

KNOWLEDGE, ATTITUDE AND PERCEPTION OF PIT AND FISSURE SEALANT ON DECAY - A SURVEY

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ABSTRACT:

Introduction: Oral diseases pose a major health burden for many countries and affect people throughout their lifetime, causing pain, discomfort, disfigurement and even death. Untreated dental caries (tooth decay) in permanent teeth is the most common health condition according to the Global Burden of Disease 2017. More than 530 million children suffer from dental caries of primary teeth (milk teeth). Severe periodontal (gum) disease, which may result in tooth loss, is also very common, with almost 10% of the global population affected.

Aim: To assess the knowledge, attitude and perception of pit and fissure sealants on decay

Materials and methods: Questionnaires containing 20 questions were circulated among the random age population. Responses from the participants were collected and exported to SPSS software. Statistical analysis was done using SPSS.

Results and Discussion: More than 83% of individuals answered that pit and fissure sealants are used mostly in occlusal surfaces. Around 69% of individuals replied that for caries, food particles and microorganism pit and fissure sealants act as physical barriers.

Conclusion: Our present study concludes that knowledge, attitude and perception of pit and fissure sealants was found to be moderate. More awareness programs need to be created.

Keywords: Pit and fissure sealants, tooth decay, dental caries, occlusal surface, Innovative technology, Eco friendly.

INTRODUCTION:

Oral health is an essential aspect of overall health. The oral cavity is linked to the creation of a healthy personality, attitudes, and overall pleasure experiences. Because of their high prevalence and negative impact on an individual's quality of life, oral diseases are a significant public health issue. Genetic predispositions, developmental disorders, poor oral hygiene, and stressful events are all potential etiological causes for these oral diseases (Das *et al.*, 2019). A variety of factors affect oral hygiene practices and the ability to pursue oral health treatment. Many studies have been conducted from time to time to assess people's awareness and behaviour regarding oral health, but there is still a lack of education in this field, especially among rural people, who account for more than 70% of India's population (Shekaret *et al.*, 2011). There were various common dental problems like dental caries, tooth decay and gingivitis. Damage to a tooth's surface, or enamel, is known as tooth decay. It is a common name used for dental caries. It occurs when bacteria in your mouth produce acids that eat away at your teeth's enamel. Cavities (dental caries) are cracks in the teeth created by tooth decay. If left untreated, tooth decay can lead to pain, infection, and even tooth loss (Khan, Jain and Shrivastav, 2008). The prevalence of these diseases is gradually rising as people's eating patterns shift and sugar intake increases. In India, dental caries affect 60 % to 65 % of the population (Prabakar, John and Srisakthi, 2016). However, several factors other than sugar intake have a significant impact on this disease.

According to the National Health and Nutrition Examination Survey 2011-2012, almost one-fourth of children and more than half of teenagers in the United States had dental caries in their permanent teeth (Dye *et al.*, 2015). The term pit and fissure sealants is the introduction of cement like substance into the occlusal surface of the teeth. It forms a micromechanical bond in the tooth. Because of the application, microorganisms won't get their required nutrition for their growth. Thereby preventing the caries deposition (Sanders, Feigal and Avery, 2011). As compared to the enamel on smooth surfaces, the enamel in pits and fissures cannot obtain the same level of fluoride protection. The products used in the first sealant clinical trials were cyanoacrylate-based. Dimethacrylate-based products were sold to take their place. The process of polymerization used by commercial sealants differs significantly (Marwah and Ahuja, 2014). UV light initiated the first-generation sealants, auto polymerized the second-generation sealants, and visible light initiated the third-generation sealants. In children and teenagers, pit and fissure caries account for around 90% of caries in permanent posterior teeth and 44% of caries in primary teeth. The use of caries prevention methods such as community, topical fluoridation, plaque decay, dietary sugar control has been widely credited as the cause of the overall decline in caries prevalence, which has had a greater influence on the reduction of smooth surface carious lesions (Kher and Rao, 2019).

Pits and fissures are difficult to clean due to their plaque retentive nature, making them more vulnerable to cavities than smooth surfaces and likely not covered by fluoride administration.

Numerous previous articles regarding the procedure of pit and fissure application, awareness of pit and fissure sealants (Krishna and Dasar, 2010; S, Sahana and Shivakumar, 2016). Despite the fact that the effectiveness and caries-preventive effect of pit and fissure sealants have been well reported in the literature, they are still considered to be underused globally. Due to their adverse effects and retention properties, the application of pit and fissure is doubted. Methods to improve the retention of the sealing material on the tooth surface are, a thorough cleaning of the occlusal surface with, for example, hydrogen peroxide, pumice, as well as air abrasion and pretreatment with acid. Our team has extensive knowledge and research experience that has translate into high quality publications (Narendran *et al.*, 2020; Reddy *et al.*, 2020; Teja and Ramesh, 2020; Bhavikattiet *al.*, 2021; Chakraborty *et al.*, 2021; Karobariet *al.*, 2021; Muthukrishnan, 2021a, 2021b; PradeepKumaret *al.*, 2021; Sawant *et al.*, 2021), (Romera *et al.*, 2018; Ezhilarasan, 2020; Raj R, D and S, 2020; Rohit Singh and Ezhilarasan, 2020), (Priyadharsini *et al.*, 2018; VijayashreePriyadharsini, 2019; Gudipani *et al.*, 2020; Uma Maheswari, Nivedhitha and Ramani, 2020; Chaturvedula *et al.*, 2021) (Kanniah *et al.*, 2020). Our present study is aimed to assess the knowledge, attitude and perception of pit and fissure sealants on decay.

MATERIALS AND METHODS:

A Cross sectional study was conducted among 100 participants of the random age population. The self structured questionnaire was designed containing 15 questions. The study setting used was prospective observational study. Because this is easy to create and has a wide reach. But it didn't overcome survey bias and survey fatigue. The approval was obtained from the scientific review board, Saveetha Dental College, Chennai. The sampling method used here was simple random sampling. The questions are designed to assess the awareness, knowledge, attitude and perceptions of individuals about pit and fissure sealants on decay. Validation of the study was done by principal investigators. The results /responses obtained were statistically analysed using SPSS software for descriptive analysis. The results were represented in a pie chart. Association between groups was observed using the chi-square test.

RESULTS:

Total of 100% participants in which 62% of them were males and 38% of them were females (Figure:1). 56% of individuals belong to 26-32 years of age, 43% of individuals belong to 18-25 years of age and 1% of individuals belong to 35-40 years of age (Figure: 2). 68% of individuals were undergraduate students, 30% of individuals were postgraduate students and 2% of individuals were PhD students (Figure: 3). 68% of individuals were aware about the purpose of pit and fissure sealants, 25% of individuals answered that it can be used as the only prevention method and 7% of individuals answered that it is only a restoration procedure (Figure: 4). 83% of participants felt that pit and fissure can be used only on occlusal surface, 9% of participants felt that it can be used on distal surface, 6% of individuals felt that it can be used on mesial surface and only 2% of participants felt that it can be used on facial surface (Figure: 5). 69% of individuals felt that pit and fissure sealants act as physical barriers against caries, food particles and microorganisms, 14% of individuals felt that barrier against caries, 10% of individuals felt that barrier against microorganisms and 7% of individuals felt that food particles (Figure: 6). 65% of individuals felt both resin based and glass ionomers are major components of pit and fissure sealants, 29% of individuals felt as resin based and 6% of individuals felt as glass ionomers (Figure: 7). 90% of individuals preferred resin based over glass ionomer and 10% of individuals preferred glass ionomer over resin based (Figure: 8). 76% of individuals felt high caries prevalence is seen in first molars, 21% of individuals felt high caries prevalence is seen in second molars and 3% of individuals felt high caries incidence is seen in third molars (Figure: 9). 84% of individuals felt tooth preparation required for pit and fissure sealants and 16% of individuals felt no tooth preparation required for pit and fissure sealants (Figure:10). 72% of individuals aware that acid etching promotes adhesion and 28% of individuals were unaware (Figure: 11). 81% of individuals are aware that sealing along with fluoride application reduces dental caries and 19% of individuals are unaware (Figure: 12). 71% of individuals felt rubber dam is more effective in isolation, 28% of individuals felt cotton rolls are more effective and only 1% of individuals felt that gingival retraction cords are effective (Figure: 13). 86% of individuals were aware of the adverse effects of pit and fissure sealants and 14% of individuals were unaware (Figure: 14). 71% of individuals felt semi erupted teeth and allergy to methacrylate as contraindications, 16% of individuals felt as semi erupted teeth and 13% of individuals felt as allergic to methacrylate (Figure: 15).

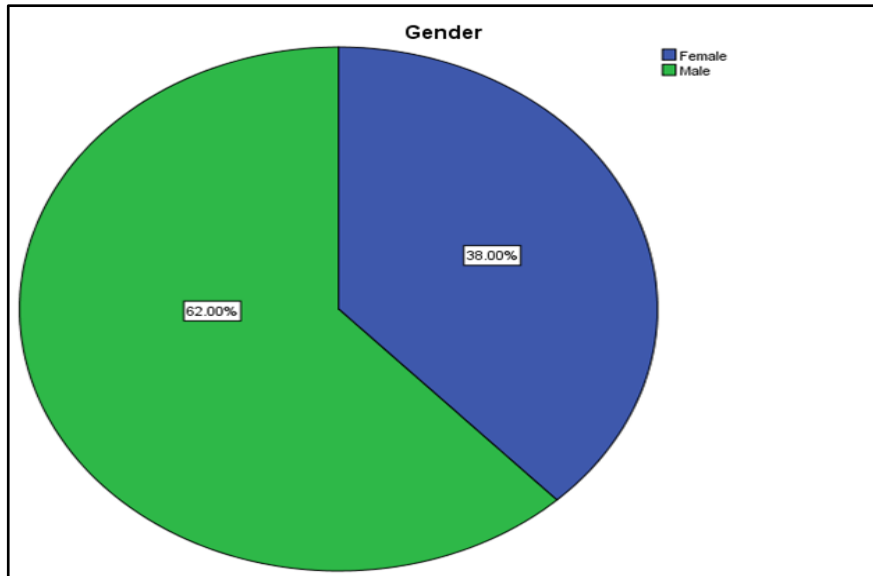


Figure :1 The pie chart represents the percentage of sex group of participants, in which 62% were males(green) and 38% were females(blue).

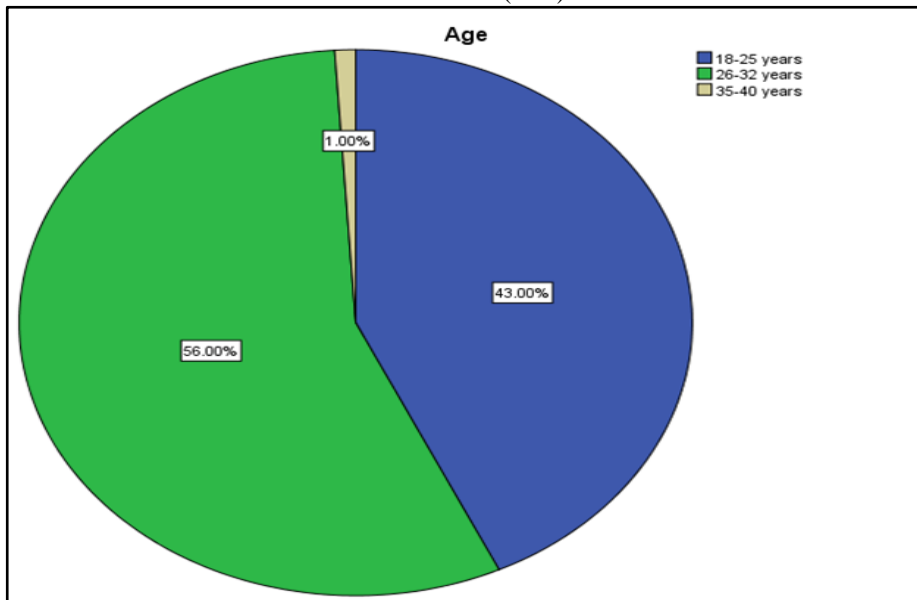


Figure: 2 The pie chart represents the percentage of age group of participants, in which 56% of individuals belonged to 26-32 years old(green), 43% of individuals belonged to 18-25 years old(blue) and 1% of individuals belonged to 35-40 years old(beige).

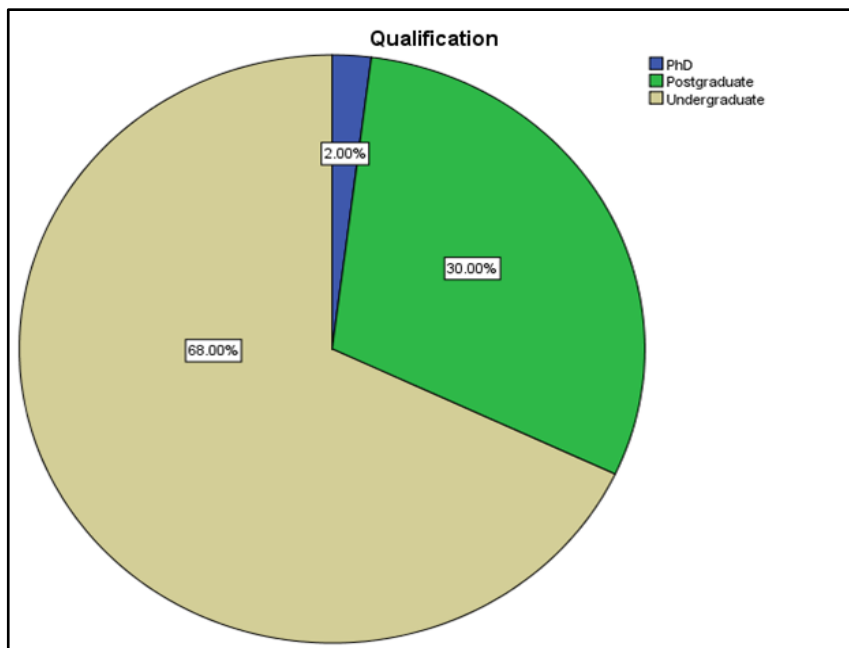


Figure: 3 The pie chart represents the educational qualification of participants, in which 68% of individuals were undergraduate students (beige), 30% of individuals were postgraduate students (green) and 2% of individuals were PhD graduates (blue).

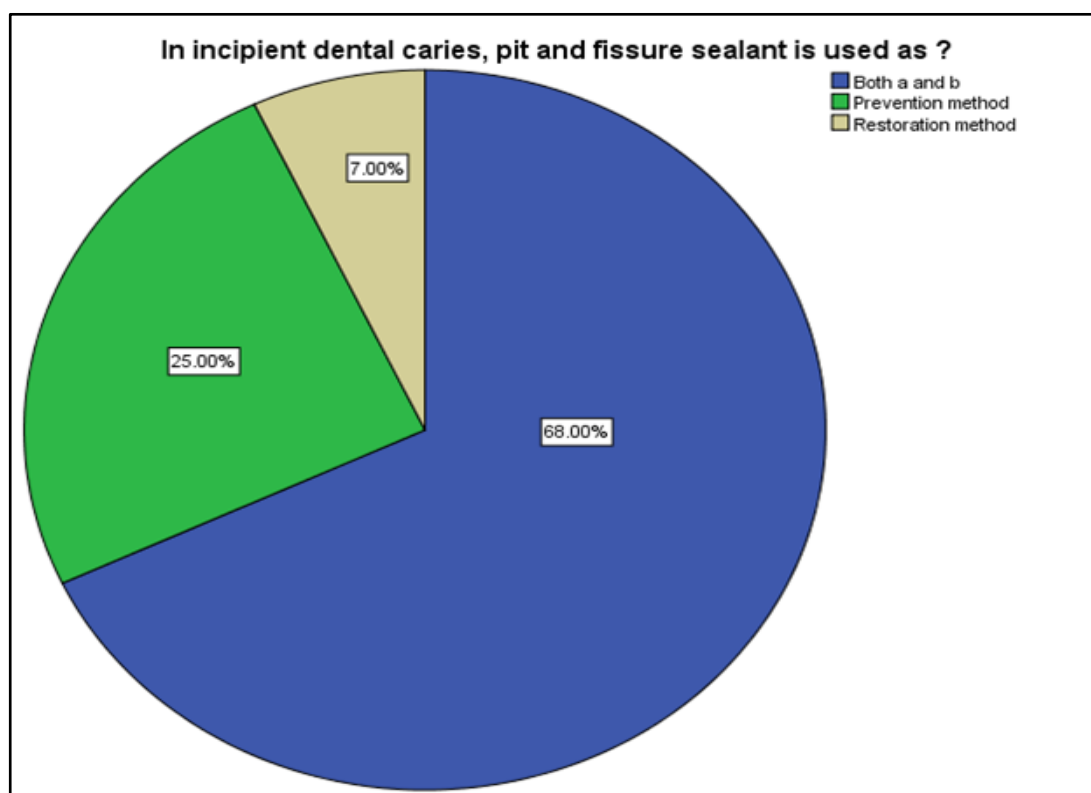


Figure: 4 The pie chart represents the percentage of awareness of purpose of pit and fissure sealants, in which 68% of participants answered as it can be used as both prevention and restoration method (blue), 25% of individuals answered that it can be used only as prevention method (green) and 7% of individuals answered that it can be used only restorative procedure (beige).

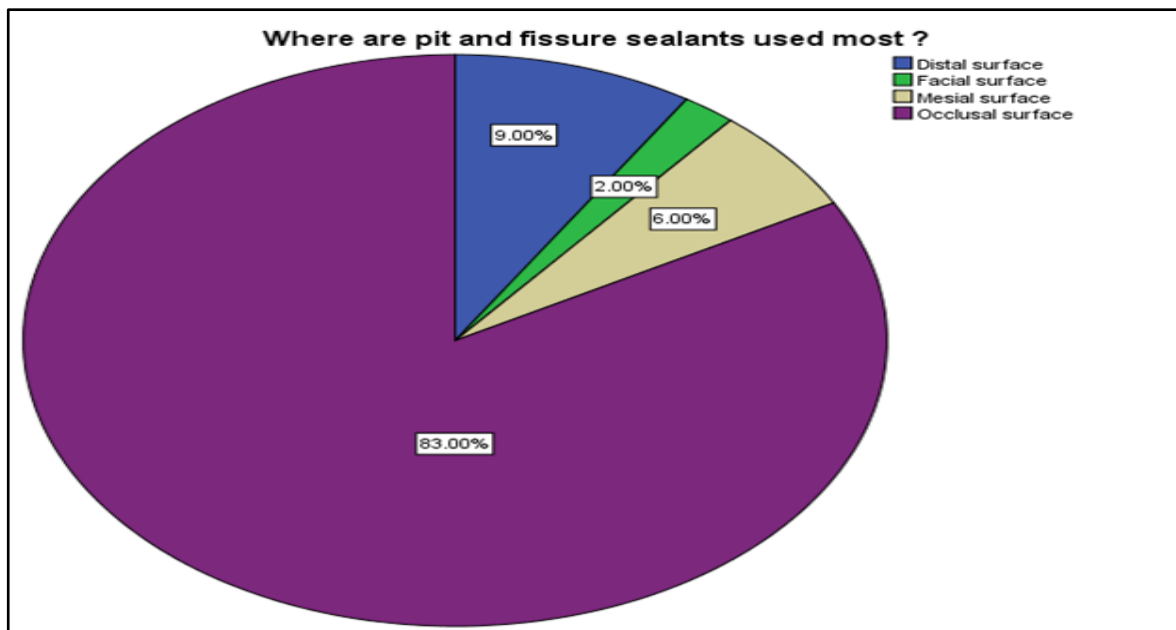


Figure: 5 The pie chart represents the percentage of awareness of application surface of pit and fissure sealants, in which 83% of individuals answered as occlusal surface (purple), 9% of individuals answered as distal surface (blue), 6% of individuals answered as mesial surface (beige) and 2% of individuals answered as facial surface (green).

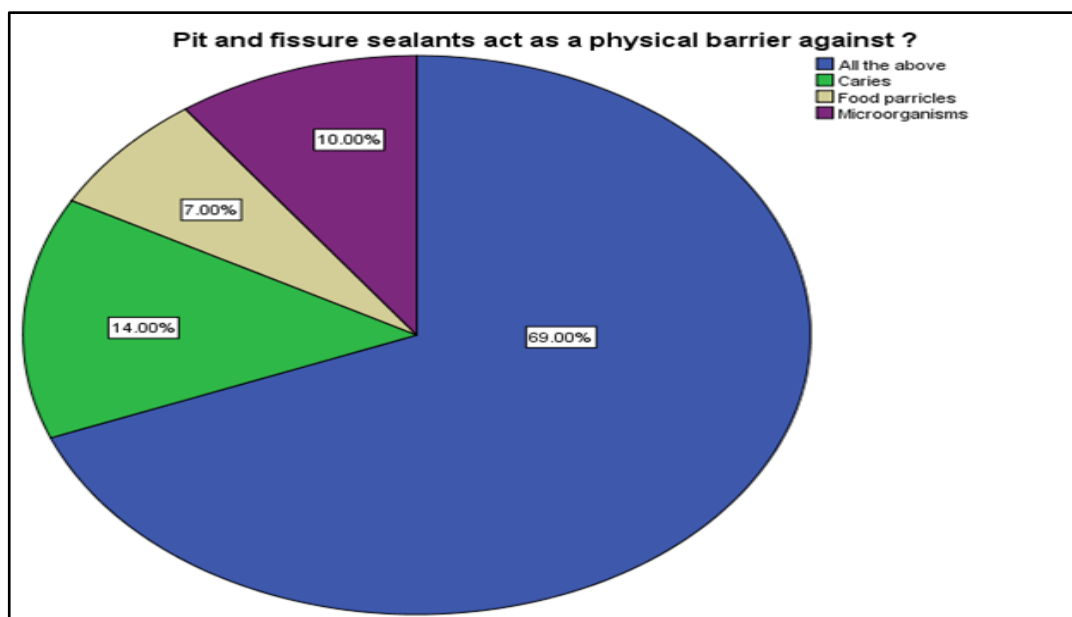


Figure: 6 The pie chart represents the percentage of awareness of participants' views on physical barriers, in which 69% of individuals felt barrier against caries, food particles and microorganisms (blue), 14% of individuals felt barrier against caries (green), 10% of individuals felt barrier against microorganisms (purple) and 7% of individuals felt barrier against food particles (beige).

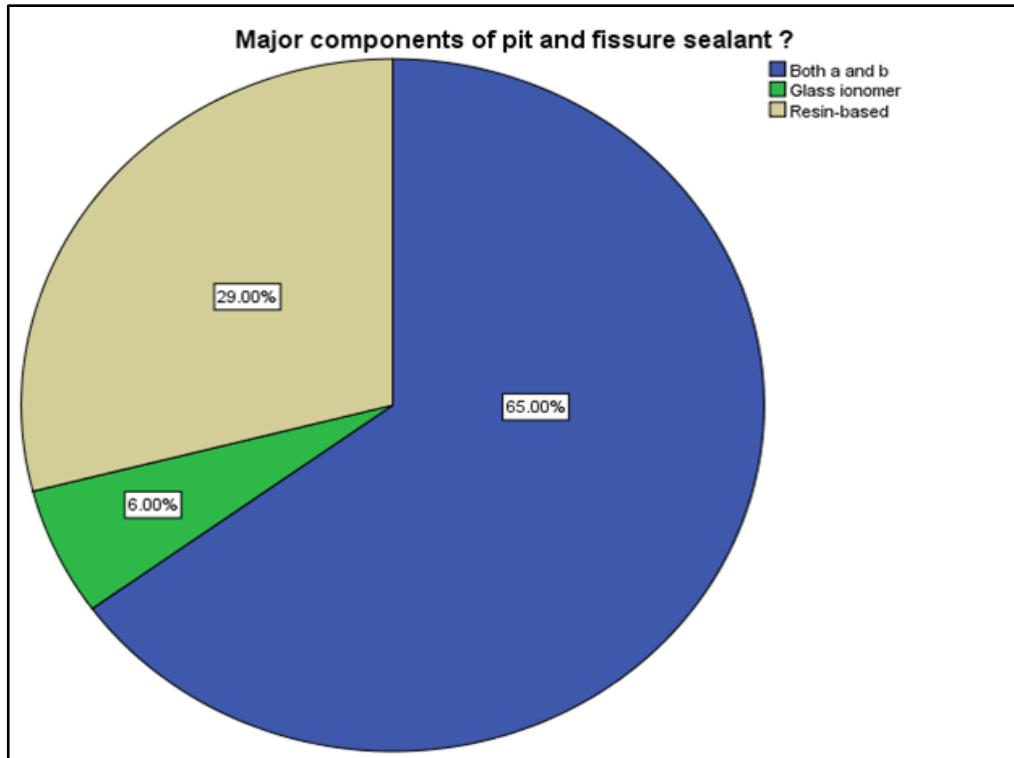


Figure: 7 The pie chart represents the percentage of awareness of components of the participants, in which 65% of individuals felt that both glass ionomer and resin based as major component(blue), 29% of individuals felt that resin based material as major component(beige) and 6% of individuals felt that glass ionomer as major component(green)

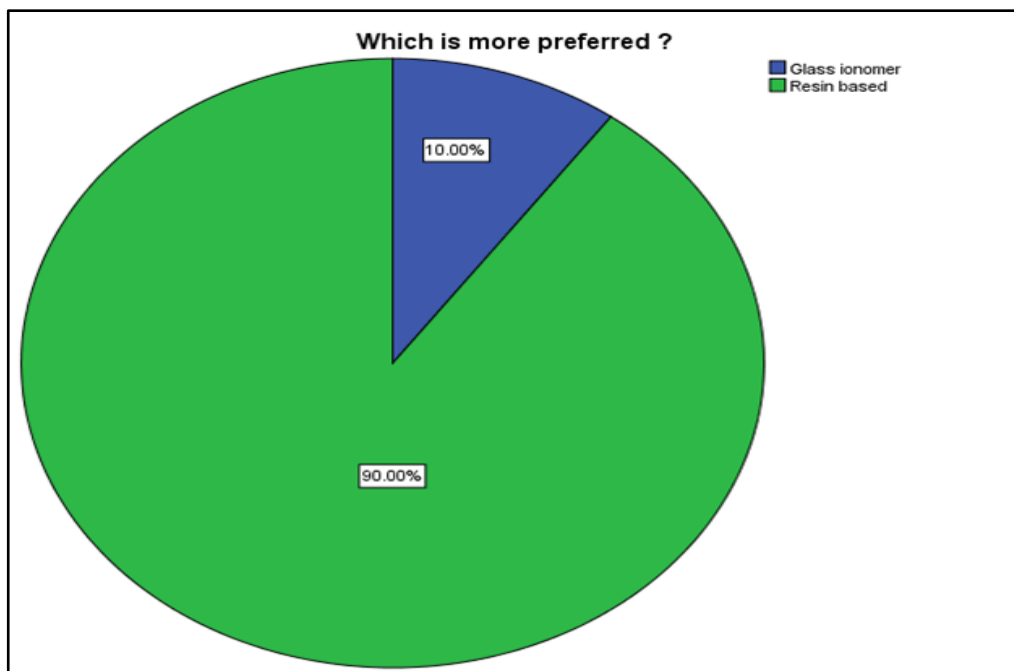


Figure: 8 The pie chart represents the percentage preference of participants, in which 90% of individuals preferred resin based over glass ionomer(green) and 10% of individuals preferred glass ionomer over resin based(blue).

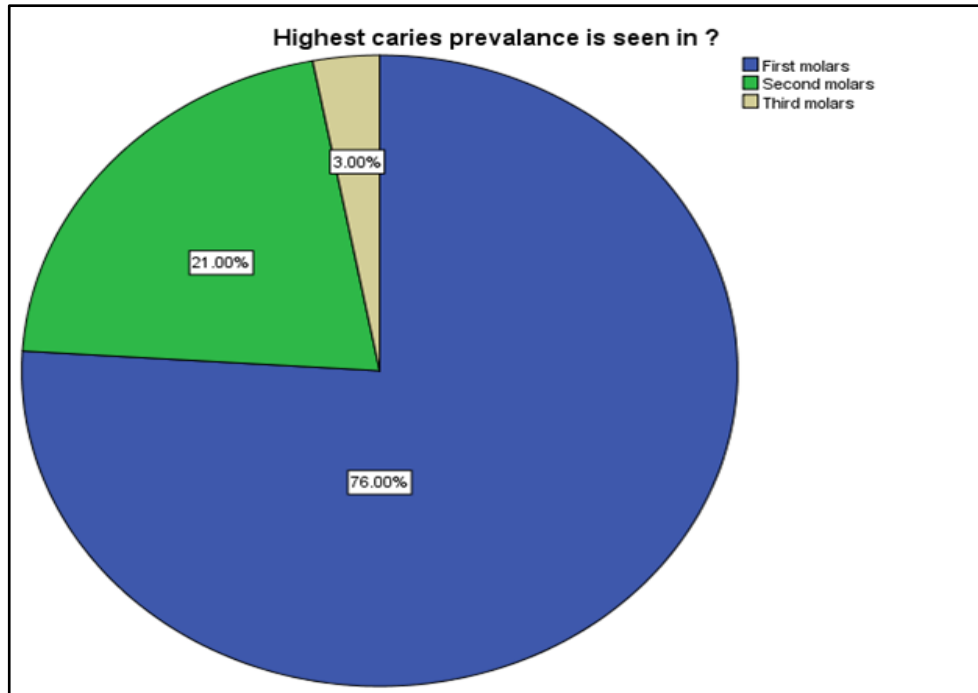


Figure: 9 The pie chart represents the percentage of participants awareness on caries incidence, in which 76% of individuals felt more incidence seen in first molars(blue), 21% of individuals felt more incidence seen in second molars(green) and 3% of individuals felt more incidence seen in third molars(beige).

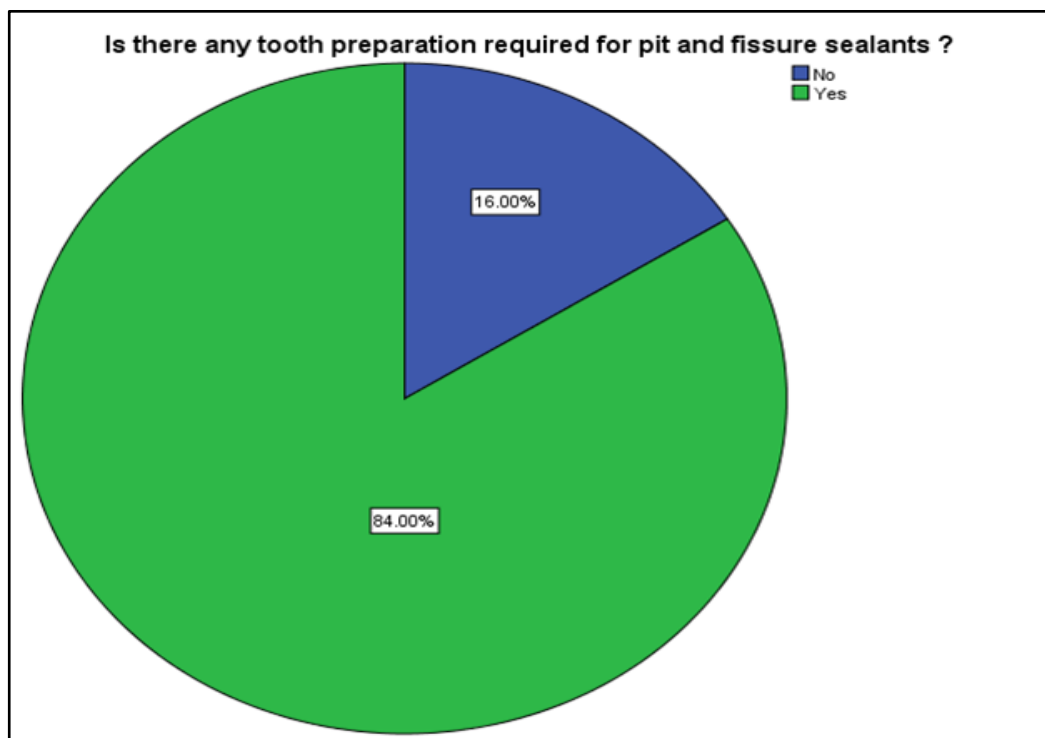


Figure: 10 The pie chart represents the percentage of practice awareness of participants regarding the pit and fissure sealants, in which 84% of individuals felt tooth preparation is needed(green) and 16% of individuals felt tooth preparation is not needed(blue).

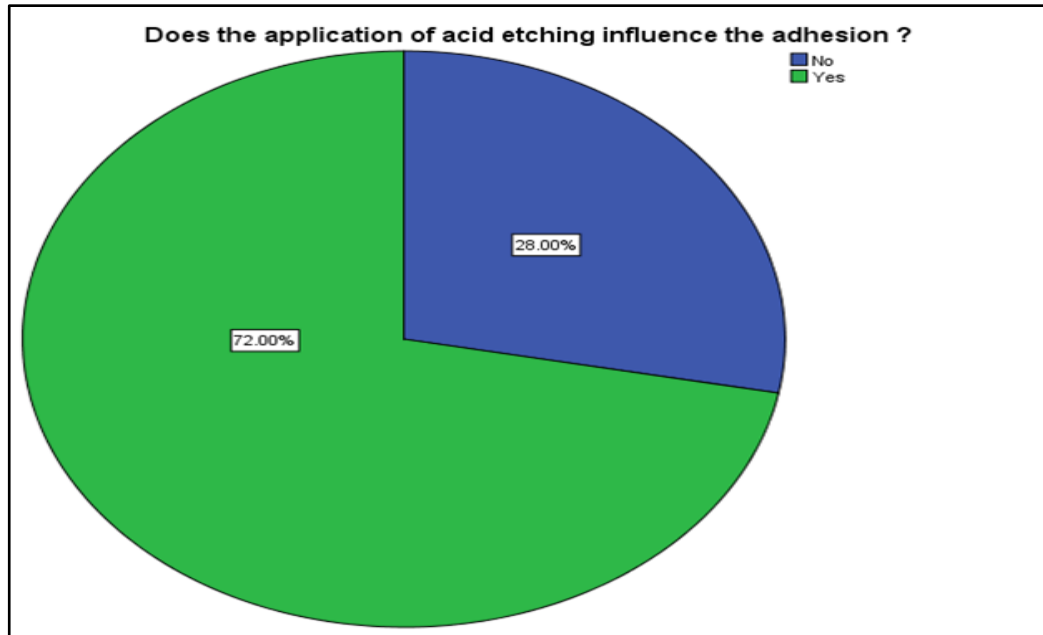


Figure: 11 The pie chart represents the percentage of participants' awareness about application procedure of pit and fissure sealants, in which 72% of individuals are aware that acid etching promotes adhesion(green) and 28% of individuals answered as no(blue).

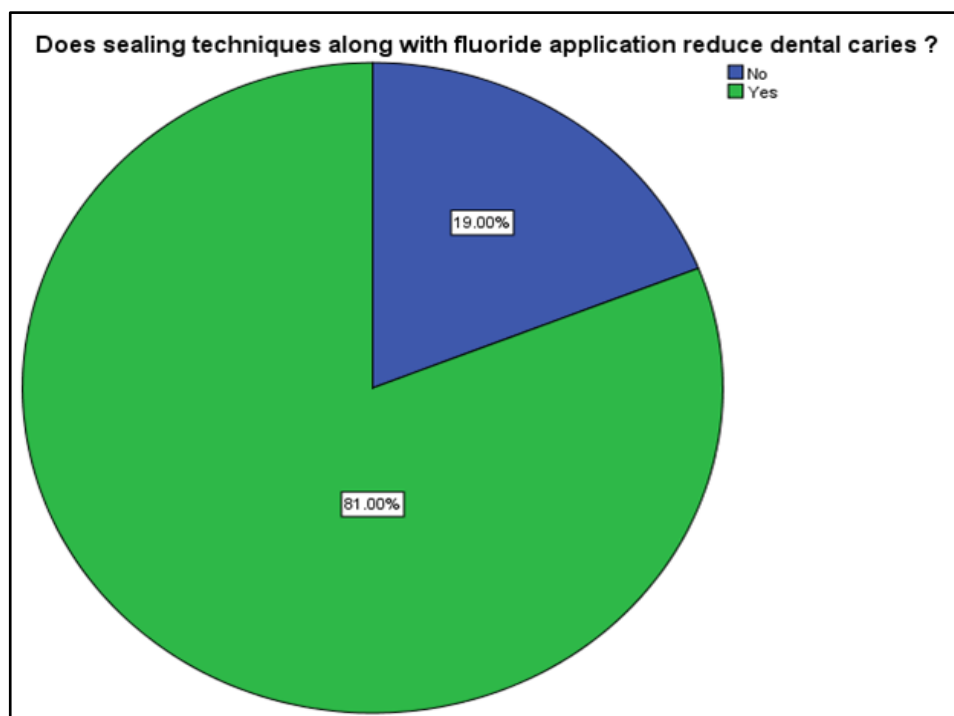


Figure: 12 The pie chart represents the percentage of participants' awareness on sealing technique, in which 81% of individuals are aware that sealing along with fluoride application reduce dental caries(green) and 19% of individuals denied the statement(blue).

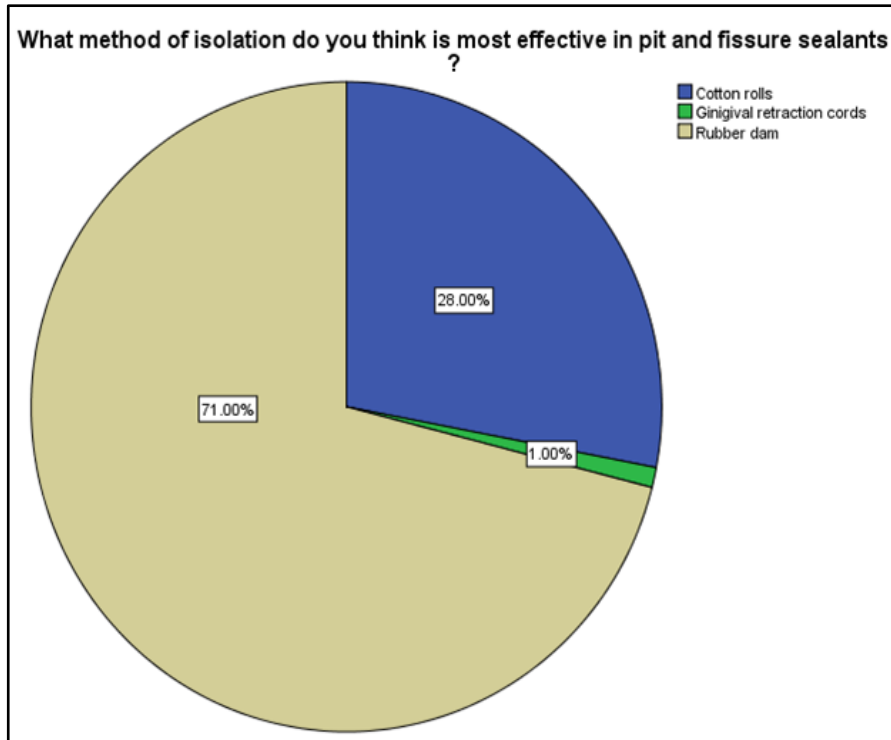


Figure: 13 The pie chart represents the percentage of participants awareness on method of isolation in pit and fissure sealants, in which 71% of individuals answered as rubber dam is effective (beige), 28% of individuals answered as cotton rolls is effective (blue) and 1% of individuals answered as gingival retraction cord is effective (green).

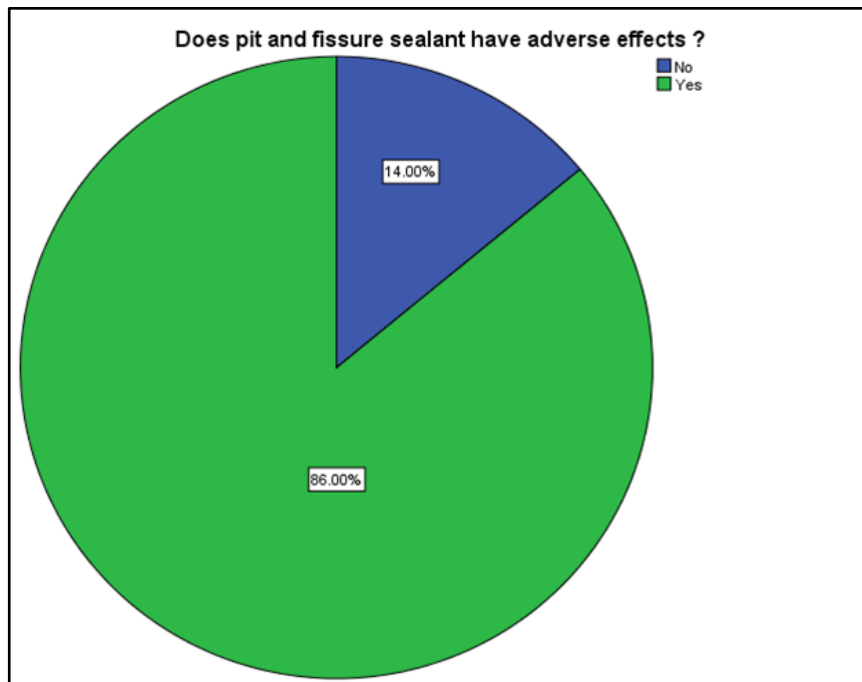


Figure: 14 The pie chart represents the percentage of participants aware of adverse effects on pit and fissure sealants, in which 86% of individuals are aware of the adverse effects (green) and 14% of individuals unaware of the adverse effects.

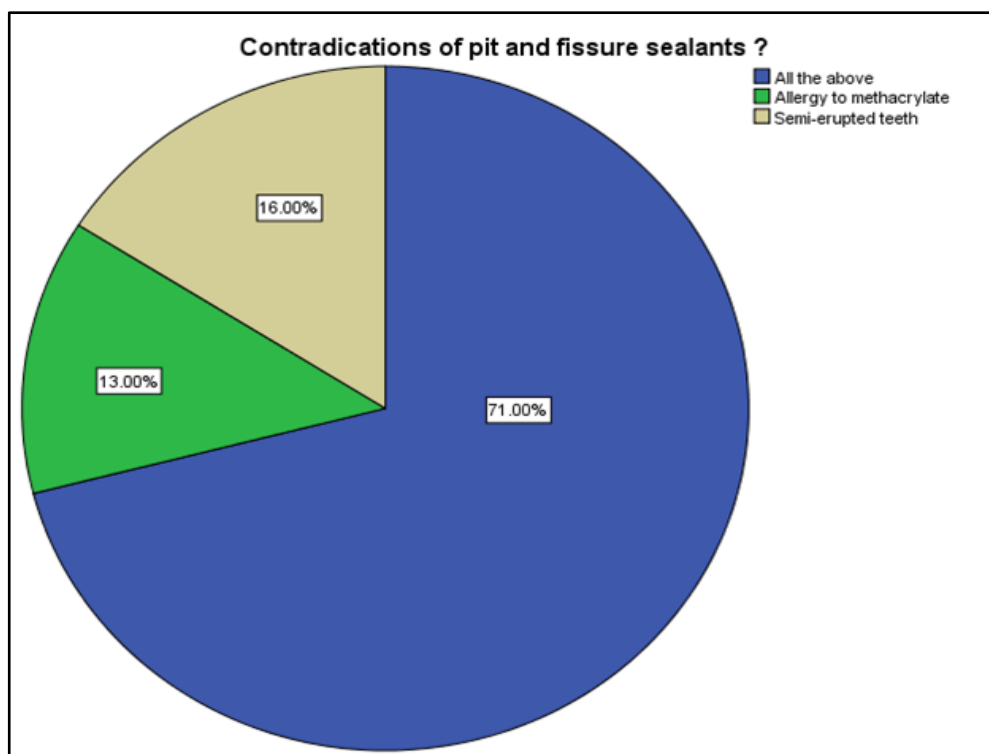


Figure: 15 The pie chart represents the percentage of participants awareness of contraindications of pit and fissure sealants, in which 71% of individuals felt all the above options were contraindications on pit and fissure sealant(blue), 16% of individuals felt that semi-erupted tooth as contraindication(beige) and 13% of individuals felt that allergy to methacrylate(green)

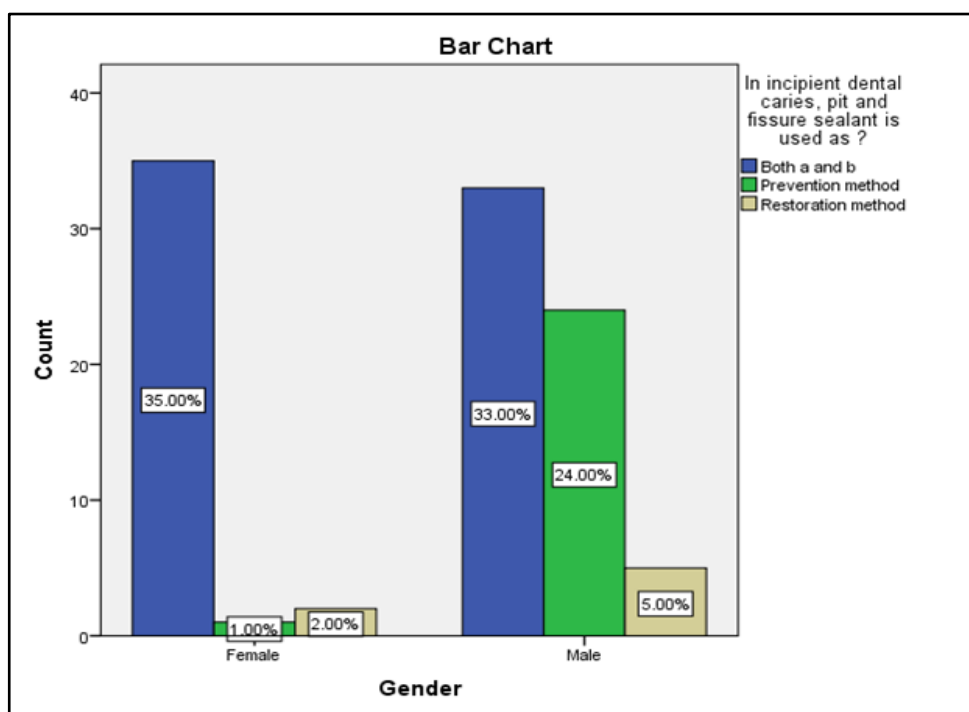


Figure: 16 Bar graph represents the association between gender and purpose of pit and fissure sealants. X axis represents gender and Y axis represents the count of the participants. Here blue represents both a and b, green represents prevention method and beige represents restoration method. The association is statistically significant. Chi square value (p value) = 0.000(p<0.05 is statistically significant).

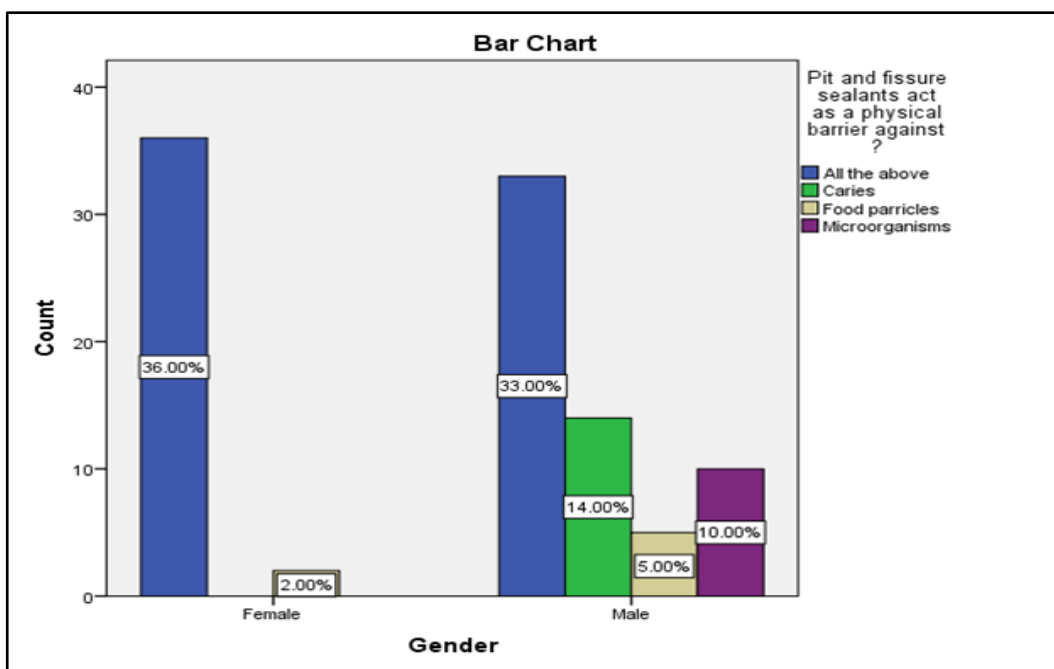


Figure: 17 Bar graphs represent the association between gender and knowledge about pit and fissure sealants. X axis represents gender and the Y axis represents the count of individuals. Here blue represents all the above, green represents caries, beige represents the food particles and purple represents the microorganisms. The association is statistically significant. Chi square analysis value(p value) = 0.000(p<0.05 is statistically significant).

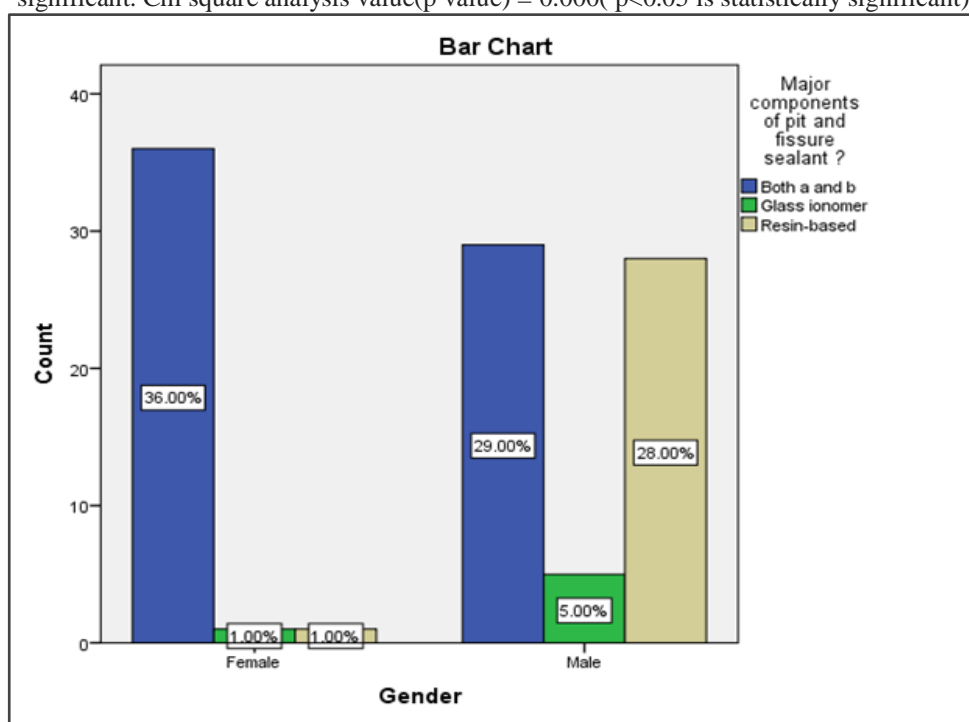


Figure: 18 Bar graphs represent the association between gender and knowledge major components about pit and fissure sealants. X axis represents gender and the Y axis represents the count of the individuals. Here blue represents both a and b, green represents glass ionomer and beige represents the resin based. The association is statistically significant. Chi square analysis value(p value) = 0.000(p<0.05 is statistically significant).

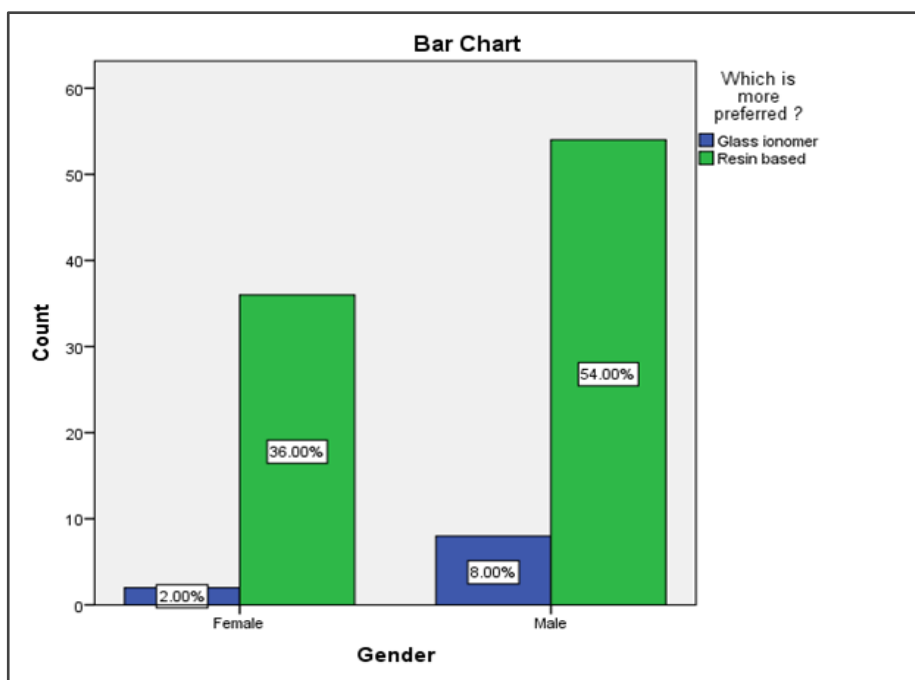


Figure: 19 Bar graphs represent the association between gender and participants preference on pit and fissure sealants. X axis represents gender and the Y axis represents the count of the individuals. Here blue represents glass ionomer and green represents resin based. The association is statistically significant. Chi square analysis value(p value) = 0.000($p < 0.05$ is statistically significant).

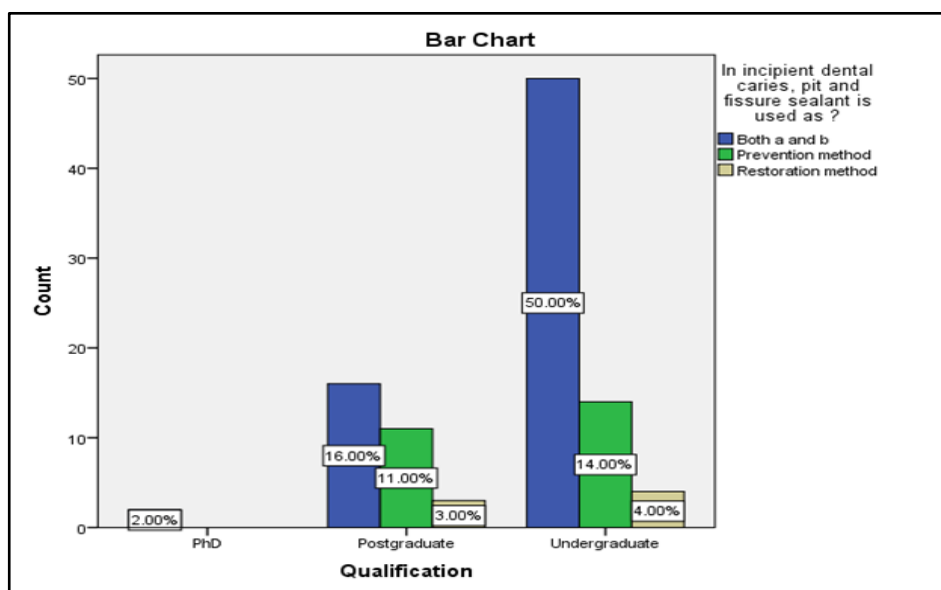


Figure: 20 Bar graphs represent the association between gender and knowledge about pit and fissure sealants. X axis represents educational qualification and Y axis represents the count of the individuals. Here blue represents both a and b, green represents prevention method and beige represents restoration method. The association is statistically insignificant. Chi square analysis value(p value) = 0.301($p > 0.05$ is statistically insignificant).

DISCUSSION:

This study evaluated the knowledge, attitude and perception of pit and fissure sealants on decay. This study was done in the south indian population. The importance of pit and fissure sealants is underestimated. Pit and fissures are most vulnerable sites where caries prevalence is more and quite difficult to treat. Due to this reason pit and fissure sealants were considered as the cornerstone of preventive dentistry.

From the above results, in case of incipient caries pit and fissure sealants can be used as both preventive and restorative technique was agreed by 68% of the participants(Figure:3). A study done by dental students(Ealla *et al.*, 2018), states the

pit and fissure sealants are used as primary preventive tool and also it has a restorative advantage. Dental sealants are one of the most cost effective methods for caries prevention. Around 83% of individuals answered pit and fissure sealants use is more common in occlusal surfaces(Figure: 5). Pit and fissure sealants account for approximately 80-90% of all caries in the permanent posterior teeth and in case of primary teeth around 44%. Sealants are more effective in reducing occlusal caries incidence in permanent posteriors(Govindaiah and Bhoopathi, 2014). High incidence of dental caries is seen in first molars reported by 76% of the participants(Figure: 9). A similar finding was found (Manton and Messer, 1995) that posterior teeth are more vulnerable to caries in comparison with anteriors. First molars have a high rate of caries incidence because of the eruption sequence. It is the first tooth to erupt in the oral cavity and is the only tooth which remains in the oral cavity for a long period of time. Around 69% of individuals are aware that pit and fissure sealants act as physical barriers against caries, micro organisms and also food particles(Figure: 6). Dental sealants provide a physical barricade to cover natural tooth surfaces and grooves, inhibiting the build-up of bacteria and food trapped within those fissures and grooves, preventing tooth decay from the pits and fissures of the teeth. Dental sealants often provide a smooth surface that is readily accessible to the natural protective factor, saliva, as well as toothbrush bristles(Simonsen and Neal, 2011).On looking into the major components of pit and fissure sealants, 65% of individuals preferred resin based material over the glass ionomer material(Figure:8). But a study states (Brignardello-Petersen, 2018) the opposing results. Despite the higher non-success rate, GIC materials were found to be more successful in preventing the production of caries than resin-based sealants. This may be explained by GIC's fluoride-releasing property, which raises salivary fluoride levels and may help prevent dental caries. In most cases, resin-based sealants are the ideal material for denture sealants. When there are questions about sufficient moisture control, GIC material may be used as a temporary protective layer.

Around 84% of the individuals felt that tooth preparation is required for application of pit and fissure sealants(Figure: 10). Before the application of pit and fissure sealants, the surface of the tooth should be whipped or cleaned properly. More than 70% of individuals are aware that application of acid etching influences the adhesion property(Figure:11). Etching of tooth surface with an acid is to remove the smear layer and open enamel tubules, promote the retention of resin based pit and fissure sealants and increase the mechanical retention(Zhu *et al.*, 2014). Awareness of method isolation in pit and fissure sealants, rubber dam technique was chosen by around 70% of the participants(Figure:13). Analysing the different isolation techniques, rubber dam technique seemed to possess good retention followed by cotton rolls(Kumaran, 2013).

On analysing the association graph females had a good percentage of awareness regarding the purpose , advantage and components of pit and fissure sealants when compared with males. But on looking into the preference of choosing the material of pit and fissure sealants, males chose more resin based when compared with females. Assessing the awareness with correlating the educational qualification of the participants, undergraduates had more awareness when compared with PhD students. This is because the percentage of undergraduate students who participated in this study was comparatively more. Limitation of the study includes small sample size and homogenous population.

CONCLUSION:

Our present study concludes that knowledge, awareness and perception of pit and fissure sealants on decay was found to be moderate. Females had more awareness compared with males. Future studies should concentrate on creating awareness programs to make a healthier society.

AUTHORS CONTRIBUTION:

Akshaya has done the data collection, statistical analysis and manuscript preparation. Dr. Deepak.S had edited and revised the manuscript of the present study.

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CONFLICT OF INTEREST:

The authors have no conflict of interest.

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