

Current status of usage of ivermectin in the management of COVID

Swetha Ilangovan,
Dhanraj Ganapathy,
Nabeel Ahmed,
Kiran Kumar Pandurangan,
Subhabrata Maiti

Department of Prosthodontics,
Saveetha Dental College and Hospitals,
Saveetha Institute of Medical and
Technical Sciences, Saveetha
University, Chennai, Tamil Nadu, India

J. Adv. Pharm. Technol. Res.

ABSTRACT

The antibacterial, antiviral, and anticancer properties of ivermectin make it a wonder drug with a wide range of possible applications. It works against a variety of microorganisms, including viruses. Ivermectin has a wide range of antiviral effects, according to *in vivo* research in animal models. Because ivermectin is involved in a range of biological processes, it could be a promising therapeutic candidate for viruses such as COVID-19 and other positive-sense single-stranded RNA viruses. The study aims to analyze the awareness about the current status of usage of ivermectin in management of COVID among students studying in a private dental college. A study based on questionnaire was organized among students studying in a private dental college in Tamil Nadu. The subjects were asked a series of structural questions based on the usage of ivermectin in management of COVID. The questionnaire was prepared with 10 questions. 150 individuals completed the questionnaire; all of their answers were tallied in excel and imported into SPSS. For statistical analysis, the Chi-square test was performed. Excel was used to tabulate and enter the data, and the SPSS package software was used to analyze it. The study's threshold for statistical significance was set at $P < 0.05$. From this study, we found that the students had limited knowledge about the usage of ivermectin for management of COVID. More studies should be conducted to widen the knowledge among the students about the current affairs of the world.

Key words: COVID, innovative technology, ivermectin

INTRODUCTION

Ivermectin was discovered in late 1970 and has been approved to use in animals since 1981. The medication of choice for treating and controlling a number of tropical diseases that are typically disregarded is ivermectin.^[1]

Address for correspondence:

Dr. Subhabrata Maiti,
Department of Prosthodontics, Saveetha Dental College and
Hospitals, Saveetha Institute of Medical and Technical Sciences,
Saveetha University, Chennai - 600 077, Tamil Nadu, India.
E-mail: subhabratamaiti.sdc@saveetha.com

Submitted: 09-May-2022

Published: 30-Dec-2022

Accepted: 12-Aug-2022

Access this article online

Quick Response Code:



Website:

www.japtr.org

DOI:

10.4103/japtr.japtr_344_22

With almost 2 billion doses administered in the previous 30 years, the medication has a great safety record. Its potential to stop the spread of malaria by killing mosquitoes is also being investigated in multiple trials around the world.^[2] Several single-stranded RNA viruses can replicate *in vitro* like dengue virus,^[3] yellow fever virus,^[4] zika virus,^[5] and others^[6] is inhibited by ivermectin.

The Food and Drug Administration (FDA) has approved ivermectin for the management of tropical diseases such as scabies, onchocerciasis, and helminthiasis.^[7,8] Ivermectin has not yet received FDA approval for the treatment of any viral infections.

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

For reprints contact: WKHLRPMedknow_reprints@wolterskluwer.com

How to cite this article: Ilangovan S, Ganapathy D, Ahmed N, Pandurangan KK, Maiti S. Current status of usage of ivermectin in the management of COVID. *J Adv Pharm Technol Res* 2022;13:S407-11.

The knowledge of the various management techniques can be used as teaching guidelines in the upcoming years. The present research is to determine the knowledge of the current status of ivermectin in the management of COVID in different study years of dentistry. Our team has a plethora of research and knowledge that has resulted in high-quality publications.^[9-30] This type of research would be useful to educational planners in developing ways for improving pupils' awareness of new and upcoming events. The purpose of this study is to determine whether UG dental students are aware of the current status of ivermectin for COVID therapy.

MATERIALS AND METHODS

Study setting

The cross sectional survey was conducted among all the study year students of private dental university. The sample size was 150 UG dental students. Participants were above 18 years of age and gave consent to participate in the survey. Participants in the study were informed about the study and the participation was voluntary. This was an online survey conducted via surveyplanet website and the link was circulated among the students during the months of November and December 2020.

Data collection

The study instrument was a questionnaire which was compiled with questions related COVID and ivermectin as a drug of choice. 10 questions included collected information pertaining to their knowledge about the current status of ivermectin for management of COVID. The pretested questionnaire provided internal validity. External validity was determined via homogenization, experiment replication, and cross-validation with other investigations.

Data analysis

Excel was used to enter data into a spreadsheet. Statistical Package for Social sciences (SPSS) software, version 1.0.0.1347 64 bit (IBM corp., NY, USA) was used to analyze the data gathered. Crosstabular descriptive statistics were used to analyze the data, and frequencies, percentages, and averages were used in the descriptive analysis.

A nonparametric test known as the Chi-square test of independence was conducted using the SPSS program to ascertain the statistical significance of the current investigation. The probability value for the significance level in this inquiry was set at 5%, and any value of $P = 0.05$ was considered to indicate the level of statistical significance.

RESULTS

The total participants included in the present study were 150 UG dental students. The survey was conducted online and all the questions had to be answered. All the participants were above the age of 18 and consented to this study. 56.67%

were females in this study and 43.33% were males. 13.33% of participants were 1st year, 18.67% were 2nd year, 21.33% were 3rd year, and 14% were 4th years and 16% were interns and 6.67% were PG.

The participants were then asked if they were aware about the drugs used for COVID-19, 62.65 were aware and 37.4% were not aware. The next question asked was if they have ever heard about ivermectin; yes was replied by 8.67% 1st years, 14.67% 2nd year, 18.5% of 3rd year, 20.67% 4th year, 11.33% interns, and 6% PG participants and 4.67% of first year students, 4% of second year, 3.33% third year and fourth year, 4.67% interns, and 0.67% PG replied no, they have not heard about ivermectin.

The participants were then asked if they know about the uses of ivermectin, yes was said by 7.33% first year, 10% second year, and 14% third year, 7.33% fourth year, 2.67% interns and 1.33% PG also no was said by 6.99% first year, 10% of second year, 7.33% third year and 16.67% fourth year, 13.33% interns and 5.33% PG.

When the participants were asked what were the properties of ivermectin, 11.3% said anticancer, 34% said antimicrobial, 22.6% said antiviral, and 32% said all of the above [Figure 1]. The participant were asked about the side effects of ivermectin 11.3% said nausea 18% said dizziness, 15.3% said fatigue, 10% were loss of appetite, and 45.3% said all of the above [Figure 2]. The next question asked was dosage of ivermectin: 7.3% said 5 mg/day, 16.67% said 10 mg/day, 17.3% said 12 mg/day, and 58.6% said 20 mg/day [Figure 3].

The participants were asked if they were aware that ivermectin was an veterinarian drug, yes was said by 10 1st year, 13.33% 2nd year, 11.33% 3rd year, 12.56% 4th year, 9.33% interns, and 4% were PG [Figure 4]. The participants were asked if they thought that ivermectin can be used to treat COVID, 31.33% said yes, 18.6% said no, and 50% said maybe [Figure 5].

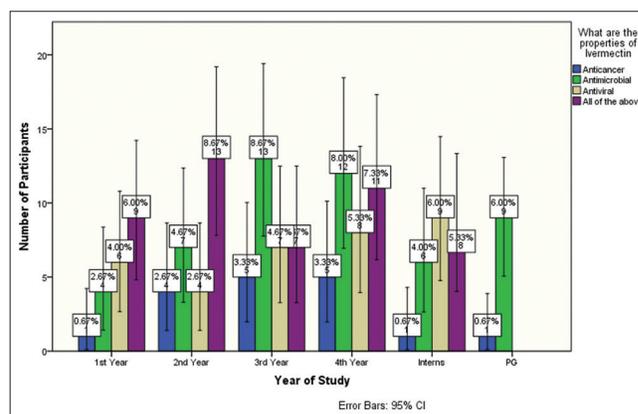


Figure 1: The year of study and response to “the properties of ivermectin”

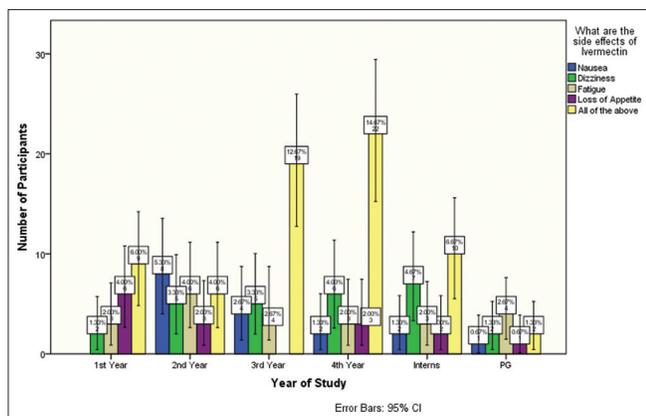


Figure 2: The association between the year of study and response to the side effects of ivermectin

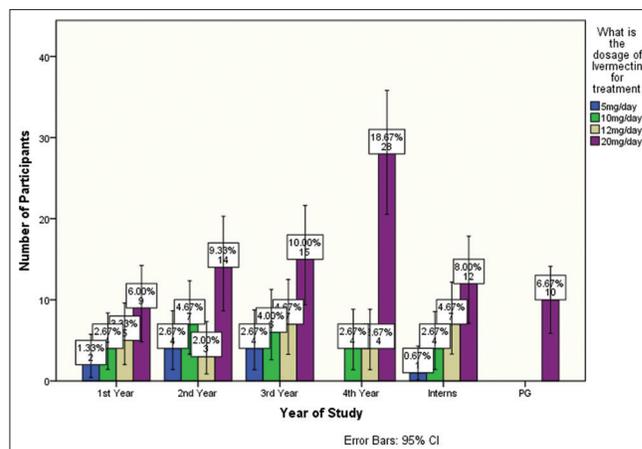


Figure 3: The year of study and response to “the dosage of drug of Ivermectin”

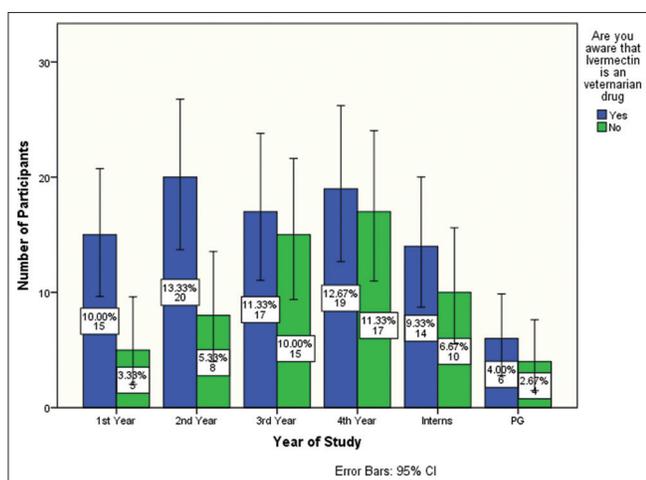


Figure 4: The year of study and response to “if they were aware of the Ivermectin being veterinarian drug”

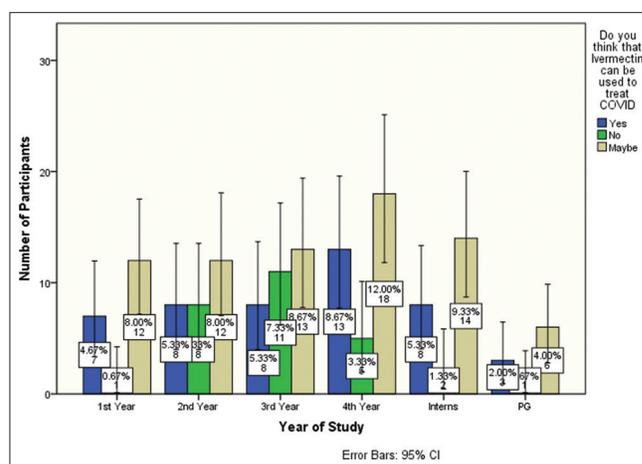


Figure 5: The year of study and response to “if they think that ivermectin can be used to treat COVID-19”

DISCUSSION

In this current study, we found that dental students had some level of knowledge about the current usage of ivermectin in COVID-19. In several clinical investigations, ivermectin had no effect or did not worsen the condition;^[31,32] on the other hand, others reported a shorter time to remission of clinical signs when COVID-19 was blamed.^[33] When ivermectin was used instead of placebo or other medications, there was a higher drop in inflammatory marker levels, a shorter period for viral clearance, and lower fatality rates.^[34-37]

A new area of study into the possible use of ivermectin and its derivatives has emerged as a result of numerous recent discoveries with improved pharmacokinetics but extreme precaution and diligence under regulation is needed before testing ivermectin. The knowledge of the current medical problems can be used as teaching guidelines in the upcoming years. The present research is to determine the knowledge of the current status of ivermectin

in COVID-19 in different study years of dentistry. Educational planners could use the data from this kind of study to suggest techniques for educating students about various medical conditions and management. The investigation was constrained by a few factors. The study was cross-sectional and uncentered with geographical limitations and a predominately South Indian population. The study’s sample size and duration can be expanded for more accurate results. The study’s scope will be expanded with a larger sample size and the inclusion of participants from different ethnic groups.

CONCLUSION

Within the limits of the study, the students are familiar with the knowledge of how ivermectin affects COVID-19 management. The knowledge of the various management techniques can be used as teaching guidelines in the upcoming years. More awareness about this has to be done in the future long-term study.

Acknowledgment

The authors acknowledge Saveetha University for all the help and support.

Financial support and sponsorship

The present study is funded by the

- Saveetha Institute of Medical and Technical Sciences
- Saveetha Dental College and Hospitals
- Saveetha University
- Thomas Cook Private Ltd., Chennai.

Conflicts of interest

There are no conflicts of interest.

REFERENCES

1. Omura S, Crump A. Ivermectin: Panacea for resource-poor communities? *Trends Parasitol* 2014;30:445-55.
2. The Ivermectin Roadmappers, Billingsley P, Binka F, Chaccour C, Foy B, Gold S, *et al.* A roadmap for the development of ivermectin as a complementary malaria vector control tool. *Am J Trop Med Hyg* 2020;102:3-24.
3. Wagstaff KM, Sivakumaran H, Heaton SM, Harrich D, Jans DA. Ivermectin is a specific inhibitor of importin α/β -mediated nuclear import able to inhibit replication of HIV-1 and dengue virus. *Biochem J* 2012;443:851-6.
4. Varghese FS, Kaukinen P, Gläsker S, Bepalov M, Hanski L, Wennerberg K, *et al.* Discovery of berberine, abamectin and ivermectin as antivirals against chikungunya and other alphaviruses. *Antiviral Res* 2016;126:117-24.
5. Barrows NJ, Campos RK, Powell ST, Prasanth KR, Schott-Lerner G, Soto-Acosta R, *et al.* A screen of FDA-approved drugs for inhibitors of zika virus infection. *Cell Host Microbe* 2016;20:259-70.
6. Lee YJ, Lee C. Ivermectin inhibits porcine reproductive and respiratory syndrome virus in cultured porcine alveolar macrophages. *Arch Virol* 2016;161:257-68.
7. Crump A. Ivermectin: Enigmatic multifaceted “wonder” drug continues to surprise and exceed expectations. *J Antibiot* 2017;70:495-505.
8. Gloeckner C, Garner AL, Mersha F, Oksov Y, Tricoche N, Eubanks LM, *et al.* Repositioning of an existing drug for the neglected tropical disease onchocerciasis. *Proc Natl Acad Sci U S A* 2010;107:3424-9.
9. 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;10:12-20.
10. Pratha AA, Thenmozhi MS. A study of occurrence and morphometric analysis on meningo orbital foramen. *Res J Pharm Technol* 2016;9:880-2.
11. Nair M, Jeevanandan G, Vignesh R, Subramanian EM. Comparative evaluation of post-operative pain after pulpctomy with k-files, kedous files and mtwo files in deciduous molars-a randomized clinical trial. *Brazilian dental science* 2018;21:411-7.
12. Kannan R, Thenmozhi MS. Morphometric study of styloid process and its clinical importance on Eagle’s syndrome. *Res J Pharm Technol* 2016;9:1137-9.
13. Samuel AR, Thenmozhi MS. Study of impaired vision due to Amblyopia. *Research Journal of Pharmacy and Technology* 2015;8:912-4.
14. Viswanath A, Ramamurthy J, Dinesh SP, Srinivas A. Obstructive sleep apnea: Awakening the hidden truth. *Niger J Clin Pract* 2015;18:1-7.
15. Dinesh SP, Arun AV, Sundari KK, Samantha C, Ambika K. An indigenously designed apparatus for measuring orthodontic force. *J Clin Diagn Res* 2013;7:2623-6.
16. Varghese SS, Thomas H, Jayakumar ND, Sankari M, Lakshmanan R. Estimation of salivary tumor necrosis factor-alpha in chronic and aggressive periodontitis patients. *Contemp Clin Dent* 2015;6:S152-6.
17. Priyanka S, Kaarthikeyan G, Nadathur JD, Mohanraj A, Kavarthapu A. Detection of cytomegalovirus, Epstein-Barr virus, and torque teno virus in subgingival and atheromatous plaques of cardiac patients with chronic periodontitis. *J Indian Soc Periodontol* 2017;21:456-60.
18. Panda S, Jayakumar ND, Sankari M, Varghese SS, Kumar DS. Platelet rich fibrin and xenograft in treatment of intrabony defect. *Contemp Clin Dent* 2014;5:550-4.
19. Wu F, Zhu J, Li G, Wang J, Veeraraghavan VP, Krishna Mohan S, *et al.* Biologically synthesized green gold nanoparticles from *Siberian ginseng* induce growth-inhibitory effect on melanoma cells (B16). *Artif Cells Nanomed Biotechnol* 2019;47:3297-305.
20. 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;80:714-30.
21. 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;16:312-21.
22. Uthrakumar R, Vesta C, Raj CJ, Krishnan S, Das SJ. Bulk crystal growth and characterization of non-linear optical bistiourea zinc chloride single crystal by unidirectional growth method. *Curr Appl Phys* 2010;10:548-52.
23. Vijayakumar Jain S, Muthusekhar MR, Baig MF, Senthilnathan P, Loganathan S, Abdul Wahab PU, *et al.* Evaluation of three-dimensional changes in pharyngeal airway following isolated left one osteotomy for the correction of vertical maxillary excess: A prospective study. *J Maxillofac Oral Surg* 2019;18:139-46.
24. Kasabwala H, Maiti S, Ashok V, Sashank K. Data on dental bite materials with stability and displacement under load. *Bioinformation* 2020;16:1145-51.
25. Agarwal S, Maiti S, Ashok V. Correlation of soft tissue biotype with pink aesthetic score in single full veneer crown. *Bioinformation* 2020;16:1139-44.
26. Agarwal S, Ashok V, Maiti S, Agarwal V. Dentists' Preference toward Fixed Versus Removable Implant Prosthesis on Edentulous Jaws to Improve Quality of Life. *J Long Term Eff Med Implants* 2022;33:83-9. doi: 10.1615/JLongTermEffMedImplants.
27. Ponnanna AA, Maiti S, Rai N, Jessy P. Three-dimensional-printed malo bridge: Digital fixed prosthesis for the partially edentulous maxilla. *Contemp Clin Dent* 2021;12:451-3.
28. Aparna J, Maiti S, Jessy P. Polyether ether ketone – As an alternative biomaterial for metal richmond crown-3-dimensional finite element analysis. *J Conserv Dent* 2021;24:553-7.
29. Agarwal S, Ashok V, Maiti S. Open- or closed-tray impression technique in implant prosthesis: A dentist’s perspective. *J Long Term Eff Med Implants* 2020;30:193-8.
30. Merchant A, Ganapathy DM, Maiti S. Effectiveness of local and topical anesthesia during gingival retraction. *Braz Dent Sci* 2022;25:e2591.
31. Ahmed S, Karim MM, Ross AG, Hossain MS, Clemens JD, Sumiya MK, *et al.* A five-day course of ivermectin for the treatment of COVID-19 may reduce the duration of illness. *Int J Infect Dis* 2021;103:214-6.
32. Chachar AZ, Khan KA, Asif M, Tanveer K, Khaqan A, Basri R. Effectiveness of ivermectin in SARS-CoV-2/COVID-19 patients. *Int J Sci* 2020;9:31-5.

33. Poyiadji N, Shahin G, Noujaim D, Stone M, Patel S, Griffith B. COVID-19-associated acute hemorrhagic necrotizing encephalopathy: Imaging features. *Radiology* 2020;296:E119-20.
34. Campbell WC. Ivermectin and Abamectin. New York: Springer; 2011.
35. Kalil AC. Treating COVID-19-off-label drug use, compassionate use, and randomized clinical trials during pandemics. *JAMA* 2020;323:1897-8.
36. Nussbaumer-Streit B, Mayr V, Dobrescu AI, Chapman A, Persad E, Klerings I, *et al.* Quarantine alone or in combination with other public health measures to control COVID-19: A rapid review. *Cochrane Database Syst Rev* 2020;4:CD013574.
37. Yuki K, Fujiogi M, Koutsogiannaki S. COVID-19 pathophysiology: A review. *Clin Immunol* 2020;215:108427.