

# KNOWLEDGE ABOUT RECENT MODIFICATIONS IN THE CLASSIFICATION OF ODONTOGENIC TUMOUR AMONG ORAL PATHOLOGIST - A QUESTIONNAIRE BASED SURVEY

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## ABSTRACT

Classification is the process of grouping similar entities under one category for the ease of their comprehension and better handling. The WHO systems of classification is a time-honoured system that has prevailed from decades together and is under constant evolution. Classification of Odontogenic Tumours was formulated by Pierre Paul Broca and has undergone several transformations over 1989 - till 2017. So many entities appear every year in the classification. The study aimed to assess the knowledge, awareness regarding recently revised modification of OT among oral pathologists. A cross-sectional, questionnaire-based survey study was conducted among 100 oral pathologists around Chennai and Puducherry population. Ethical clearance was given by the institutional review board and study was conducted over a period of 2 weeks through the questionnaire in Google Forms and sent in an email link. Questionnaire was divided into various sections based on demographic data, awareness and knowledge along with feedback questions are added in that survey. The statistical analysis done with software 2.1.0 version and Microsoft Word and Excel sheet were used to generate tables and graphs. Of the 100 questionnaires are filled and returned to the response rate of 100%. Majority of the participants fall under the age of 28 - 29 years of about 51% remaining in 24-27 years (34%) with female predominance of 93% (n=93). Majority of the participants were PG residents of about 81%. In that 15% of the participants are not aware about the update version of classification. This survey is first of its kind. From the survey, we conclude that although oral pathologists were aware about OT classification but still most of the PG residents did not have enough knowledge regarding updation in the classification of OT. So, to create awareness regarding odontogenic tumour classification is of utmost importance for oral pathologists as odontogenic tumours are key lesions in diagnosis of oral and jaw swellings.

**KEYWORDS:** Oral pathologist; Odontogenic tumour; Questionnaire based survey; Recent modification; WHO classification

## INTRODUCTION

Odontogenic tumour(OT) are a group of heterogeneous lesions derived from epithelial and/ or mesenchymal elements are a part of the tooth- forming apparatus(Regezi and Sciubba, 1993). OT ranged from hamartomatous or neo neoplastic tissue proliferation to malignant neoplasms with metastatic capacity(Reichart and Philipsen, 2003). Many reviews literature revealed that Odontogenic tumour was associated with 1% and 30% of oral lesion(Arotiba, Ogunbiyi and Obiechina, 1997),(Odukoya, 1995). The first major attempt to classify this group of lesions was published 1971 after a 5 year effort, organised by WHO(Pindborg, Kramer and Torloni, 1971). An updated second edition of WHO classification was published in the year 1992(Kramer, Pindborg and Shear, 1992). Due to advances in immunohistochemistry and molecular biology during the last decade, revision of 1992 edition of WHO classification has been proposed by Philipsen and Reichert(Reichart and Philipsen, 2003).WHO again revised the classification and again in 2005. The major changes in the 2005 classification system was 1.Parakeratinized odontogenic keratocyst has termed as keratocystic odontogenic tumour ( KCOT) and is regarded as benign tumour derived from odontogenic epithelium;2.AOT( Adenoid odontogenic tumour has been formed to originate from odontogenic epithelium with mature fibrous stromatolites and not with ectomesenchymal;3.Calcyifying odontogenic cyst (COC) has been divided into a two benign and one malignant lesion; 4. Clear cell odontogenic tumour being a malignant lesion and has been termed as clear cell odontogenic carcinoma ( CCOC);5. Odontogenic carcinosarcoma has been excluded due to lack of evidence for its occurrence as separate entities(Ebenezer and Ramalingam, 2010),(Wright *et al.*, 2014).It was associated with a poor therapeutic outcome and survival despite aggressive multi- modality management(Thangaraj *et al.*, 2016).

In the update 2005, WHO edition defined OT as a group of heterogeneous lesions, the same thing described in 1992 editions. Such edition omitted the classification of odontogenic cyst reclassified and refined OKC to Keratocystic odontogenic tumour(Banes *et al.*, 2005). The last published edition by the WHO outlines OT as rare tumours-since these constitute only 1% Of all oral tumours, as well as benign entities that somehow present an aggressive behaviour and high recurrence rates(Soluk-Tekkeşin and Wright, 2018). In 2017 edition place where odontogenic cyst back to OTS And now classifies KOT as a cyst, also turning it into an odontogenic keratocyst. Deliberating that this is a common lesion, it is obvious that reclassification and redefinition by this subsistence – both for tumor and cyst – causes a significant increase in the frequency and prevalence of Odontogenic Tumours, as well as the ranking order among Odontogenic Tumours. Other lesion that were excluded and included from 2017 classification could also influence of Odontogenic tumour epidemiology,less significantly than Odontogenic keratocyst,as they are exceedingly limited.For the 2017 classification, the sclerosing odontogenic tumour or carcinoma, or odontogenic carcinosarcoma, primordial odontogenic tumour and cement - ossifying fibrous were included.The cystic odontogenic tumour was relocated to the odontogenic cystic classification,whereas odonto- ameloblastoma and ameloblastoma fibrous- odontoma we're not considered to be single entities(Soluk-Tekkeşin and Wright, 2018),(Speight and Takata, 2018),(Bianco *et al.*, 2020),(Sivapathasundaram, Biswas and Preethi, 2019).

Surgeons, radiologists and pathologists have been improving their classification of tumours and tumour-like lesions of the odontogenic tissues over the years, based on experience, in order to develop a uniform treatment protocol(Ebenezer and Ramalingam, 2010). Thus,this study sought to approach the history of reclassification around odontogenic tumours,as prepared by the WHO, as well as to understand the knowledge regarding odontogenic tumours for a pathologist (both PG resident and oral pathologist practitioners).

## **MATERIALS AND METHODS**

A cross-sectional, descriptive, questionnaire-based survey was carried out to assess the level of KAP regarding revised classification of odontogenic tumour among oral pathologist practitioners and PG residents.Prior to conduct of the study, ethical clearance was obtained from the institutional review board, Saveetha University, which was considered as a part of the study in the form of confidentiality of the respondents. As a total of 100 participants of oral pathologists residing in Chennai and Puducherry. This study was conducted over a period of two weeks through the questionnaire sent in email links.

The questionnaire was divided into various sections of demographic data and KAP towards modification in odontogenic tumour classification recently. The questionnaire was prepared in English containing 20 items. In this, 1-3 questions were demographic data, awareness (4-9) Questions, knowledge (10-18) and feedback (questions-19, 20).( Questionnaire-1)

For statistical analysis, descriptive statistics done for independent variable age, gender, qualification and dependent variables like only oral pathologists along with knowledge, awareness related questions, based on this statistical software SPSS 20.0 version used for analysis. Microsoft Word and Excel sheets were used to generate tables and graphs.

## RESULTS AND DISCUSSION

Out of the 100 participants, all are oral pathologists who participated in the study with a response rate of 100%. Figure-1 shows the majority of the participants under the age group of 20 to 29 years (85%) followed by 30 to 39 years (15 %) respectively. Figure -2 shows the majority of the participants in the study to be female  $n=93$  (93%) followed by male  $n=7$  (7%). Figure -3 shows the majority of the participants were PG residents  $n=81$ (81%) and oral pathologists practitioners  $n=19$ (19%).

For awareness related questions, regarding the percentage of about 1%- For that aware(98%) and not aware (2%) in Figure4. Figure-5 response for OT derived from ectomesenchymal and epithelium shows the response of about 96 % (aware) and 4% (Not aware).Figure.-6 shows the response about OT can occur both intraosseously and extraosseous of about 97% (aware) and 3% (No). Figure-7 shows the response rate of 53% (swelling), 1% (pain) and both (46%) for the question sign and symptoms of OT. Figure-8 has the response rate of 99% aware that the question mandible is the most common site for odontogenic tumours.Figure-9 shows the response rate of 91% aware of the question on recent modification in classification of OT.

Based on a knowledge question, regarding the 1971 classification about “first edition” the response rate is about 85% (aware) and 15% (Not aware) in Figure-10. Figure-11 shows the response rate of about 83% for awareness and 17% (Not aware) for the question “Second edition”of classification of OT in 1992. Figure -12 shows the response of about 85% aware regarding the question COT was introduced in OT in the year 1992.Figure-13 shows the response rate of about 95% for reclassification of OKC to KCOT in 2005. Figure-14 shows the response of 85%aware of the question on revised classification of 2005. Figure-15 shows the response of 84% aware of the question whether CEOC and AOT was included in 2017. Regarding the latest classification in 2017 revised the CEOC and KCOT to COC and OKC , respectively the response rate for the question is about 95% aware in Figure-16. Figure-17 shows the response rate for awareness about 85% regarding the predecessors of odontoma were AFD,FD and odontoameloblastoma in 2017.

Recording their feedback questions,85% have knowledge sufficient concerning OT classification but 15% have no update about the modification.Figure -19. The questionnaire is helpful for understanding odontogenic tumour classification , regarding that 98% (aware) implicate in Figure-20. Figure-21 shows the association of responses based on the qualification to the question ameloblastic fibrodentinoma and fibro odontoma and odontoameloblastoma are now included as a predecessor of odontoma and not a separate entity with 68% of PG residents and 17% of OPP and Chi-square test is statistically not significant with  $p=0.544$ .Figure-22 shows the association of responses based on the qualification to the question ameloblastic fibroma, primordial odontogenic tumor, odontoma, dentinogenic ghost cell tumour is included in reclassification of 2017 with 68% of PG residents and 17% of OPP and Chi-square test is statistically not significant with  $p=0.544$ . Figure-23 shows the association of responses based on the qualification to the question calcifying epithelial odontogenic cyst and adenomatoid odontogenic tumor was not included in revised classification of 2017 with 67% of PG residents and 17% of OPP and Chi-square test is statistically not significant with  $p=0.470$ .Figure-24 shows the association of responses based on the qualification to the question revised classification of benign and malignant OT (2005) to epithelial, mesenchymal and mixed OT in 2017with 67% of PG residents and 18% of OPP and Chi-square test is statistically not significant with  $p=0.187$ .Figure-25 shows the association of responses based on the qualification to the question second edition of classification of odontogenic tumour introduced in 1992with 65% of PG residents and 18% of OPP and Chi-square test is statistically not significant with  $p=0.130$ .

There was a lack of usage of uniform nomenclature among surgeons and pathologists, as the WHO classification has not entirely been adopted completely. There are few published reports of large series of OTs around the world which have to be standardised and updated continuously (Ebenezer and Ramalingam, 2010).

Because, in the present survey mostly common for the oral pathologists, so mostly female is prevalent as an oral pathologist in most places. (Jnaneswar *et al.*, 2017) In the present study, PG residents (81%) and oral pathologists practitioners (19%). Based on the study, 11.11% of PG residents are not aware of recent modifications and 62.96% of PG residents with 0.53% OPP have thought that major symptoms for OT are swelling. 2.4% of PG residents, even don't know the percentage of OT. In the previous case report studies and review studies, the percentage of OT was about 1.3%. Lu.Y.xan in 1998 (Lu *et al.*, 1998) Regzi *et al.* and (Regezi and Sciubba, 1993), Akinola *et al.* (Ladeinde *et al.*, 2005) state that the most common site for OT was mandible, which our participants were well aware of.

90% of the participants, especially the oral pathologists were well aware that the most common symptom of OT is swelling, they are recurrent and were also able to assimilate the reclassification of odontogenic tumours.

Based on the knowledge related questions of this survey, it is suggested that 17.28% of PG residents and 10.53% of Oral pathologists were not aware recent modifications in classification of mixed OT included in 2017 and 11.28% of PG residents and 5.23% of OPP did not have sufficient knowledge about older modifications.

Similarly, Weight *et al.* (Wright and Vered, 2017), update that WHO classification 2017 and 2005 and Phillipsen *et al.* in 1997 (Reichart and Philipsen, 2003) states that worldwide literature surveys published cases of MOT (AF, AFD, FO) and odontoma in spite of the reclassification of these mixed tumours.

In its survey, 80% of the participants are aware of the revised classification of 1971 and 1992, 95% of the participants are aware of the classification of 2005 and 85% of the participants are only aware about the latest classification of 2015. Based on feedback questions, 15% of the participants do not have the updated information about recent modifications of OT classifications.

Many awareness related studies and case reports studies regarding oral pathology and dental aids have been done in our department (Jangid *et al.*, 2015; Hannah *et al.*, 2018), (Sivaramakrishnan and Ramani, 2015), (Swathy, Gheena and Varsha, 2015). Due to advances in immunohistochemistry, diagnostic aids and molecular biology related studies are increasing, many such were conducted in our department regarding oral cancer, potentially malignant disorders and other tumours and tumour like lesions (Viveka *et al.*, 2016), (Sherlin *et al.*, 2015), (Shree *et al.*, 2019), (Gupta and Ramani, 2016) (Gifrina Jayaraj, Ramani, *et al.*, 2015; Gifrina Jayaraj, Sherlin, *et al.*, 2015; G. Jayaraj *et al.*, 2015; Sridharan, Ramani and Patankar, 2017; Gheena and Ezhilarasan, 2019; Sridharan *et al.*, 2019) which has increased the knowledge in this field and hence we are concentrating on community related surveys. The current study thus has helped in the understanding of the knowledge about odontogenic tumours and its classification in the oral pathology community.

## CONCLUSION

Out of the 19% of oral pathologist practitioners, 17% were aware and had sufficient knowledge regarding the recent modification of Odontogenic tumours whereas out of 81% of PG residents participated in the survey only 65% were aware about the reclassification of odontogenic tumours. More knowledge regarding the OT classification modifications is the need of the hour in order to improve the diagnostic ability and treatment modality for the various tumours. Seminar and webinar related programmes have to be conducted often regarding classification of OT. Articles and magazines related to OT can be displayed in activity boards for knowledge updates. This survey is first of its kind. From the survey, we conclude that even though most oral pathologists were aware about OT reclassification, most of the PG residents are not aware about newer updates of the revised classification which has been continuously dynamic ever since it was proposed.

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## CONFLICTS OF INTEREST

The authors declare no potential of interest.

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Knowledge about recent modifications on classification of odontogenic tumour among oral pathologists –A questionnaire based survey

Questionnaire:

1. Age
2. Gender- Male/ female
3. Qualification- PG residents/ oral pathologist practitioner
4. Among all of the oral diseases, the percentage of odontogenic tumour is about 1%
  - a. Yes b. No
5. Are you aware that odontogenic tumours are derived from both ectomesenchymal and epithelium?
  - a. Yes b. No
6. Are you aware that odontogenic tumour can occur both intraosseously and extraosseously?
  - a. Yes b. No
7. Do you think mandible most common site for Odontogenic tumour occurrence?
  - a. Yes b. No
8. What are the signs and symptoms of odontogenic tumours?
  - A. Pain
  - B. Swelling
  - C. Both
  - D. None.
9. Do you know about recent modification in classification of odontogenic tumours?
  - a. Yes b. No
10. Did you know "first edition" gave the title of Histology of odontogenic tumour, cyst and allied lesion by WHO was published in 1971?
  - A. Yes B.No
11. Do you know the second edition of classification of odontogenic tumour introduced in 1992?
  - a. Yes b. No
12. Do you know Calcifying odontogenic cyst was introduced as an odontogenic tumour in the year of 1992 WHO classification?
  - a. Yes b. No
13. Are you aware of the reclassification of odontogenic keratocyst (OKC) to keratocystic Odontogenic tumour (KCOT) in the year of 2005?
  - a. Yes b. No
14. Are you aware of revised classification of benign and malignant OT (2005) to epithelial, mesenchymal and mixed OT in 2017?
  - a. Yes b. No
15. Are you aware of calcifying epithelial odontogenic cyst and adenomatoid odontogenic tumor was not included in revised classification of 2017?
  - a. Yes b. No
16. Do you know that in the latest classification of 2017 revised the calcifying Cystic odontogenic tumour and KCOT to calcifying odontogenic cyst and OKC respectively?

a. Yes b. No

17. Did you know that ameloblastic fibroma, primordial odontogenic tumor, odontoma, dentinogenic ghost cell tumour is included in reclassification of 2017?

a. Yes b. No

18. Do you feel that you have sufficient knowledge concerning the odontogenic tumour classification?

a. Yes b. No

19. Did you know that ameloblastic fibrodentinoma and fibro odontoma and odontoameloblastoma are now included as a predecessor of odontome and not a separate entity

A. Yes B.No

20. Did you find this questionnaire useful in understanding the classification of Odontogenic tumour?

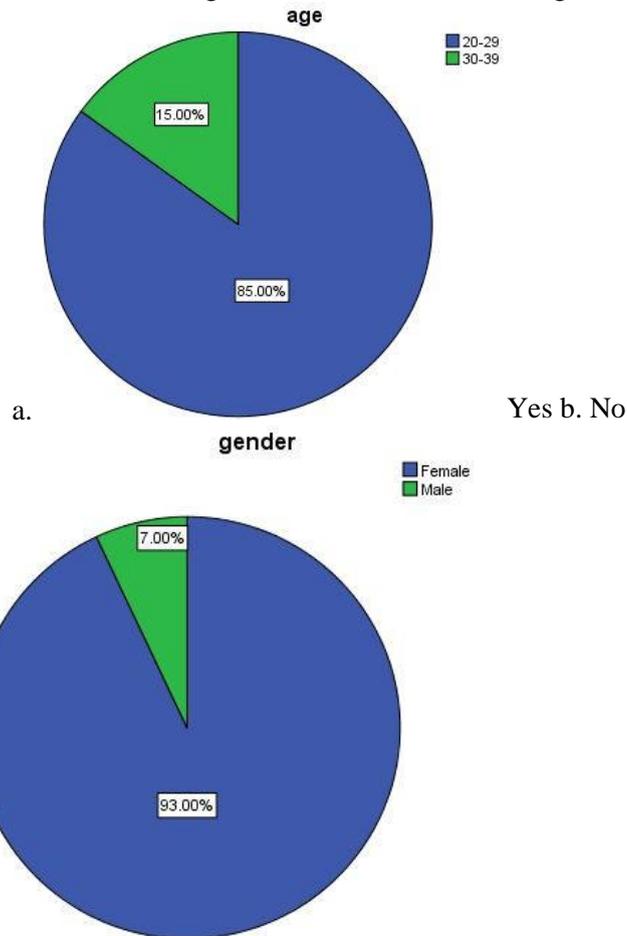


Figure-1: Pie chart depicting the percentage of responses on demographic data of age received from the questionnaire based survey. 85%- age group of 20-29 (Blue) 15% 30-39 years of age (Green)

Figure-2 : Pie chart depicting the percentage of responses on demographic data of gender received from the questionnaire based survey. 93% - Females (Blue), 7%- Males (green)

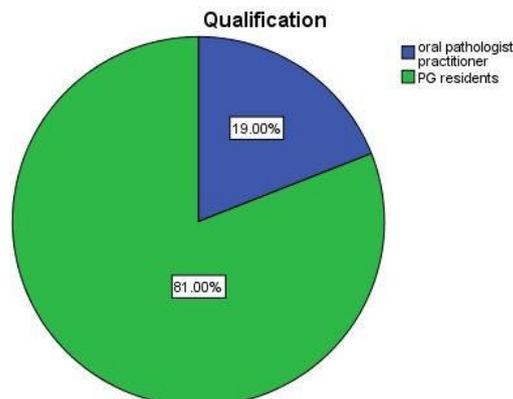


Figure-3 : Pie chart depicting the percentage of responses on demographic data of qualification received from the questionnaire based survey. 81%-Aware(green)and 19%-Not aware(blue).

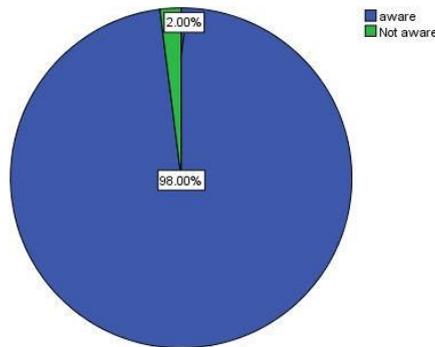


Figure-4 :Pie-chart depicting the percentage of responses regarding whether the percentage of odontogenic tumour is about 1% of all oral diseases. 98%-Aware(blue)and2%-Not aware (green).

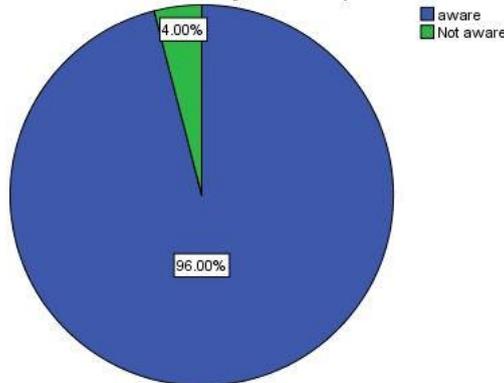


Figure-5 :Pie-chart depicting the responses received for the question “Are you aware about odontogenic tumours are derived from ectomesenchymal and epithelium”.96%-Aware(blue)and4%-Not aware (green).

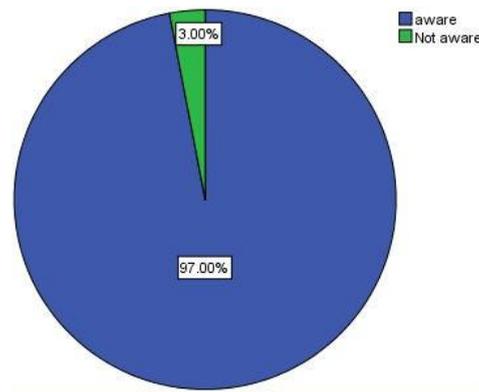


Figure-6 :Pie-chart depicting the responses received for the question “Are you aware that odontogenic tumour can occur both intraosseously and extraosseous?”.97%-Aware(blue)and 3%-Not aware (green).

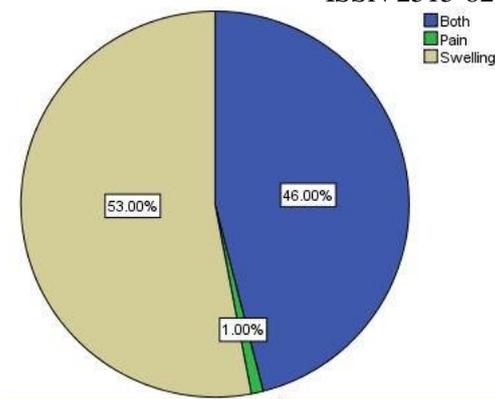


Figure-7 :Pie-chart depicting the responses received for the question “What are the signs and symptoms of odontogenic tumour?”.53%-Swelling(yellow);46%-both pain and swelling(blue)and1%-Pain(green).

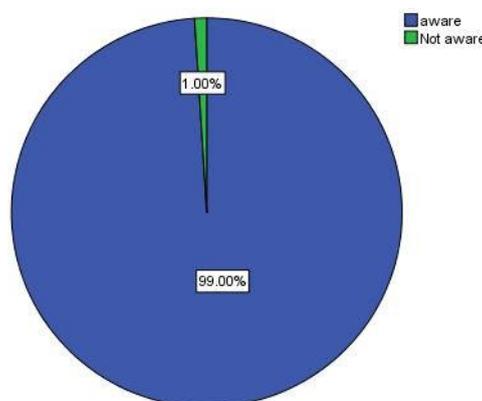


Figure-8:Pie-chart depicting the responses received for the question “Do you think mandible is the most common site for Odontogenic tumour occurrence?”.99%-Aware(blue)and1%-Not aware (green).

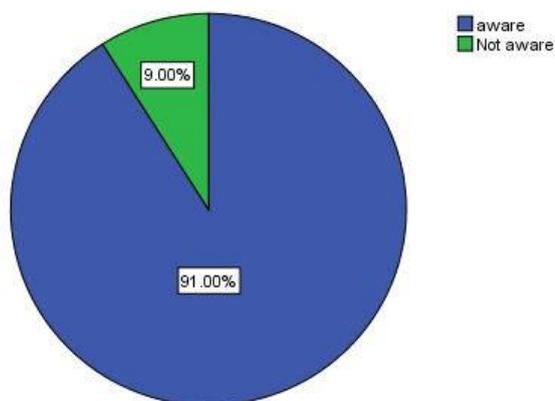


Figure-9:Pie-chart depicting the responses received for the question “Do you know about recent modifications in classification of odontogenic tumours?”.91%-Aware(blue)and 9%-Not aware (green).

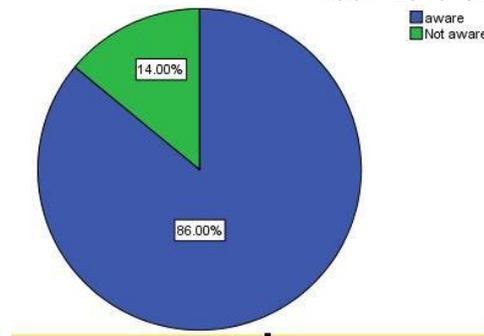


Figure-10:Pie-chart depicting the responses received for the question “Did you know “first edition” gave the title of Histology of odontogenic tumour, cyst and allied lesion by WHO was published in 1971?”.86%-Aware(blue)and14%-Not aware (green).

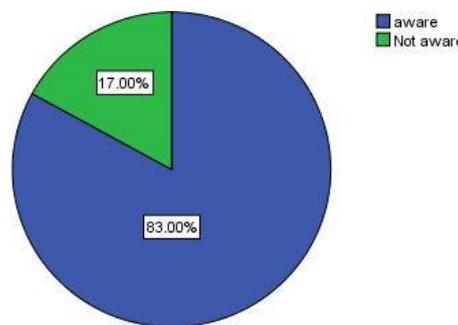


Figure-11:Pie-chart depicting the responses received for the question “Do you know the second edition of classification of odontogenic tumour introduced in 1992?”.83%-Aware(blue)and17%-Not aware (green).

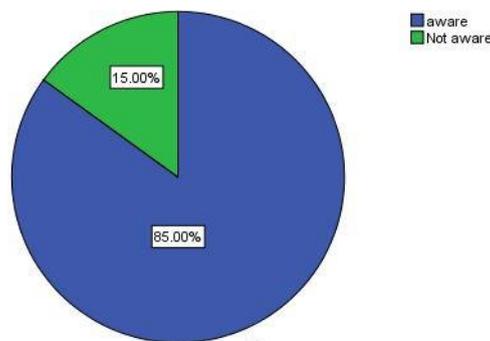


Figure-12:Pie-chart depicting the responses received for the question “Do you know Calcifying odontogenic cyst was introduced as an odontogenic tumour in the year of 1992 WHO classification?”.85%-Aware(blue)and15%-Not aware (green).

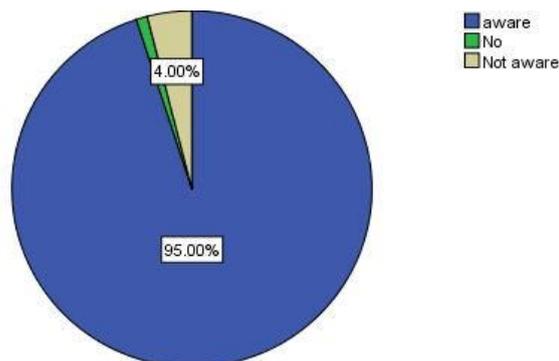


Figure-13:Pie-chart depicting the responses received for the question “Are you aware of the reclassification of odontogenic keratocyst (OKC)to keratocystic Odontogenic tumour(KCOT) in the year of 2005?”.95%- Aware(blue)and 5%-Not aware (green).

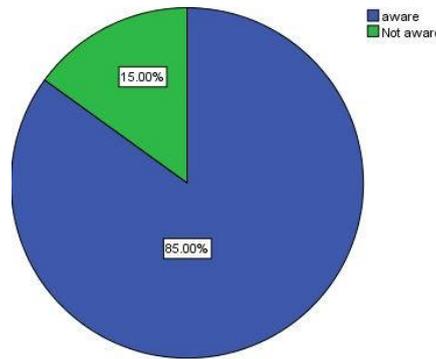


Figure-14:Pie-chart depicting the responses received for the question “Are you aware of revised classification of benign and malignant OT (2005) to epithelial, mesenchymal and mixed OT in 2017?”.85%-Aware(blue)and15%- Not aware (green).

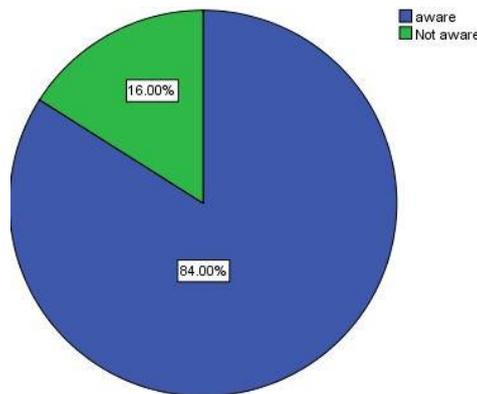


Figure-15:Pie-chart depicting the responses received for the question “Are you aware of calcifying epithelial odontogenic cyst and adenomatoid odontogenic tumor was not included in revised classification of 2017?”.84%- Aware(blue)and16%-Not aware (green).

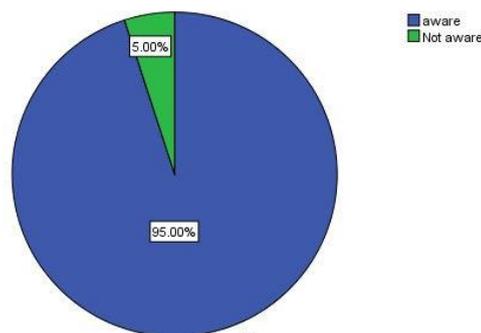


Figure-16:Pie-chart depicting the responses received for the question “Do you know that in the latest classification of 2017 revised the calcifying Cystic odontogenic tumour and KCOT to calcifying odontogenic cyst and OKC respectively?”.95%-Aware(blue)and 5%-Not aware (green).

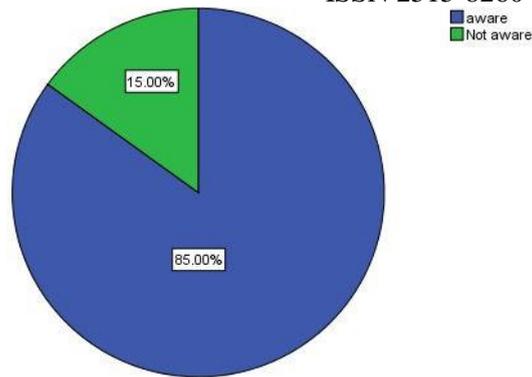


Figure-17:Pie-chart depicting the responses received for the question “Did you know that ameloblastic fibroma, primordial odontogenic tumor, odontoma, dentinogenic ghost cell tumour is included in reclassification of 2017?”.85%-Aware(blue)and15%-Not aware (green).

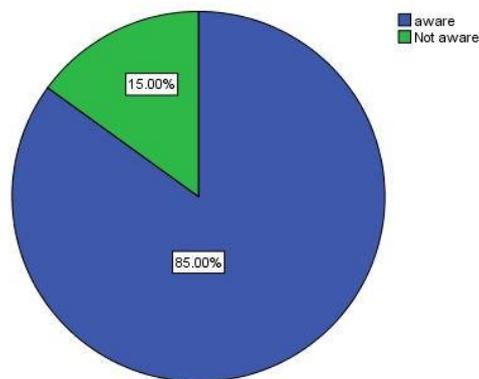


Figure-18:Pie-chart depicting the responses received for the question “Did you know that ameloblastic fibrodentinoma and fibro odontoma and odontoameloblastoma are now included as a predecessor of odontome and not a separate entity”.85%-Aware(blue)and15%-Not aware (green).

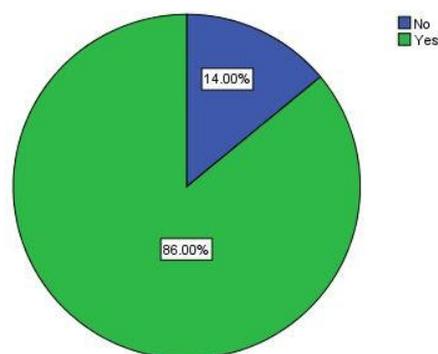


Figure-19:Pie-chart depicting the responses received for the question “Do you feel that you have sufficient knowledge concerning the odontogenic tumour classification?”.86%-Yes (green) and 14%-No (blue)

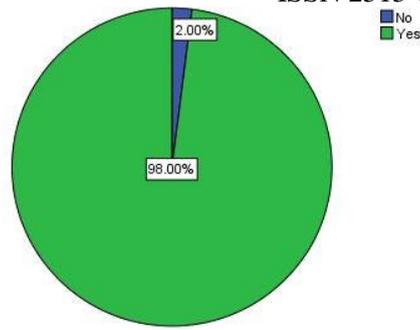


Figure-20 :Pie-chart depicting the responses received for the question “Did you find this questionnaire useful in understanding the classification of Odontogenic tumour?”.98% -Yes(green) thinks that questionnaires is useful and 2%- No(blue )

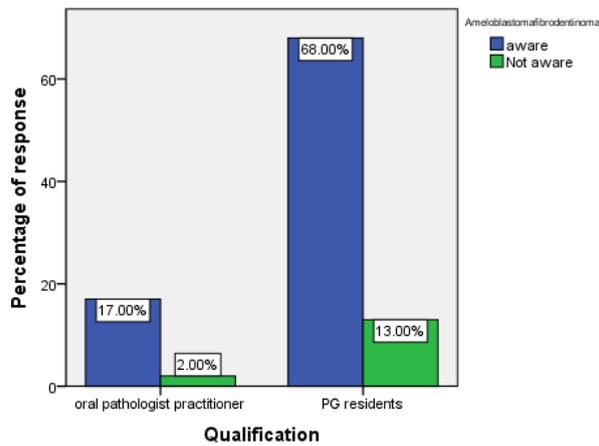


Figure-21:Bar chart depicting the association of qualification and awareness regarding whether ameloblastic fibrodentinioma, fibro odontoma and odontoameloblastoma are now included as a predecessor of odontome and not a separate entity. X- axis depicting the qualification and Y- axis depicting the percentage of response. The percentage of Pg residents who were not aware was more than that of the Oral pathologist practitioners. Chi-square test is statistically not significant with  $p=0.544$

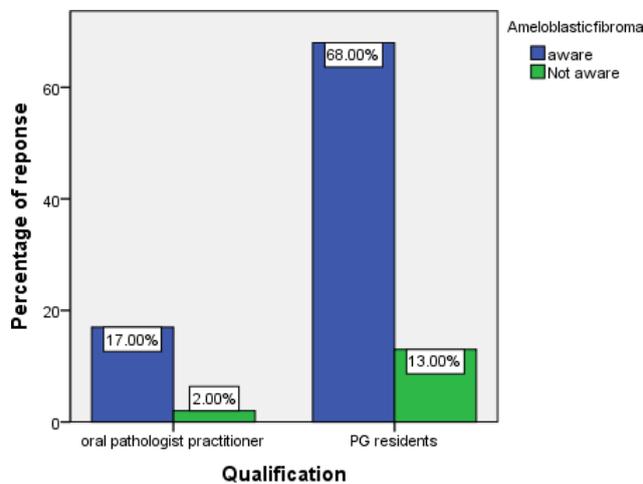


Figure-22:Bar chart depicting the association of qualification and awareness regarding whether ameloblastic fibroma, primordial odontogenic tumor, odontoma, dentinogenic ghost cell tumour is included in reclassification of

2017.X- axis depicting the qualification andY- axis depicting the percentage of responses.The percentage of Pg residents who were not aware was more than that of the Oral pathologist practitioners.Chi-square test is statistically not significant with  $p=0.544$ .

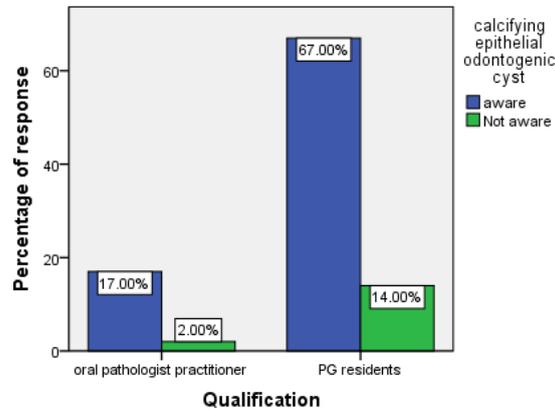


Figure-23:Bar chart depicting the association of qualification and awareness regarding whether calcifying epithelial odontogenic cyst and adenomatoid odontogenic tumor was not included in revised classification of 2017.X- axis depicting the qualification andY- axis depicting the percentage of response. The percentage of Pg residents who were not aware was more than that of the Oral pathologist practitioners.Chi-square test is statistically not significant with  $p=0.470$ .

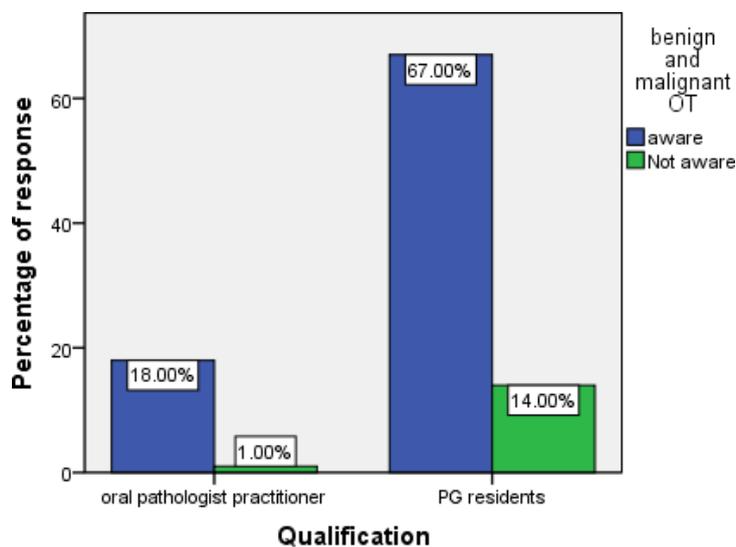


Figure-24:Bar chart depicting the association of qualification and awareness regarding the revised classification of benign and malignant OT (2005) to epithelial, mesenchymal and mixed OT in 2017.X- axis depicting the qualification andY- axis depicting the percentage of response.The percentage of Pg residents who were not aware was more than that of the Oral pathologist practitioners.Chi-square test is statistically not significant with  $p=0.187$ .

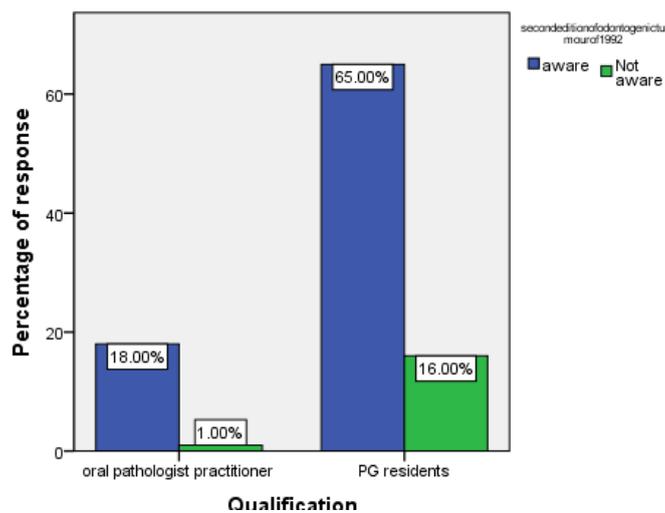


Figure-25: Bar chart depicting the association of qualification and awareness regarding whether the second edition of classification of odontogenic tumour was introduced in the year 1992. X- axis depicting the qualification and Y- axis depicting the percentage of response. The percentage of Pg residents who were not aware was more than that of Oral pathologist practitioners. Chi-square test is statistically not significant with  $p=0.130$ .