



AWARENESS ON MODE OF POLYMERISATION AND POLYMERISATION DEVICES AMONG UNDERGRADUATES - A KAP SURVEY

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Abstract: Objective: Clinical successful use of resin-based composite restorations (RBCs) depends on knowledge of polymerisation related factors. The purpose of this study was to evaluate the knowledge of polymerisation of resin based composite. **Introduction:** Resin-based composite (RBC) goes from a plastic phase to a semisolid phase through a process called polymerization. The start of this process involves reactions that produce free radicals. These free radicals can be the result of energy (heat or light) or chemical activation. **Materials and methods:** A questionnaire consisting of 10 multiple choice questions was prepared based on the methods of polymerisation using online software. This study was conducted online which included 103 participants who were the undergraduates doing dentistry. The data were collected and analyzed through SPSS software. **Conclusion:** The study suggests that undergraduates knowledge on polymerisation of resin base composite restorations is good.

Keywords: polymerisation methods, LED, resin composite materials, monomers

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INTRODUCTION

Resin based composite materials (hereinafter alluded to as composites), because of their positive physical and mechanical properties, including high protection from compression and wear, generally low expenses and straightforward application (Papadogiannis *et al.*, 2008) (Arola, Galles and Sarubin, 2001). Composites are basically made of three fundamental segments: resin based organic matrix, inorganic filler particles or nonorganic dispersed phases and organic inorganic bonding agent, silane(Maserejian *et al.*, 2012) . Organic matrix lattice is made of monomers, that, because of polymerization, bond into polymers and structure a three-dimensional organization, which is loaded up with fillers (Dudea *et al.*, 2016). Since the presentation of light-cured resin based composite, probably the best test has been the nature of their polymerization. Sufficient polymerization is an urgent factor in getting ideal mechanical properties and guaranteeing agreeable clinical execution of resin composite materials (Furtos *et al.*, 2005). Diminished biocompatibility because of the arrival of unreacted monomers (Cokic *et al.*, 2018)and drops in actual properties, like a

decrease in colour stability (Albuquerque *et al.*, 2013), are different results of deficient polymerization. A few elements may influence the photograph polymerization of gum composite materials, including the kind of light relieving unit, restoring boundaries, illumination models, temperature, concealing shades, photograph initiator framework, monomers, fillers, thickness, and optical properties (Rueggeberg, 2005; Schneider *et al.*, 2008). Our team has extensive knowledge and research experience that has translated into high quality publications (Choudhari and Thenmozhi, 2016; Govindaraju, Jeevanandan and Subramanian, 2017; Ravi *et al.*, 2017; Vikram *et al.*, 2017; Gupta, Ariga and Deogade, 2018; Hannah *et al.*, 2018; Kavarthapu and Thamaraiselvan, 2018; Pandian, Krishnan and Kumar, 2018; Ramamurthy and Mg, 2018; Ashok and Ganapathy, 2019; Ramesh *et al.*, 2019; Sharma *et al.*, 2019; Venu, Raju and Subramani, 2019; Wu *et al.*, 2019; Samuel, Acharya and Rao, 2020)

MATERIALS AND METHODS

The advantage of this study was the properly defined population, as the study setting was an online survey. We were able to reach more people and the study population was educated so they were able to make better knowledge choices. People involved in this study were the undergraduates in Chennai. The total sampling size of the survey was 100 and the sampling method used was a simple randomised method. The primary data collection was done through an online portal. Prominently known as google forms. The questionnaire totally consisted of ten questions. Questionnaire validity checking was done in a standard manner. Output variables, the data collection software scores represent the participant's awareness as a bar graph. The statistical test used was descriptive analysis and mean variable statistics software used was SPSS. Analysis used was comparative analysis, correlation and association. Steps followed in software analysis were entering the data in excel

sheet and making the necessary steps and entering them in SPSS and generating the bar graph was required.

RESULT

Among the people who took the survey, 78.4% are males and 21.5% are females. Participants were asked about light sources they were aware of. 24.2% answered plasma arc light, 15.5% answered argon laser, 8.7% answered pale yellow, 51.4% answered purple. Students who took up the survey were asked through what activation does polymerisation happen. 78% answered by chemical activation. 10.7% answered by heat activation and 7.8% answered by mechanical activation. What makes the curing composite materials get converted from monomers to polymers. 73% answered chemical activation, 16% answered they don't know (Santini and Turner, 2011). The students were asked about the intensity of LED. 60% answered 440-480 nm . 31% answered 420-440 nm and 8.7% answered 440-420 nm. The students were asked about the recently developed polymerisation devices. 63% answered digital light processing. 25.2% answered 3D photo polymerisation. 11.6% answered stereolithography.

DISCUSSION

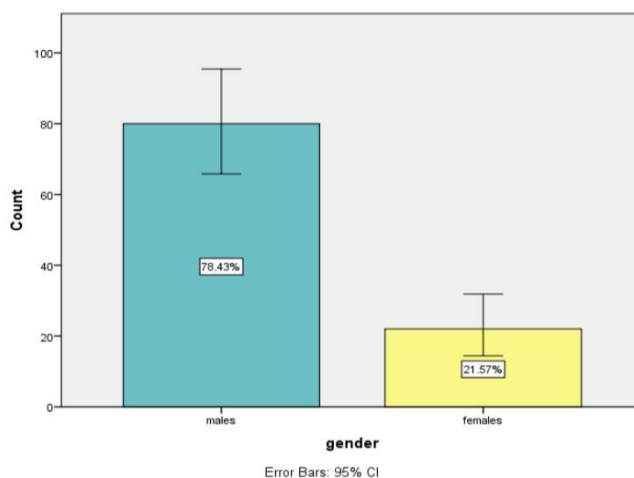


Figure 1: The pie chart depicts the percentage distribution of the gender of people who took the survey. 78.4% were males (blue) and 21.5% were females (yellow).

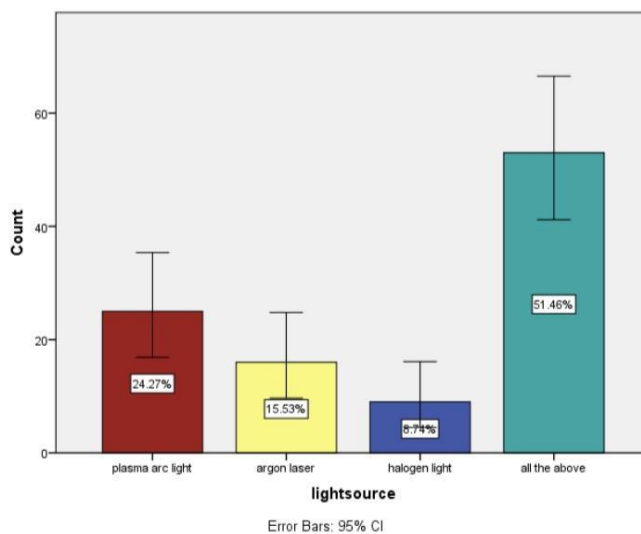


Figure 2: The pie chart depicts the percentage distribution of the awareness of types of light sources among the undergraduates. 24.2% answered plasma arc light (brown). 15.5% answered argon laser (yellow). 8.7% answered halogen light (blue). 51.4% answered all the above (green).

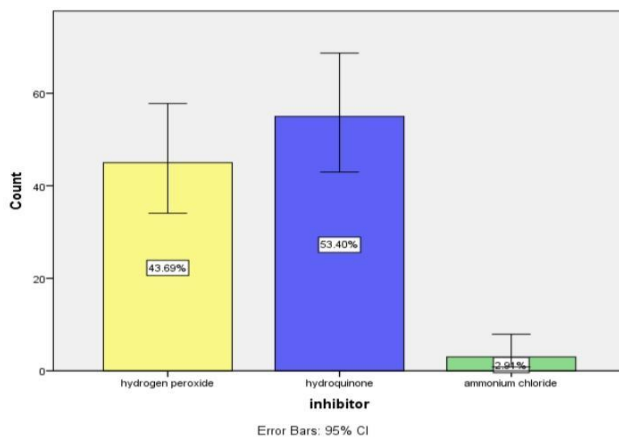


Figure 3: The pie chart depicts the percentage distribution of the awareness of the inhibitor of chemically activated resin. 43.6% answered hydrogen peroxide (yellow). 53.4% answered hydroquinone (blue). 2.9% answered ammonium chloride (green).

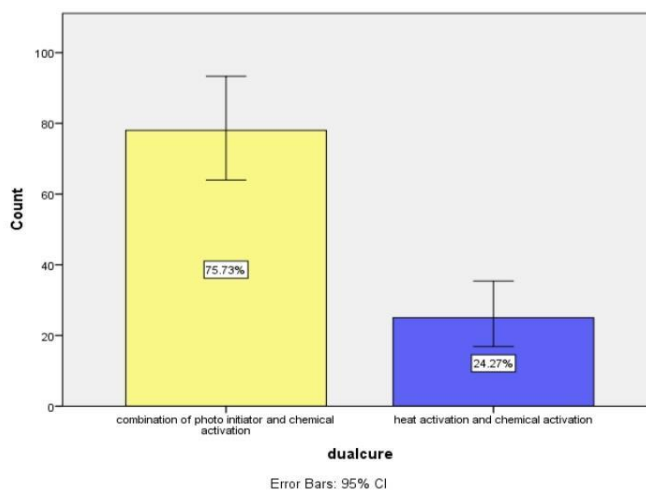


Figure 4: The pie chart depicts the percentage distribution of what is dual cure. 75.7% answered the combination of photoinitiator and chemical activation (yellow). 24.2% answered heat activation and chemical activation (blue).

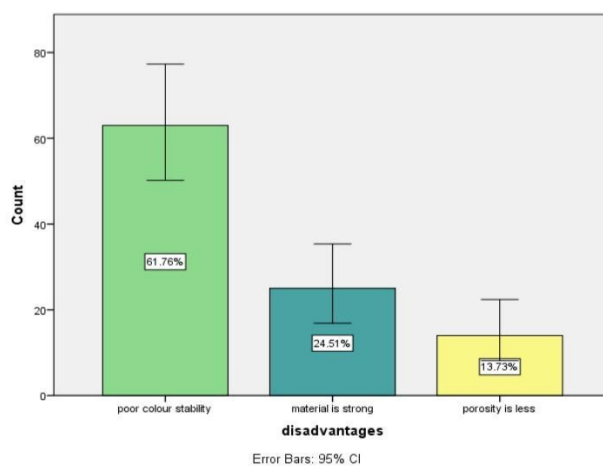


Figure 5: The pie chart depicts the percentage distribution of the disadvantages of self cure. 61.7% answered poor colour stability (green). 24.5% answered material is strong (blue) and 13.7% answered porosity is less (pale yellow).

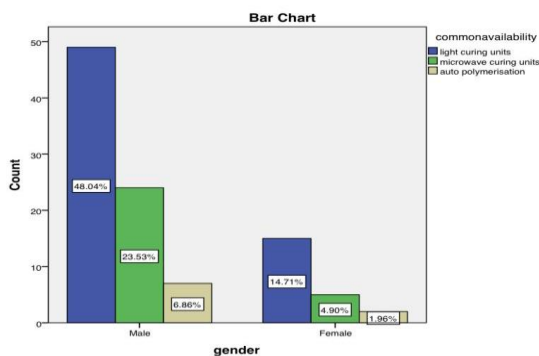


Figure 6: The bar chart depicting the comparison between gender and the commonly available polymerisation devices. X axis represents gender and Y axis represents the commonly available polymerisation devices that are the light curing units (blue),microwave curing units (green), and auto polymerisation (pale yellow). Majority of the males were aware of the commonly available polymerisation devices (48%) . Chi square test $P = 0.455$

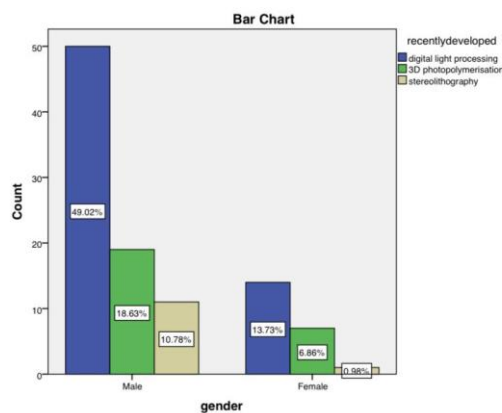


Figure 7: The bar chart depicting the comparison between gender and the recently developed polymerisation devices. X axis represents gender and Y axis represents the recently developed polymerisation devices that are the digital light processing units (blue),3D photopolymerisation (green), and stereolithography (pale yellow). Majority of the males were aware of the recently developed polymerisation devices (49%). Chi square test $P = 0.430$

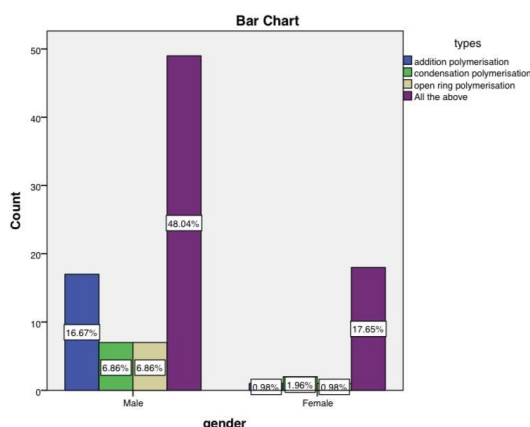


Figure 8: The bar chart depicting the comparison between gender and the types of polymerisation. X axis represents gender and Y axis represents the types of polymerisation that are the addition polymerisation (blue),condensation polymerisation (green), and open ring polymerisation (pale yellow) and all the above (purple). Majority of the males were aware of the indicator of age estimation in children (48%) . Chi square test $P = 0.238$

CONCLUSION

The study was conducted among dental undergraduates. The present study concluded that people have very good knowledge on the methods of polymerisation. The consistent finding of lack of knowledge among respondents to the study is therefore likely to be strongly indicative of a more general need for training and guidance in this aspect.

AUTHOR CONTRIBUTIONS

Pinky Ruskin contributed for the conception of the study, developed the questionnaires and performed data collection, interpretation of the results, and wrote the manuscript from the support of the Guide.

Dr. SankeerthanaKolli contributed for guidance, the design of the work, verified the analytical methods, supervised the findings of the work, revised the article and final approval for publication.

Conflict of interest: The authors declare no conflict of interest.

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