

Analysis Of Translation Of Health Information In Dental Caries

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ABSTRACT

Introduction:

Language helps an individual in expressing their feelings and desires. In India around 22 languages are spoken which creates language barriers among people. Language barriers lead to miscommunication which can be harmful in the medical field, it can cause hindrance in quality medical treatment which can thereby affect the health of the patient. The prime motive of healthcare workers is to provide good treatment to the patients irrespective of language barriers for the purpose of which language translation apps such as Google translate can be used to overcome this.

Aim:

The aim of this study is to make use of language translation tools to overcome issues faced by the general population due to language barriers which create a communication gap between the medical professional and the patient that causes hindrance in quality medical treatment.

Materials and methods:

The sample size chosen for this study is 100. A self structured questionnaire was prepared in google forms and circulated among the study population. The results of the responses received from the study population were tabulated and analysed using chi square analysis and IBM SPSS software.

Results:

It was found that 28.93% of the study population faced difficulty during dental visits due to language barriers whereas 58.86% of the study population believed that the usage of language translation apps and tools would minimise their efforts for

expressing their concerns to the medical health care workers. The results obtained were statistically significant with a p-value of 0.01 ($p < 0.05$).

Conclusion:

The study inferred that the study population is comfortable in using language translation apps such as google translate for overcoming language barriers caused due to the diversity of languages that can hinder quality medical treatment.

KEYWORDS: Translation, language, google translate, language barriers, therapeutic relationship, Innovative Technology

INTRODUCTION

Language helps an individual to express their desires, feelings and thoughts. Words are a symbol of reality and they are used to symbolise concepts and manipulate knowledge concerning. Language also helps greatly in understanding traditions, love and cultures. Language helps its users to have various experiences and even understand the essence of education. It is through language and culture that tradition is passed from one generation to another generation.(1)

India is a multilingual country where there are diverse languages and cultures. Hindi is the most widely spoken language in India, other languages commonly spoken in India include Bengali, Odia, Marathi, Kannada, Malayalam, Telugu, Tamil, Bhojpuri, Konkani, Punjabi, there are about 22 languages spoken in India. Due to this diversity of languages and cultures, in several places of our country language barriers are created.(2)

Language barriers cause miscommunication among people, but the most common problem faced due to language barriers is in the medical field. Language barriers cause communication problems among healthcare providers and patients due to uncommon languages.

The primary motive of healthcare workers is to provide high-quality treatment to patients, regardless of communication gap, however uncommon languages impact the quality of healthcare was to do for satisfactory treatment. Patients usually face difficulty in expressing their concerns to healthcare workers because of which they have to undergo a greater amount of medical procedures.(3)

Linguistic services are costly however it can be managed by faster medical service and testing, short emergency department stays which can be cost-effective for the patient and convince the patient for repetitive follow-ups. Communication is essential between the patient and the doctor for developing a therapeutic relationship to ensure faster health improvement of the patient. (4), This can be done by applying alternative methods such as communication tools. Communication tools such as Google translate can be helpful in translating the various queries and concerns, this would be helpful for the patient and the healthcare worker. Certain apps such as voice to voice and voice to text translate can be

helpful for patients to reduce the effort of typing their concerns and about giving quick results.(5) However, given the current situation very few students in the medical field as well as patients have made use of translation tools and communication apps for health information.

Dental caries are untreated cavities of the tooth which are caused due to the dietary and salivary influences. Destructive factors inculcated in the diet lead to the demineralisation of hard tissues of the tooth which causes cavities. The most common symptoms of dental caries include inflammation and toothache. Individuals in their younger age are more prone to dental caries due to their dietary habits of eating greater amounts of sweets and chocolates which easily causes the breakdown of the enamel layer of the tooth in deciduous dentition . (6)

Our team has extensive knowledge and research experience that has translated into high quality publications. (7),(8),(9),(10),(11),(12),(13),(14),(15),(16),(17),(18),(19),(20),(21),(22),(23),(24),(25),(26)

This study has been conducted to analyse the difficulty that is faced by patients due to language barriers in expressing their concerns about dental caries and other teeth related problems to doctors which causes hindrance in satisfactory medical treatment. It will enhance the quality of medical treatment and will thereby create a therapeutic relationship between the patient and the doctor.

MATERIALS AND METHODS

The sample size used for the study is hundred. A self structured questionnaire had been prepared and uploaded in Google forms. The standard questionnaire in Google forms had been circulated among the sample study population and at the end of the survey, all the data was collected and analysed by using chi-square correlation test . The chi-square analysis was done using statistical software IBM SPSS. The study setting is an institutional study based in Saveetha Dental College and hospitals which facilitated flexible data collection from the general population and the case sheet was verified by a third person however, there was lack of external validity, that is the result of the data collected, is not generalisable. The study was approved by SRB Saveetha Dental College.

The questionnaire prepared included demographic questions such as age and gender as well as questions related to language barriers and language translation tools such as,

- Age
- Gender
- Educational qualification

- What is your mother tongue
- How many languages do you know
- How often do you visit the dentist
- Do you face trouble during dental visits due to language barriers
- Are you comfortable using language translation apps such as google translate for overcoming language barriers
- How often do you follow up for a dental routine check up
- Should vernacular languages be introduced as a compulsory course for all healthcare workers
- Did you ever face difficulty in expressing your concerns to the dentist due to language barriers

RESULTS AND DISCUSSION

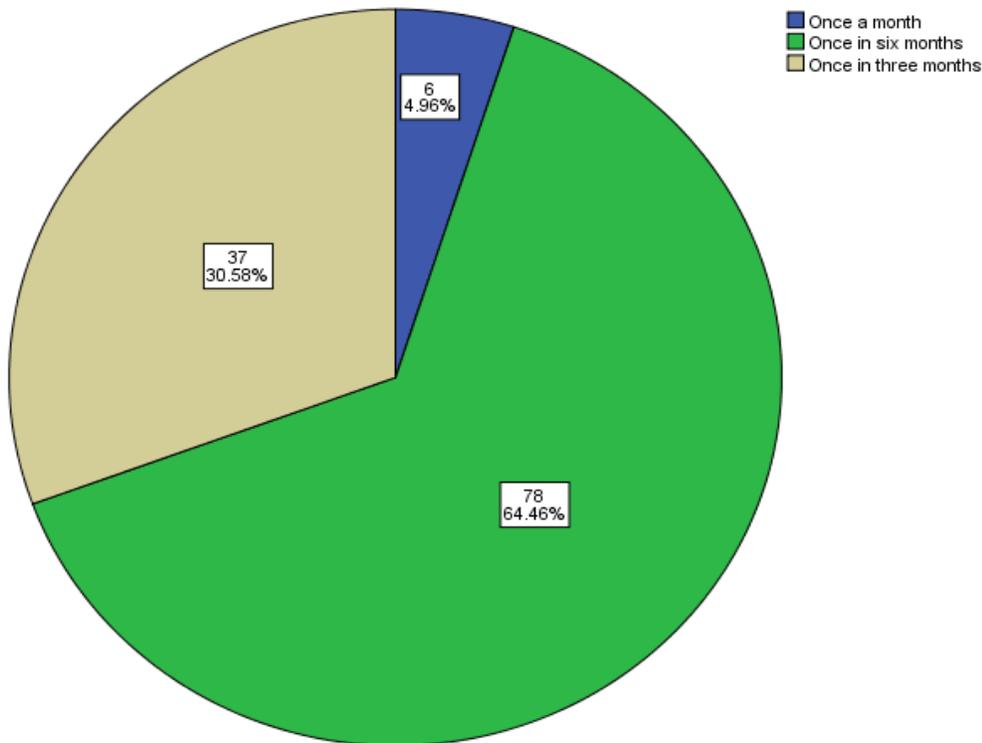


Figure 1 : Pie chart representing the percentage distribution of frequency of dental visits among the study population. Blue represents once a month(4.96%), green represents once in six months(64.46%),beige represents once in three months(30.58%). Majority of the study population visited their dentists once in six months.

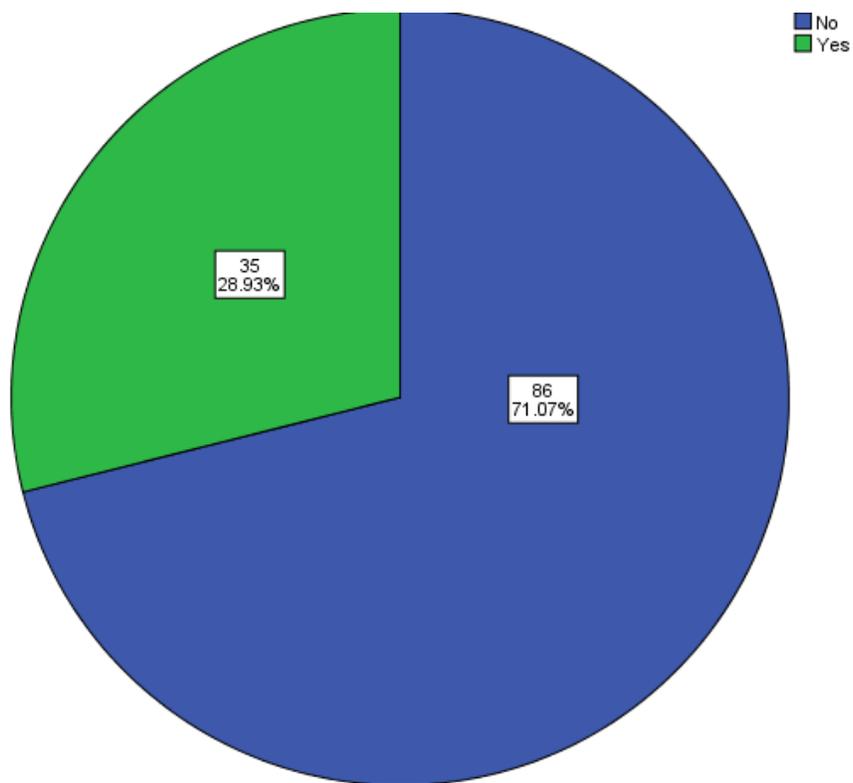


Figure 2 :Pie chart showing percentage distribution of whether the study population faces trouble during their dental visits due to language barriers. Blue represents no (71.07%), green represents yes (28.93%). It was found that the majority of the study population did not face trouble during their dental visits due to language barriers.

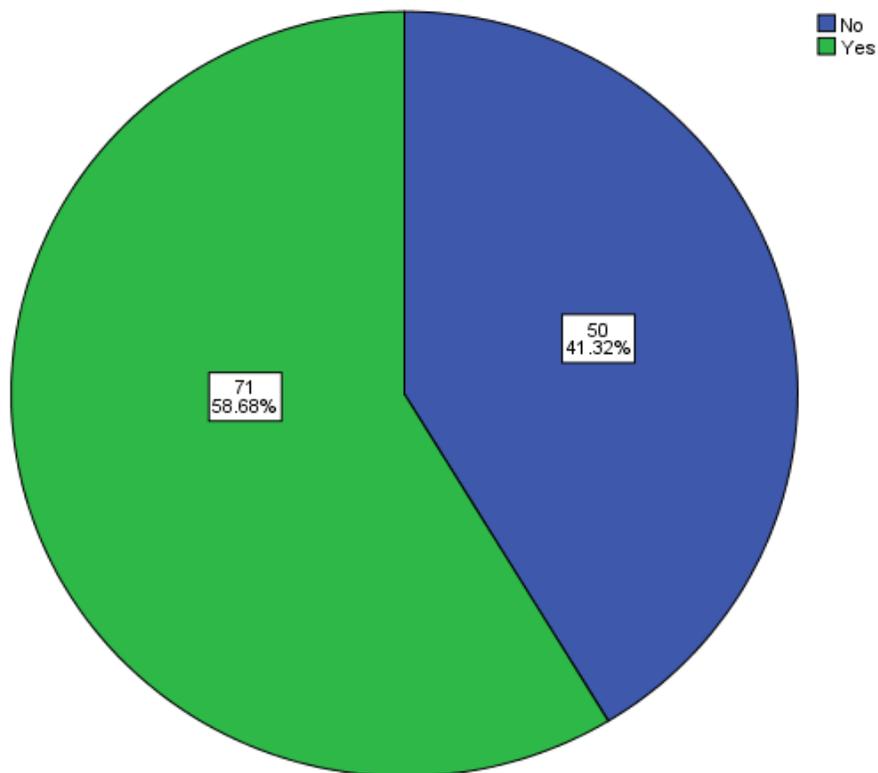


Figure 3: Pie chart showing percentage distribution of whether the study population was comfortable in using language translation apps such as google translate for communication in order to overcome language barriers. Green represents yes(58.68%), blue represents no(41.32%). Majority of the study population was comfortable using language translation apps for communication.

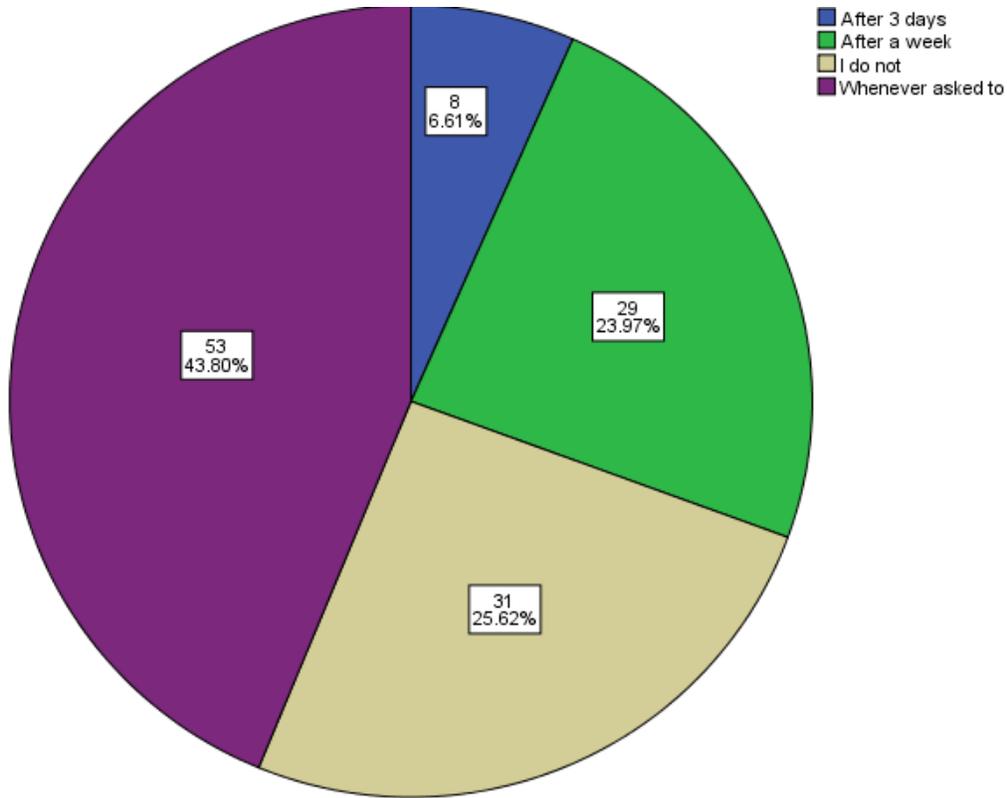


Figure 4:Pie chart showing percentage distribution of frequency of dental routine check up among the study population. Blue represents after 3 days(6.61%), green represents after a week(23.97%), beige represents that do not follow up for a dental routine check(25.62%), purple represents the study population follows up for a routine check whenever asked to(43.8%). Majority of the study population went for routine dental check ups whenever asked to.

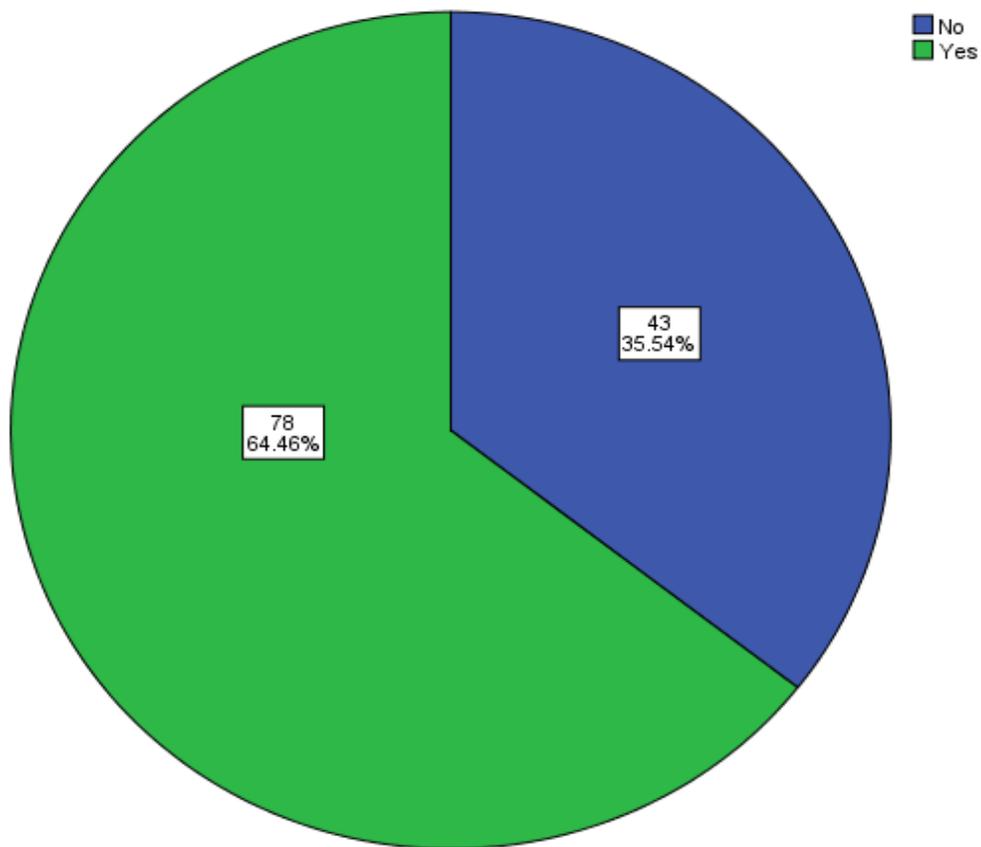


Figure 5:-Pie chart representing percentage distribution of views of the study population for introducing vernacular language as a compulsory course for all health care professionals. Green represents yes(64.46%) and blue represents no (35.54%) implying that the majority of the study population agreed to introduce vernacular language as a compulsory course for all health care professionals.

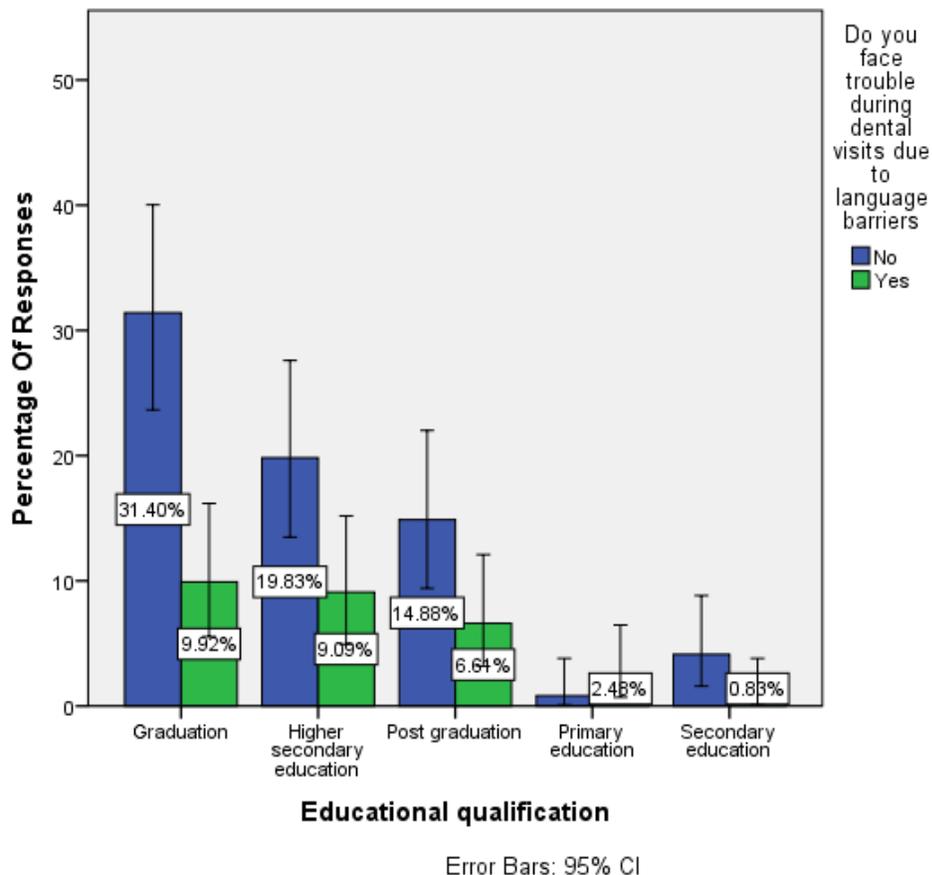


Figure 6:- Bar graph showing correlation between educational qualification and whether the study population faces trouble during their dental visits due to language barriers. X axis represents educational qualification and Y axis represents the percentage of responses. Blue denotes No and Green denotes Yes. 31.4% of graduates, 19.83% of higher Secondary, 14.88% of Post Graduates, 0.85% Primary, 4.13% Secondary responded no.(blue). 9.92% of Graduates, 9.09% of Higher Secondary, 6.61% of Post Graduates, 2.48% Primary, 0.83% Secondary responded yes (green). Majority of the graduates did not face trouble during their dental visits due to language barriers. P value is 0.037 ($p < 0.05$) which is statistically significant and concludes that the majority of people from all educational levels have faced troubles during dental visits due to language barriers.

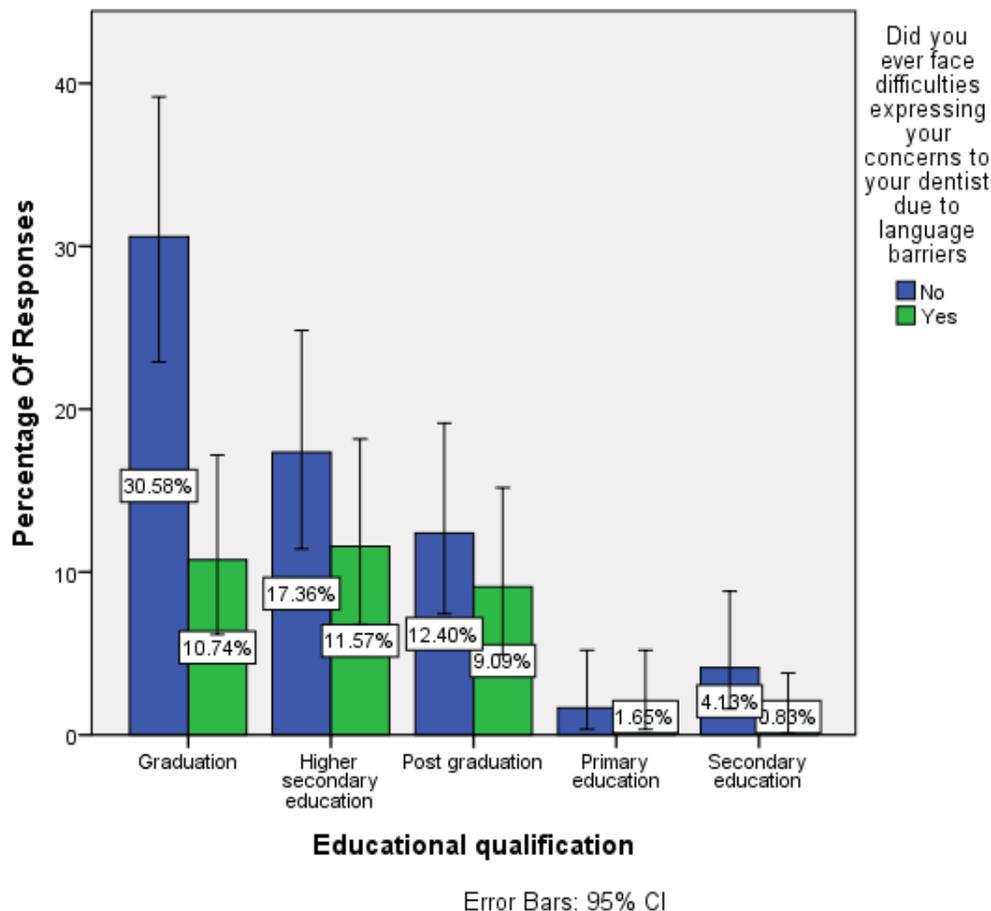
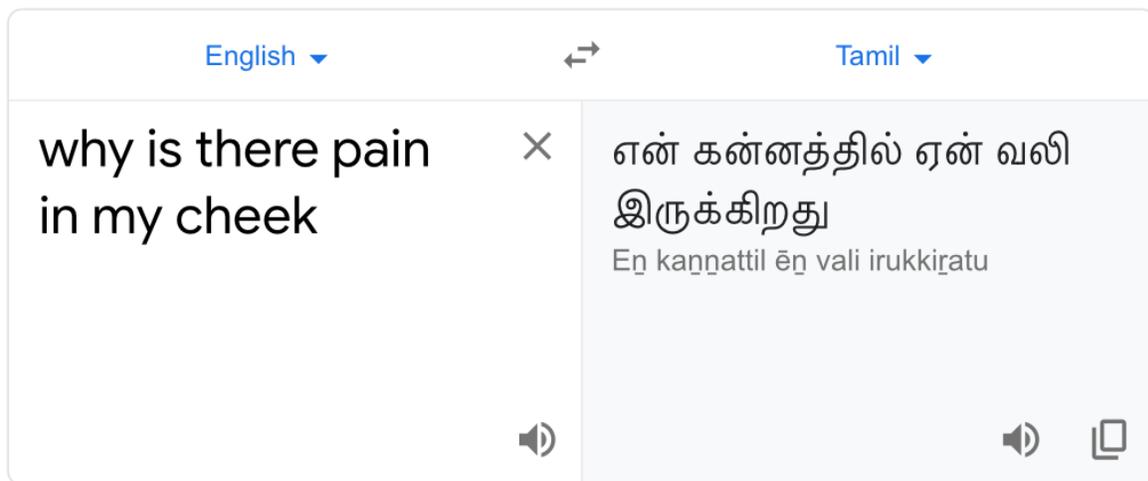
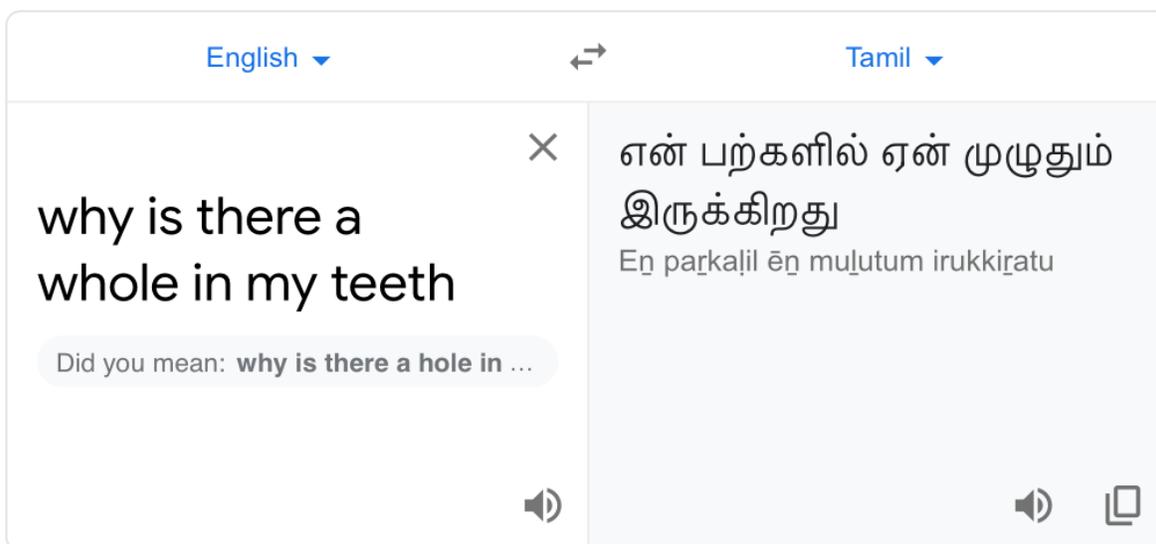


Figure 7: Bar graph showing correlation between educational qualification and whether the individuals of the study population ever faced difficulty in expressing their concerns to their dentists due to language barriers. X axis represents educational qualification and Y axis represents the percentage of responses. Blue denotes No and green denotes Yes. 30.58% Graduates, 17.36% Higher Secondary, 12.40% Post Graduates, 1.65% Primary, 4.13% Secondary responded No(Blue). 10.74% Graduates, 11.57% Higher Secondary, 9.09% Post Graduates, 0.83% Secondary responded Yes (green). Majority of graduates did not face difficulty in expressing their concerns to their dentists due to language barriers. P value is 0.02 ($p < 0.05$) which is statistically significant and concludes that the majority of people from all educational levels have faced difficulties expressing their concerns to a dentist due to language barriers.



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Figure 8, 9 : Represents translation of some of the most common concerns of the study population in relation to dental caries.

The present study divulged that 64.46% of the individuals from the study population visit the dentist once in six months, 30.58% of the individuals visited their dentists once every three months and 4.96% of the study population visited their dentist once a month (Figure 1). 70.07% of the individuals of the study population did not face trouble during dental visits due to language barriers, 28.93% of the individuals did face issues during dental visits due to language barriers (Figure 2) . 58.68% of the total

study population was comfortable using apps like google translate, 41.32% of the total study population was not comfortable using translation apps such as google translate to overcome language barriers(Figure 3). 6.61% of the study population would follow up for a dental routine check up after 3 days, 23.97%of the individuals from the study population would follow up for a routine check up after a week, 25.62% of the total study population did not follow up for their routine dental check and 43.80% of the individuals from the study population would follow up for their dental check up whenever asked to(Figure 4). 64.46% of the individuals from the study population believe that vernacular language should be introduced as a compulsory course for all health care workers whereas 35.54% did not believe that it was important for the health care workers to learn the vernacular language(Figure 5) . . Graduates did not face trouble during dental visits due to language barriers as compared to individuals having other educational qualifications(Figure 6). Graduates faced less trouble in expressing their concerns to health care workers as compared to higher secondary education individuals(Figure 7) . Translation of some of the most common concerns of the study population in relation to dental caries (Figure 8, 9). The p value obtained from the study was 0.01($p < 0.05$) which was statistically significant.

The study conducted revealed that 33.9% of the individuals from the general population who participated in the research faced difficulty in expressing their concerns to their dentists due to language barriers. Commonly asked questions by patients were taken and translated in different languages on google translate which helped them communicate with their health care provider.

In our study it was found that 58.7% of individuals were comfortable using online translation apps like google translation for language translation. In a study conducted by Hilal Al Shamsi, it was found that 43.2% of the patients and 21-76% of the health care workers had poor access to interpreter services. Certain health care organizations used language translation apps like google translate to avoid the hindrance caused due to language barriers which increased the satisfaction of the patients and the medical professionals.(27) (28)

In our study 64.5% of the population believed that it was important for vernacular language to be introduced as a compulsory course for all health care workers. Previous literature study stated that though english is the most commonly accepted language it is still not preferred to be used in several places, vernacular languages can help the population of that area to understand and express themselves better. In our study it was found that 71.1% of individuals did not face trouble due to language barriers during their dental visits. A study conducted by floor van rosse stated that language barriers posed a

major threat to the health of a patient therefore it was important to bridge the gap between the patient and the medical health care worker for the safety of the patient. (29) (30)

In our study it was found that 24.79% graduates and 15.7% post graduates were comfortable using language translation tools and apps such as google translate for an easy translation of health information and for them to express their concerns to the medical professional in an easy manner, whereas 16.53 % graduates and 5.97% post graduates did not want to use language translation tools for communicating with their health care professional. In a study conducted by Anita Panayiotou it was found that careful considerations were required for I-pad based language translation which was based on the features of the apps available, out of the evaluation which was carried out apps such as Talk To Me and CALD Assist were considered most suitable for language translation as the health phrases that were translated were brief and clear. It was also found that it is not possible to access a professional interpreter for every communication between the healthcare professional and the patient therefore, it is important to make use of language translation tools and apps for smooth communication and better understanding of the patient's concerns. There was lack of external validity, the results of the study conducted is not generalisable due to constrained sample size. This study has been conducted to overcome the hindrance in treatment that is caused by language barriers between the healthcare workers and the patient in order to provide good quality treatment to them.

CONCLUSION

This study conducted for analysing translation of health information among medical healthcare workers and patients concluded that, only a few people faced language barriers, however they were comfortable in using language translation of a Google translate for communication to overcome this hindrance.

AUTHORS CONTRIBUTION

Medha Rajiv Ranjan: Literature search, data collection analysis, manuscript drafting.

Dr. Palati Sindhuja: Aided in conception of the topic, has participated in the study design, statistical analysis and has supervised in preparation and final corrections of the manuscript.

Dr. Lakshmi T.A: Data verification, manuscript drafting, preparation of the manuscript.

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CONFLICT OF INTEREST

The author declares that there was no conflict of interest in the present study

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REFERENCES

1. Morrish L. Introduction: what is language? What is linguistics? [Internet]. Exploring Language and Linguistics. p. 1–23. Available from: <http://dx.doi.org/10.1017/cbo9781139548922.002>
2. Dasgupta P. Language policies and lesser-known languages in India [Internet]. The Yearbook of South Asian Languages and Linguistics (2006). 2006. Available from: <http://dx.doi.org/10.1515/9783110186611.191>
3. Language Barriers [Internet]. SpringerReference. Available from: http://dx.doi.org/10.1007/springerreference_308184
4. Auerback ML. Language Barriers in Medicine [Internet]. Vol. 274, JAMA: The Journal of the American Medical Association. 1995. p. 683. Available from: <http://dx.doi.org/10.1001/jama.1995.03530090013008>
5. Computer-assisted translation tools as tools for language learning [Internet]. Technology-Enhanced Language Learning for Specialized Domains. 2016. p. 265–76. Available from: <http://dx.doi.org/10.4324/9781315651729-34>
6. Tilling E. Rotten roots: root surface caries risks and management [Internet]. Vol. 11, Dental Nursing. 2015. p. 328–31. Available from: <http://dx.doi.org/10.12968/denn.2015.11.6.328>

7. Princeton B, Santhakumar P, Prathap L. Awareness on Preventive Measures taken by Health Care Professionals Attending COVID-19 Patients among Dental Students. *Eur J Dent.* 2020 Dec;14(S01):S105–9.
8. Mathew MG, Samuel SR, Soni AJ, Roopa KB. Evaluation of adhesion of *Streptococcus mutans*, plaque accumulation on zirconia and stainless steel crowns, and surrounding gingival inflammation in primary molars: randomized controlled trial. *Clin Oral Investig.* 2020 Sep;24(9):3275–80.
9. Sridharan G, Ramani P, Patankar S, Vijayaraghavan R. Evaluation of salivary metabolomics in oral leukoplakia and oral squamous cell carcinoma. *J Oral Pathol Med.* 2019 Apr;48(4):299–306.
10. R H, Hannah R, Ramani P, Ramanathan A, Jancy MR, Gheena S, et al. CYP2 C9 polymorphism among patients with oral squamous cell carcinoma and its role in altering the metabolism of benzo[a]pyrene [Internet]. Vol. 130, *Oral Surgery, Oral Medicine, Oral Pathology and Oral Radiology.* 2020. p. 306–12. Available from: <http://dx.doi.org/10.1016/j.oooo.2020.06.021>
11. Antony JVM, Ramani P, Ramasubramanian A, Sukumaran G. Particle size penetration rate and effects of smoke and smokeless tobacco products - An invitro analysis. *Heliyon.* 2021 Mar 1;7(3):e06455.
12. Sarode SC, Gondivkar S, Sarode GS, Gadail A, Yuwanati M. Hybrid oral potentially malignant disorder: A neglected fact in oral submucous fibrosis. *Oral Oncol.* 2021 Jun 16;105390.
13. Hannah R, Ramani P, WM Tilakaratne, Sukumaran G, Ramasubramanian A, Krishnan RP. Author response for “Critical appraisal of different triggering pathways for the pathobiology of pemphigus vulgaris—A review” [Internet]. Wiley; 2021. Available from: <https://publons.com/publon/47643844>
14. Chandrasekar R, Chandrasekhar S, Sundari KKS, Ravi P. Development and validation of a formula for objective assessment of cervical vertebral bone age. *Prog Orthod.* 2020 Oct 12;21(1):38.
15. Subramanyam D, Gurunathan D, Gaayathri R, Vishnu Priya V. Comparative evaluation of salivary malondialdehyde levels as a marker of lipid peroxidation in early childhood caries. *Eur J Dent.* 2018 Jan;12(1):67–70.
16. Jeevanandan G, Thomas E. Volumetric analysis of hand, reciprocating and rotary instrumentation

- techniques in primary molars using spiral computed tomography: An in vitro comparative study. *Eur J Dent.* 2018 Jan;12(1):21–6.
17. Ponnulakshmi R, Shyamaladevi B, Vijayalakshmi P, Selvaraj J. In silico and in vivo analysis to identify the antidiabetic activity of beta sitosterol in adipose tissue of high fat diet and sucrose induced type-2 diabetic experimental rats. *Toxicol Mech Methods.* 2019 May;29(4):276–90.
 18. Sundaram R, Nandhakumar E, Haseena Banu H. Hesperidin, a citrus flavonoid ameliorates hyperglycemia by regulating key enzymes of carbohydrate metabolism in streptozotocin-induced diabetic rats. *Toxicol Mech Methods.* 2019 Nov;29(9):644–53.
 19. Alsawalha M, Rao CV, Al-Subaie AM, Haque SKM, Veeraraghavan VP, Surapaneni KM. Novel mathematical modelling of Saudi Arabian natural diatomite clay. *Mater Res Express.* 2019 Sep 4;6(10):105531.
 20. Yu J, Li M, Zhan D, Shi C, Fang L, Ban C, et al. Inhibitory effects of triterpenoid betulin on inflammatory mediators inducible nitric oxide synthase, cyclooxygenase-2, tumor necrosis factor- α , interleukin-6, and proliferating cell nuclear antigen in 1, 2-dimethylhydrazine-induced rat colon carcinogenesis. *Pharmacogn Mag.* 2020;16(72):836.
 21. Shree KH, Hema Shree K, Ramani P, Herald Sherlin, Sukumaran G, Jeyaraj G, et al. Saliva as a Diagnostic Tool in Oral Squamous Cell Carcinoma – a Systematic Review with Meta Analysis [Internet]. Vol. 25, *Pathology & Oncology Research.* 2019. p. 447–53. Available from: <http://dx.doi.org/10.1007/s12253-019-00588-2>
 22. Zafar A, Sherlin HJ, Jayaraj G, Ramani P, Don KR, Santhanam A. Diagnostic utility of touch imprint cytology for intraoperative assessment of surgical margins and sentinel lymph nodes in oral squamous cell carcinoma patients using four different cytological stains. *Diagn Cytopathol.* 2020 Feb;48(2):101–10.
 23. Karunagaran M, Murali P, Palaniappan V, Sivapathasundharam B. Expression and distribution pattern of podoplanin in oral submucous fibrosis with varying degrees of dysplasia – an immunohistochemical study [Internet]. Vol. 42, *Journal of Histotechnology.* 2019. p. 80–6. Available from: <http://dx.doi.org/10.1080/01478885.2019.1594543>

24. Sarode SC, Gondivkar S, Gadbail A, Sarode GS, Yuwanati M. Oral submucous fibrosis and heterogeneity in outcome measures: a critical viewpoint. *Future Oncol.* 2021 Jun;17(17):2123–6.
25. Raj Preeth D, Saravanan S, Shairam M, Selvakumar N, Selestin Raja I, Dhanasekaran A, et al. Bioactive Zinc(II) complex incorporated PCL/gelatin electrospun nanofiber enhanced bone tissue regeneration. *Eur J Pharm Sci.* 2021 May 1;160:105768.
26. Prithviraj N, Yang GE, Thangavelu L, Yan J. Anticancer Compounds From Starfish Regenerating Tissues and Their Antioxidant Properties on Human Oral Epidermoid Carcinoma KB Cells. In: PANCREAS. LIPPINCOTT WILLIAMS & WILKINS TWO COMMERCE SQ, 2001 MARKET ST, PHILADELPHIA ...; 2020. p. 155–6.
27. Al Shamsi H, Almutairi AG, Al Mashrafi S, Al Kalbani T. Implications of Language Barriers for Healthcare: A Systematic Review. *Oman Med J.* 2020 Mar;35(2):e122.
28. Welmers WE. The Use of Vernacular Languages in Education [Internet]. Vol. 30, *Language*. 1954. p. 190. Available from: <http://dx.doi.org/10.2307/410243>
29. van Rosse F, de Bruijne M, Suurmond J, Essink-Bot M-L, Wagner C. Language barriers and patient safety risks in hospital care. A mixed methods study [Internet]. Vol. 54, *International Journal of Nursing Studies*. 2016. p. 45–53. Available from: <http://dx.doi.org/10.1016/j.ijnurstu.2015.03.012>
30. Panayiotou A, Gardner A, Williams S, Zucchi E, Mascitti-Meuter M, Goh AMY, et al. Language Translation Apps in Health Care Settings: Expert Opinion [Internet]. Vol. 7, *JMIR mHealth and uHealth*. 2019. p. e11316. Available from: <http://dx.doi.org/10.2196/11316>