AWARENESS ABOUT THE ROLE OF CBCT IN IDENTIFICATION AMONG DENTAL STUDENTS

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ABSTRACT:

INTRODUCTION: Cone-beam CT machines are widely used nowadays. It has become a standardised diagnosing tool. It helps with 3D planning implants. It was used for high reconstruction. In 2D projection, it helps in the construction of circular orbit.The differences between the target object in the physical imaging process and mathematical modeling. They have divergent forms of X-ray. It is used for dental and maxillofacial imaging. **AIM**: To create awareness about the role of CBCT in identification among the dental students. **MATERIALS AND METHODOLOGY**: Fourteen carefully crafted questions covering sociodemographic data, knowledge, attitude, and perception were generated and sent to the participants via online Google forms. **RESULTS**: among 100 dental students 76% of students were aware of the role of CBCT in identification. And 24% were not aware of the CBCT identification.The survey was conducted among 100 college students. When gender and awareness of CBCT was compared both males and females were aware about CBCT .The p value for the Pearson chi-square test is 0.876 (p value>0.05). It is therefore not statistically significant. **CONCLUSION**: From this survey, we conclude that CBCT was aware among many students. But the role and scope should be aware. In the future, CBCT will be a great tool.

KEYWORDS: Innovative technology, Knowledge, awareness, dental students, Cone beam CT

INTRODUCTION:

Cone-beam CT (CBCT) scanners are extensively utilized in numerous nations. The method is currently evolving into a common diagnostic instrument.(1) It is utilized for jaw and face evaluation, visualizing aberrant teeth, and three-dimensional (3D) implant planning. In a single scan, it offers 3D imaging of the teeth, soft tissues, nerve pathways, and bone.(2) Using a large number of two-dimensional (2D) X-ray projections taken in a circular orbit around the target

object, CBCT machines rebuild the volume.(2,3) The function was found in 1917 by the Austrian mathematician Johann Radon using the integrals over an unlimited number of lines that passed through the function. A grayscale distribution in imaging can be thought of as a mathematical function (4). Advanced imaging with significant clinical utility in dentistry is CBCT. It successfully explores modality.Cone-beam tomography allows the 3D image to visualize the dentoalveolar structure avoiding the major limitation of conventional radiography. CBCT has a great role in disease detection.(6)

In endodontics, CBCT is used for diagnosing and treatment planning. Which helps to see the periapical, root fracture, exploration of root canal anatomy. Diagnosing images help in achieving the lowest possible dose of radiation. (7) A valuable source of information, CBCT helps with bone measurement, enhances implant failure prevention, and improves case selection and assistance. Assessments of bone grafts and additional post-treatment assessments are carried out.(8). When evaluating the tooth's relationship to important structures that could obstruct orthodontic treatment, as well as the bone density before, during, and after treatment, CBCT is a trustworthy tool. It is also useful when determining whether small screw implants need to be placed.(9). CBCT is a non-invasive method for age assessment that can be used for tooth extraction, jawbone resection, and sectioning. Using microfocus computed tomography, age is estimated using a 3D volume ratio of the pulp cavity to the entire tooth in a variety of single-rooted teeth(10). There are numerous benefits.(11),(12),(13),(14),(15),(16),(17),(18),(19),(20),(21),(22),(23),(24),(25),(26),(27),(28),(29),(30) .The aim of the study is to create awareness and assess the knowledge about the role of CBCT in identification among dental students.

MATERIALS AND METHODS:

In this study, dental students' awareness of the use of CBCT in identification was examined. One hundred dental students were given a well-structured questionnaire with fourteen questions covering sociodemographic, knowledge, attitude, and perception. The questionnaire was distributed using an online Google Form link.

This study set is a prospective observational study. Its advantages are low cost, simple to design, big data collection, rapid interpretation, and broad reach. Its disadvantages are survey fatigue, a homogeneous population, and survey response fatigue. The Saveetha Dental College in Chennai's scientific review board has accepted the project. A basic random sampling technique was used. Internal and external validity, reducing question error, and avoiding leading questions are the strategies used to minimize sampling. Risk factors, comorbidities, and CBCT identification among college students provide the basis of internal validity. The awareness, research findings, and study outcome serve as the foundation for external validity. The output variable is linked to social media, demographic data, caution, avoiding contaminated individuals, and frequent hand washing. Pie charts are used to show the output variables for every output. Pie charts and bar graphs were used to display the ordinal data for each output variable that was gathered. SPSS

software version 23.0 was used to conduct a statistical test. Frequency percentage and descriptive analysis were employed in the statistical test.There was also a statistical significance of $p<0.05$ using the Pearson Chi Square test. Significant non-parametric correlation was found at $p < 0.05$.

RESULTS:

This survey involves the percentage of awareness on CBCT role in identification. 51% of the respondents were male and 49% were female (Fig 1). 84% belonged to UG and 16% of the students belonged to PG (Fig 2). 76% of the students said that they were aware of the role of CBCT in identification, and 24% said that they were not aware of CBCT (Fig 3). 72% said that CBCT stands for cone-beam computed tomography and 28% said that CBCT stands for conventional beam computed tomography (Fig 4). 30% of the students said that CBCT is used in dental implant planning, 21% said that it is used in visualizing the abnormal teeth and 11% said that it is used in the evaluation of jaw and face (Fig 4). And 38% said that it is used in all the above. In fig-6, 79% of the students said that CBCT provides 3D images of teeth, soft tissue, nerve pathway, bone in a single scan and 21% of the students said no. In fig-7 70% said that ionising radiation is divergent and 30% said that it is convergent. In fig-8 53% said that CBCT is safer to use and 47% said that it is not safer. In fig -8 31% said that radiation exposed by CBCT is above 1000, 41% said that radiation is 400-1000 and 28% said that radiation is 500-1000, In fig-9 59% said CBCT provides 3D in all planes and 41% said CBCT does not provide in all planes. In fig-10, 62% said CBCT does not pass through the soft parts and 38% said it passes through the soft parts. In fig-11, 2% said that in CBCT the age is determined by pulp ratio, 23% said tooth ratio, 37% mandibular of 1st premolar and 38% said by all the above. In the fig-12 25% said CBCT is not useful in forensic science and 75% said it is useful in forensic odontology. In fig-14 83% said that they have used CBCT and 17 % said they have not used CBCT. in Figure 15's bar graph illustrates the relationship between gender and CBCT awareness. The p value for the Pearson chi-square test is 0.876 (p value>0.05). It is therefore not statistically significant. The bar graph in Figure 16 shows the relationship between gender and the safety of CBCT. The p value for the Pearson chi-square test is 0.17 (p value>0.05). It is statistically significant as a result. The relationship between gender and CBCT usage is depicted in the bar graph. Gender is represented by the X-axis, and CBCT usage are represented by the Y-axis. The p value, as indicated by the Pearson chi-square test, is 0.151 (p value>0.05). It is statistically significant as a result.

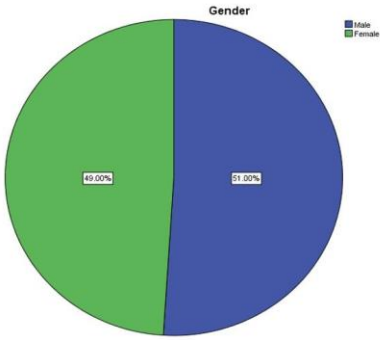

Fig 1: Pie chart shows the responses of gender. 51% participants were males and 49% participants were females . Blue indicates male and green indicate female.

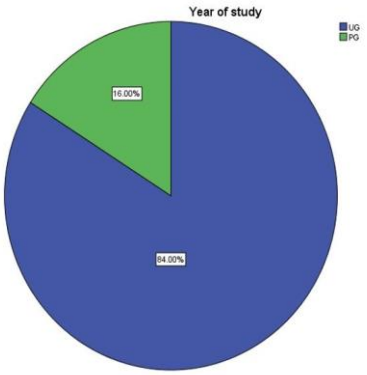

Fig 2 : Pie chart shows the year of study of the participants of the study. 84% were undergraduates and 16% were postgraduates. Blue indicates UG and green indicates PG.

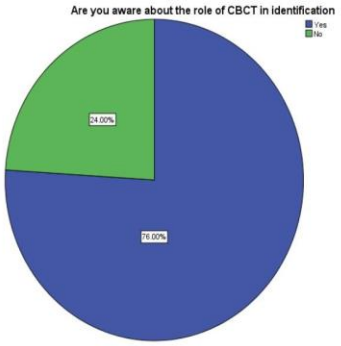

Fig -3: Pie chart shows the percentage of awareness of the role of identification in CBCT , in that 76% of the participants were aware about the CBCT and 24 % were not aware about the CBCT, blue indicated the participant who were aware and green indicated participants who were not aware.

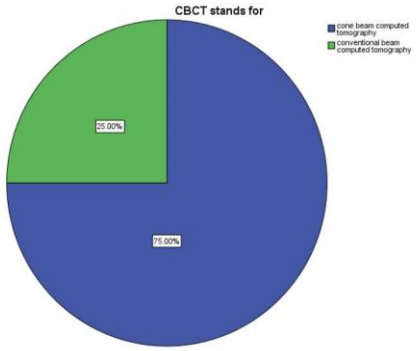

Fig -4: Pie chart shows the knowledge about for the question CBCT stands for. 75% said that CBCT stands for cone beam computed tomography and 25% said that CBCT stands for conventional beam computed tomography. Blue indicates cone beam computed tomography and green indicates conventional beam tomography.

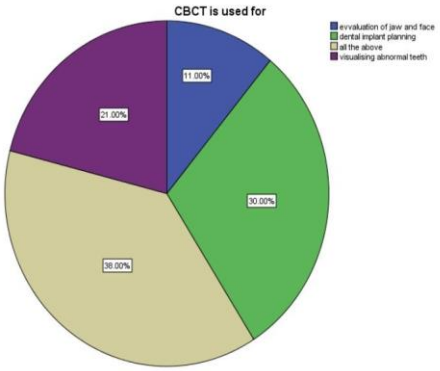

Fig-5: Pie chart shows the knowledge about the uses of CBCT. 11% said that it is used for evaluation of jaw and face , 30% said that it is used for dental implant planning , 21 % said that it is used for visualising the abnormal teeth, and 38% said that it is used for all the above. In that blue indicate the evaluation of jaw and face , green indicate the dental implant planning , purple indicate the visualizing abnormal teeth and grey indicate all the above.

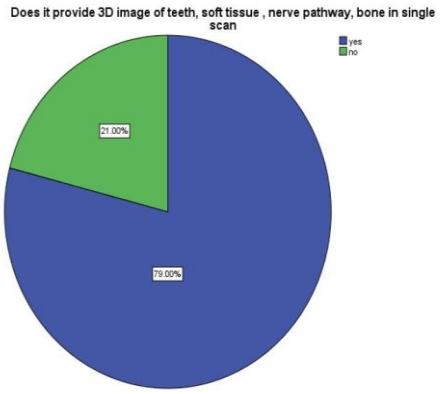

Fig -6: Pie chart shows the knowledge about CBCT providing 3D imaging in single scan . in that 79% said it can be seen in a single scan and 21% said it cannot be seen in the single scan. Blue indicates yes and no indicate green.

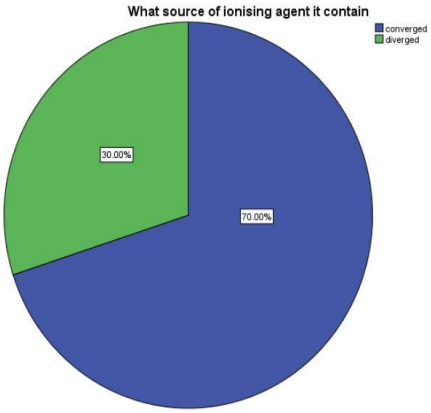

Fig -7 : Pie chart shows the knowledge about the source of ionising agent. 70 % said it is converged and 30% said it is diverged. Blue indicates convergence and green indicate diverged .

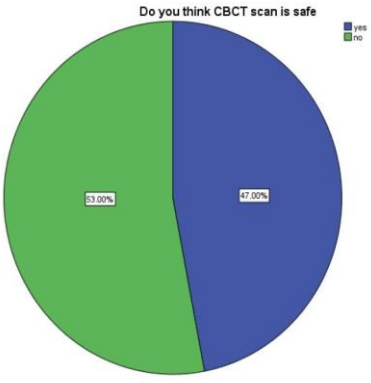

Fig 8: Pie chart shows the response about the safely of CBCT , 47% said yes and 53% said it is no easier. In this blue indicates yes and green indicates no.

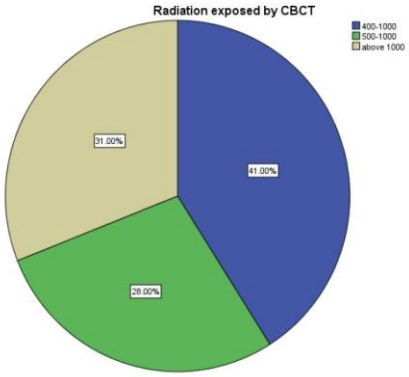

Fig 9: Pie chart shows the response about radiation exposed by CBCT . 41% said radiation exposed by CBCT is 400-100 percent , 28% said radiation exposed by CBCT is 500 -1000 percent and 31% said CBCT exposed radiation above 1000 percent. In that blue colour indicates 400-1000 , green colour indicates 500-1000 and grey colour indicates above 1000.

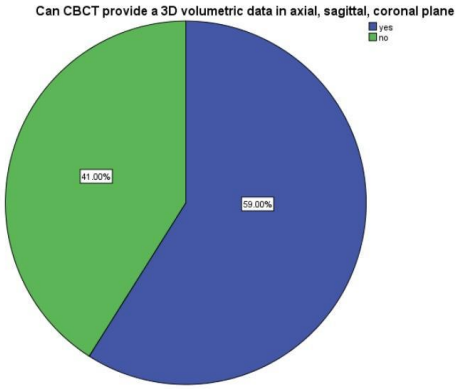

Fig 10- Pie chart shows the response about CBCT providing a 3D plane . 59 % said that it provides a 3D plane and 41% said it does not provide a 3-D plane. In this blue colour indicates yes and green colour indicates no.

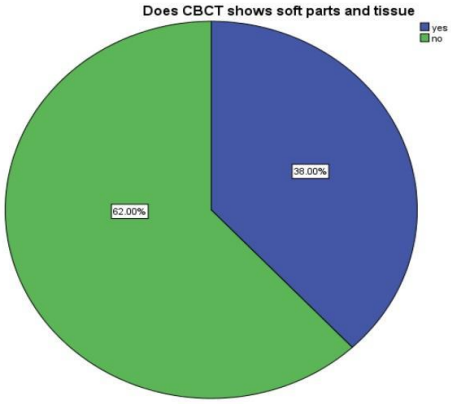

Fig -11: Pie chart shows the response of the participants about CBCT showing soft parts and tissue. In that 62% said no and 38 % said yes . Blue colour indicates yes and green colour indicates no

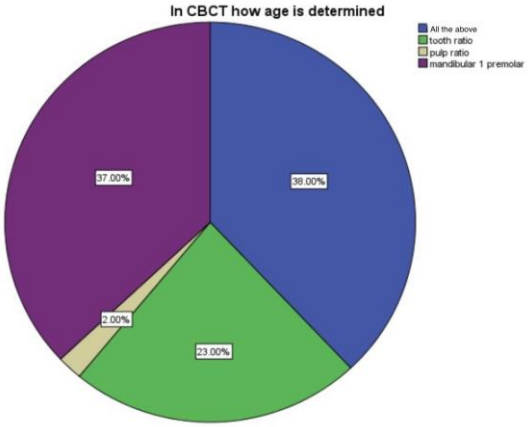

Fig 12- Pie chart shows the percentage of how CBCT is useful in determining the age. In that, 23% said that it is by tooth ratio, 2% said that it is by pulp ratio, 37% said that it is by mandibular 1st premolar and 38% said that it is by all the above. In this green indicate tooth ratio, grey colour indicate pulp ratio, purple colour indicate mandibular 1st premolar and blue indicate all the above.

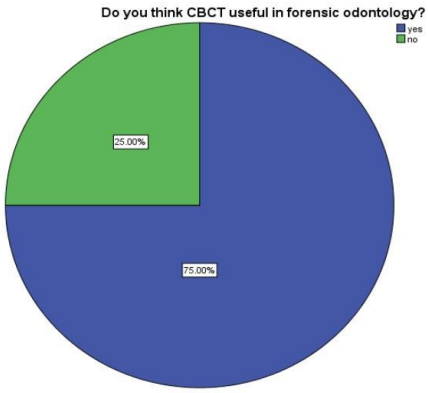

Fig 13: Pie chart shows the awareness about the participants whether CBCT is useful in forensic odontology . 75 % said yes and 25% said no. Blue colour indicates yes and green colour indicates no.

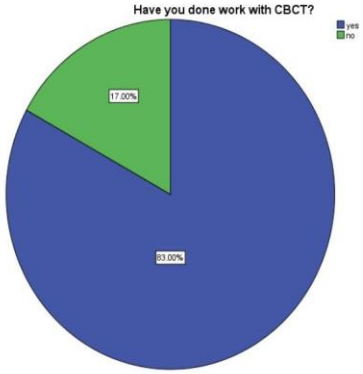

Fig -14: Pie chart shows the percentage of participants who work with CBCT . In this 83% said yes and 17% said no. Blue colour indicates yes and green colour indicates no.

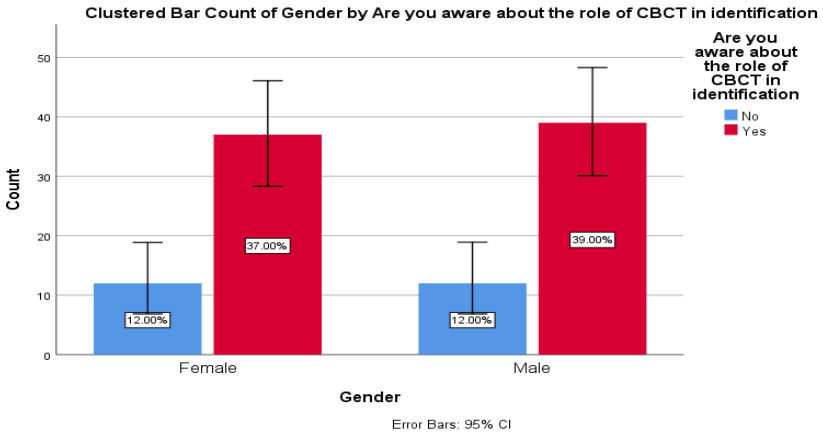

Fig 15: The bar graph represents the association between the gender and awareness of CBCT. X-axis represents the gender and the Y - axis represents the awareness of CBCT. Blue colour denotes they were aware about the CBCT and green colour represents they were not aware about the CBCT. Both males and females were aware about CBCT .Pearson chi -square test shows the p value is 0.876 (p value>0.05). Hence, it is statistically not significant

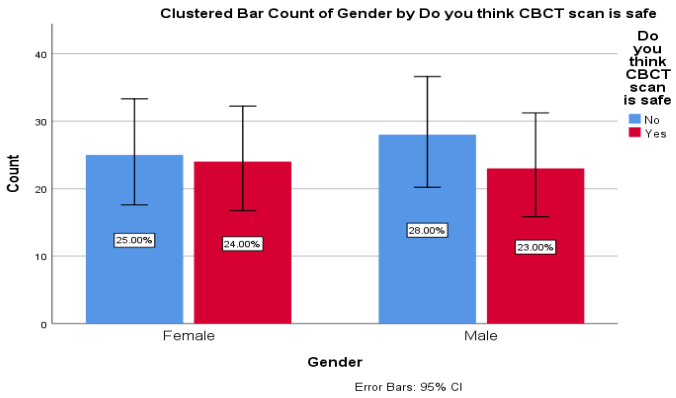

Fig- 16: The bar graph represents the association between the gender and whether CBCT is safe. The X- axis represents the gender and the Y - axis represents the CBCT is safe. Blue colour denotes they were safe about the CBCT and green colour represents it is not safe about the CBCT. Both male and female said that it is not safe .Pearson chi -square test shows the p value is 0.17 (p value>0.05). Hence, it is not statistically significant.

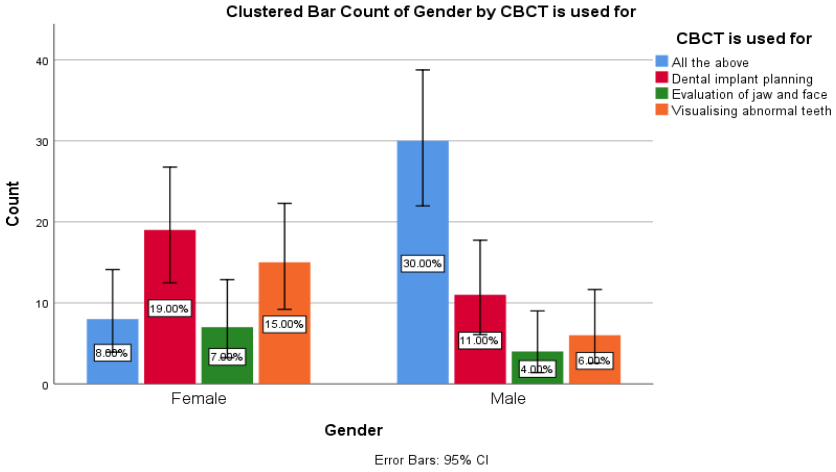

Fig 17: The bar graph represents the association between the gender and uses of CBCT. X- axis represents the gender and Y - axis represents the uses of CBCT. Blue colour denotes CBCT is used for evaluation of jaws about the CBCT . Green colour represents CBCT can be used for dental implant planning, violet colour represents that it can be used for visualising abnormal teeth and grey colour represents all the above uses. Both male and female said that it is used for all purposes. Pearson chi -square test shows the p value is 0.151(p value>0.05). Hence, it is statistically not significant.

DISCUSSION:

This survey involves the percentage of awareness on CBCT role in identification. In fig-1 51% of the respondents were male and 49% were female. In fig-2 84% belonged to UG and 16% of the students belonged to PG. in the previous survey many of them were aware of the role of CBCT in identification, in the previous article the author described well about the CBCT which has For linear measurements from CBCT 3D and multiplanar images, excellent intraobserver reliability and good to high precision interobserver reliability values were found (fig. 3) (31). When compared to the preceding article, conventional beam computed tomography (CBCT) offers a three-dimensional representation of the pulp canal space, enabling the clinician to ascertain the spatial relationships between the root canals at different cross-sectional levels throughout the root's length (32). A survey including dentistry students revealed that CBCT is utilized for dental implant planning, aberrant tooth visualization, and jaw and face evaluation (fig-5). The author of the prior paper stated that they were examined in the axial, sagittal, and coronal planes of CBCT images. Different criteria. Many factors, including the quantity of roots, number of canals, kind of root

canal, diameter of the root, and root canal (33). When compared to the current study in (fig. 6) (34), students stated in the prior survey that CBCT gives 3D views of teeth, soft tissue, nerve pathways, and bone in a single scan.Anthropometric measurements obtained from CBCT scan. Further, bone measurements are used with CBCT. The frontal sinus helps in identifying the intact bones in CBCT which is an imaging device that uses a cone-shaped X-ray beam. The X-ray source and detector rotate around a field of interest of the patient (34)The received images are transferred into a computer that performs primary reconstructions which can be viewed as 2D multiplanar reformatted slices or in 3D. The advancements in oral and maxillofacial radiology, together with the availability and affordability of CBCT devices, lead to an increase in scanning in the field of dentistry and forensics science(35).

Forensic identification can be performed using the reconstructed image. Although some research has been done, this approach is still in its early stages of testing. To increase its efficacy and precision, more research studies focused on the Indian population might be conducted.Oral and maxillofacial surgery, endodontics, orthodontics, implantology, temporomandibular joint dysfunction, periodontics, and restorative and forensic dentistry have all made use of CBCT. Dental students lacked awareness and understanding of the significance of identity.

CONCLUSION:

From this survey we conclude that many of the dental students were aware about the CBCT role in identification, and more knowledge on the role of identification should be created among the medical college students. In the future, CBCT will be a great tool in forensic dentistry.

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CONFLICT OF INTEREST: NIL

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Ethical Clearance:- Not required

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