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Awareness Of Acromegaly Among Dental Students.

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ABSTRACT

Acromegaly is an acquired disorder related to excessive production of growth hormone (GH) and characterized by progressive somatic disfigurement (mainly involving the face and extremities) and systemic manifestations. Due to insidious onset and slow progression, acromegaly is often diagnosed four to more than ten years after its onset. The main clinical features are broadened extremities (hands and feet), widened thickened and stubby fingers, and thickened soft tissue. The sample size included both undergraduate and postgraduate students. The aim of the study is to create awareness about acromegaly among dental students. The total participants were 100 in number. A set of questionnaires eliciting awareness on early childhood caries among dental students the survey was conducted in May 2020. The obtained data was transferred to an excel sheet and it was coded and analyzed using Spss software. In the results that we obtained out of 100 participants 40% of the participants were post graduates and 60% of the students were undergraduates. The obtained results were compared using Chi square test. Year of study and dental students were aware that acromegaly is most often caused by hypersecretion of growth hormone was compared, the p value obtained was statistically significant ($p < 0.05$). Year of study and if students were aware that acromegaly patients with longstanding disease commonly present with striking physical characteristics was compared and the p value obtained was statistically significant ($p < 0.05$). We found that most students were aware about acromegaly but however few had moderate knowledge and few still lacked proper awareness. Awareness among health professionals early recognition of symptoms and signs of acromegaly would reduce delays in time-to-diagnosis, enable better treatment and may improve outcomes for patients with acromegaly.

Keywords: acromegaly, awareness, dental students, early diagnosis, symptoms

INTRODUCTION

Acromegaly is characterized by an acquired progressive somatic disfigurement, mainly involving the face and extremities, but also many other organs, that is associated with systemic manifestations. The disease is related to the excessive production of growth hormone (GH). This GH hypersecretion originates from a monoclonal benign pituitary tumor in more than 90% of cases. Acromegaly is a rare disease, with a prevalence of 40 to 70 cases per million people and an annual incidence of 3 to 4 new cases per million people (Holdaway and Rajasoorya, 1999). The extremities of the hands and feet are broadened, the fingers are widened, thickened and stubby, and the soft tissue is thickened. The facial aspect is characteristic, and patients with established acromegaly are generally alike in this respect: the nose is widened and thickened, the cheekbones are obvious, the forehead bulges, the lips are thick and the facial lines are marked. The forehead and overlying skin is thickened, sometimes leading to frontal bossing. There is a tendency towards mandibular overgrowth with prognathism, maxillary widening, teeth separation and jaw malocclusion (Chanson and Salenave, 2008).

Although acromegaly manifests with distinct physical characteristics, diagnosis of the disease in its early stages can be difficult due to its insidious nature, meaning that neither the patient, their families nor their physicians may notice these changes. The recognition that acromegaly can be accompanied by apparently normal GH concentrations and dynamics, mild or absent clinical features and pituitary tumors that are too small to be detected by MRI, must contribute to this difficulty, and indicates the importance of IGF-1 measurement in diagnosis (Ribeiro-Oliveira and Barkan, 2012).

There is a clear role to be played for specialists from other disciplines like dentists, as well as primary care physicians, in the early identification of patients with acromegaly through better awareness of common

comorbidities. Recent studies have shown that around 40 % of patients are diagnosed by internists or family physicians, and dentists by orofacial changes, separation of teeth and malocclusion.

Craniofacial development depends on genetic and ethnic characteristics, as well as on normal hormone secretion (Nandaa, 2000). Normal development is characterized by the absence of asymmetries, normal maxilla-mandibular ratio, and dental contact in normal occlusion. In acromegaly there are soft tissue alterations, and increased mandibular condyle-occlusion derangements (Jadresic *et al.*, 1982). This can lead to functional disturbances, such as in chewing, swallowing, and speech. As the diagnosis of acromegaly is often delayed, orofacial changes such as prognathism, facial asymmetry, and dental diastemas may compromise the patients quality of life both functionally and socially.

Acromegaly is a condition accompanied by cardiovascular, cerebrovascular and pulmonary dysfunction; which causes long-term complications and a 30% decrease in the life span of patients. The clinician first visited by the patient should be astute enough to diagnose the condition thereby reducing the morbidity and mortality due to late diagnosis. Diagnosis of acromegaly and its treatment is a challenge to all health professionals due to the subtle presentation of disease process and multiple system involvement. Such patients are usually ignorant about their condition and most often visit a dental surgeon with chief symptoms of growing mandible, malocclusion, TMJ pain or ill-fitting dentures.

In a study conducted by Siegel *et al* at a German University Hospital to assess healthcare delivery in patients with acromegaly it was found that the most frequent symptoms experienced by the patients were teeth and jaw problems, 36.6% of the patients had to visit the dentist at some time prior to diagnosis (Siegel *et al.*, 2012). Nevertheless, none of the patients were diagnosed with acromegaly by a dentist. Dental professionals may be the first healthcare providers to be visited by these patients and thereby prove instrumental in early diagnosis (Drange *et al.*, 2000).

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)

this vast research experience has inspired us to research about the awareness of acromegaly among the dental students.

MATERIALS AND METHODS

The sample size included both undergraduate and postgraduate students. The total number of participants was 100. A set of questionnaires was made to evaluate the amount of knowledge and awareness of acromegaly among dental students using google forms. The survey was conducted in May 2020. The obtained data was transferred to an excel sheet and it was coded and analyzed using Spss software. By using the statistical software IBM spss version 20, descriptive and inferential statistics were done and results were analysed.

RESULTS AND DISCUSSION

In the results that we obtained out of 100 participants 40% of the participants were post graduates and 60% of the students were undergraduates (figure 1). 64% of the students knew that acromegaly is most often caused by hypersecretion of growth hormone 36% of the students did not know that acromegaly is most often caused by hypersecretion of growth hormone (figure 2). Acromegaly is a rare, insidious disease commonly caused by a pituitary adenoma, which overproduces growth hormone (GH), and results in increased levels of insulin-like growth factor 1 (IGF-1) (Adelman *et al.*, 2013) (Melmed, 2009). Some studies estimate that it affects 86–240 per million of the population, though others have estimated its prevalence at 40–70 per million (Ben-Shlomo *et al.*, 2011). 65% of the students were fully aware about the rare disease acromegaly and 35% of the students were not aware about the rare disease acromegaly (figure 3).

65% of the students were aware that acromegaly patients with longstanding disease commonly present with striking physical characteristics 35% of the students were not aware that acromegaly patients with longstanding disease commonly present with striking physical characteristics (figure 4). The facial aspect is characteristic, and patients with established acromegaly are generally alike in this respect: the nose is widened and thickened, the cheekbones are obvious, the forehead bulges, the lips are thick and the facial lines are marked. The forehead and overlying skin is thickened, sometimes leading to frontal bossing (Chanson and Salenave, 2008).

70% of the students knew that acromegaly patients are more likely to present with complaints typical of other conditions and 30% of the students were not aware that acromegaly patients are more likely to present with complaints typical of other conditions (figure 5). Manifestations of acromegaly include soft and acral tissue overgrowth, joint pain, hypertension, and heart and respiratory failure. Many studies have provided diagnostic algorithms from the associated comorbidities to identify acromegaly.8 A scoring system called

“ACROSCORE” has been used to investigate and confirm acromegaly in the very early stages (Prencipe *et al.*, 2016).

72% of the students knew that craniofacial changes of acromegaly include extraoral and intraoral soft tissue changes and 28% of students did not know that craniofacial changes of acromegaly include extraoral and intraoral soft tissue changes (figure 6). Normal development is characterized by the absence of asymmetries, normal maxilla-mandibular ratio, and dental contact in normal occlusion. In acromegaly there are soft tissue alterations (increased volume of tongue, uvula, lips and nose), and increased mandibular condylar occlusion derangements (Sugata, Myoken and Tanaka, 1998). This can lead to functional disturbances, such as in chewing, swallowing, and speech. As the diagnosis of acromegaly is often delayed, orofacial changes such as prognathism, facial asymmetry, and dental diastemas may compromise the patients quality of life both functionally and socially.

67% of the students were aware that dental professionals may play an important role in diagnosing and treating such patients and 33% of the students were not aware that dental professionals may play an important role in diagnosing and treating such patients (figure 7). Since the dentist may be the first healthcare professional to examine the patient, they should be made aware of the disease through awareness programs. Unfortunately, unlike acromegalic changes to soft tissue, associated bone enlargement is not reversible with successful treatment. If any corrective surgical procedures are to be performed, this should only be carried out after normalization of GH and IGF-1 levels (The American Cancer Society, 2018). Siegel *et al.* also reported that despite a third of patients with acromegaly seeking care from dentists, the diagnosis was not considered. This raises the question of whether adequate awareness about acromegaly is present among dentists, despite the prevalence of oral symptoms in patients with the disease (Zarool-Hassan *et al.*, 2016).

The obtained results were compared using Chi square test. Year of study and dental students were aware that acromegaly is most often caused by hypersecretion of growth hormone was compared, the p value obtained was statistically significant ($p < 0.05$) (figure 8). Year of study and if students were aware that acromegaly patients with longstanding disease commonly present with striking physical characteristics was compared and the p value obtained was statistically significant ($p < 0.05$) (figure 9).

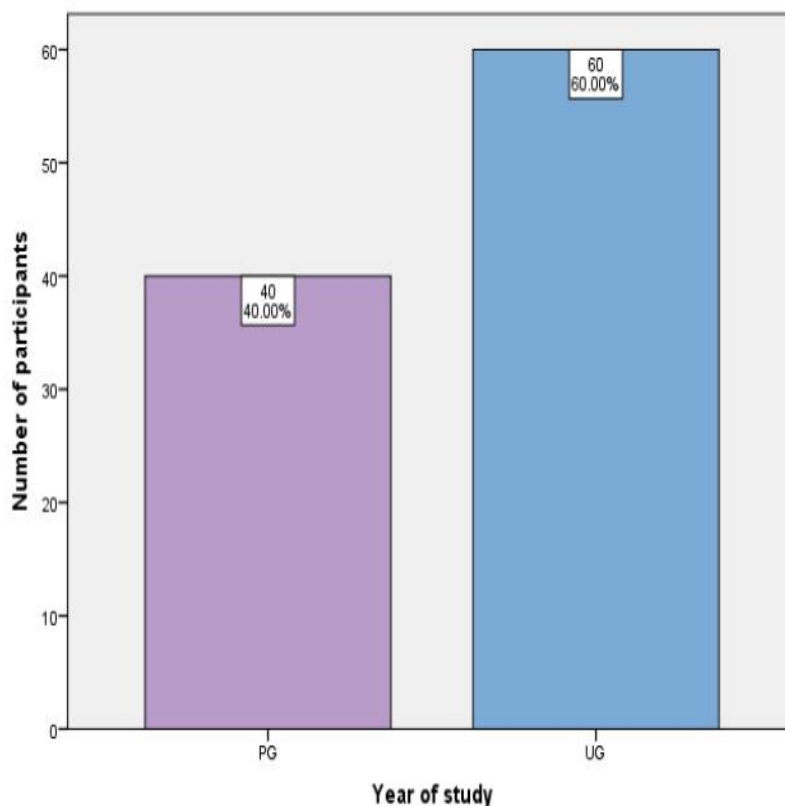


Figure 1: Bar graph showing frequency distribution of the year of study of dental students 40% post graduate and 60% (purple) of the students were 66% of the students were undergraduates. (light blue).

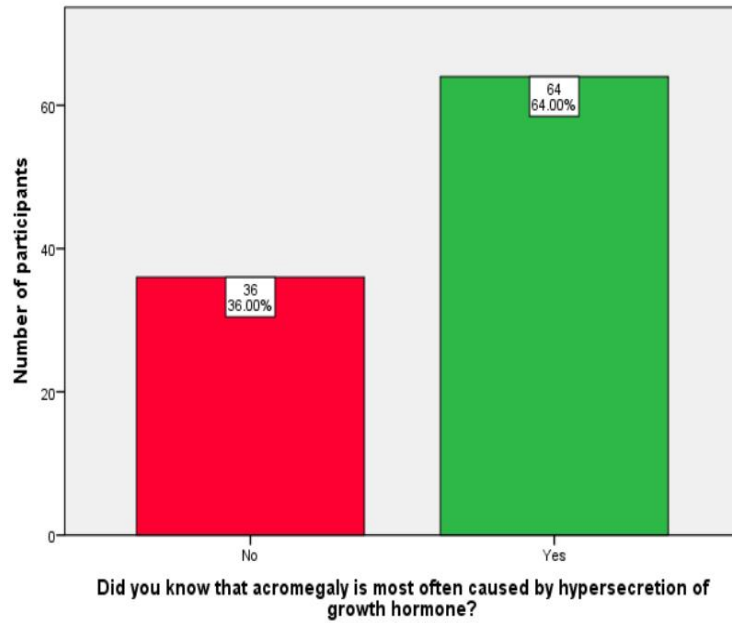


Figure 2: Bar graph showing frequency distribution if the the students knew that acromegaly is most often caused by hypersecretion of growth hormone 64% of the students knew that acromegaly is most often caused by hypersecretion of growth hormone 36% of the students did not know that acromegaly is most often caused by hypersecretion of growth hormone.

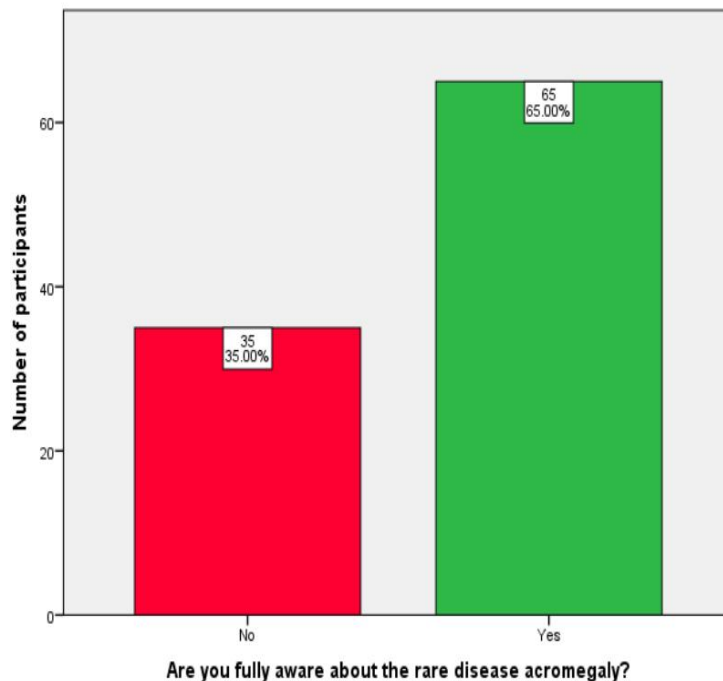


Figure 3: Bar graph showing frequency distribution if the students were fully aware about the rare disease acromegaly next which 65% of the students were fully aware about the rare disease acromegaly and 35% of the students were not aware about the rare disease acromegaly.

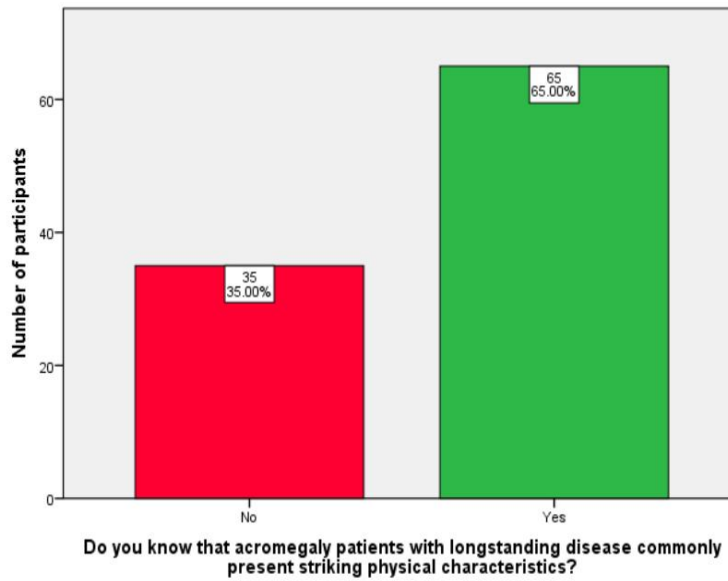


Figure 4: Bar graph showing frequency distribution if the students were aware that acromegaly patients with longstanding disease commonly present with striking physical characteristics. 65% of the students were aware that acromegaly patients with longstanding disease commonly present with striking physical characteristics 35% of the students were not aware that acromegaly patients with longstanding disease commonly present with striking physical characteristics.

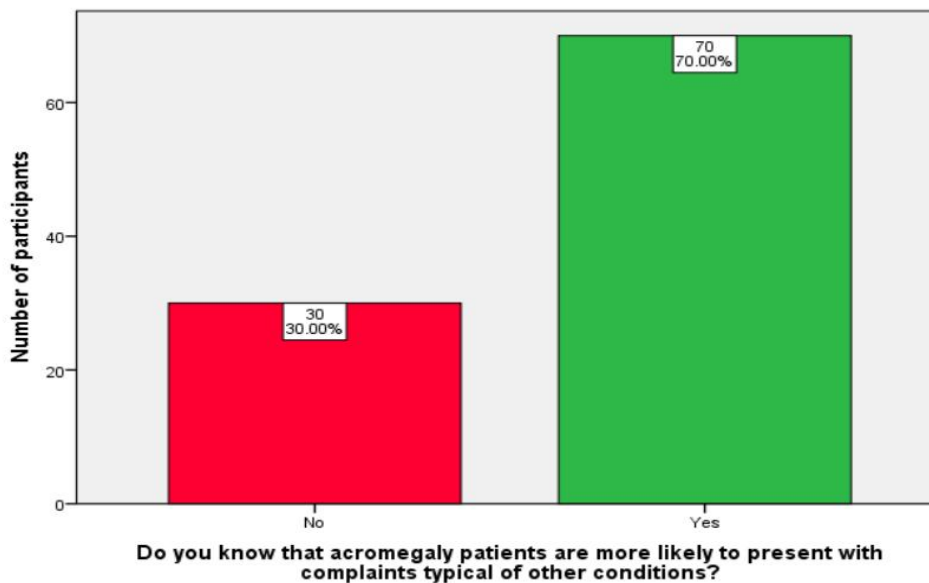


Figure 5: Bar graph showing frequency distribution if the students knew that acromegaly patients are more likely to present with complaints typical of other conditions 70% of the students knew that acromegaly patients are more likely to present with complaints typical of other conditions and 30% of the students were not aware that acromegaly patients are more likely to present with complaints typical of other conditions

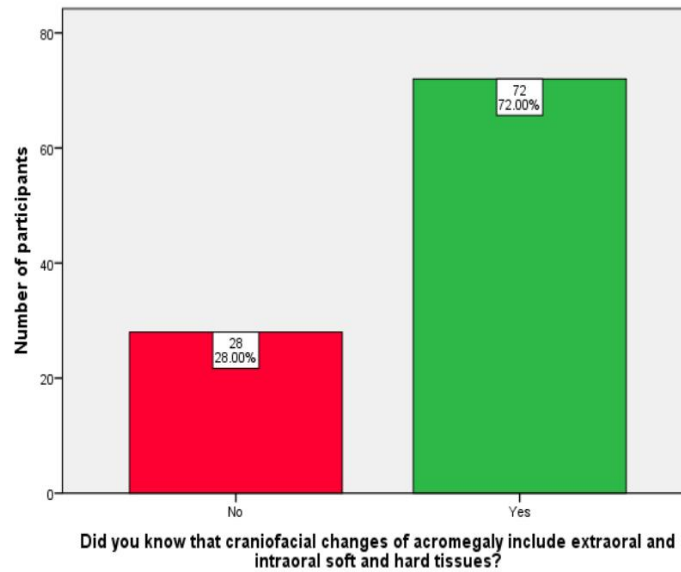


Figure 6: Bar graph showing frequency distribution of the students if they knew that craniofacial changes of acromegaly include extraoral and intraoral soft tissue changes. 72% of the students knew that craniofacial changes of acromegaly include extraoral and intracranial soft tissue changes and 28% of students did not know that craniofacial changes of acromegaly include extraoral and intraoral soft tissue changes.

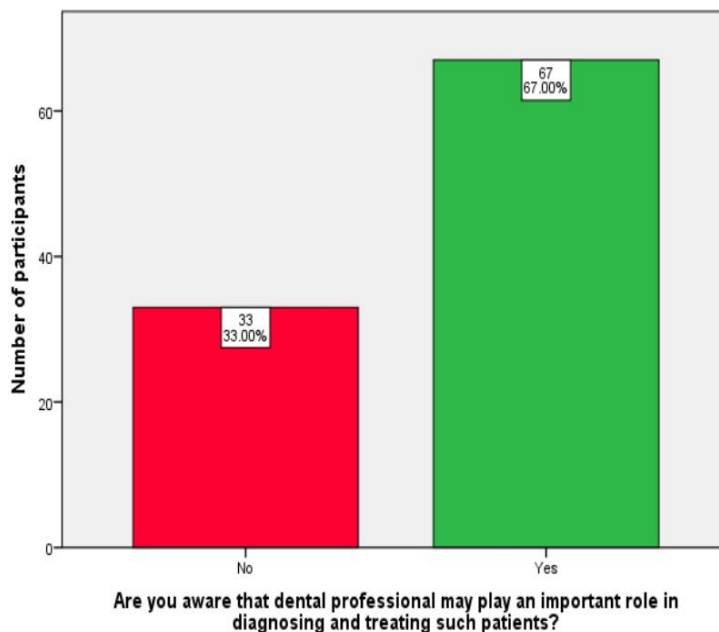


Figure 7: Bar graph showing frequency distribution if the students knew that acromegaly patients are more likely to present with complaints typical of other conditions of which 70% of the students knew that acromegaly patients are more likely to present with complaints typical of other conditions and 30% of the students were not aware that acromegaly patients are more likely to present with complaints typical of other conditions.

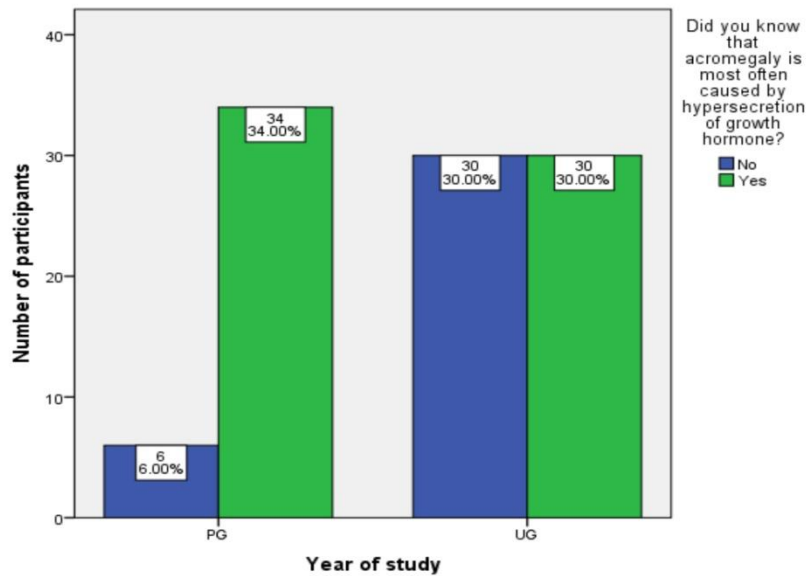


Figure 8: Bar graph showing the association between year of study and if they knew that acromegaly is most often caused by hypersecretion of growth hormone the X axis represents year of study and the y axis represents the number of students; Pearson chi square test showed $p= 0.01$ ($p<0.05$) indicating statistically significant. 34% of the postgraduate knew that acromegaly is most often caused by hypersecretion of growth hormone only 6% were not aware. The postgraduate students were more aware compared to the undergraduate students.

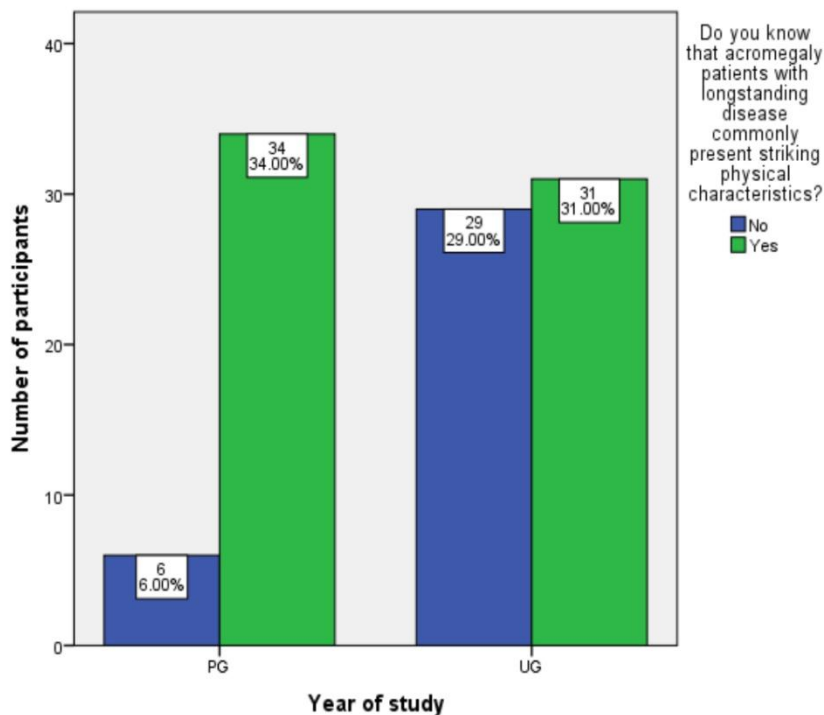


Figure 9: Bar graph showing the association between year of study and if they knew that acromegaly is most often caused by hypersecretion of growth hormone the X axis represents year of study and the y axis represents the number of students; Pearson chi square test showed $p= 0.01$ ($p<0.05$) indicating statistically significant. 34% of the postgraduate knew that acromegaly is most often caused by hypersecretion of growth hormone only 6% were not aware. The postgraduate students were more aware compared to the undergraduate students.

CONCLUSION

Most of the students were aware from the postgraduates but enough knowledge was not there among the undergraduates. Ultimately, raising awareness of acromegaly among primary healthcare clinicians remains a simpler yet more practical approach to improving the early diagnosis of the disease. Simple measures such as handouts, awareness campaigns and close relations with local acromegaly societies may still be the most effective approaches. Both medical and dental schools could also emphasise the disease in their curriculum. We recommend that if the diagnosis of acromegaly is entertained when meeting a patient, that further questioning should be perfectly and any suggestive symptoms should result in measurement of a serum IGF-1.

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CONFLICT OF INTEREST

The authors declare that there were no conflicts of interest in the present study.

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