A Cross Sectional Survey of Knowledge, Attitude and Practice of Antibiotic Use in Pregnancy Patients Among Undergraduate Students in Dental School

Mabbithasri. A [1], Dr. Subasree S [2]*

[1]Saveetha Dental College and Hospitals, Saveetha Institute of Medical and Technical Sciences (SIMATS), Saveetha University, Chennai, Tamil Nadu, India. Email: 151901079.sdc@saveetha.com
[2]Senior Lecturer, Department of Periodontics, Saveetha Dental College and Hospitals, Saveetha Institute of Medical and Technical Sciences (SIMATS), Saveetha University, Chennai, Tamil Nadu, India. Email: subasrees.sdc@saveetha.com
**Corresponding Author: Dr. Subasree S*

KEYWORDS
Antibiotics, Bacterial infection, Dental treatment, Microbes, Pregnant women

ABSTRACT
Objective: Antibiotics were "invented" billions of years ago and susceptibility is largely the product of bacterial adaptation to aeons of antibiotic exposure. Because of antibiotics' curative ability, their use in nature usually selects for pre-existing resistant bacteria populations. Antibiotics are the medications that are commonly prescribed for pregnant women. Antibiotics play a vital role in improving and enhancing the health of pregnant women.
Materials and Methods: An online survey was conducted through google docs link. A questionnaire containing 18 questions was created and the questions were approved by Saveetha research board Chennai.
Discussion: Dentist usually have a separate treatment plan for pregnant women as they too fear anesthesia, analgesics and some antibiotics which can lead to malformations. In a study conducted by tantradi et al, among interns, 35% of the participants had never treated a pregnant patient, 57 % had treated fewer than 5 pregnant patients, and 21% of the participants were not confident in treating such patients.
Conclusion: Dental treatment for pregnant women needs special care and attention. From the results obtained it is known that the dental students have average knowledge about the use of antibiotics for pregnant women.

1. Introduction

One of the most serious questions about the use of antimicrobials is the selection and growth of antibiotic-resistant bacteria. Tonnes of antibiotics were used in the EU and Switzerland, of which 65 percent was used in human medicine; 29 percent was used in the veterinary field and 6 percent as growth promoters.[1]. Antibiotics were "invented" billions of years ago and susceptibility is largely the product of bacterial adaptation to aeons of antibiotic exposure.Because of antibiotics' curative ability, their use in nature usually selects for pre-existing resistant bacteria populations.[2].Antibiotic-like molecules formed by various microbes have been around for a long time, even before mankind realised their value in preventing and treating bacterial infections.

However there are only few organism that has antibiotic property. mass-producing antibiotics were started in the twentieth century, they were mostly synthetic versions of naturally occurring antibiotic molecules, but few were also entirely synthetic compounds which lead to a tough selection process of the antibiotics[3]. Most antibiotics have traditionally been derived from a limited number of molecular coatings whose functional lifetimes have been prolonged by centuries of synthetic tailoring. A typical course of antibiotics lasts just a few weeks.[4]. Antibiotics are provided to about a one third of all hospitalised patients. Physicians often prefer broad-spectrum antibiotics over narrower-spectrum antibiotics[5].

Antibiotics are the medications that are commonly prescribed for pregnant women. Antibiotics must be included in this category of patients due to the known risk of complications during pregnancy, perinatal infections, and infections in newborns, and in case of recurrent genital tract infections in pregnant women. Antibiotics play a vital role in improving and enhancing the health of pregnant women. However, as with other treatments, excessive use may be harmful[6]. Penicillin, cephalosporin, and erythromycin are prescribed antibiotics if they are required.[7].

Dentists should avoid prescribing any medications commonly used for local anaesthesia, sedation, analgesia, or infection while treating pregnant patients.The dental practitioner must determine the potential benefits of the dental therapy needed for the treatment outweigh the risks to the foetus in the case of a pregnant woman.While most elective dental procedures can be postponed until after the pregnancy is over, dental care for a pregnant woman who is experiencing oral pain, has advanced disease, or is infected should not be delayed.[8]. During pregnancy, infections are normal, and a large number of pregnant women are exposed to antibiotics. Antibiotics have the ability to harm the foetus when they cross the placenta and majority are excreted in breast milk and can have an effect on the newborn.[9]. Our team has extensive knowledge and research experience that has translate into high quality publications ([10–19][20–29])

2. Materials and Methods

An online survey was conducted through google docs link. A questionnaire containing 18 questions was created and the questions were approved by Saveetha research board Chennai.The questionnaire was circulated among 100 dental students. Minimizing errors, framing questions in simple language and avoiding leading questions were some of the measures taken to minimize bias. The results were statistically analyzed using SPSS Software and represented in the form of a pie chart.

3. Results

In the present study the participants were aged between 18-21 years, in which 20% were 18 years old, 20% were 19 years old, 26% were 20 years old, 34% were 21 years old, out of which 46% were male and 54% were female. When the participants were questioned regarding the awareness about the use of antibiotics 84% were aware and 16% were not aware. In figure 1 the 22% participants responded that amoxicillin is the most preferred antibiotic during pregnancy, 24% responded ampicillin, 24% responded clindamycin and 30% responded erythromycin. When the participants were questioned regarding the prescription period of antibiotics 40% responded 3days, 32% answered 5 days, 28% answered 7 days and regarding the safety of antibiotics during pregnancy 34% responded yes, 40% answered no and the remaining 26% answered maybe. In figure 2, 32% have answered that cleft palate is the side effect of antibiotics, 18% answered diaphramatic hernia, 26% answered discoloration of the fetal teeth. 24% answered miscarriage. When the participants were questioned about breastfeeeding 46% have responded that antibiotics will affect breastfeeding, 10% have answered that antibiotics will not affect breastfeeding, 44% have responded that antibiotics may affect breastfeeding. Regarding the use of tetracycline 20% of the participants have responded that it is better to avoid tetracycline because it causes black hairy tongue, 18% have answered mouth sores, 30% have answered nausea and 32% have responded to teeth staining. When the participants were questioned about undergoing dental procedures during pregnancy, 54% have answered that dental procedures are safe during pregnancy, 22% have answered that it is not safe during pregnancy and 24% of them have answered that dental procedures may be safe during pregnancy and 18% have responded that scaling is safe during pregnancy, 22% have responded that the root canal is safe during pregnancy, 18%have answered that filling is safe, 12% have answered extraction is safe during pregnancy and the remaining 30% have answered that all the above procedures are safe during pregnancy. When the participants were questioned about their experience in treating pregnancy patients 60%have answered that they have treated pregnancy patients and 40%have answered that they have not treated pregnancy patients during training, and 30% have responded that the first trimester is the best period to treat a pregnant woman, 26%have responded that the second trimester is the best period, 12%have responded that the third trimester is the best period and 32% have answered all the above. In figure. 3, 26% have responded that they prescribe antibiotics for patients with chronic periodontitis, 32% have responded that they have dental abscess, 26% have responded that they prescribe antibiotics for patients in severe pain and 16% have answered that they prescribe antibiotics for patients with undergone trauma. When the participants were questioned about the antibiotic prescription protocol, 72% have responded that they follow the antibiotic prescription protocol and 28% have answered they do not follow antibiotic

prescription protocol. 70% of the participants have answered that they ask the patients about antibiotics and 30% do not ask their patients for antibiotic history. Regarding the antibiotic sensitivity 74% have answered that they will enquire about antibiotic sensitivity in their previous pregnancy and 26% do not ask their patients for antibiotic sensitivity. In figure 4, When the participants were questioned about their level of confidence 52% of the participants had low levels of confidence while treating pregnancy patients, 10% had high levels of confidence and 30 % have answered that they had moderate level of confidence. In figure 5, Bar chart showing the association between gender and their knowledge about using antibiotics during pregnancy. X axis represents gender and Y axis represents the individuals who feel antibiotics are safe during pregnancy (green), who feel antibiotics are not safe during pregnancy (blue) and participants who were not sure about usage of antibiotics during pregnancy (brown). Out of 100 participants, 15 responded yes,19 responded no and 15 responded maybe among females and 21 responded yes, 14 responded no amd 16 responded maybe among males. In figure 6 Bar chart showing the association between gender and their knowledge about using antibiotics during pregnancy. X axis represents gender and Y axis represents the individuals who feel antibiotics are safe during pregnancy (green), who feel antibiotics are not safe during pregnancy (blue) and participants who were not sure about usage of antibiotics during pregnancy (brown). Out of 100 participants, 15 responded yes,199 responded no and 15 responded maybe among females and 21 responded yes, 14 responded no and 16 responded maybe among males.

4. Discussion

During pregnancy only few women reach out to the dentist for treatment, especially women from low economic status who have much limitted knowledge about oral health during prenancy. Women do not visit their dentist untill pregnancy or delay them. Dentist ususually have a separate treatment plan for pregnant women as they too fear about anesthesia, analgesics and some antibiotics which can lead to malformations[30]. The time of maximum sensitivity is embryogenesis, and it occurs between the fifth and tenth weeks of pregnancy. Furthermore, the Food and Drug Administration of the United States10 finds a range of local anaesthetics, antibiotics, and analgesics to be reasonably safe for use in pregnant women, giving clinicians a variety of choices for treating intraoperative and postoperative oral pain. dentist offer different treatment plan for pregnancy women and moreover they need extra oral care. During pregnancy, increases in local (tissue) and systemic oestrogen levels cause vascular and qualitative changes in the subgingival oral microbiota, which may result in increased gingival bleeding and exuberant soft-tissue reactions to local irritants [31].

In study conducted by tantradi etal, among interns, 35% of the participants had never treated a pregnant patient, 57 % had treated fewer than 5 pregnant patients, and 21% of the participants were not confident in treating such patients[32]. In a study conducted by Hashim etal, 87% of the participants have answered 2nd trimester was safe for a pregnant lady to undergo any dental treatment [33]. In another study conducted by onigbinde etal, 90% of participants were aware of the safest NSAID prescribed for pregnant women[34].

In the study conducted by swapna etal, almost 55% of the participants lacked confidence to manage the dental needs of pregnant patients. While 35% responded that they were somewhat confident to do any dental treatment for a gestating female, 65% have answered that amoxicillin is the drug prefered for pregnant women.[35].

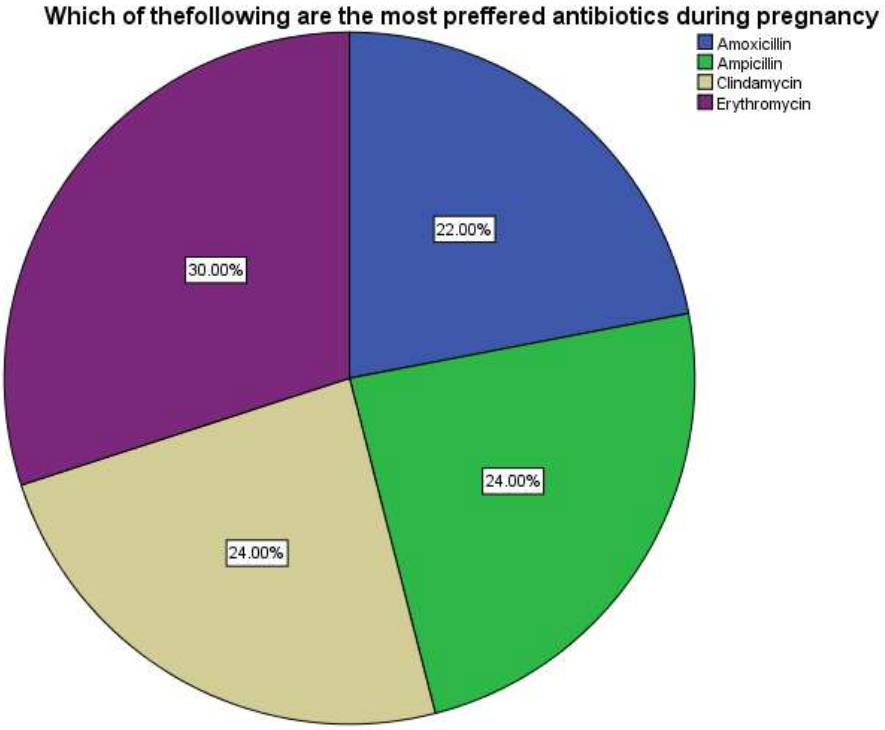

Figure 1

Figure 1 pie chart depicts the most preferred antiboitics during pregnancy. Blue represents amoxicillin, green represents ampicillin, brown represents clindamycin, purple represents eruthromycin.

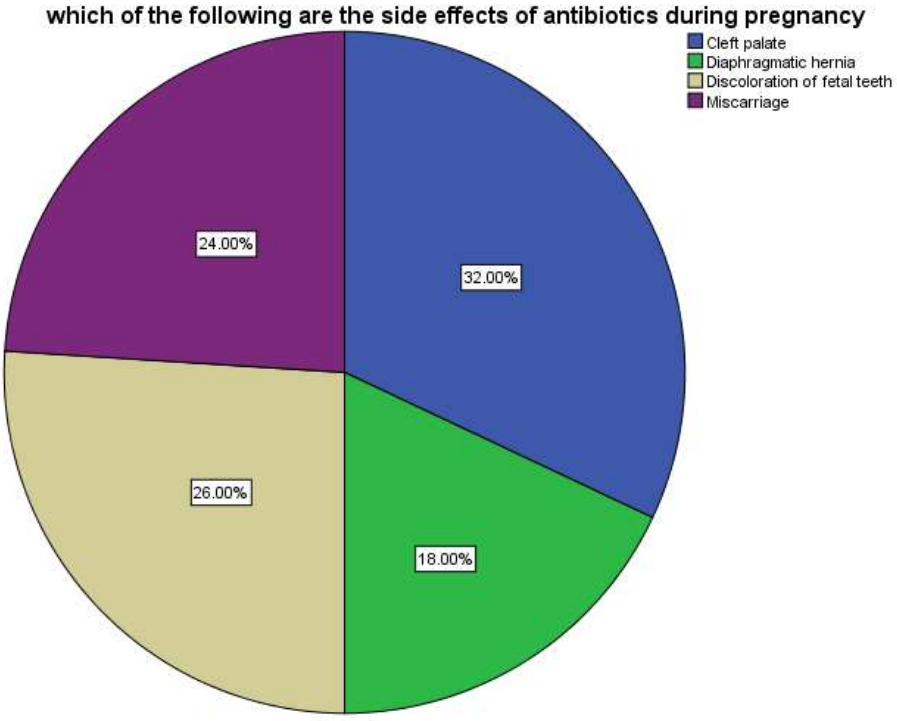

Figure 2

Figure 2: pie chart depicts the side effects of antibiotics during pregnancy. Blue represents cleft palate, green represents diaphragmatic hernia, brown represents discoloration of fetal teeth and purple represents miscarriage

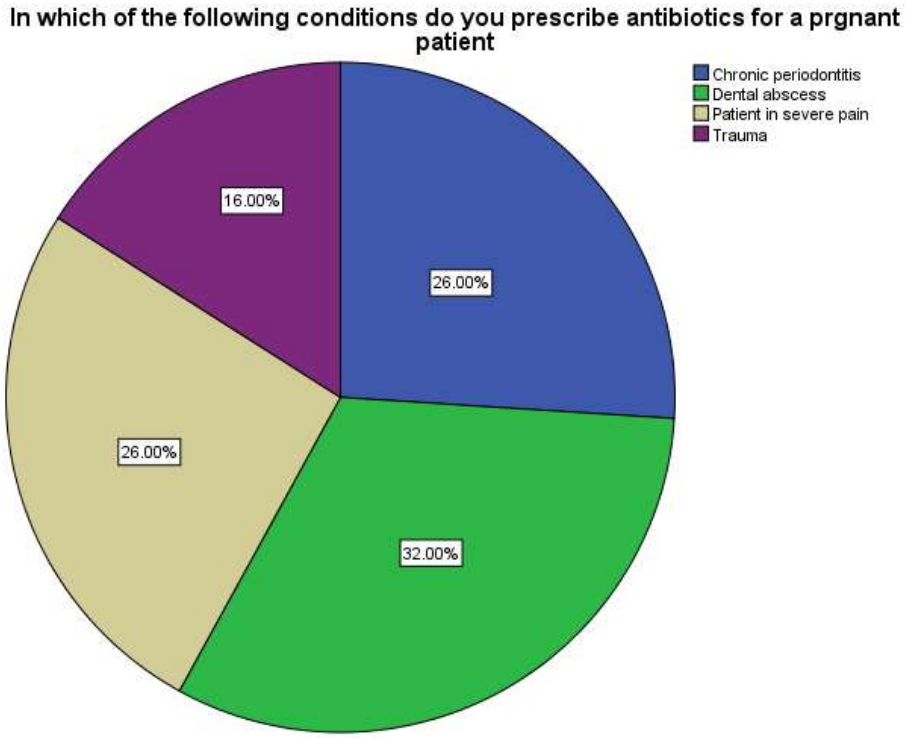

Figure 3

Figure 3: pie chart depicts the condition in prescribing antibiotics for a preganant. Blue represents black hairy tongue, green represents mouth sores, brown represents and purple represents teeth staining

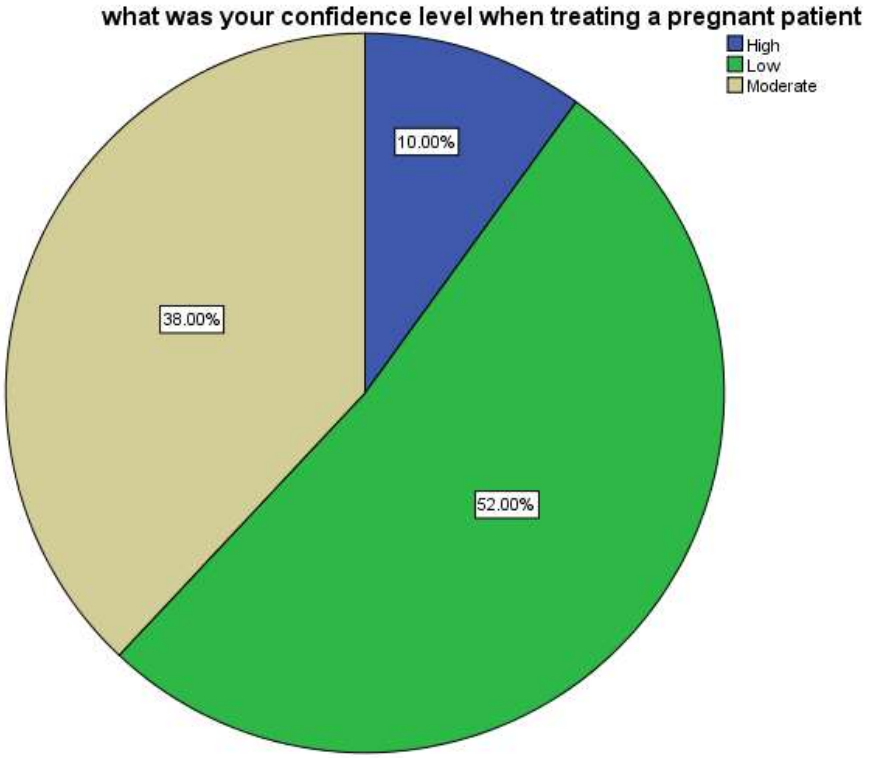

Figure 4

Figure 4: pie chart depicts the confidence level of the participants treating the pregnant patient . Blue represents high, green represents low and brown represents moderate.

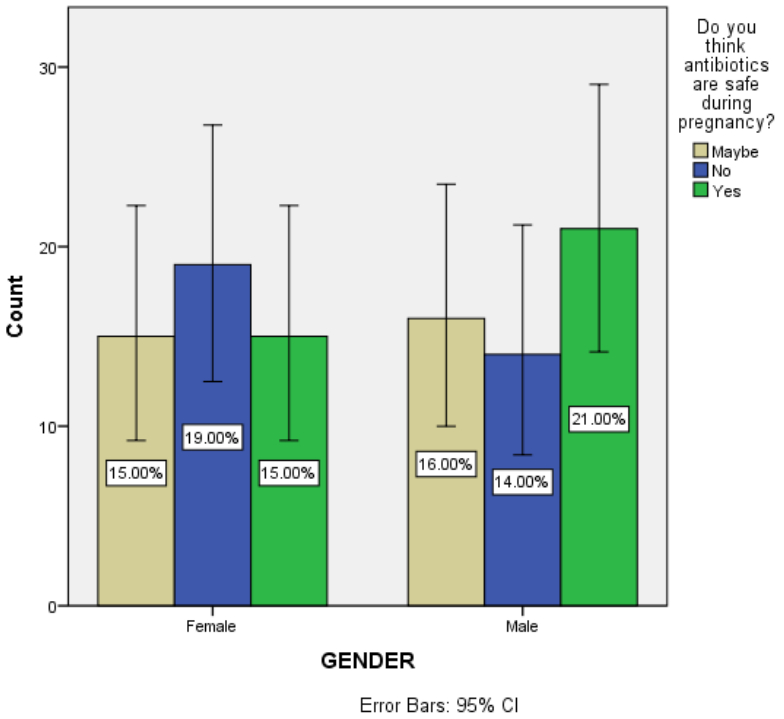

Figure 5

Figure 5: Bar chart showing the association between gender and their knowledge about using antibiotics during pregnancy. X axis represents gender and Y axis represents the individuals who feel antibiotics are safe during pregnancy (green), who feel antibiotics are not safe during pregnancy (blue) and participants who were not sure about usage of antibiotics during pregnancy (brown). Out of 100 participants, 15 responded yes,19 responded no and 15 responded maybe among females and 21 responded yes, 14 responded no amd 16 responded maybe among males. Pearson's chi square value:1.751, DF:2, p value= .417 (>0.005) and it was statistically insignificant.

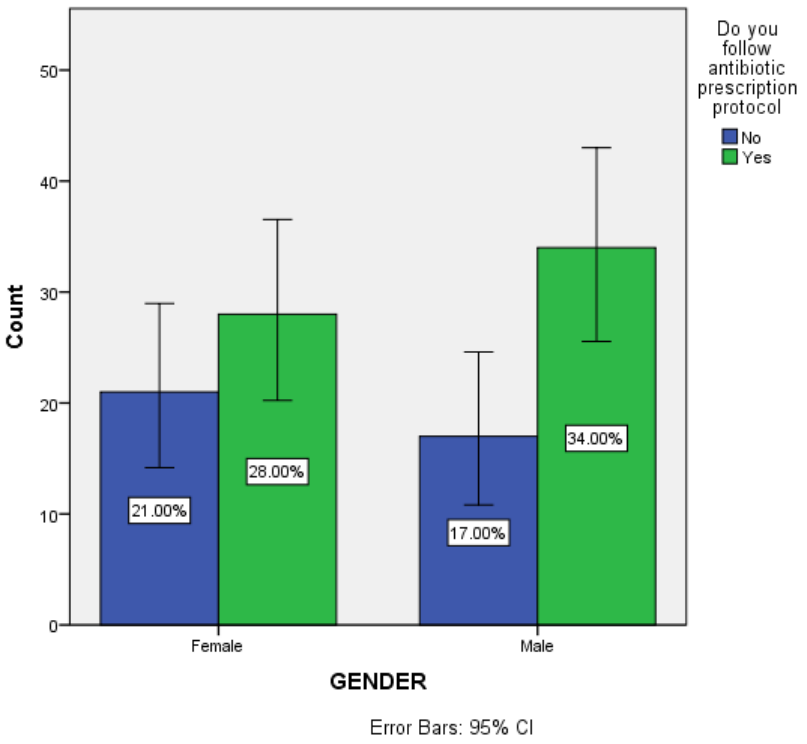

Figure 6

Figure 6: Bar chart showing the association between gender and their knowledge about using antibiotics during pregnancy. X axis represents gender and Y axis represents the individuals who feel antibiotics are safe during pregnancy (green), who feel antibiotics are not safe during pregnancy (blue) and participants who were not sure about usage of antibiotics during pregnancy (brown). Out of 100 participants, 15 responded yes,19 responded no and 15 responded maybe among females and 21 responded yes, 14 responded no amd 16 responded maybe among males. Pearson's chi square value: 0.962, DF:1, p value=0.327 (>0.005) and it was statistically insignificant.

5. Conclusion

Dental treatment for pregnant women needs special care and attention. From the results obtained it is known that the dental students have average knowledge about the use of antibiotics for pregnant women.

Authors Contribution:

Mabbithasri.A - Contributed to conception, design, data acquisition and interpretation, drafted and critically revised the manuscript.

Dr. Subasree S - Contributed to conception, design and critically revised the manuscript.

All authors gave final approval and agreed to be accountable for all aspects of the work.

Conflict of Interest:

The authors declare no conflict of interest.

Acknowledgement:

The authors would like to thank the management of Saveetha dental college, Saveetha Institute of Medical and Technical Sciences, Saveetha University, Chennai for giving a platform to carry out this project.

Funding Support:

The present project is funded by Saveetha Dental College and Hospital, Saveetha Institute of Medical and Technical sciences, Saveetha University and LALI auto fuel and traders.

Reference

[1] Kümmerer K. Pharmaceuticals in the Environment: Sources, Fate, Effects and Risks. Springer Science & Business Media; 2008.

[2] Spellberg B, Bartlett JG, Gilbert DN. The future of antibiotics and resistance. N Engl J Med 2013;368(4):299–302.

[3] Larsson DGJ, Joakim Larsson DG. Antibiotics in the environment [Internet]. Upsala Journal of Medical Sciences2014; 119(2):108–12. Available from: http://dx.doi.org/10.3109/03009734.2014.896438

[4] Fischbach MA, Walsh CT. Antibiotics for emerging pathogens. Science 2009;325(5944):1089–93.

[5] Solomon DH, Van Houten L, Glynn RJ, Baden L, Curtis K, Schrager H, et al. Academic detailing to improve use of broad-spectrum antibiotics at an academic medical center. Arch Intern Med 2001;161(15):1897–902.

[6] Różańska A, Pac A, Jachowicz E, Jaślan D, Siewierska M, Wójkowska-Mach J. Outpatient Antibiotic Prescriptions in Pregnant Women in Małopolska Province. Antibiotics (Basel) [Internet] 2020;10(1). Available from: http://dx.doi.org/ 10.3390/antibiotics10010014

[7] Pertl C, Heinemann A, Pertl B, Lorenzoni M, Pieber D, Eskici A, et al. [The pregnant patient in dental care. Survey results and therapeutic guidelines]. Schweiz Monatsschr Zahnmed 2000;110(1):37–46.

[8] Moore PA. SELECTING DRUGS FOR THE PREGNANT DENTAL PATIENT [Internet]. The Journal of the American Dental Association1998;129(9):1281–6. Available from: http://dx.doi.org/10.14219/jada.archive.1998.0425

[9] Dashe JS, Gilstrap LC. ANTIBIOTIC USE IN PREGNANCY [Internet]. Obstetrics and Gynecology Clinics of North America1997;24(3):617–29. Available from: http://dx.doi.org/10.1016/s0889-8545(05)70326-0

[10] Thejeswar EPT. Educational Research -iPad System vs Textbook System [Internet]. Research Journal of Pharmacy and Technology; Raipur volume2015;8(8):1158–60. Available from: https://search.proquest.com/openview/d14e9aab038e831b33b3a3d266af69d1/1?pq-origsite=gscholar&cbl=1096441

[11] Krishna RN, Nivesh Krishna R, Yuvaraj Babu K. Estimation of stature from physiognomic facial length and morphological facial length [Internet]. Research Journal of Pharmacy and Technology2016;9(11):2071. Available from: http://dx.doi.org/10.5958/0974-360x.2016.00423.6

[12] Sriram N, Thenmozhi, Yuvaraj S. Effects of Mobile Phone Radiation on Brain: A questionnaire based study. J Adv Pharm Technol Res 2015;8(7):867.

[13] Subashri A, Thenmozhi MS. Occipital Emissary Foramina in Human Adult Skull and Their Clinical Implications [Internet]. Research Journal of Pharmacy and Technology2016;9(6):716. Available from: http://dx.doi.org/10.5958/0974-360x.2016.00135.9

[14] Menon A, Thenmozhi MS. Correlation between thyroid function and obesity. J Adv Pharm Technol Res 2016;9(10):1568.

[15] Rubika J, Felicita AS, Sivambiga V. Gonial angle as an indicator for the Prediction of Growth Pattern. World J Dent 2015;6(3):161–3.

[16] 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;13(1):22–8.

[17] Nandhini JST, Thaslima Nandhini JS, Yuvaraj Babu K, Mohanraj KG. Size, Shape, Prominence and Localization of Gerdy's Tubercle in Dry Human Tibial Bones [Internet]. Research Journal of Pharmacy and Technology2018;11(8):3604. Available from: http://dx.doi.org/10.5958/0974-360x.2018.00663.7

[18] Avinash K, Malaippan S, Dooraiswamy JN. Methods of Isolation and Characterization of Stem Cells from Different Regions of Oral Cavity Using Markers: A Systematic Review. Int J Stem Cells 2017;10(1):12–20.

[19] Pratha AA, Thenmozhi MS. A study of occurrence and morphometric analysis on meningo orbital foramen. Research Journal of Pharmacy and Technology 2016;9(7):880–2.

[20] Muthukrishnan S, Krishnaswamy H, Thanikodi S, Sundaresan D, Venkatraman V. Support vector machine for modelling and simulation of Heat exchangers. Thermal Science 2020;24(1 Part B):499–503.

[21] Nandhini NT, Rajeshkumar S, Mythili S. The possible mechanism of eco-friendly synthesized nanoparticles on hazardous dyes degradation. Biocatal Agric Biotechnol 2019;19:101138.

[22] Ezhilarasan D. Oxidative stress is bane in chronic liver diseases: Clinical and experimental perspective. Arab J Gastroenterol 2018;19(2):56–64.

[23] Rajagopal R, Padmanabhan S, Gnanamani J. A comparison of shear bond strength and debonding characteristics of conventional, moisture-insensitive, and self-etching primers in vitro. Angle Orthod 2004;74(2):264–8.

[24] Neelakantan P, Sharma S, Shemesh H, Wesselink PR. Influence of Irrigation Sequence on the Adhesion of Root Canal Sealers to Dentin: A Fourier Transform Infrared Spectroscopy and Push-out Bond Strength Analysis. J Endod 2015;41(7):1108–11.

[25] Sahu D, Kannan GM, Vijayaraghavan R. Carbon black particle exhibits size dependent toxicity in human monocytes. Int J Inflam 2014;2014:827019.

[26] Jose J, P. A, Subbaiyan H. Different Treatment Modalities followed by Dental Practitioners for Ellis Class 2 Fracture – A Questionnaire-based Survey [Internet]. The Open Dentistry Journal2020;14(1):59–65. Available from: http://dx.doi.org/10.2174/1874210602014010059

[27] Wu F, Zhu J, Li G, Wang J, Veeraraghavan VP, Mohan SK, et al. Biologically synthesized green gold nanoparticles from *Siberian ginseng* induce growth-inhibitory effect on melanoma cells (B16) [Internet]. Artificial Cells, Nanomedicine, and Biotechnology2019;47(1):3297–305. Available from: http://dx.doi.org/10.1080/21691401.2019.1647224

[28] Dua K, Wadhwa R, Singhvi G, Rapalli V, Shukla SD, Shastri MD, et al. The potential of siRNA based drug delivery in respiratory disorders: Recent advances and progress. Drug Dev Res 2019;80(6):714–30.

[29] Patil SB, Durairaj D, Suresh Kumar G, Karthikeyan D, Pradeep D. Comparison of Extended Nasolabial Flap Versus Buccal Fat Pad Graft in the Surgical Management of Oral Submucous Fibrosis: A Prospective Pilot Study. J Maxillofac Oral Surg 2017;16(3):312–21.

[30] Little JW, Falace DA, Miller CS, Rhodus NL. Cancer and Oral Care of the Cancer Patient [Internet]. Little and Falace's Dental Management of the Medically Compromised Patient2013;459–92. Available from: http://dx.doi.org/10.1016/b978-0-323-08028-6.00026-9

[31] Hilgers KK, Douglass J, Mathieu GP. Adolescent pregnancy: a review of dental treatment guidelines. Pediatr Dent 2003;25(5):459–67.

[32] Tantradi P, Madanshetty P. Knowledge of dental interns about management of dental needs of pregnant patients [Internet]. Journal of Education and Ethics in Dentistry2013;3(2):76. Available from: http://dx.doi.org/10.4103/0974-7761.136050

[33] Hashim R. Self-reported oral health, oral hygiene habits and dental service utilization among pregnant women in United Arab Emirates. Int J Dent Hyg 2012;10(2):142–6.

[34] Onigbinde OO, Sorunke ME, Braimoh MO, Adeniyi AO. Periodontal status and some variables among pregnant women in a Nigeria tertiary institution [Internet]. Annals of Medical and Health Sciences Research2014;4(6):852. Available from: http://dx.doi.org/10.4103/2141-9248.144876

[35] Swapna LA, Alanazi EZM, Aldoji AAA, Koppolu P, Alqerban A. Awareness of Dental Interns to Treat Pregnant Patients. Open Access Maced J Med Sci 2019;7(19):3265–9.