



AWARENESS OF TREATMENT PROTOCOLS WITH MYXEDEMA PATIENTS AMONG DENTAL COLLEGE STUDENTS - A SURVEY.

P.Harini^[a], Dhanraj Ganapathy^{[b]*}, L. Keerthi Sasanka^[c], Vinay Sivaswamy^[d]

Article History: Received: 28.07.2022

Revised: 27.08.2022

Accepted: 22.09.2022

Abstract: Introduction: Myxedema is a severe form of hypothyroidism most commonly occurs in females which is a life threatening condition with a high rate of mortality. It should be treated and diagnosed at the early stage to avoid complications. Thyroxine therapy, steroid treatment and glucocorticoid treatment are the major therapy to cure myxedema. **Aim:** The aim of the study is to evaluate the awareness about the treatment protocols with myxedema patients among dental college students. **Materials and methods:** Self administered questionnaires were designed based on knowledge, attitude and practice. The questions were distributed through an online platform. The study population included people belonging to the age group of 18 to 24 years. The data were collected and statistically analyzed using SPSS software. **Results:** Results were collected as ordinal data and it is good to know that more than half of the population are aware of treatment protocols to treat myxedema patients. They are aware of symptoms, causes, complications and treatment for myxedema. **Conclusion:** It is important to know about the treatment protocols for better treatment planning and diagnosis. It is concluded that 72 % of the population were aware of treatment protocols to be followed for myxedema patients.

Keywords: Myxedema, treatment protocols, symptoms, causes, innovative technology, eco friendly

- [a]. Saveetha Dental College and Hospitals, Saveetha Institute of Medical and Technical Sciences, Saveetha University, Chennai-600077
- [b]. Saveetha Dental College and Hospitals, Saveetha Institute of medical and Technical Sciences, Saveetha University,, Chennai-600077.
- [c]. Saveetha Dental College and Hospitals, Saveetha Institute of Medical and Technical Sciences, Saveetha University, Chennai-600077
- [d]. Saveetha Dental College and Hospitals, Saveetha Institute of Medical and Technical Sciences, Saveetha University, Chennai-600077

*Corresponding Author

E-mail: 151901095.sdc@saveetha.com,
dhanrajmaganapathy@yahoo.co.in,
keerthis.sdc@saveetha.com, vinay.sdc@saveetha.com

DOI: 10.31838/ecb/2022.11.08.001

INTRODUCTION

Myxedema is a life threatening and severe form of decompensated hypothyroidism. It is associated with a high rate of mortality. Discontinuation of thyroid supplements, Infections and hypothermia are the major precipitating factors of myxedema (Gummalla, Manjunath and Phillips, 2020). Lower level of intracellular T3 is the major reason for the cause of myxedema. Which leads to cardiogenic shock, respiratory depression and coma. Patients should be carefully treated on the

basis of low index of suspicion and the patient's history should be taken into consideration carefully and the examination, diagnosis and treatment for the disease is focused on features of hypothyroidism and the precipitating factors causing the disease (Ansah-Addo and Alexis, 2021). Coagulation disorders and arrhythmias are the major crisis of myxedema. The best treatment to treat myxedema patients is replacement of thyroid hormones. Careful attention should be given to symptoms like hypotension, steroid replacement and fluid replacement (Maldonado, Patel and Tarlin, 2020). Thyroid hormone replacement through ryle's tube is the best maintenance therapy and efficacious intravenous therapy to treat myxedema patients. Oral therapy of T4 is also significantly used in the majority of the countries. Symptoms like hypotension and bradycardia need to be concentrated with mechanical ventilation. Early diagnosis and examination of myxedema in hypothyroid patients prevent the mortality and morbidity rate. Diagnosing the development of sepsis and other precipitating factors is also associated with treating myxedema crisis (Braithe *et al.*, 2021).

Myxedema is an emergency presentation of hypothyroidism which is a lethal and life threatening condition. 0.22 per million per year are suffering from myxedema. Intravenous replacement of LevoThyroxine is considered to be a standard therapy in treating myxedema patients (Bhatt *et al.*, 2017). Unrecognized hypothyroidism and the severe form of hypothyroidism which leads to complicated conditions like myxedema coma. Thyroid hormone treatment is considered to be effective when combined with hemodynamic support and ventilatory support (Lambrinouadaki, 2020). Thyroxine and triiodothyronine are considered to be effective. It is considered as an endocrine emergency with a very high mortality rate. If it is left untreated it may result in death. It is most commonly

seen in females than in males. It is generally associated with symptoms like hypothermia, hyponatraemia, hypothyroidism, hypoxemia and hypercarbia(Lambrinouadaki, 2020; Ludemann and Cammarano, 2020). Organ specific symptoms are also most commonly seen. Seizures are recognised but it is considered as a rare manifestation. Memory impairment and drowsiness were also observed in myxedema patients. Sodium correction is also taken into account for the treatment of myxedema patients(Basu, 2012). 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) The aim of the study is to assess awareness about the treatment protocols with myxedema patients among dental college students.

MATERIALS AND METHODS

Self-administered questionnaires were designed based on the attitude and knowledge of the participants. The questions were circulated to the age group of 18 to 24 years and circulated among 100 undergraduate college students. It was circulated using Google forms and a list of output variables were included. Descriptive variables like age, year of study, gender and explanatory variables like personality trait, knowledge, attitude and practice were also included.

Each output variable was collected as ordinal data and the collected data were represented as pie charts. A statistical test was done using the software SPSS. Statistical tests used descriptive analysis and frequency percentage. The study was approved by the institutional review board. Chi square test was done.

Exclusion criteria of the study were participants not willing to participate and medically compromised participants. Some of

the inclusion criteria was participants above 18 years of age, college students and participants who can understand and fill the questionnaire.

RESULTS

In the current study the questionnaire was circulated on the basis of knowledge, attitude and practice. The study consists of the age group of 18 to 25 years (figure 1). Among them, 67 % of them are female and 33% of them are male (figure 2). Among the population 82 % of them were undergraduate students and 18 % of them were postgraduate students (figure 3). 81% of the participants responded that airway treatment is the most necessary therapy to treat myxedema patients (figure 4). 87% of them reported that Cardiovascular disease is the most common commodity in myxedema patients (figure 5). 83 % of the population responded that Levothyroxine supplement is important to treat myxedema patients (figure 6). 79% of the population reported that initial supplementation of intravenous T4 is important to cure myxedema patients (figure 7). 54 % of them reported that low body temperature, swelling and difficulty in breathing, weakness and lethargy are the main symptoms of myxedema (figure 8). 54% of the population reported that iodine deficiency, pregnancy and radiation therapy are the main causes of myxedema (figure 9). 88% of them responded that steroid treatment is necessary in treating myxedema patients (figure 10). 59 % of the participants reported that heart attack, hypothermia and preeclampsia are the major complications of myxedema (figure 11). 49 % of the participants reported that mortality rate in myxedema patients is 25-60 % (figure 12). 94 % of the population reported that glucocorticoid treatment is necessary in treating myxedema patients (figure 13). From the age group of 18 to 20 were highly aware of the symptoms regarding myxedema (figure 14). From the age group of 18 to 20 were highly aware of the causes of myxedema (figure 15). From the age group of 18 to 20 were highly aware of the mortality rate of myxedema patients.

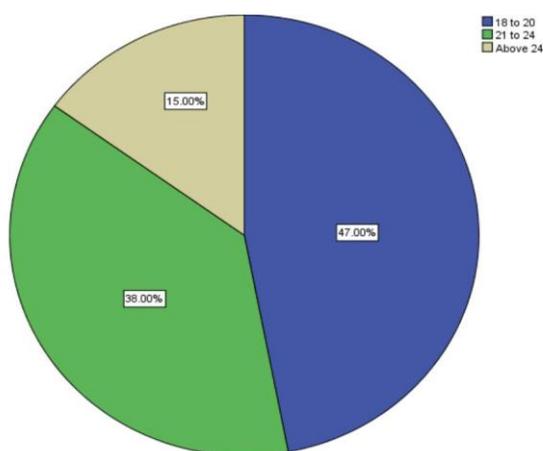


Figure 1: Pie chart showing percentage distribution of age groups. 47%- 18-20(blue) , 38%- 21-24(green), 15%- Above 24 (sand).

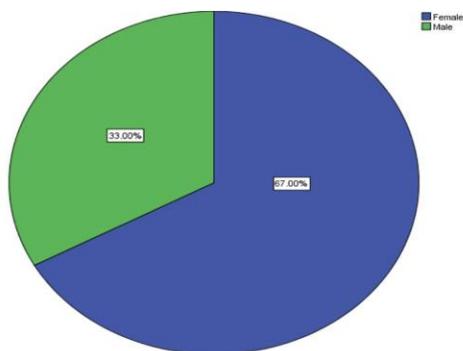


Figure 2: Pie chart showing percentage distribution of male and female participants. 67%- Female (blue) , 37%- Male (green). More female population participated in the study.

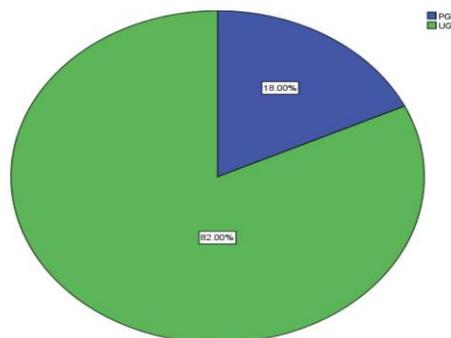


Figure 3: Pie chart showing percentage distribution of educational qualification. 82%- undergraduate (green) , 18%- postgraduate(blue). More undergraduate students participated in the study.

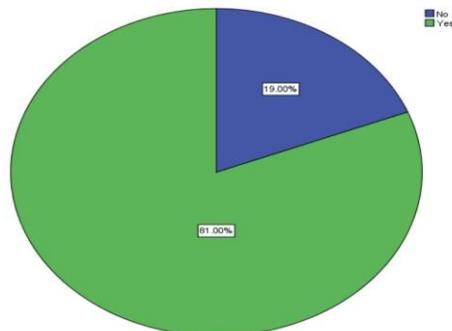


Figure 4: Pie chart showing percentage distribution of positive response on airway treatment. 81%- yes (green) , 19%- no (blue). 81 % of the population showed positive affirmation for airway treatment.

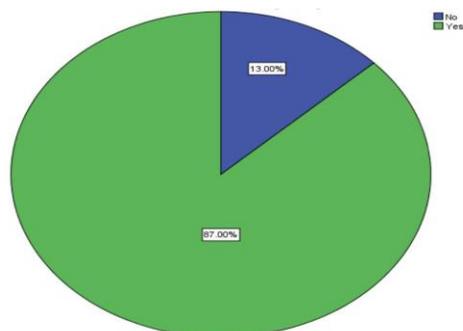


Figure 5: Pie chart showing percentage distribution of CVS disease as the major risk. 87%- yes (green) , 13%- no (blue). 87 % of them reported that CVS disease is the major risk in myxedema patients.

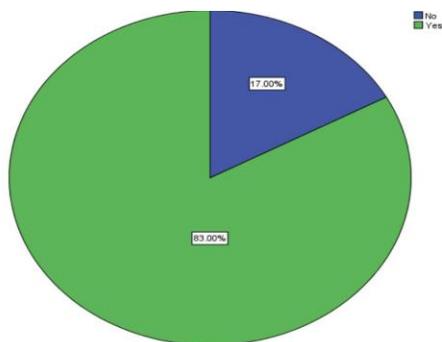


Figure 6: Pie chart showing percentage distribution of responses on levothyroxine is better therapy. 83%- Yes (green) , 17%- no (blue). 83 % of them reported that levothyroxine is better therapy for myxedema patients.

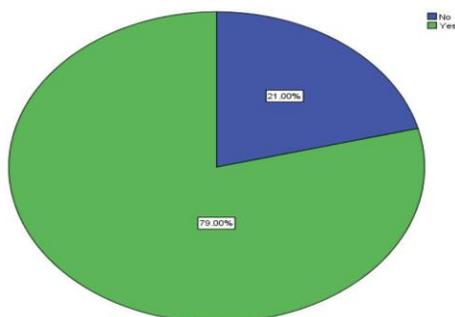


Figure 7: Pie chart showing percentage distribution on IVT4 treatment. 79% - yes (green) , 21%- no (blue). 79 % of them reported that IVT4 treatment is the best treatment protocol.

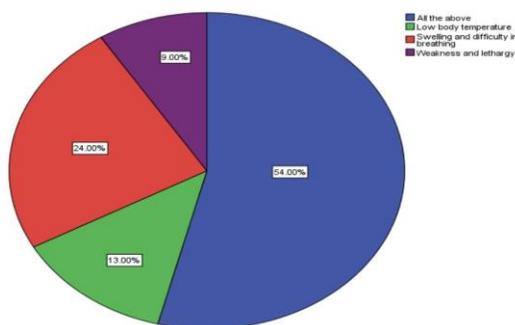


Figure 8: Pie chart showing percentage distribution on symptoms of myxedema. 54%- All the above (blue) , 24%- swelling and difficulty in breathing(red) , 13%- low body temperature (green) , 9%- weakness and lethargy (violet). 54 % of them reported that low body temperature, swelling and weakness were the symptoms of myxedema patients.

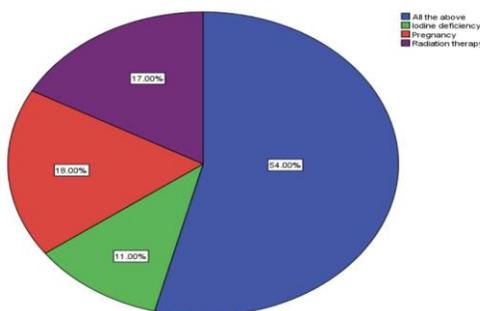


Figure 9: Pie chart showing percentage distribution on causes of myxedema. 54%- All the above (blue) , 18%- lethargy (red) , 17%- radiation therapy (violet) , 11%- iodine deficiency (green). 54 % of them reported that iodine deficiency, pregnancy and radiation therapy were the major causes of myxedema.

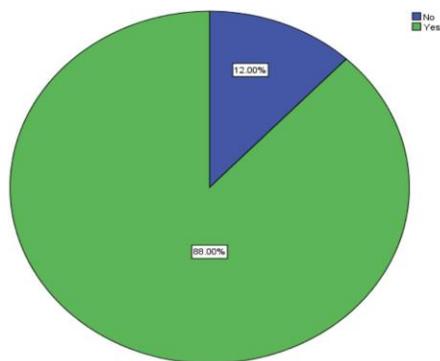


Figure 10: Pie chart showing percentage distribution on steroid treatment. 86%- yes (green) , 12%- no (blue). 8 % of them reported that steroid treatment is the best treatment for myxedema patients.

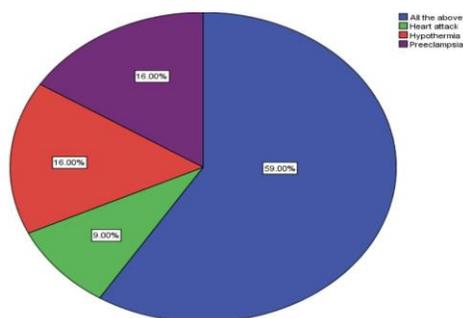


Figure 11: Pie chart showing percentage distribution on complications of myxedema. 59%- All the above (blue) , 16%-hypothermia (red) , 16%- preeclampsia (violet) , 9%- heart attack (green). 59 % of them reported that heart attack, preeclampsia and hypothermia were the complications in myxedema patients.

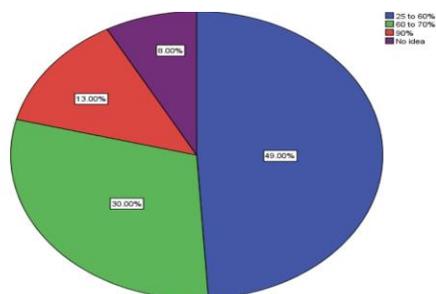


Figure 12: Pie chart showing percentage distribution on mortality rate of myxedema patients. 49%- 25 -60% (blue) , 30%- 60-70 % (green) , 13% -90% (red) , 8% - no idea (violet). 49 % of them reported that 25 to 60 % is the mortality rate in myxedema patients.

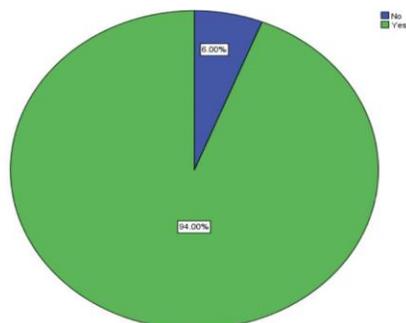


Figure-13: Pie chart showing percentage distribution on glucocorticoid treatment. 94%- yes (green) , 6%- no (blue). 94 % of them reported that glucocorticoid treatment is the best option.

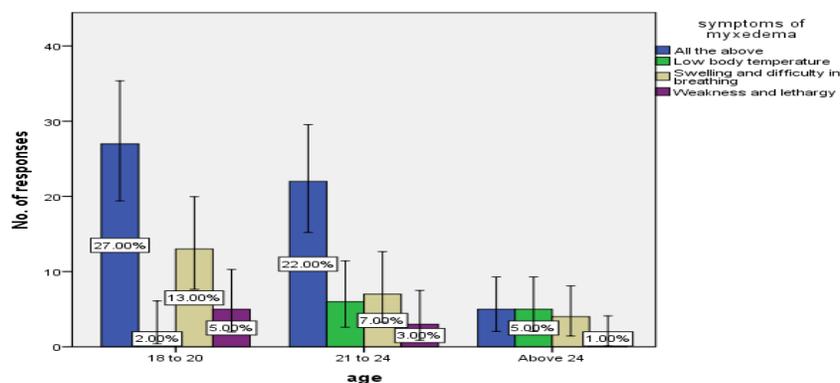


Figure 14: Bar graph represents the association between the age (X axis) and responses to symptoms of myxedema (Y axis) . 27% of the age group between 18-20 reported all the above and 22 % of the age group between 21-24 reported all the above. 5 % of the age group above 24 reported low body temperature. Blue colour denotes all the above, red denotes swelling and difficulty in breathing, green denotes low body temperature, violet denotes weakness and lethargy. Chi square value=1.255; P value = 0.01 (P>0.05 statistically significant). Hence it is statistically significant.

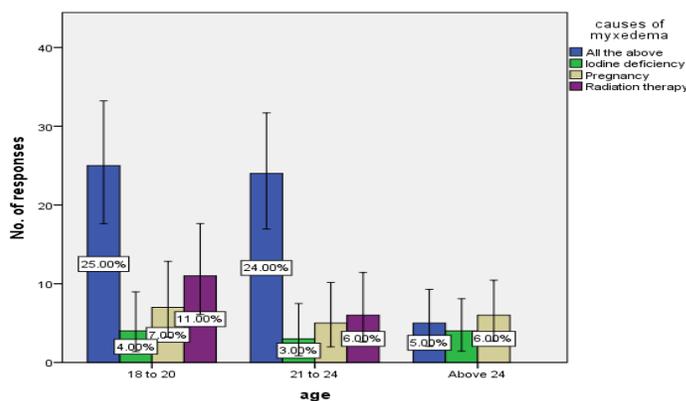


Figure 15: Bar graph represents the association between the age (X axis) and responses to causes of myxedema (Y axis) . 25% of the age group between 18-20 reported all the above and 24 % of the age group between 21-24 reported all the above. 6 % of the age group above 24 reported pregnancy. Blue colour denotes all the above, red denotes pregnancy, green denotes iodine deficiency, violet denotes radiation therapy. Chi square value=1.255; P value = 0.01(P>0.05 statistically significant). Hence it is statistically significant

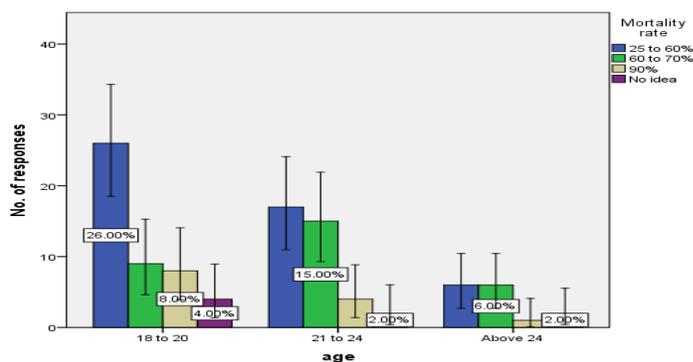


Figure 16: Bar graph represents the association between the age (X axis) and responses to mortality rate in myxedema patients (Y axis) . 26% of the age group between 18-20 reported 25-60 % and 17 % of the age group between 21-24 reported 25-60%. 6% of the age group above 24 reported 60-70% of mortality rate. Blue colour denotes 25-60%, red denotes 90% , green denotes 60-70% , violet denotes no idea. Chi square value=1.255; P value = 0.03 (P>0.05 statistically significant). Hence it is statistically significant

DISCUSSION

In the present study approximately 72 % of the participants were aware about the treatment protocols and diagnosis of myxedema patients. The participants have clear knowledge about the causes, symptoms and treatment for the patients affected by myxedema. They also have detailed knowledge about the recent trends evolved in the treatment for the patients affected by myxedema. They are also aware about the various treatments like airway treatment, steroid treatment, LT3 therapy and glucocorticoid treatment. They were also aware about the medications used for the patients.

In a previous study it is reported that myxedema is the most life threatening disease with symptoms like arrhythmia, coagulation disorders and diseases related to heart and it can be treated by levothyroxine which acts as a better therapy in treating myxedema patients (Mathew *et al.*, 2011). In present study it is reported that low body temperature, swelling, difficulty in breathing, weakness and lethargy are the characteristic symptoms and it can be treated by Levothyroxine, steroid treatment and glucocorticoid treatment. In a previous study done based on the hospital mortality reported that 30 % of them died due to myxedema among them more than half of the patients were female and they also reported that most of them were treated by LT4, LT3 and steroid treatment (Ono *et al.*, 2017). In the present study it is reported that the mortality rate of myxedema patients is 25 -60 % and the patients can be treated with LT3 therapy, airway treatment, Steroid treatment and glucocorticoid treatment. In some studies it is reported that thyroxine and triiodothyronine are given in a combined form for better treatment. They have also reported that it is more effective when proper ventilatory and hemodynamic support is given (Kwaku and Burman, 2007). In the present it is reported that airway support must also be given for better cure. In some studies they have reported that depression of central nervous system and cardiovascular system are the major complications of myxedema (Jordan, 1995), whereas in present study it is reported that Heart attack, hypothermia and preeclampsia are the major complications of myxedema patients and cardiovascular depression is the major commodity in myxedema crisis. In previous studies done it is concluded that untreated myxedema leads to myxedema coma and it also results in cardiac diseases which is considered the most severe form of myxedema. It should be treated carefully and the diagnosis should be done in a proper way (Baldwin *et al.*, 2021). In previous studies they have reported that it is a rare disease but the most severe form of disease, altered consciousness, confusion, lethargy, metabolic disturbances and infections are the major symptoms of myxedema (Gupta, 2013). Similarly, in present study it is reported that weakness, lethargy, difficulty in breathing are the major symptoms in myxedema patients. In a few studies it is reported that seizures and drowsiness are the major complications of myxedema (Gunatilake and Bulugahapitiya, 2017). In the present it is reported that heart attack, hypothermia and preeclampsia are the major complications of myxedema. In previous studies the authors have concluded that Levothyroxine treatment is more effective than any other option in treating myxedema patients (Rajendran *et al.*, 2020). Similarly in present study also it is concluded that more than half the population have suggested Levothyroxine therapy for better treatment.

Despite the findings introduced here, it is important to stress

that this survey has some limitations. The sample size chosen was small, the responses were collected in short duration and the population selected were homogeneous. In future, awareness and knowing about treatment protocols helps in better treatment and better welfare of the patients. And the proper treatment can be given in a timely manner and it helps to eliminate the risk.

CONCLUSION

From the above study we can conclude that more than half of the population were aware about the treatment protocols to treat myxedema patients. It is a life threatening disease with severe complications. It is important to diagnose the disease early and better treatment planning should be done to avoid the complications.

Acknowledgement: We thank the Department of Prosthodontics, Saveetha Dental College in supporting us to conduct the survey and the participants of the survey for their valuable time and coordination.

Conflict of interest: NIL

SOURCE OF FUNDING

The present study was supported by the following agencies.

- Saveetha dental college
- SIMATS, Saveetha University
- SKR Pack Tech Pvt Limited, Thiruvallur, Tamil Nadu.

REFERENCES

- i. Ansah-Addo, S. and Alexis, A.F. (2021) 'Pretibial Myxedema in a Euthyroid Patient', *The Journal of clinical and aesthetic dermatology*, 14(1), pp. 21–23.
- ii. Ashok, V. and Ganapathy, D. (2019) 'A geometrical method to classify face forms', *Journal of oral biology and craniofacial research*, 9(3), pp. 232–235.
- iii. Baldwin, C. *et al.* (2021) 'Myxedema Heart and Pseudotamponade', *Journal of the Endocrine Society*, 5(1), p. bvaa125.
- iv. Basu, S. (2012) 'Benefit of Treating Patients of Subclinical Hypothyroidism with Subfertility: Anecdotal Observation or True Association?', *The American Journal of Medicine*, p. e9. doi:10.1016/j.amjmed.2011.07.042.
- v. Bhatt, D. *et al.* (2017) 'Treating mild central hypothyroidism in postoperative pituitary patients - impact of Endocrine Society guidelines', *Endocrine Abstracts* [Preprint]. doi:10.1530/endoabs.50.p289.
- vi. Braithe, N. *et al.* (2021) 'An Unusual Presentation of ST Elevation Myocardial Infarction Complicated with Cardiogenic Shock Due to Myxedema Coma: A Case Report', *The American journal of case reports*, 22, p. e929573.
- vii. Choudhari, S. and Thenmozhi, M.S. (2016) 'Occurrence and Importance of Posterior Condylar Foramen', *Journal of advanced pharmaceutical technology & research*, 9(8), p. 1083.
- viii. Govindaraju, L., Jeevanandan, G. and Subramanian, E.

- (2017) 'Clinical Evaluation of Quality of Obturation and Instrumentation Time using Two Modified Rotary File Systems with Manual Instrumentation in Primary Teeth', *Journal of clinical and diagnostic research: JCDR*, 11(9), pp. ZC55–ZC58.
- ix. Gummalla, S., Manjunath, M. and Phillips, B. (2020) 'Myxedema Coma: A Life-Threatening Condition in Patients Using Pembrolizumab', *Case reports in endocrinology*, 2020, p. 8855943.
- x. Gunatilake, S.S.C. and Bulugahapitiya, U. (2017) 'Myxedema Crisis Presenting with Seizures: A Rare Life-Threatening Presentation—A Case Report and Review of the Literature', *Case Reports in Endocrinology*, pp. 1–5. doi:10.1155/2017/4285457.
- xi. Gupta, K.J. (2013) 'Myxedema Coma: A Sleeping Giant in Clinical Practice', *The American Journal of Medicine*, pp. e3–e4. doi:10.1016/j.amjmed.2013.07.037.
- xii. Gupta, P., Ariga, P. and Deogade, S.C. (2018) 'Effect of Monopoly-coating Agent on the Surface Roughness of a Tissue Conditioner Subjected to Cleansing and Disinfection: A Contact Profilometric In vitro Study', *Contemporary clinical dentistry*, 9(Suppl 1), pp. S122–S126.
- xiii. Hannah, R. *et al.* (2018) 'Awareness about the use, ethics and scope of dental photography among undergraduate dental students dentist behind the lens', *Journal of advanced pharmaceutical technology & research*, 11(3), p. 1012.
- xiv. Jordan, R.M. (1995) 'Myxedema coma. Pathophysiology, therapy, and factors affecting prognosis', *The Medical clinics of North America*, 79(1), pp. 185–194.
- xv. Kavarthapu, A. and Thamaraiselvan, M. (2018) 'Assessing the variation in course and position of inferior alveolar nerve among south Indian population: A cone beam computed tomographic study', *Indian journal of dental research: official publication of Indian Society for Dental Research*, 29(4), pp. 405–409.
- xvi. Kwaku, M.P. and Burman, K.D. (2007) 'Myxedema Coma', *Journal of Intensive Care Medicine*, pp. 224–231. doi:10.1177/0885066607301361.
- xvii. Lambrinoudaki, I. (2020) 'Treating hypothyroidism in people over 70', *Maturitas*, p. 60. doi:10.1016/j.maturitas.2019.11.004.
- xviii. Ludemann, M. and Cammarano, J. (2020) 'Does treating subclinical hypothyroidism improve patients' quality of life?', *Evidence-Based Practice*, pp. 24–25. doi:10.1097/ebp.0000000000000722.
- xix. Maldonado, D., Patel, U. and Tarlin, N. (2020) 'A Case of Refractory Myxedema Coma', *Cureus*, 12(8), p. e9737.
- xx. Mathew, V. *et al.* (2011) 'Myxedema Coma: A New Look into an Old Crisis', *Journal of Thyroid Research*, pp. 1–7. doi:10.4061/2011/493462.
- xxi. Ono, Y. *et al.* (2017) 'Clinical characteristics and outcomes of myxedema coma: Analysis of a national inpatient database in Japan', *Journal of epidemiology / Japan Epidemiological Association*, 27(3), pp. 117–122.
- xxii. Pandian, K.S., Krishnan, S. and Kumar, S.A. (2018) 'Angular photogrammetric analysis of the soft-tissue facial profile of Indian adults', *Indian journal of dental research: official publication of Indian Society for Dental Research*, 29(2), pp. 137–143.
- xxiii. Rajendran, A. *et al.* (2020) 'Oral Levothyroxine is an Effective Option for Myxedema Coma: A Single-Centre Experience', *European Thyroid Journal*, pp. 1–7. doi:10.1159/000507855.
- xxiv. Ramamurthy, J. and Mg, V. (2018) 'Comparison of effect of Hiora mouthwash versus Chlorhexidine mouthwash in gingivitis patients: A clinical trial', *Asian journal of pharmaceutical and clinical research*, 11(7), p. 84.
- xxv. Ramesh, A. *et al.* (2019) 'Esthetic lip repositioning: A cosmetic approach for correction of gummy smile - A case series', *Journal of Indian Society of Periodontology*, 23(3), pp. 290–294.
- xxvi. Ravi, S. *et al.* (2017) 'Additive Effect of Plasma Rich in Growth Factors With Guided Tissue Regeneration in Treatment of Intra-bony Defects in Patients With Chronic Periodontitis: A Split-Mouth Randomized Controlled Clinical Trial', *Journal of Periodontology*, pp. 839–845. doi:10.1902/jop.2017.160824.
- xxvii. Samuel, S.R., Acharya, S. and Rao, J.C. (2020) 'School Interventions-based Prevention of Early-Childhood Caries among 3-5-year-old children from very low socioeconomic status: Two-year randomized trial', *Journal of public health dentistry*, 80(1), pp. 51–60.
- xxviii. Sharma, P. *et al.* (2019) 'Emerging trends in the novel drug delivery approaches for the treatment of lung cancer', *Chemico-biological interactions*, 309, p. 108720.
- xxix. Venu, H., Raju, V.D. and Subramani, L. (2019) 'Combined effect of influence of nano additives, combustion chamber geometry and injection timing in a DI diesel engine fuelled with ternary (diesel-biodiesel-ethanol) blends', *Energy*, 174, pp. 386–406.
- xxx. Vikram, N.R. *et al.* (2017) 'Ball Headed Mini Implant', *Journal of clinical and diagnostic research: JCDR*, 11(1), pp. ZL02–ZL03.
- xxxi. Wu, F. *et al.* (2019) 'Biologically synthesized green gold nanoparticles from *Siberian ginseng* induce growth-inhibitory effect on melanoma cells (B16)', *Artificial Cells, Nanomedicine, and Biotechnology*, pp. 3297–3305. doi:10.1080/21691401.2019.1647224.