ORIGINAL ARTICLE

INTERNATIONAL JOURNAL OF RESEARCH IN PHARMACEUTICAL SCIENCES

Knowledge and awareness of precision medicine among dental students

Bipin M[1], Jeevitha M[*2], Kavitha S[1]

[1]Saveetha Dental College and Hospitals, Saveetha Institute of Medical and Technical Sciences, Saveetha University, Chennai, Tamil Nadu, India
[2]Department of Periodontics, Saveetha Dental College and Hospitals, Saveetha Institute of Medical and Technical Sciences, Saveetha University, Chennai, Tamil Nadu, India

ABSTRACT

Precision medicine is an emerging approach for the treatment of diseases and prevention that takes into account individual variability in genes, environment and lifestyle of a person. Although the term precision medicine is relatively new, the concept has been a part of healthcare for many years. This study focuses especially to evaluate the knowledge on characteristics of precision medicine among dental students. The aim of this study is to analyse the knowledge and awareness of Precision medicine among dental students. A descriptive cross-sectional survey was conducted among dental students through a self-administrated questionnaire. The responses had been collected and statistically analysed. 61% of the study population were aware of Precision medicine and surprisingly, 82% of the respondents came across this term precision medicine. This study concludes that the dental students were aware of the term precision medicine, but they were not well aware of the role of precision medicine in the medical field.

*Corresponding Author

Name: Jeevitha M
Phone: +91 7904613787
Email: jeevitham.sdc@saveetha.com

INTRODUCTION

Precision medicine is the personalization of health-care, with medical procedures, therapies, methods or products being personalized to the particular patient rather than one medication that fits all models. Indeed it refers to tailoring medical care to a patient's particular characteristics. Personalized medicine is a modern health-care field that puts together genetics, large data and public wellbeing.

From the beginning of the era, health care professionals have been trying to make their activities more successful for their patients by experimenting with new procedures, studying and communicating their outcomes, and by making the experiences of previous generations more available. Many researches have been conducted in favour of social insurance understudies in biobanking and biospecimen gifts. Many investigations were made to assess the information on precision medicine to analyse the given biospecimens and the variable inspecting their mentalitie (Zhang *et al.*, 2013). The accuracy medication idea vows to accomplish a move to future social insurance frameworks with an increasingly proactive and persistent way to deal with medication. The individualisation of treatment for every patient will be at the focal point of this methodology, with the entirety of the patient's clinical information being computationally incorporated and available (Hood and Auffray, 2013). To accomplish these objectives, exactness medication means to create computational models that coordinate information from both centre and essential research to

increase robotic comprehension (Sharma, 2020). The complexities of the components that constitute precision medicine do not detract from what the implementation of precision medicine may mean for individual patients. Genome sequencing has great potential for enhancing patient care through improved diagnostic sensitivity. Genomics strategies developed for genetic discovery, including DNA sequencing technologies and analytical algorithms, need to be adapted to suit specific clinical needs in order to improve and maximize potential (Circulation, 2020). Metabolomics plays an important role in precision medicine through the development of personalised phenotyping and individualised drug response monitoring (Tsien, 2020; Liu and Locasale, 2017; Clift, 2015). The new field of precision medicine aims to provide the best possible treatment for every patient on the basis of stratification into a disease classification with a specific biological basis for disease (Gehlert, 2016). Radiation oncology has a high potential to show the effectiveness of precision medicine in oncology. It enables the further (Re et al., 2018; Deluche et al., 2015). Developing specific medication to treat metastatic breast cancer is an enticing idea, but significant research and practical difficulties impede its clinical adoption (Ganesan and Hirshfield, 2019; Arnedos et al., 2015; Andre et al., 2014). However, the knowledge and awareness of precision medicine seem to be good among dental students. Hence, this study was conducted to assess the awareness about Precision medicine among dental students. In the emphasis on precision medicine in the decade ahead, we can say that advances in thyroid pathophysiology will help us refine the assessment of individual patients to determine whether their thyroid function test or imaging findings are really helpful in clinical manifestations (Samuel and Devi, 2015). Obesity (Fathima, 2016) is a common health issue where it affects the women in the reproductive age and is associated with multiple adverse reproductive outcomes, but the mechanisms involved are largely unknown (Baheerati and Devi, 2018; Fathima, 2016) most of the habits of today's lifestyle to be sedentary (Harsha et al., 2015). Precision medicine plays a key role in pathogenesis and novel drugs for treating asthma (Dave and Preetha, 2016) diseases like muscular dystrophy can be treated by using advanced techniques like precision medicine (Abigail, 2019). Physical fitness reduces the stress of obesity risk factors as it can be dealt with precision medicine (Shruthi and Preetha, 2018) Precision medicine deals with advanced chronic liver disease (Choudhari and Jothipriya, 2016; Iyer et al., 2019) evaluation of adenoids, acupuncture and back

pain (Renuka and Sethu, 2015) and peak expiratory flow rate (Timothy et al., 2019; Swathy and Sethu, 2015; Devi and Sethu, 2018) affects the sleeping patterns (Ilankizhai and Devi, 2016). The aim of the present study is to analyse the knowledge and awareness of Precision medicine among dental students.

MATERIALS AND METHODS

A descriptive cross-sectional study was carried out to analyse knowledge, attitude and practice among dental students based on parameters including undergraduates and post graduates. Approval was obtained from the institutional review board. The survey was conducted among 100 dental students. The study participants include undergraduates and postgraduate students. Undergraduate students were grouped into first-year and second-year students, third-year and fourth-year students, interns. A self-administered questionnaire of 15 closed-ended questions was prepared and distributed among dental students through online based survey forms "google forms". A self-administrated questionnaire was prepared. The responses were collected, tabulated in the excel sheet and analysed. Data entered in SPSS and the results were represented in a Bar graph. Chi-square test was used to analyse and compare the educational level of students and their knowledge and awareness on precision medicine.

RESULTS AND DISCUSSION

The survey included all undergraduates and postgraduates of dentistry, including senior residents. The survey was circulated; 100 responses were obtained. 81% of the study population had come across the term precision medicine. 61% of them are aware of precision medicine and it's used. 90% of the study population think precision medicine and accurate medicine are the same terms. 71% of the study population assume that precision medicine is affordable by all. 70% of respondents are sure about precision medicine which plays a major role in diagnosing cancer. 72% of the respondents assume that precision medicine is customised treatment for an individual patient. They even feel that this kind of treatment creates the biggest impact in the medical field. 76% of the study population are aware that precision medicine is related to genetics. 77% of the population believe that precision medicine is herbal medicine. 76% of the respondents assume that precision medicine engages high powered computational tools to integrate advanced biomedical research. 70% of them

responded and they do support that every child should undergo molecular genetic testing for precision medicine. 70% of the study population believe that customization of nutrition will play a significant role in precision medicine.
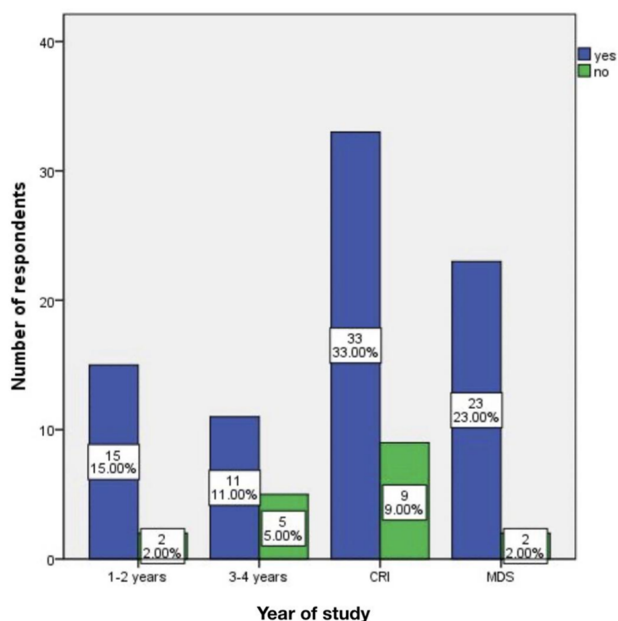

Figure 1: Bar chart represents the association between the year of study and the awareness of the term precision medicine.
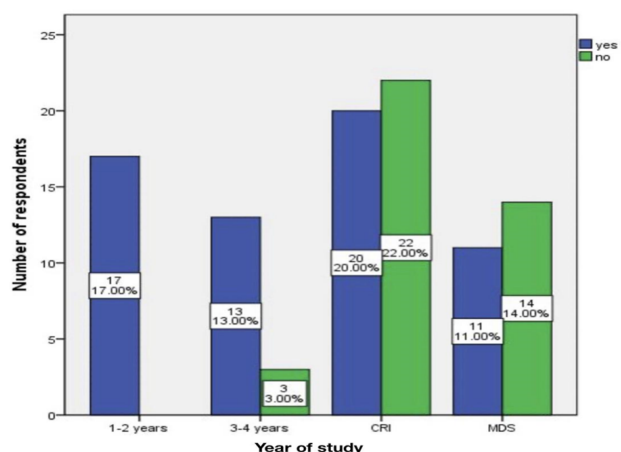

Figure 2: Bar chart represents the association between students' year of study and the awareness of precision medicine and its uses.

Precision medicine actually allows doctors to select treatments based on genetic understanding of the patient's disease and to create personalised treatment plans. So, to have an awareness of the Precision medicine survey has been conducted to analyse the data and ideas of the respondents. 33% of the interns were aware of the term precision medicine. Pearson Chi-square value- 4.379, p-value- 0.223 (<0.05) - not significant. Student's year of study
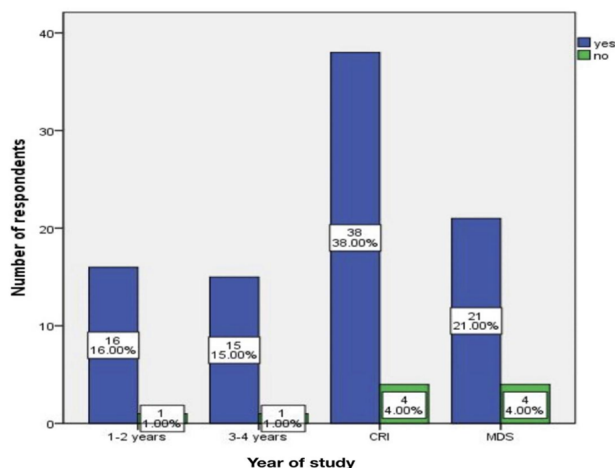

Figure 3: Bar chart represents the association between students' year of study and the difference in terminologies.
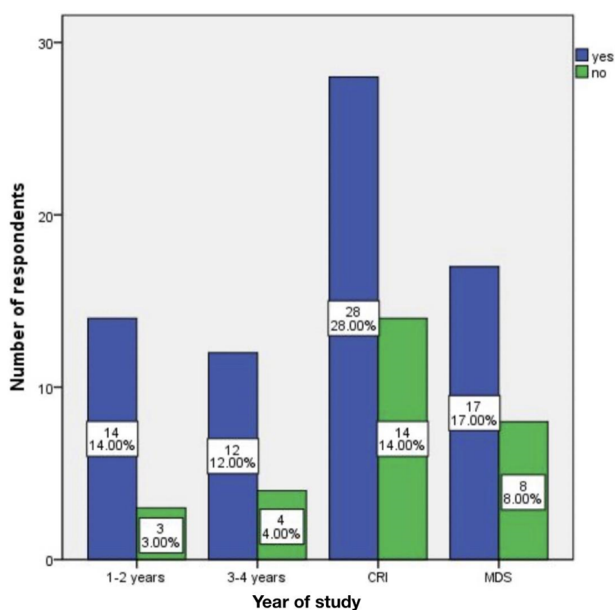

Figure 4: Bar chart represents the association between students' year of study and affordability of precision medicine.

was not significantly associated with the awareness of the term precision medicine [Figure 1]. In the present study, 20% of the study population belonging to in terms have answered that they are aware of precision medicine and its uses, whereas other category populations do not agree to the statement. (p>0.05) which is statistically significant [Figure 2]. In the present study, 38% of the interns thought that precision medicine and accurate medicine are the same terms. Pearson chi-square test value 1.581, p-value 0.664(>0.05) and statistically insignificant. Student's year of study was not significantly associated with awareness of the difference between precision medicine and accurate medicine [Figure 3]. In the present study, 28% of the interns felt pre-
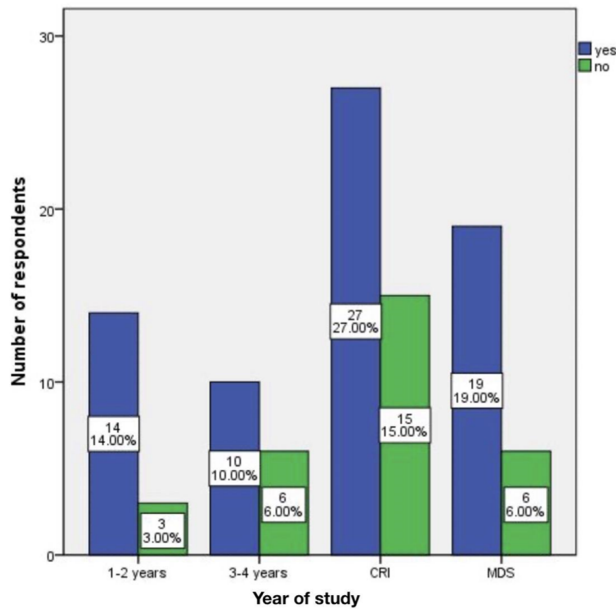
Figure 5: Bar chart represents the association between students' year of study and the role of precision medicine in diagnosing cancer.
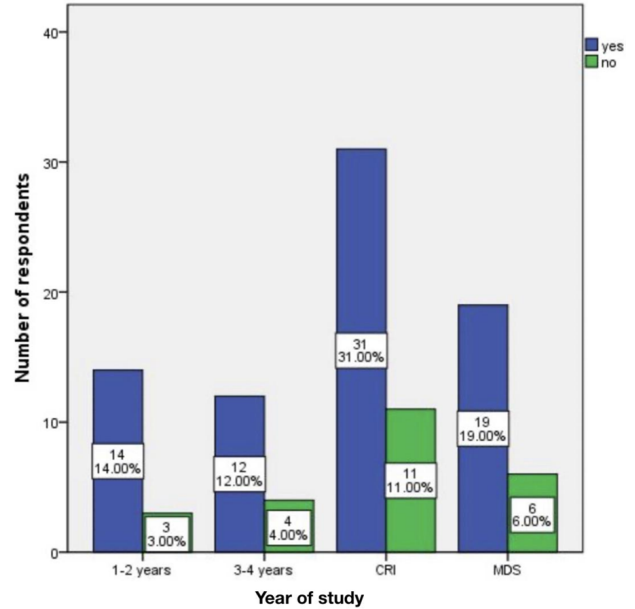

Figure 7: Bar chart represents the association between the students year of study and the role of precision medicine in genetics.
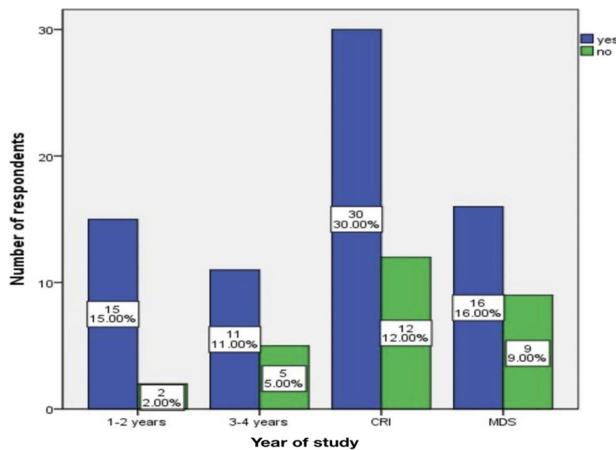

Figure 6: Bar chart represents the association between students' year of study and the impact of precision medicine in the medical field.
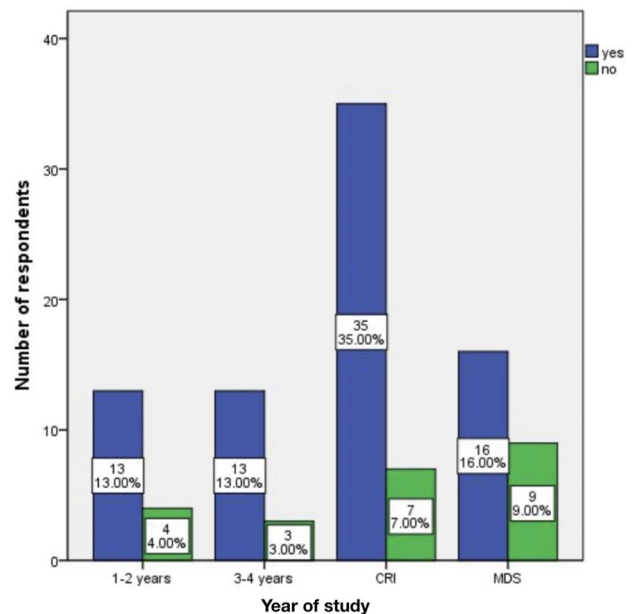

Figure 8: Bar chart represents the association between the students year of study and the role of herbal medicine in precision medicine.

cision medicine is affordable by all. Pearson chi-square test 1.681, p-value 0.641(>0.05) which is statistically insignificant. Student's year of study was not statistically associated with the affordability of precision medicine [Figure 4]. 27% of the interns felt precision medicine plays an important role in diagnosing cancer. Pearson chi-square test value 2.745, p-value 0.433(>0.05) which is statistically not significant. Student's year of study was not significantly associated with the role of precision medicine in diagnosing cancer [Figure 5]. 30% of the interns felt precision medicine would create the biggest impact in the medical field. Pearson chi-square test value 3.107, p-value 0.375(>0.05) which is not significant [Figure 6]. In the present

study, 31% of the interns felt precision medicine is related to genetics. Pearson chi-square test value 0.495, p-value 0.920(>0.05) which is statistically not significant [Figure 7]. In the present study, 35% of the interns felt precision medicine is related to herbal medicine. Pearson chi-square value 3.503, p-value 0.320(>0.05) which is statistically not significant [Figure 8]. 30% of the interns felt precision medicine engages high powered computational tools that integrate advanced biomedical research.
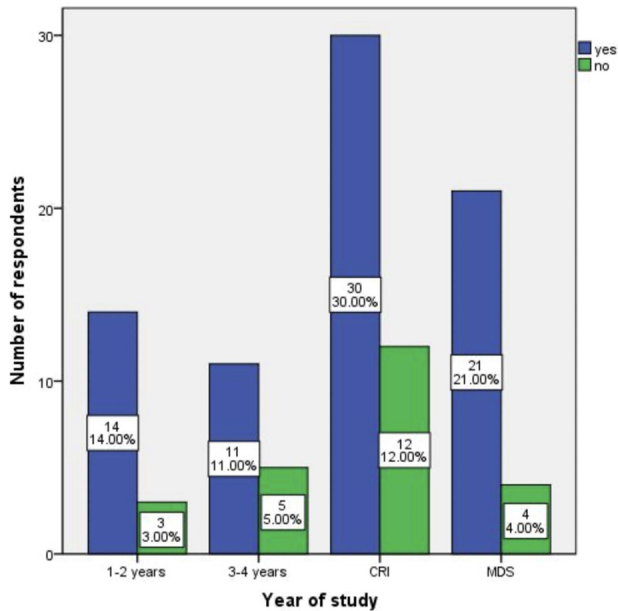
Figure 9: Bar graph represents the association between students' years of study and the role of precision medicine in biomedical research.
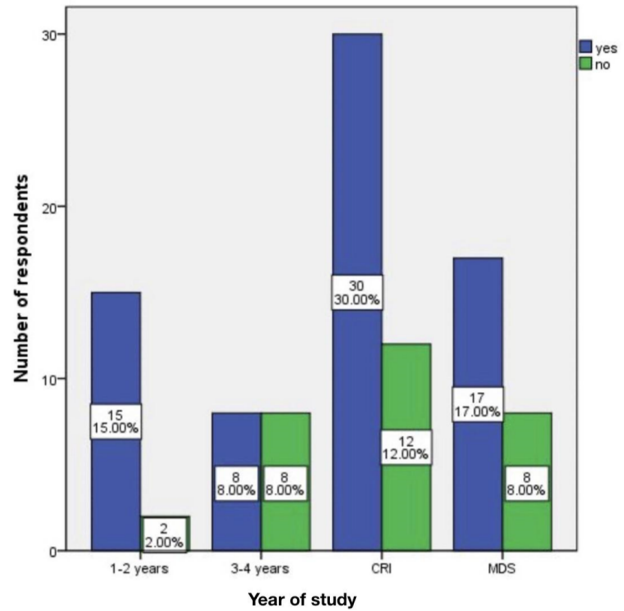

Figure 11: Bar chart represents the association between the students year of study and the customisation of nutrition in precision medicine.
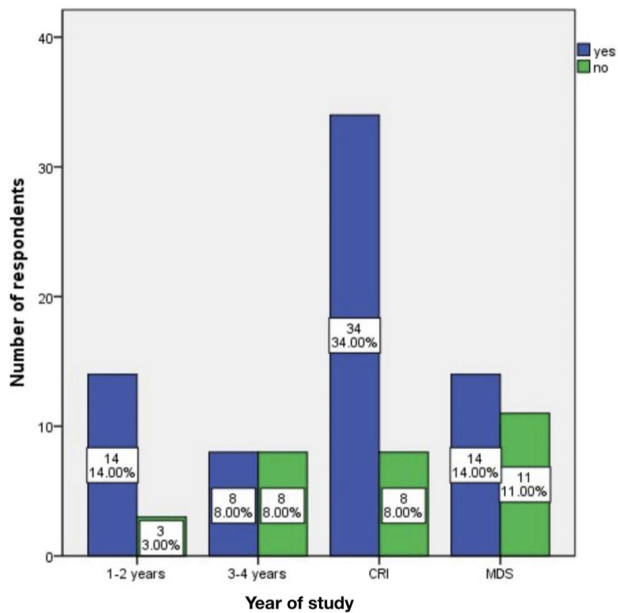

Figure 10: Bar chart represents the association between the student's year of study and the role of precision medicine in molecular genetic testing for children.

Pearson chi-square value 2.196, 0.533(>0.05) which is statistically not significant [Figure 9]. 34% of the interns felt every child should be subjected to molecular genetic testing. Pearson chi-square test value 9.015, the p-value 0.029(<0.05) which is statistically significant [Figure 10]. 30% of the interns felt customisation of nutrition plays a significant role in precision medicine. Pearson chi-square test value 5.828 the p-value 0.120(>0.05) which is statistically not

significant [Figure 11].

CONCLUSIONS

From the present study, it is evident that all dental students were aware of the term precision medicine and the lack of awareness of its potential applications. This study highlights the need for awareness about the use of precision medicine in various fields among dental students emphasizing it in dental education programs.

Conflict of Interest

The authors declare that they have no conflict of interest for this study.

Funding Support

The authors declare that they have no funding support for this study.

REFERENCES

Abigail 2019. Evaluation of Muscular Endurance among Dentists. *Indian Journal of Public Health Research and Development*, pages 1–258.

Andre, F., Vicier, C., Delaloge, S. 2014. The Horizon of Precision Medicine in Breast Cancer: Fragmentation, Alliance, or Reunification? *American Society of Clinical Oncology Educational Book*, 34(1):5–10.

Arnedos, M., Vicier, C., Loi, S., *et al.* 2015. Precision medicine for metastatic breast cancer—limitations and solutions. *Nature Reviews Clinical*

Oncology, 12(12):693–704.

Baheerati, M. M., Devi, R. G. 2018. Obesity in relation to Infertility. *Research Journal of Pharmacy and Technology*, 11(7):3183.

Choudhari, S., Jothipriya, M. A. 2016. Non-alcoholic fatty liver disease. *Research Journal of Pharmacy and Technology*, 9(10):1782.

Circulation 2020. Genomic and Precision Medicine Editors and Editorial Board. *Circulation: Genomic and Precision Medicine*, 13(1).

Clift, I. C. 2015. Metabolomics in Precision Medicine. *Genetic Engineering and Biotechnology News*, 35(10):14–15.

Dave, P. H., Preetha 2016. Pathogenesis and Novel Drug for Treatment of Asthma-A Review. *Research Journal of Pharmacy and Technology*, 9(9):1519–1523.

Deluche, E., Onesti, E., Andre, F. 2015. Precision medicine for metastatic breast cancer. *American Society of Clinical Oncology Educational Book*, 35(1):2–7.

Devi, R. G., Sethu, G. 2018. Evaluation of adenoids byoronasaland nasal spirometry. *Asian Journal of Pharmaceutical and Clinical Research*, 11(10):272.

Fathima, F. 2016. Preetha. Evaluation of Thyroid Function Test in Obese Patients. *Asian J Pharm Clin Res*, 9(3):353–355.

Ganesan, S., Hirshfield, K. M. 2019. Infrastructures in Precision Medicine Oncology. *Precision Medicine Oncology*, pages 81–92.

Gehlert, S. J. 2016. Abstract IA40: Maximizing the benefits of precision medicine for cancer disparities. *Cancer Epidemiology Biomarkers and Prevention*, 25(3):40.

Harsha, L., Priya, J., Shah, K. K., Reshmi, B. 2015. Systemic Approach to Management of Neonatal Jaundice and Prevention of Kernicterus. *Research Journal of Pharmacy and Technology*, 8(8):1087–1092.

Hood, L., Auffray, C. 2013. Participatory medicine: a driving force for revolutionizing healthcare. *Genome Medicine*, 5(12):110.

Ilankizhai, R. J., Devi, R. G. 2016. Role of environmental factors on sleep patterns of different age groups. *Asian Journal of Pharmaceutical and Clinical Research*, 9(6):124.

Iyer, P. K., Devi, R. G., Priya, A. J. 2019. A Survey Study on Causes, Treatment and Prevention of Onychocryptosis. *Indian Journal of Public Health Research and Development*, 10(8):807–811.

Liu, X., Locasale, J. W. 2017. Metabolomics reveals intratumor heterogeneity – Implications for precision medicine. *EBioMedicine*, 19:4–5.

Re, A., Nardella, C., Quattrone, A., Lunardi, A. 2018. Precision Medicine in Oncology. *Frontiers in Oncology*, 8:479.

Renuka, S., Sethu, G. 2015. Regeneration after Myocardial Infarction. *Research Journal of Pharmacy and Technology*, 8(6):738.

Samuel, A. R., Devi, M. G. 2015. Geographical distribution and occurrence of Endemic Goitre. *Research Journal of Pharmacy and Technology*, 8(8):973–978.

Sharma, A. 2020. PRISM: A Platform for Imaging in Precision Medicine. *JCO clinical cancer informatics*, 4:491–499.

Shruthi, M., Preetha, S. 2018. Effect of Simple Tongue Exercises in Habitual Snorers. *Research Journal of Pharmacy and Technology*, 11(8):3614–3616.

Swathy, S., Sethu, V. G. 2015. Acupuncture and lower back pain. *Research Journal of Pharmacy and Technology*, 8(8):991.

Timothy, C. N., Devi, R. G., Priya, A. J. 2019. Evaluation of Peak Expiratory Flow Rate (PEFR) in Pet Owners. *Indian Journal of Public Health Research and Development*, 10(8):803–806.

Tsien, F. 2020. Cytogenetics in precision medicine. *Clinical Precision Medicine*, pages 1–10.

Zhang, Z., Zhao, Z., Liu, B., Li, D., Zhang, D., Chen, H., Liu, D. 2013. Systems biomedicine: It's your turn-Recent progress in systems biomedicine. *Quantitative Biology*, 1(2):140–155.