated in future in vitro studies.

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According to Prithesga et al.[39],higher tolerance of the newer hydrophilic pit and fissure sealant to saliva contamination with less microleakage, but in terms of penetration ability the newer sealant was found to be inferior to the conventional sealants.According to Khogli et al.,[39,40]Er:YAG ablation significantly decreased the microleakage at the tooth–sealant interface compared to the non-invasive technique. The hydrophilic sealant applied on different surface conditions showed comparable results to the conventional resin-based sealant.

CONCLUSION-

The study concludes that Dental practitioners were aware of hydrophilic sealants . There was a significant association between the highest level of education and usage of hydrophilic sealants in clinical practice ($p<0.05$). Hydrophilic sealants are found to be more efficient and provide better retention in relation to pit and fissure cavity.

ACKNOWLEDGEMENT-

We would like to thank all the participants who took part in the study. We also thank Saveetha dental college and hospitals for their constant help and support.

CONFLICT OF INTEREST-

All the authors declare that there was no conflict of interest in the present study.

SOURCE OF FUNDING-

The present project is supported/funded/sponsored by
Saveetha Institute of Medical and Technical Sciences
SaveethaDentalCollege and Hospitals
Saveetha University

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