Original Research

THE PREFERENCE OF LEARNING METHODS AND THE UTILITY AND USEFULNESS OF LEARNING METHODS AMONG MEDICAL STUDENTS IN SOUTH INDIA : A CROSS–SECTIONAL STUDY

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ABSTRACT

Introduction: Lectures are traditional sources of learning and are effective with face-to-face interactions but lack efficacy because of distractions and the lack of attentiveness of students to lecture. This study aimed to assess the preference for learning methods among medical students and the utility and usefulness of learning methods among medical students. **Methods:** A cross-sectional study was conducted among 566 medical students in a tertiary care teaching hospital all over Tamilnadu, South India using web-based platforms for 4 months (December 2021 to March 2022). Participants were selected by using a convenience sampling method. A pre-tested and semi-structured questionnaire was used to collect the data on sociodemographic details (gender, age, level of degree, time spent on learning) and preference of learning methods for their university examination and competitive exam. The data was analyzed by using an independent t-test, Chi-square test, and Binary logistic regression, and the data was represented as Mean, Standard Deviation (SD), Frequency, and Percentage.
Results: The mean (SD) age of the participants was 22.78 (2.62) years. Among the 566 responses, the offline mode 438 (73%) of education was preferred among medical students over the online mode of education 128 (23%). More than half of the participants preferred textbooks 406 (71.7%) followed by 327 (57.8%) written notes in offline mode and nearly half of them preferred the Google/internet search 346 (61.1%) followed by YouTube 315 (55.7%) in online mode. Age [AOR:0.88 95%CI (0.80-0.96)]is the only predictor of the preference for online learning and which is statistically significant (p-0.038)
Conclusion: Traditional offline learning methods are well accepted than online learning methods among medical students in Tamil Nādu. By emphasizing the importance of e-learning and incorporating it effectively into the curriculum, institutions can cater to the diverse learning needs of medical students in Tamil Nadu.

Keywords: Education, medical students, e-learning, Traditional learning method

Introduction:

Historically, class-based learning has been the standard and only source of learning. Lectures are the traditional sources of learning in medical education. These lectures include a PowerPoint Presentation being projected, a lecturer elaborating on the topic of discussion, and a group of audience (medical students) taking notes (Bhatti et al., 2011; Joshi, 2021).

Lectures are effective and compulsive at times. They also lag in their efficacy because of distractions causing a lack of attentiveness to the lecture, inability to cope with the rate at which the lecturer deliveries the narration or not being able to follow the language and these lectures may be interrupted by frequent probing of the students by asking the lecturer to repeat the concepts and attempting to take notes of every word that is being uttered. All these disadvantages have made the offline mode of learning less effective (Sendra-Portero et al., 2013)

The emergence of technology has been way more complementary to the mentioned setbacks faced in face-to-face traditional learning methods (Farahmand et al., 2016). Medical students of today are in the millennial world, who are living all their lives in the presence of technology (Han et al., 2014). As the breadth of medical education expands, an increasing number of difficulties are being faced in both delivering the knowledge by the educators and in perceiving and learning the concepts by the students. The online mode of learning or web-based learning has its advantages and disadvantages compared to classroom-based learning (Dhawan, 2020; Liew et al., 2015).

There is a lack of student participation and less interaction between students and teachers in the online method. It is recommended to teachers that the teaching and learning process should be based on two ways of communication. There may be class activities in online classes that can be discussed and short quizzes. It will decrease the loneliness of students in the online learning process and will increase student participation and also help with interaction with teachers (Maqsood et al., 2022).

Online modes of learning come up with certain flexibilities like when and where the student prefers to learn (Muflih et al., 2021). It even has an adjusted pace of listening to the lectures and the amount/number of times the lecture needs to be reviewed. This also allows the isolation of both the educator and the student, from the prevailing pandemic (Porter et al., 2014).

Online mode of learning acts as a complement to the traditional method of learning and even as an alternative in recent times. Online methods of learning have emerged well but students face certain problems like slow network connections, electronic resources, and eye strain compromising health (Gupta et al., 2021; Thepwongsa et al., 2021).

During the COVID-19 pandemic, online learning indeed played a crucial role in ensuring that students could continue their education despite the closure of schools and the need for social distancing. It provided an alternative to traditional classroom learning and allowed students to access their lessons remotely. This approach helped in avoiding overcrowding in classrooms, reducing the risk of virus transmission, and ensuring the completion of the syllabus.(Radha et al., 2020)

Many students had a generally positive attitude toward e-learning during this period. They recognized the benefits of online learning in terms of flexibility, convenience, and the ability to learn at their own

pace. It allowed them to stay connected with their lessons, interact with teachers and peers through virtual platforms, and submit assignments digitally. Additionally, e-learning services gained significant attention and were widely utilized for academic purposes during the pandemic.(Mishra et al., 2020)

Therefore, this study aims at assessing the preference for the learning methods among medical students and also to assess the utility and usefulness of online methods of learning among medical students, which may help in the improvisation of the aids being used and in rectifying the setbacks dealt with in the traditional form of learning.

Methods

An online based cross-sectional study was conducted by using web-based platforms among medical students in Tamil Nadu. The study was conducted over four months (December 2021-March 2022). The data was collected among the medical students who can be contacted via social media platforms and email facilities. Ethics committee approval was obtained from the e Institutional Ethics Committee (IEC) of Dhanalakshmi Srinivasan Medical College and Hospital, Perambalur, Tamil Nadu, India (Approval number: IECHS/ IRCHS/ N0: 202 B) and informed consent was taken before the start of the study.

The sample size was calculated using the study done by Shenoy et al (Shenoy et al., 2020) was done in Kottayam showed that 72.8% were liking towards e-learning methods and after applying the formula, $n=Z\alpha^2PQ/d^2$ ($Z\alpha=1.96$, $P=72.8$, $Q=27.2$, $d=5$), the sample size came up to 304. The study data was collected from 566 subjects. The participants were recruited by using the convenience sampling method.

The objective was assessed using a questionnaire made up via the G-suite application and disseminated via social media platforms. The questionnaire contains Two sections- sociodemographic details and learning methods. The sociodemographic details included Gender, Age, Level of degree, and type of college studying (government/private). The learning method section included the details of preference of offline or online methods of learning and the time spent for learning and its usefulness in post-MBBS competitive exams and university exams and subject-wise online preference learning. The answer to every item is based on the Likert scale. The data collection was made anonymous without collecting any link to the respondent like name, email, or work organization and participants provided informed consent to participate.

The data collected were entered into Microsoft Excel and analyzed using SPSS version 26 software. The data was analyzed by using an independent t-test, Chi-square test, and Binary logistic regression and also the data was represented as Mean (SD), Frequency, and Percentage. P-value < 0.05 which is statistically significant.

Results:

A total of 566 responses were obtained during the study duration. Many participants 299 (52.8%) were females and the remaining 267 (47.2%) were males belonging to the age group of 17 to 37 years. The mean (SD) age was 22.78 (2.62) years.

The participants were from both the government and private medical colleges of Tamil Nadu comprising 160 (28.3%) from government medical colleges and 406 (71.7%) from private colleges. The subjects included were from various levels of medical education such as first-year 91 (16.1%), second-year 62 (11%), third-year 87 (15.4%), and final year 78 (13.8%), interns 163 (28.8%) and postgraduates 85 (15%). Sociodemographic details were explained in Table 1.

Table 1: Sociodemographic characteristics of study participants (n=566)

Characteristics		N (%)
Gender	Male	267(47.20%)
	Female	299(52.80%)
Year of education	First-year	91(13.80%)
	Second year	62(11.00%)
	Third year	87(15.40%)
	Final year	78(13.80%)
	Internship	163(28.80%)
	Post-graduation	85(15.00%)
Type of college studying	Government	160(28.30%)
	Private	406(71.70%)
Time spent on learning (in hours)	≤ 3	271 (47.90%)
	>3	295 (52.10%)

The subjects were asked about the duration of time they spent learning in a day, based on the responses received, the mean duration of time spent is 3.8 hours. The responses for the preference for the mode of learning are shown in Figure 1.

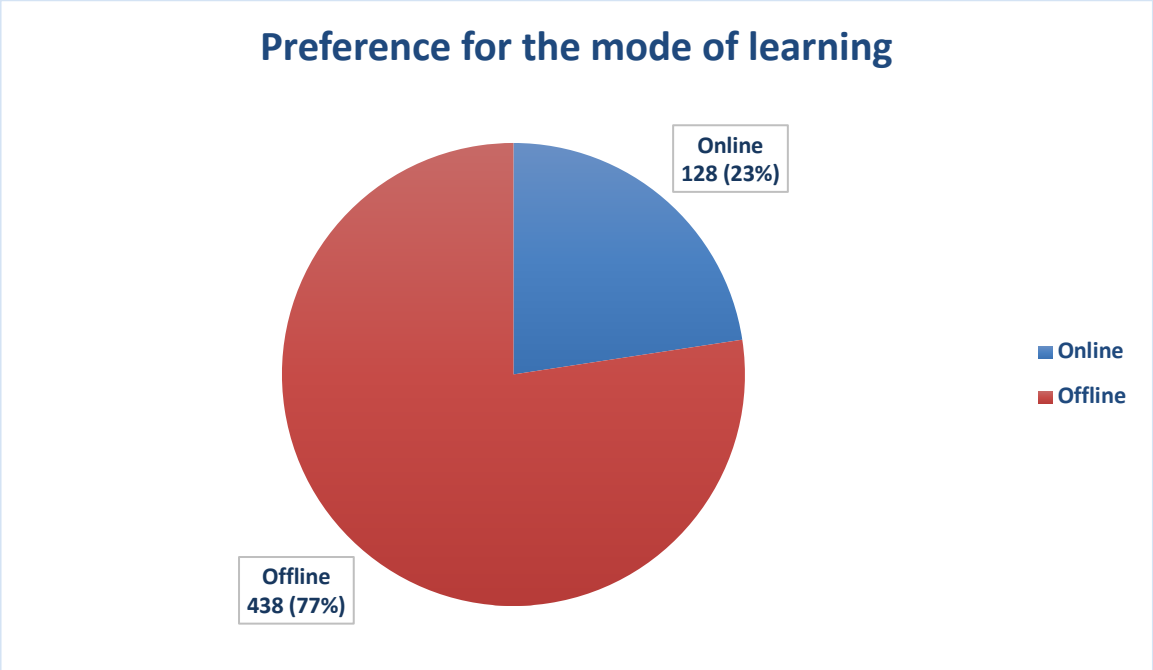

Figure 1: Preference for the mode of learning among study participants (n= 566)

The participants were asked about their preference for offline methods of learning and the aids used which includes textbooks, written notes, attending lectures in person, learning from seniors and peer groups, attending outside institution lectures in person, and printed question banks. Among these 406 (71.7%) preferred textbooks followed by 327 (57.8%) written notes and 317 (56%) attending lectures in person. Other descriptions of the offline methods of learning are shown in Figure 2.

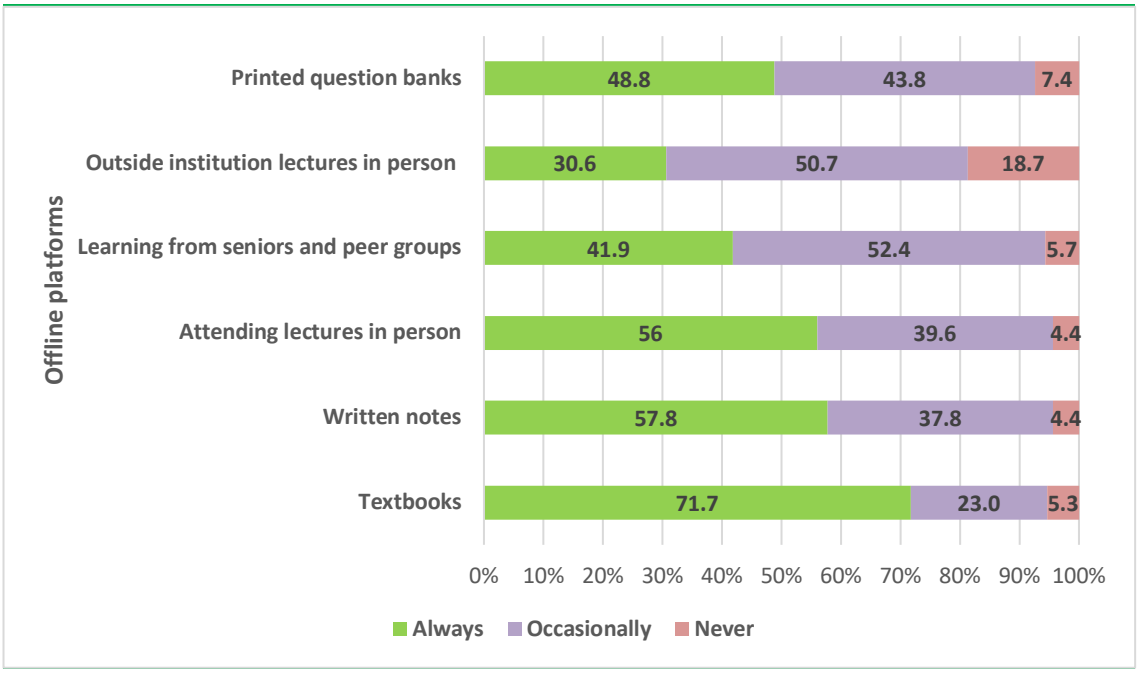

Figure 2: Preference for offline methods of learning among study participants, (n=566)

The participants were also asked about their preferences for online platforms in learning which included YouTube, medical apps, google or the Internet, social media, audio materials, etc. Among these 346 (61.1%) participants prefer Google and the internet followed by 315 (55.7%) YouTube the description of the preferences of other online sources is shown in Figure 3. The participants also seem to use other online sources for learning such as Marrow, white army, Byjus, Unacademy, etc.

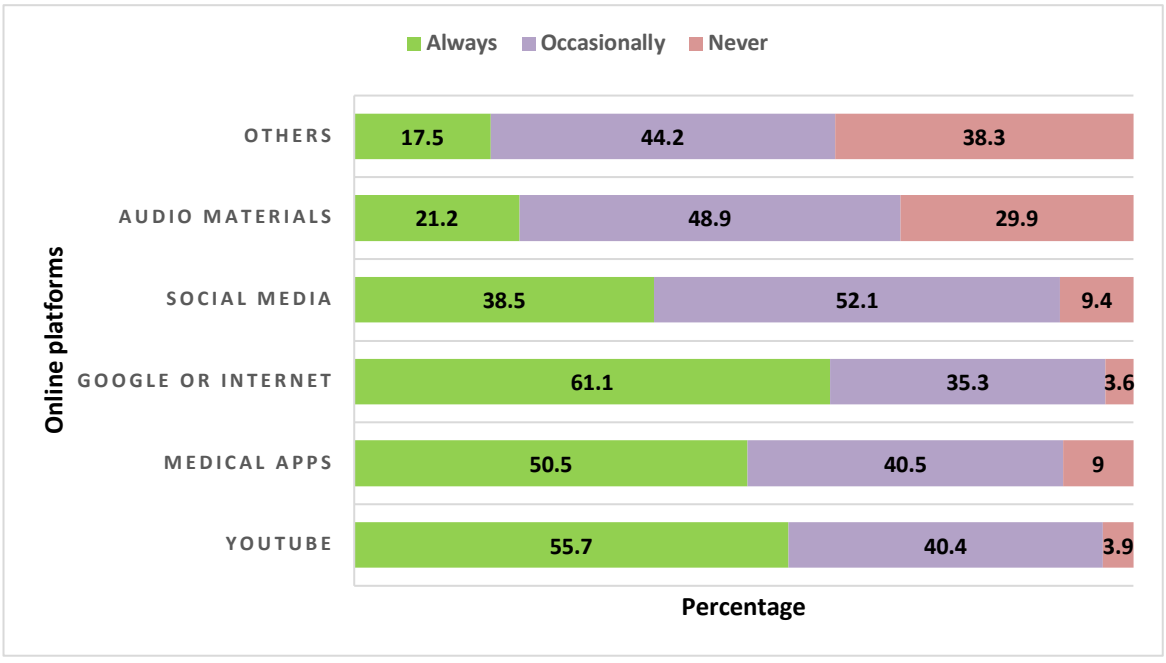

Figure 3: Preference of online platforms for learning among study participants, (n=566)

Figure 4 shows the aids that are found helpful in post-MBBS competitive exams preparations. Among these 346 (61.1%) preferred textbooks followed by which 339 (59.9%) used medical apps (Marrow/pre ladder etc..) and 337 (59.5%) used written notes were more useful in post-MBBS competitive exams preparation. More than half of the participants occasionally use social media (WhatsApp /Telegram /Instagram /Facebook) and audiovisuals (podcasts) for their competitive exams.

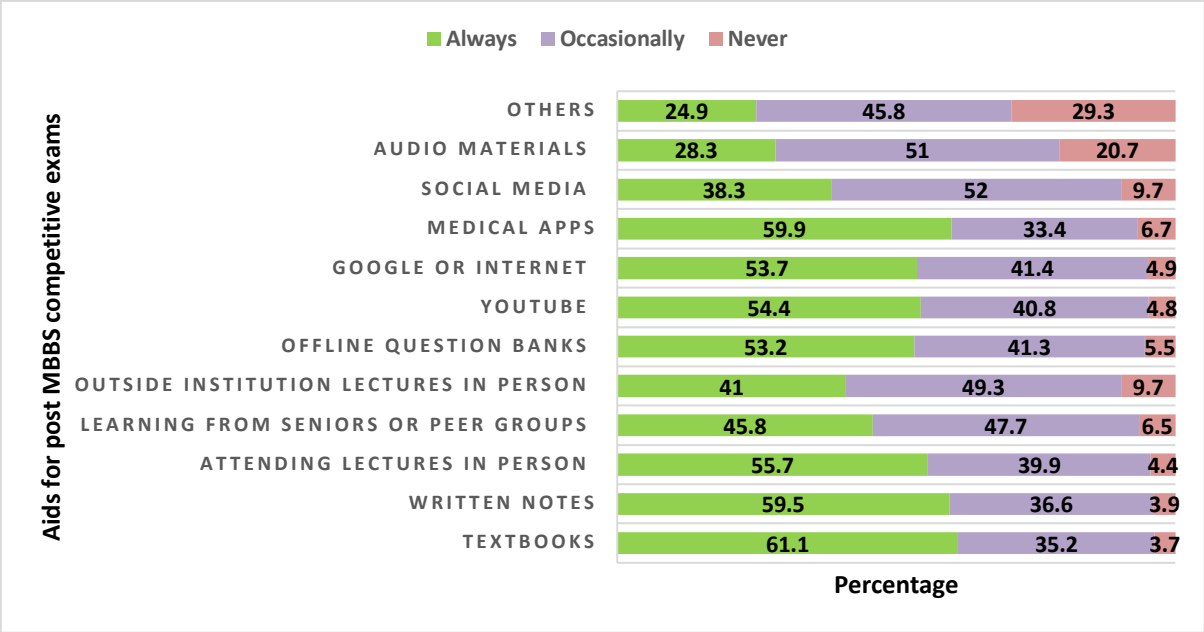

Figure 4: Aids that are found helpful in post-MBBS competitive exams (n=566)

Figure 5 shows the aids that are found helpful in preparing for the University exams. Of which 395 (69.8%) participants find textbooks more useful and 354 (62.5%) of them find written notes useful. Table 2 represents the subject-wise usage of online aids in their learning in which one-third of students found online aids were more useful for first-year subjects.

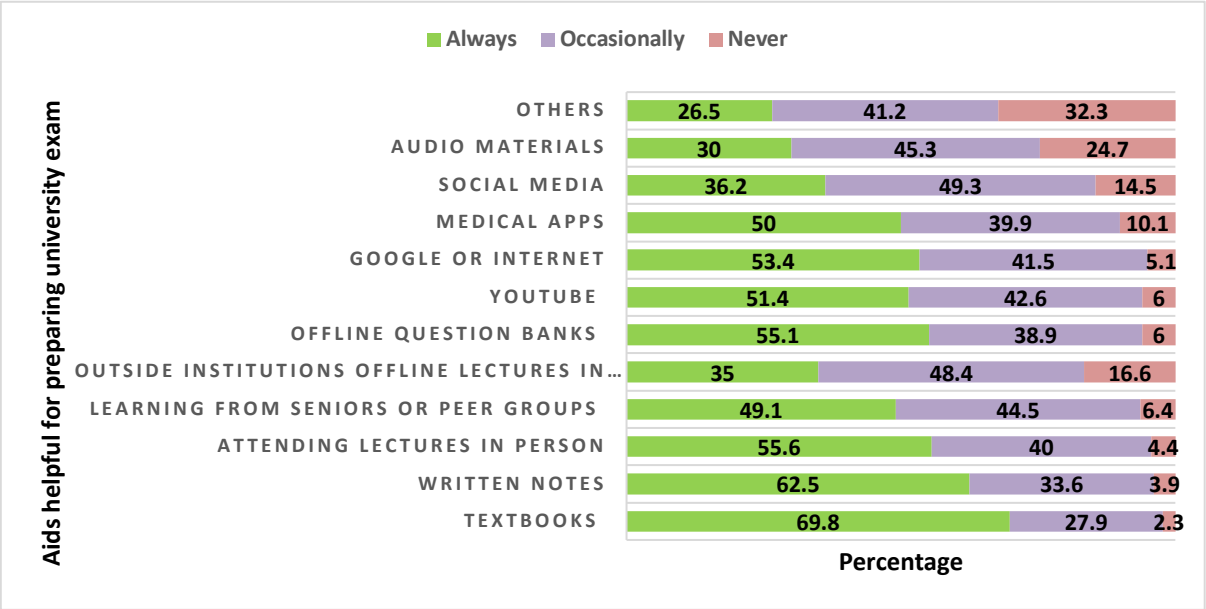

Figure 5: Aids that are found helpful in preparing for university exams (n=566)

Table 2: Subject-wise usage of online aids to assist in their learning. (n=566)

Subjects	Always	Occasionally	Never	Not applicable
Anatomy	38.0	45.0	10.6	6.4
Physiology	35.4	49.8	9.0	5.8
Biochemistry	35.3	48.4	11.0	5.3
Pharmacology	31.4	43.6	10.0	15.0
Pathology	33.9	40.5	10.4	15.2
Microbiology	30.6	44.0	9.9	15.5
Forensic medicine	28.4	39.9	9.8	21.9
Community medicine	30.4	40.1	8.1	21.4
ENT	32.0	37.1	8.3	22.6
Ophthalmology	32.9	37.5	7.4	22.2
Medicine	33.6	36.6	6.7	23.1
Surgery	34.1	35.5	6.9	23.5
Pediatrics	32.2	35.9	7.2	24.7
Radiology	30.9	36.6	7.4	25.1
OBG	32.5	34.8	7.4	25.3
Orthopedics	33.2	34.0	7.2	25.6
Psychiatry	31.6	35.9	7.2	25.3
Dermatology	31.4	35.7	7.2	25.7
Anaesthesiology	31.4	34.8	8.1	25.7

Table 3 shows the binary logistic regression between sociodemographic details and learning methods in which the mean age of participants who were using online learning methods is 23 years, which is more than their counterparts and is statistically significant (p-0.038). Age [AOR:0.88 95%CI (0.80-0.96)] is the only predictor of preference for online learning among the population studied. The reported odds

ratio (OR) of 0.88 suggests that for each one-unit increase in age, the odds of preferring online learning decrease by approximately 12%.

Table 3: Binary logistic regression between basic characteristics of study participants and the preference for online learning method (n=566)

Characteristics of participants		Learning methods		OR (95% CI)	p-value	AOR	p-value
		Online	Offline				
Age	Mean (SD)	23.20 (2.78)	22.66 (2.57)	-	**0.038***	0.88 (0.80-0.96)	**0.006**
Gender	Male	65 (24.3%)	202 (75.7%)	1.21 (0.81 – 1.78)	0.353[c]	0.88 (0.59 – 1.32)	0.529
	Female	63 (21.1%)	236 (78.9%)				
Year of education	Undergraduate (first to final year)	73 (23.0%)	245 (77.0%)	1.05 (0.70 – 1.56)	0.826[c]	0.61 (0.36 – 1.03)	0.065
	Interns & postgraduate	55 (22.2%)	193 (77.8%)				
Type of college studying	Government	37 (23.1%)	123 (76.9%)	1.04 (0.67 – 1.61)	0.855[c]	0.88 (0.66 – 1.62)	0.879
	Private	91 (22.4%)	315 (77.6%)				
Time spent on learning	≤ 3	62 (22.9%)	209 (77.1%)	1.03 (0.69 – 1.53)	0.886[c]	0.93 (0.62 – 1.39)	0.722
	>3	66 (22.4%)	229 (77.6%)				

OR: Odds Ratio; 95% CI: 95% Confidence Interval;
AOR: Adjusted Odds Ratio;
p-value <0.05 statistically significant – Independent t-test*, Chi-square test [c]

Discussion

This study was conducted to assess the preferences of learning methods among medical students. In this study, 77% of the participants preferred offline modes of learning such as using textbooks, handwritten notes, attending lectures, studying with seniors or peer groups, attending lectures conducted outside the institution face-to-face, using printed question banks, etc., whereas the

remaining 23% of them preferred mainly the online sources such as YouTube, google and internet, medical apps, audio materials like podcasts, social media, etc.

In contrast, a study done among first-year MBBS students in Kottayam during Dec 2014-2015, by Shenoy et al, showed 72.8% liking toward e-learning and 95.2% wishing that it could be added to the curriculum (Shenoy et al., 2020). A study done by Subramanian et al in the USA states that the web-based learning group demonstrated a significant improvement in retention compared to the group that received the traditional didactic Lecture (Subramanian et al., 2012). Such differences in these findings are due to the regional variation and varying levels of education in the study participants.

In a study done in the colorectal surgery department of Royal Derby Hospital USA by Bhatti et al., the participants taught via e-learning packages performed well when compared to the participants trained via the traditional methods. The study also quotes that e-learning is at the least as effective as offline learning but it can only be used as an assistance or substitution to the traditional methods given the broadening clinical knowledge and advancements (Bhatti et al., 2011).

In a study done to evaluate the use of virtual lectures for undergraduate radiology teaching by Francisco Sendra -Portero et al., in the Department of Radiology, Universidad de Malaga, Spain (Sendra-Portero et al., 2013). This study quotes virtual lectures that can substitute conventional lectures in radiology education for medical students in Spanish medical colleges. These studies were done in a specific department. So, this shows that the surgery and radiology departments were technically equipped with advanced technology which can make their time to operate and diagnose a shorter time also these studies were done before the pandemic and the student's active way of learning through the online mode.

During the COVID-19 pandemic, the only way of learning is through online mode. This approach helped in avoiding overcrowding in classrooms, reducing the risk of virus transmission, and ensuring the completion of the syllabus (Radha et al., 2020). Whereas in a developing country like India where technology is developing day by day and more e-learning platforms are coming up and getting introduced to people, there is a bright chance that e-learning could be a very accessible learning method in the future (Joshi, 2021).

In the present study, the most preferred online mode was Google. Similarly, a study done in India during Covid-19 showed a preference for online learning methods from Google, Google Classroom, etc. (51.46%), followed by Online Video conferencing/Video Call tools (29.56%) such as google meet, Skype, Zoom, etc (Gupta et al., 2021).

In the present study, the preferred offline learning was textbooks. Likewise, a study done in Japan had similar findings (Prasad & Usagawa, 2014). The results of this study imply that for post-MBBS competitive exams preparation, the participants equally prefer going with textbooks and medical apps. Whereas for the University exams preparation, they ideally prefer using Textbooks and Written notes the most. The outcomes are varied about the cause and need for learning stated, the students showed preferences mostly towards the offline modes of learning.

Limitation

The major limitation of the study is that it is a purely online survey and the sample mainly consisted of students who use social networking sites. This might neglect the participation of other groups of students who are not active social media users or have limited internet access and electronic resources.

Conclusion

In summary, this study demonstrates that traditional offline learning methods are well accepted than online learning methods among medical students. Although conventional methods are preferred, In this era of smartphones and the internet, e-learning can be used as an additional tool where the faculty strength is a limitation. This study result shows the reliability of textbooks and offline study materials among medical students and their importance even in this technological world.

Recommendation

With the rapid progress in medical knowledge and research, institutions must guide students on the credibility and relevance of textbooks. Medical schools should stay updated on the latest literature and advancements, allowing them to advise students on the most reliable and up-to-date resources. This ensures that students have access to accurate information and can rely on trustworthy sources throughout their studies.

Technology has revolutionized education, and e-learning platforms play a vital role in providing accessible and flexible learning opportunities. Medical schools should prioritize making these platforms readily available to students. E-learning platforms can provide a wide range of resources, such as online lectures, interactive modules, virtual simulations, and collaborative learning tools. These platforms enable students to study at their own pace, access materials anytime and anywhere, and engage with interactive content to enhance their understanding of medical concepts.

Providing technical assistance to students is essential for ensuring smooth access and usage of e-learning platforms. Institutions should offer support services, including troubleshooting assistance, user guidance, and technical training. This helps students overcome any technological challenges they may encounter and ensures that they can fully utilize the available online resources.

Establishing comprehensive online libraries specifically tailored to medical education can be highly beneficial. These digital libraries can provide a vast collection of textbooks, research papers, journals, and other relevant resources. Online libraries eliminate the limitations of physical space and allow students to access a wealth of information remotely. Moreover, they can offer advanced search functionalities, annotations, and collaboration features, enabling students to conduct research efficiently and engage in collaborative learning initiatives.

By implementing these measures, institutions can empower medical students with a wealth of resources, enhance their learning experience, and foster continuous professional development.

Embracing technology and leveraging online platforms can support the advancement of medical schools, contribute to the dissemination of knowledge, and ultimately improve healthcare outcomes.

Acknowledgment

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Conflicts of Interest

The author declares no conflicts of interest.

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