AWARENESS ON THE EFFECTS OF QUID USAGE AMONG DENTAL STUDENTS

Kaviyaselvi Gurumurthy[a], Dhanraj Ganapathy[b], Keerthi Sasanka[c], Vinay Sivaswamy[d]*

Article History: **Received:** 29.07.2022 **Revised:** 28.08.2022 **Accepted:** 23.09.2022

Abstract: Background: Quid, a form of betel nut, is one of the most addictive substances whose intake occurs by chewing. Quid chewing is affected by factors such as peer pressure, family influence and easy decision making. The practice of quid chewing is more predominant among younger children and possesses a high risk towards the occurrence of lung, liver and oral cancer. In contrast, it can be used as a remedy for schizophrenia. **Aim:** The present study aims at determining the awareness on the usage of quid among rural adolescents, its types and effects among dental students. **Materials and method**: A self assessable survey consisting of 10 questions were prepared and circulated among 100 dental students and the results were analysed to determine the effects of quid chewing. **Results and discussion:** On analysing the results, it was found that the practice of quid chewing affects the haemoglobin levels of he body and poses an increased risk to hepatocellular and oral carcinoma. The phenolic compounds and alkaloids in quid affect the CNS and can cause airway obstruction in children. In individuals exposed to smoking too, the functioning of the brain and mental capacity was lowered. More awareness on the positive effects of quid, its mechanism of action and its effect on the different population groups are essential. **Conclusion:** The present study concludes that the awareness among dental students on the usage, effects, advantages and disadvantages of quid usage was moderate.

Keywords: Quid, stimulant, cancer, betel nut, awareness, innovative technique, eco friendly.

[a]. Department of Prosthodontics, Saveetha Dental College and Hospitals, Saveetha Institute of Medical and Technical Sciences, Saveetha University, Chennai-600077
[b]. Professor and Head, Department of Prosthodontics, Saveetha Dental College and Hospitals, Saveetha Institute of Medical and Technical Sciences, Saveetha university, Chennai-600077
[c]. Senior Lecturer, Department of Prosthodontics, Saveetha Dental College and Hospitals, Saveetha Institute of Medical and Technical Sciences, Saveetha university, Chennai-600077
[d]. Associate Professor, Department of Prosthodontics, Saveetha Dental College and Hospitals, Saveetha Institute of Medical and Technical Sciences, Saveetha University, Chennai-600077

***Corresponding Author**
`

E-mail: 151901002.sdc@saveetha.com, dhanarajmganapathy@yahoo.co.in, keerthis.sdc@saveetha.com, vinay.sdc@saveetha.com

DOI: 10.31838/ecb/2022.11.08.002

INTRODUCTION

Quid, commonly known as betel nut, is one of the most addictive substances among adolescent students apart from nicotine and alcohol. The betel/ areca nut is predominantly cultivated in regions of southeast and South Africa. The ingestion of quid occurs by direct chewing or in combination with tobacco. The different parts of the betel plant serve different purposes such as using the leaves for wrapping and the use of the nut as a potent additive (1). The practice of quid chewing is most prevalent among adolescent populations in the country and possesses a high risk of occurrence of lung, liver and oral cancer. The use of betel quid is predicted to have potent effects against xerostomia, ailment disorders and other digestive system effects. Parallel to this, smokers in addition to chewing betel quid decreased their life expectancy due to increased oral cancer risks (2). The incidence of oral cancer is elevated due to these stimulant factors which however vary with different geographic locations, time and incidence of this practice.

The practice of betel quid chewing is commonly associated with factors such as peer pressure and influence from family members towards its use. The temporary pleasure and increase in one's energy to work, also affect the use and consumption of betel quid (3). The ingestion of betel nut and leaves negatively affects the taste buds and such individuals show intolerance to normal spicy food. The occurrence of oral submucous fibrosis has been posed as an increasing threat towards the use of betel nuts. The betel nut can be ingested in various forms and some of the most common ones are paan and gutka (4). These derivatives are often considered as a delicacy after meals are composed of the bel nut, slaked lime and other spices wrapped in the betel leaf. The foremost active metabolic component of betel quid and its derivatives is Arecoline, which exerts effects such as increased blood pressure, heart rate and breathing rate. The phenolic compounds with the help of alkaloids present in quid affect the CNS and may cause airway obstruction in younger individuals (5). When this practise is followed in pregnant women, the effects become more pronounced in the foetus. Apart from causing a decline in the birth weight and

preterm birth, chewing quid can elevate the risks of acquiring teratogenic effects too (6). However, the added benefit of its treatment modality for schizophrenia has been significantly used in the present day.

Our team has extensive knowledge and research experience that has translated into high quality publications (7–15), (16–21), (22–26). Despite previous researches conducted on the use and epidemiology of betel quid, its effects were restricted to the older members of the society and excluded the duration of the practice of quid chewing. The present study aims at determining the awareness on the use of quid among adolescent students and to assess the knowledge on the adverse effects of betel nut and its derivatives.

MATERIALS AND METHOD

For the study, a self-assessable survey consisting of 16 questions was prepared and circulated among 100 dental students of varying age groups via a google forms link. The responses provided by the students were collected, diagrammatically represented and analysed to determine the comprehension levels and understanding of the usage and effects of betel quid chewing. The statistical analysis used was the paired student's 't' test and the software employed was SPSS version 23.0. In addition to this, the requirement to lay out a proper apprehension on the same was monitored.

RESULTS AND DISCUSSION

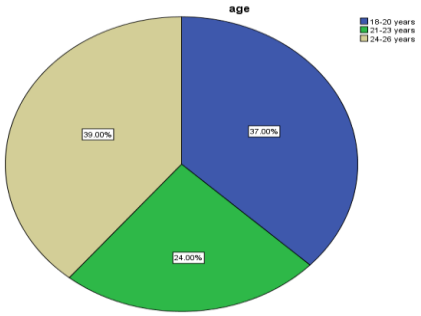

Figure.1: Pie chart showing percentage distribution of responses on the age group of participants. 37% were of the age group 18-20 years (blue), 24%- 21-23 years (green) and 38%- 24-26 years (brown). Higher number of students belonged to the age group 24-26 years (39%).

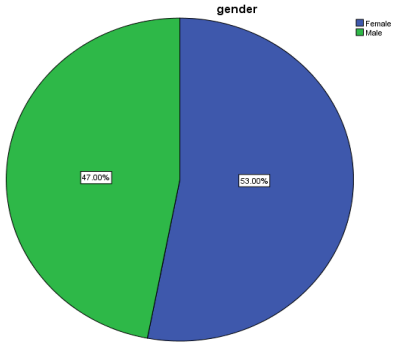

Figure.2: Pie chart showing percentage distribution of gender of participants. 53% were females (blue) and 47% were males (green).higher number of participants were females (53%).

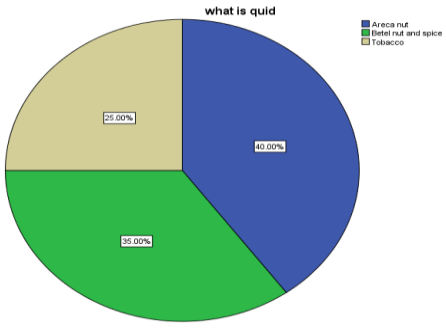

Figure.3: Pie chart showing percentage distribution of responses on awareness of the term 'quid'. About 25% responded to tobacco (brown), 40%- Areca nut (blue) and 35%- betel nut and spice (green). Higher number of

participants had responded to areca nut (40%).

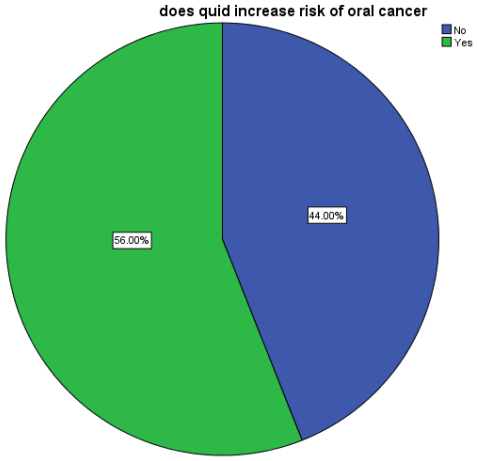

Figure.4: Pie chart showing percentage distribution of responses on awareness on whether quid chewing increases the risk of oral cancer. About 56% responded to yes (green) and 44%- no (blue). Higher number of participants had responded that intake of quid can increase the risk of oral cancer (56%).

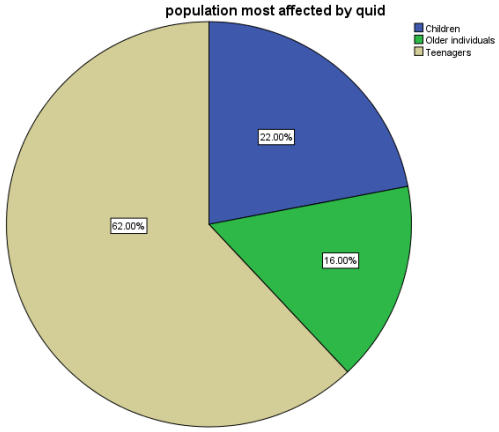

Figure.5: Pie chart showing percentage distribution of responses on awareness on the effect of quid among different population groups. About 22% responded to children (blue), 62%- teenagers (brown) and 16%- older individuals (green). Higher number of participants had responded to teenagers (62%).

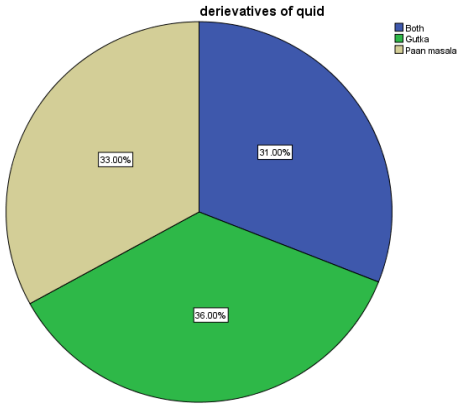

Figure.6: Pie chart showing percentage distribution of responses on awareness of quid derivatives. About 33% responded to paan masala (brown), 36%- gutka (green) and 31%- both (blue). Higher number of participants had responded to gutka (36%).

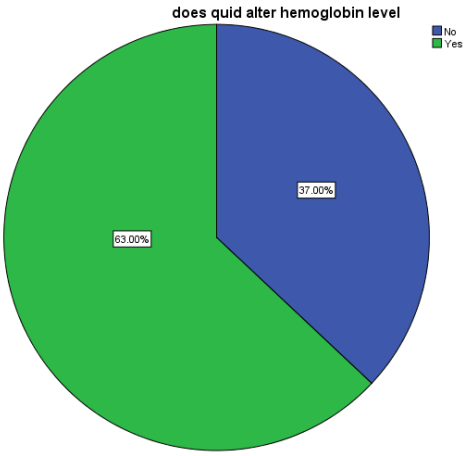

Figure.7: Pie chart showing percentage distribution of responses on awareness on whether quid chewing alters hemoglobin levels in the body. About 63% responded to yes (green) and 37%- no (blue). Higher number of participants had responded that quid can affect the hemoglobin levels in the body (63%).

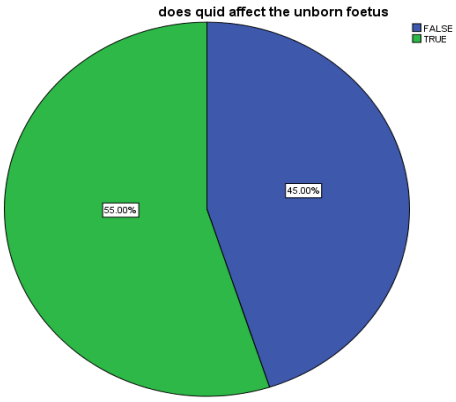

Figure.8: Pie chart showing percentage distribution of responses on awareness on whether quid chewing in pregnant women affects the unborn foetus. About 55% responded to true (green) and 45%- false (blue). Higher number of participants had responded that quid can affect the unborn foetus (55%).

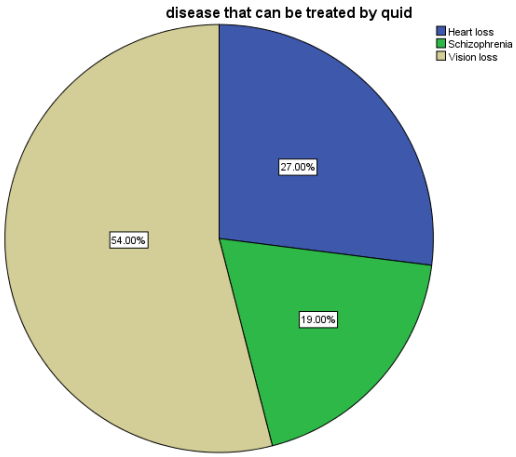

Figure.9: Pie chart showing percentage distribution of responses on awareness of diseases treated with betel quid. About 19% responded to schizophrenia (green), 54%- vision loss (brown) and 27%- heart loss (blue). Higher number of participants had responded to vision loss (54%).

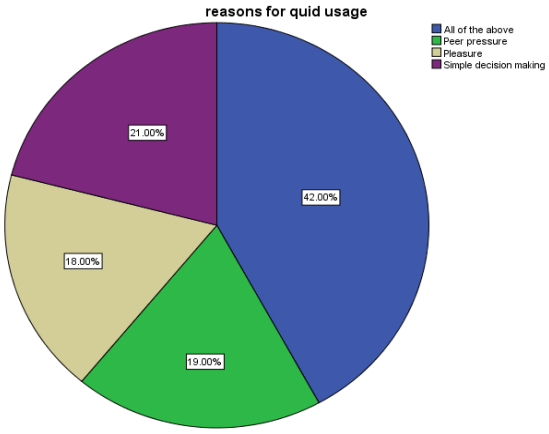

Figure.10: Pie chart showing percentage distribution of responses on awareness of reasons for usage of quid. About 21% responded to simple decision making (purple), 19%- peer pressure (green) and 18%- pleasure (brown), 42%- all of the above (blue). Higher number of participants had responded that all these reasons affected quid usage (42%).

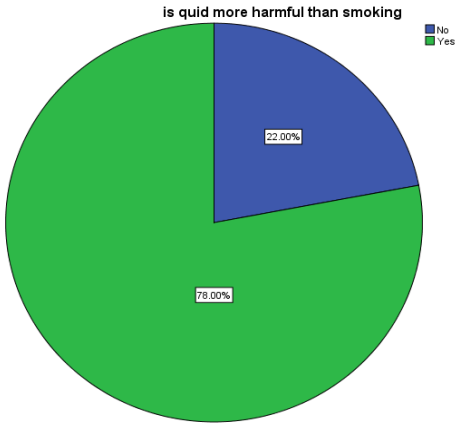

Figure.11: Pie chart showing percentage distribution of responses on awareness on whether quid chewing is more harmful when compared to smoking. About 78% responded to yes (green) and 22%- no (blue). Higher number of participants had responded that quid is more harmful than smoking (78%).

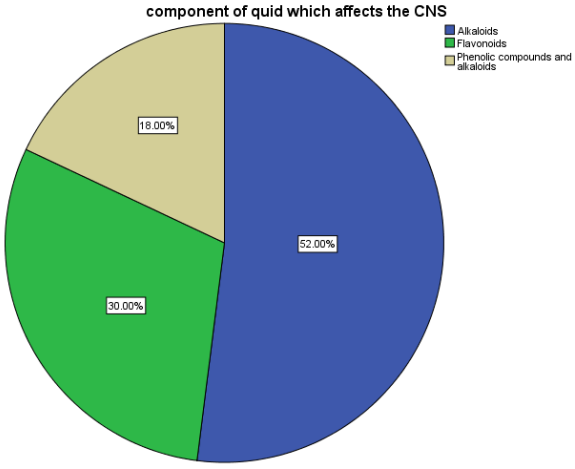

Figure.12: Pie chart showing percentage distribution of responses on awareness of which component of quid affects the CNS. About 52% responded to alkaloids (blue), 30%- flavonoids (green) and 18%- phenolic compounds and alkaloids (brown). Higher number of participants had responded to alkaloids (52%).

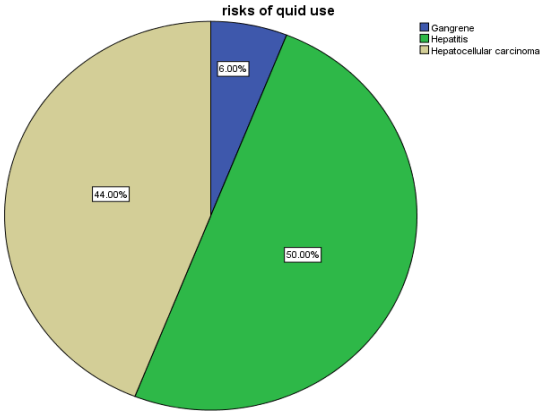

Figure.13: Pie chart showing percentage distribution of responses on awareness on risks of quid chewing. About 44% responded to hepatocellular carcinoma (brown), 50%- hepatitis (green) and 6%- gangrene (blue). Higher number of participants had responded to hepatitis (50%).

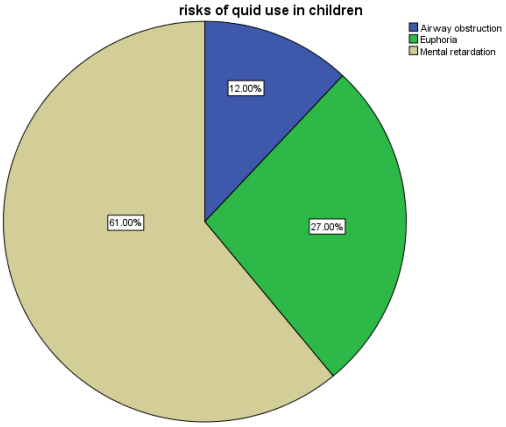

Figure.14: Pie chart showing percentage distribution of responses on awareness on risks of quid chewing among children. About 12% responded to airway obstruction (blue), 61%- mental retardation (brown) and 27%- euphoria (green). Higher number of participants had responded to mental retardation (61%).

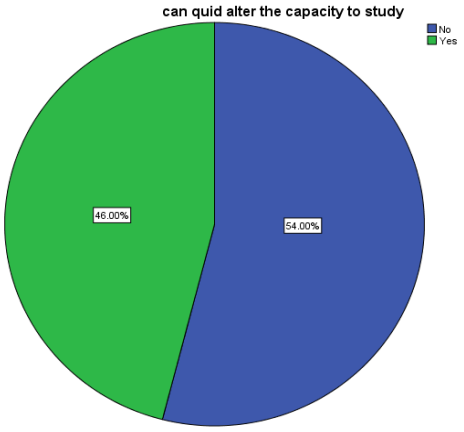

Figure.15: Pie chart showing percentage distribution of responses on awareness on whether quid chewing affects one's capacity to study. About 46% responded to yes (green) and 54%- no (blue). Higher number of participants had responded that quid did not affect one's capacity to study (54%).

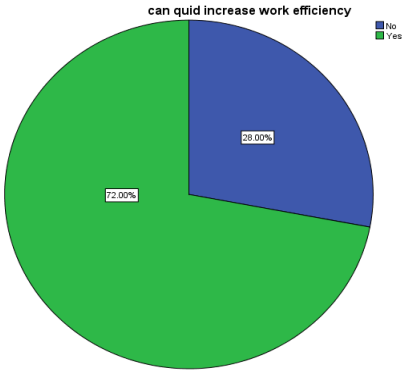

Figure.16: Pie chart showing percentage distribution of responses on awareness on whether quid chewing affects one's energy to work. About 72% responded to yes (green) and 28%- no (blue). Higher number of participants had responded that quid affects one's energy to work (54%).

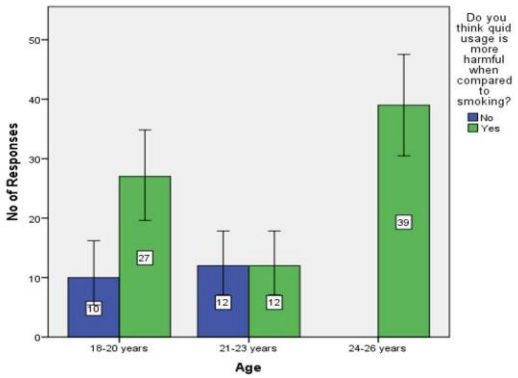

Figure.17: Bar graph showing association between age and awareness on whether quid usage is more harmful as compared to smoking. X-axis represents age and y-axis represents the number of participants responded. Green colour represents the number of students who responded to yes while blue colour represents the number of participants who responded to no. Quid usage was more harmful as compared to smoking was the most responded option (25) and it was highest among the participants of the age group 15-25 years. The difference was statistically significant (Chi square test, p value= 0.01, showing statistically significant).

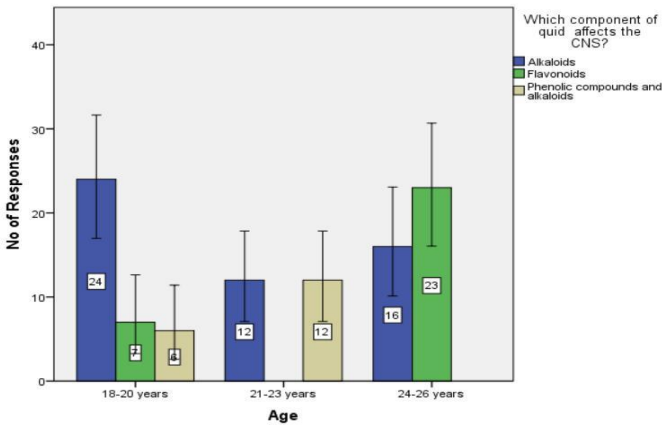

Figure.18: Bar graph showing association between age and awareness on which component of quid affects the CNS. X-axis represents age and y-axis represents the number of participants responded. Green represents the number of students who responded to flavonoids, yellow represents the number of students who responded to phenolic compounds and alkaloids while blue represents the number of participants who responded to alkaloids. Alkaloids was the most responded option (22) and it was highest among the participants of the age group 15-25 years. The difference was statistically significant (Chi square test, p value= 0.004, showing statistically significant).

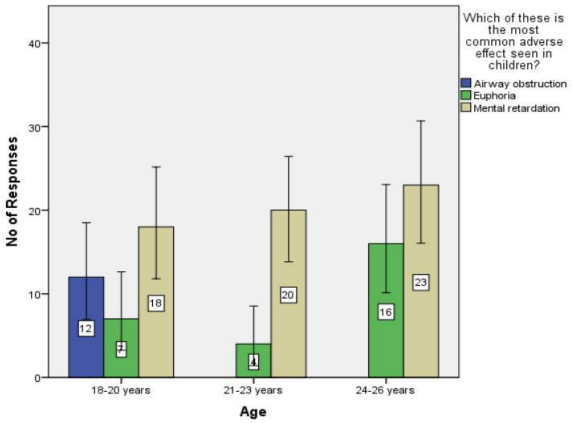

Figure.19: Bar graph showing association between age and awareness on the most common adverse effect of quid ampong children. X-axis represents age and y-axis represents the number of participants responded. Green represents the number of students who responded to euphoria, blue represents the number of students who responded to airway obstruction while beige represents the number of participants who responded to mental retardation. Mental retardation was the most responded option (35) and it was highest among the participants of the age group 25-40 years. The difference was statistically significant (Chi square test, p value= 0.001, showing statistically significant).

The data obtained was collected and analysed and it was found that most of the dental students were aware of the term 'quid'. A majority of the population felt that teenagers were the most affected individuals on prolonged use of quid. However, most of the participants were unaware of the positive effects of chewing betel quid and its relation to smoking.

In the present study, 37% of the participants belonged to the age group 18-20 years, 25% were of the age group 21-23 years while the remaining 38% fell under the age group of 24-26 years (Figure.1). The percentage of females who attended the questionnaire was 53% while the percentage of males included was 47% (Figure.2).

On analysing the awareness of the term 'quid', 25% of the participants responded that it referred to tobacco, 35% responded betel nut and spices while 40% chose areca nut Figure.3). From this, only 35% of the students were aware that quid referred to a combination of betel nut along with certain spices wrapped in the betel leaf. The results are in accordance with the article posed by Fen Wu, et al; 2015 (27). 56% of the students felt that the practice of quid chewing can increase the risk of oral cancer while 44% believed that the occurrence of oral cancer was not affected by quid chewing (Figure.4). In addition to oral cancer, quid chewing also poses an increased risk towards lung, liver and hepatocellular carcinoma (28). When questioned on the effects of quid among different populations, 16% believed that older individuals were the most affected, 22% chose children and 62% felt that teenagers were affected the most (Figure.5). From this, only 22% of the participants were aware that children were most threatened by betel quid practices.

33% of the population felt that paan was the only derivative of betel quid, 36% chose gutka while 31% believed that both paan and gutka were obtained from the betel plant (Figure.6). Various parts of the betel nut plant are proposed to have various additive effects which in turn constitute the different derivatives (29). On analysing the effect of quid on the hemoglobin levels in the body, 63% chose that quid chewing can alter the hemoglobin levels while 37% felt that the hemoglobin level remains unaffected (Figure.7). 55% of the students were aware that quid chewing in pregnant women can affect the unborn foetus while 45% chose that the foetus remains unaffected (Figure.8). The teratogenic effects are more enhanced when betel quid are consumed along with other potent additive substances (30). When asked about the positive effect of betel quid intake, 19% of the students felt that it could be used to treat schizophrenia, 54% chose vision loss while 27% opted for heart loss (Figure.9). Although a majority of the population believed that betel nuts can cure vision loss, only 19% were aware of its true benefit. 21% of the students felt that simple decision making was the reason for usage of quid, 19% chose peer pressure, 18% chose please while 42% felt that all of these reasons affected the usage of quid (Figure.10). When asked whether the usage of quid posed more side effects in comparison to smoking, 78% of the students agreed to the statement while 22% denied this fact (Figure.11).

52% of the students voted that the alkaloidal component of quid caused changes in the CNS on prolonged use, 30% believed that the effects were due to flavonoids while 18% chose phenolic compounds and alkaloids together (Figure.12). This result is in agreement with the article proposed by Krishnamurthy et al; 2004 (31). On assessing the awareness of the risks posed by quid usage, it was found that 44% of the participants believed that hepatocellular carcinoma was the most common adverse effect, 50% chose hepatitis and 6% chose gangrene (Figure.13). Among children, 12% of the population opted for airway obstruction as the adverse effect of quid in the long run while 61% chose mental retardation and 27% for euphoria (Figure.14). 46% of the students felt that quid usage affects the ability to study while 54% chose otherwise (Figure.15). 72% of the participants were aware that the use of quid can increase one's energy efficiency while 28% of the population were unaware of this fact (Figure.16).

On comparing the overall results obtained with the association graphs plotted, it was found that participants belonging to the 15-25 years had the highest knowledge on the types, usage, effects of quid among children and its components which affect

the central nervous system. Similar results were obtained by a study put forth by Gene Chen et al which coincides with the results obtained from the present study and the awareness on the usage of quid was considerably high among the middle aged population (32).

The present study brings out the risk factors associated with the prolonged use of quid and its various components which facilitate the CNS changes. Thus it was inferred that the awareness of the usage of quid, its effects in the different population groups and the positive effects was moderate among the dental students of all age groups. The data obtained from the present study proved to be parallel to previous studies conducted on similar fields. However, the present study poses certain limitations such as a limited sample size and restriction to a particular group of population.

CONCLUSION

The present study concludes that the awareness levels among the dental students on the usage, function, components and adverse effects of quid chewing was moderate and provides scope for future researches conducted on the same.

Acknowledgement: We thank Saveetha Dental College and Hospitals for providing us the support to conduct the study.

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

SOURCE OF FUNDING

The present study was funded by the following agencies.

- Saveetha Dental College
- SIMATS, Saveetha University
- Sarkav Health Services

REFERENCES

i. Gupta PC, Ray CS. Epidemiology of betel quid usage. Ann Acad Med Singapore. 2004 Jul;33(4 Suppl):31–6.

ii. Wen CP, Tsai SP, Cheng TY, Chen C-J, Levy DT, Yang H-J, et al. Uncovering the relation between betel quid chewing and cigarette smoking in Taiwan. Tob Control. 2005 Jun;14 Suppl 1:i16–22.

iii. Nagpal R, Nagpal N, Mehendiratta M, Marya CM, Rekhi A. Usage of betel quid, areca nut, tobacco, alcohol and level of awareness towards their adverse effects on health in a north Indian rural population. Oral Health Dent Manag. 2014 Mar;13(1):81–6.

iv. Nair U, Bartsch H, Nair J. Alert for an epidemic of oral cancer due to use of the betel quid substitutes gutkha and pan masala: a review of agents and causative mechanisms. Mutagenesis. 2004 Jul;19(4):251–62.

v. Jeng JH, Chang MC, Hahn LJ. Role of areca nut in betel quid-associated chemical carcinogenesis: current awareness and future perspectives. Oral Oncol. 2001 Sep;37(6):477–92.

vi. Yang MS, Chang FT, Chen SS, Lee CH, Ko YC. Betel quid chewing and risk of adverse pregnancy outcomes among aborigines in southern Taiwan. Public Health. 1999 Jul;113(4):189–92.

vii. Duraisamy R, Krishnan CS, Ramasubramanian H, Sampathkumar J, Mariappan S, Navarasampatti Sivaprakasam A. Compatibility of Nonoriginal Abutments With Implants: Evaluation of Microgap at the Implant-Abutment Interface, With Original and Nonoriginal Abutments. Implant Dent. 2019 Jun;28(3):289–95.

viii. Anbu RT, Suresh V, Gounder R, Kannan A. Comparison of the Efficacy of Three Different Bone Regeneration Materials: An Animal Study. Eur J Dent. 2019 Feb;13(1):22–8.

ix. Sekar D, Mani P, Biruntha M, Sivagurunathan P, Karthigeyan M. Dissecting the functional role of microRNA 21 in osteosarcoma. Cancer Gene Ther. 2019 Jul;26(7-8):179–82.

x. Sekar D. Circular RNA: a new biomarker for different types of hypertension. Hypertens Res. 2019 Nov;42(11):1824–5.

xi. Bai L, Li J, Panagal M, M B, Sekar D. Methylation dependent microRNA 1285-5p and sterol carrier proteins 2 in type 2 diabetes mellitus. Artif Cells Nanomed Biotechnol. 2019 Dec;47(1):3417–22.

xii. Sivasamy R, Venugopal P, Mosquera E. Synthesis of Gd2O3/CdO composite by sol-gel method: Structural, morphological, optical, electrochemical and magnetic studies. Vacuum. 2020 May 1;175:109255.

xiii. Sekar D, Nallaswamy D, Lakshmanan G. Decoding the functional role of long noncoding RNAs (lncRNAs) in hypertension progression. Hypertens Res. 2020 Jul;43(7):724–5.

xiv. Preethi KA, Lakshmanan G, Sekar D. Antagomir technology in the treatment of different types of cancer. Epigenomics. 2021 Apr;13(7):481–4.

xv. Preethi KA, Sekar D. Dietary microRNAs: Current status and perspective in food science. J Food Biochem. 2021 Jul;45(7):e13827.

xvi. Bakshi HA, Mishra V, Satija S, Mehta M, Hakkim FL, Kesharwani P, et al. Dynamics of Prolyl Hydroxylases Levels During Disease Progression in Experimental Colitis. Inflammation. 2019 Dec;42(6):2032–6.

xvii. Ezhilarasan D. Dapsone-induced hepatic complications: it's time to think beyond methemoglobinemia. Drug Chem Toxicol. 2021 May;44(3):330–3.

xviii. Thakur RS, Devaraj E. Lagerstroemia speciosa(L.) Pers. triggers oxidative stress mediated apoptosis via intrinsic mitochondrial pathway inHepG2cells [Internet]. Vol. 35, Environmental Toxicology. 2020. p. 1225–33. Available from: http://dx.doi.org/10.1002/tox.22987

xix. Ezhilarasan D, Shebi S, Thomas J, Chandrasekaran N, Mukherjee A. Gracilaria foliifera (Forssk.) Børgesen ethanolic extract triggers apoptosis via activation of p53 expression in HepG2 cells [Internet]. Vol. 15, Pharmacognosy Magazine. 2019. p. 259. Available from: http://dx.doi.org/10.4103/pm.pm_379_18

xx. P. K, M. P, Samuel Rajendran R, Annadurai G, Rajeshkumar S. Characterization and toxicology evaluation of zirconium oxide nanoparticles on the embryonic development of zebrafish, Danio rerio [Internet]. Vol. 42, Drug and Chemical Toxicology. 2019. p. 104–11. Available from: http://dx.doi.org/10.1080/01480545.2018.1523186

xxi. Balusamy SR, Perumalsamy H, Veerappan K, Huq MA,

Rajeshkumar S, Lakshmi T, et al. Citral Induced Apoptosis through Modulation of Key Genes Involved in Fatty Acid Biosynthesis in Human Prostate Cancer Cells: In Silico and In Vitro Study. Biomed Res Int. 2020 Mar 18;2020:6040727.

xxii. Arvind P TR, Jain RK. Skeletally anchored forsus fatigue resistant device for correction of Class II malocclusions-A systematic review and meta-analysis. Orthod Craniofac Res. 2021 Feb;24(1):52–61.

xxiii. Venugopal A, Vaid N, Bowman SJ. Outstanding, yet redundant? After all, you may be another Choluteca Bridge! Semin Orthod. 2021 Mar 1;27(1):53–6.

xxiv. Ramadurai N, Gurunathan D, Samuel AV, Subramanian E, Rodrigues SJL. Effectiveness of 2% Articaine as an anesthetic agent in children: randomized controlled trial. Clin Oral Investig. 2019 Sep;23(9):3543–50.

xxv. Varghese SS, Ramesh A, Veeraiyan DN. Blended Module-Based Teaching in Biostatistics and Research Methodology: A Retrospective Study with Postgraduate Dental Students. J Dent Educ. 2019 Apr;83(4):445–50.

xxvi. 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 [Internet]. Vol. 24, Clinical Oral Investigations. 2020. p. 3275–80. Available from: http://dx.doi.org/10.1007/s00784-020-03204-9

xxvii. Wu F, Parvez F, Islam T, Ahmed A, Rakibuz-Zaman M, Hasan R, et al. Betel quid use and mortality in Bangladesh: a cohort study. Bull World Health Organ. 2015 Oct 1;93(10):684–92.

xxviii. Lee K-W, Kuo W-R, Tsai S-M, Wu D-C, Wang W-M, Fang F-M, et al. Different impact from betel quid, alcohol and cigarette: risk factors for pharyngeal and laryngeal cancer. Int J Cancer. 2005 Dec 10;117(5):831–6.

xxix. Petti S, Mohd M, Scully C. Revisiting the association between alcohol drinking and oral cancer in nonsmoking and betel quid non-chewing individuals. Cancer Epidemiol. 2012 Feb;36(1):e1–6.

xxx. Ome-Kaius M, Unger HW, Singirok D, Wangnapi RA, Hanieh S, Umbers AJ, et al. Determining effects of areca (betel) nut chewing in a prospective cohort of pregnant women in Madang Province, Papua New Guinea. BMC Pregnancy Childbirth. 2015 Aug 19;15:177.

xxxi. Kannan K, Munirajan AK, Krishnamurthy J, Bhuvarahamurthy V, Mohanprasad BK, Panishankar KH, et al. Low incidence of p53 mutations in betel quid and tobacco chewing-associated oral squamous carcinoma from India. Int J Oncol. 1999;15(6):1133–9.

xxxii. Chen G, Hsieh M-Y, Chen AW-G, Kao NH-L, Chen M-K. The effectiveness of school educating program for betel quid chewing: A pilot study in Papua New Guinea. J Chin Med Assoc. 2018 Apr;81(4):352–7.