

To Assess the level of awareness and perception of digital healthcare tools among medical students of Shyam Shah Medical College, Rewa

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Abstract: Introduction: The appropriate use of digital health takes the following dimensions into consideration: health promotion and disease prevention, patient safety, ethics, interoperability, intellectual property, data security (confidentiality, integrity, and availability), privacy, cost-effectiveness, patient engagement, and affordability. It should be people-centered, trust-based, evidence-based, effective, efficient, sustainable, inclusive, equitable and contextualized. **Aim/Objectives:** Assessing the level of awareness and perception of digital healthcare tools among undergraduate medical students at Shyam Shah Medical College, Rewa. **Material & Methods:** A cross-sectional study is done by pre-tested questionnaire among n= 246 undergraduate students of all years and internship. Pre-tested tool collected demographic details, awareness of digital health tools, perceptions of utility, and barriers to use. **Results:** 246 students are participated, majority (91.9%) were aged 18–25 years; 63% were male and 37% female. Most were in the pre-final year (63%), followed by first year (19.1%), internship (8.1%), second year (6.9%), and final year (2.8%). Digital health in the curriculum was supported by 81.3% (27.2% strongly agree, 54.1% agree); 16.7% were neutral and 2% opposed. The mean Likert score was 4.06/5 (998/1230), showing strong acceptance. Willingness to use digital tools in future practice was 84.1%, with only 15.8% unwilling. These findings confirm high readiness and positive attitudes toward digital health, stressing the need for structured training in medical education. **Conclusion:** Majority of students showed positive attitude and strong support for integrating digital health into the curriculum, with high willingness to adopt such tools in future practice. These findings shows that there is need to introduce structured digital health training in medical education to prepare future doctors for technology-driven healthcare.

Keywords: Digital health, awareness, perception, telemedicine.

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INTRODUCTION

Digital health is the application of information and communication technologies in the delivery of health care services, prevention of diseases, health promotion and management of patients. It includes various technologies such as telemedicine, electronic health records (EHRs), mobile health (mHealth) platforms, wearable devices, artificial intelligence (AI), and remote patient monitoring (RPM) systems. These innovations are reshaping the healthcare delivery system to make healthcare more accessible, efficient, of higher quality, and better for patients [1].

Digital health technologies have changed the healthcare landscape around the globe significantly over the last few years. During the COVID-19 pandemic,

telemedicine and digital healthcare platforms became even more vital to provide continuity of care while reducing physical contact, and have increased access to care in underserved and remote areas [2].

With the rise of digitization in healthcare records and the introduction of telemedicine services like Ayushman Bharat Digital Mission (ABDM) and e-Sanjeevani, digital competencies among healthcare professionals have become a priority in India [4]. This means that future doctors must have the necessary knowledge and skills to successfully use digital health tools in their practice.

Medical students are the next generation of health care workers and will be required to operate in ever more

technologically advanced health care settings. Hence, it is crucial to know their awareness and perceptions about digital healthcare tools. The successful integration of these technologies into routine healthcare practice can be enabled through positive attitudes and appropriate training, with the lack of knowledge or exposure to the technologies limiting adoption [5].

Understanding the current extent of awareness and perception among medical students is important to identify educational gaps and to inform curriculum development to prepare the future health care professionals for digital health care delivery [6-8].

Hence, the present study was conducted among MBBS students of Shyam Shah Medical College, Rewa to find out their knowledge and perception about digital tools in healthcare practice and their intentions to use it in the future.

MATERIALS AND METHODS

This was a cross-sectional study done on the MBBS students and Interns of Shyam Shah Medical College using questionnaires. The study population is MBBS students of first year, second year, pre-final year, final year and internship present during the study period and gave informed consent to participate in the study. Convenient sampling was used for 246 students. The study was carried out over for six months from April 2025 to September 2025.

The data was collected by a structured pre-tested questionnaire and was extensively review of the relevant literature. The questionnaire consisted of four sections: socio-demographic characteristics (age, gender, and academic year); awareness regarding digital healthcare tools such as telemedicine, electronic health records (EHRs), mobile health applications, wearable devices, and artificial intelligence (AI); perceptions regarding the usefulness, effectiveness, and future role of digital health technologies in healthcare delivery; and perceived barriers to adoption along with willingness to use digital healthcare tools in future clinical practice. Perception is assessed by using five point likert scale ranging from strongly disagree (1) to strongly agree (5).

Questionnaires were administered to eligible students after obtaining institutional permission and informed consent. This was completely voluntary, and anonymity and confidentiality were ensured throughout the study. The collected data were entered into Microsoft excel and analyzed with the help of appropriate statistical software. The data were summarized using descriptive statistics such as frequencies, percentages, means and standard deviations. The awareness and perception scores were analysed while appropriate statistical test were used to compare the scores among the years and across the gender. *p* value of < 0.05 was deemed as significant.

Ethical approval for the study was got from the Institutional Ethics committee of Shyam Shah Medical College before the initiation of the study. All participants had provided written informed consent and all information collected was kept confidential throughout this study.

RESULTS

In all, 246 MBBS students and interns took part in the study. The majority of participants belonged to the 18–25 years age group (91.9%, *n*=226), while 6.1% (*n*=15) were older than 25 years and 2.0% (*n*=5) were younger than 18 years. The total number of students consisted of male 63.0% (*n*=155) and female 37.0% (*n*=91).

Regarding academic year, most participants were from the pre-final year (63.0%, *n*=155), followed by first year (19.1%, *n*=47), internship (8.1%, *n*=20), second year (6.9%, *n*=17), and final year (2.8%, *n*=7).

There were differences in awareness for digital healthcare tools across technologies among them. The most common digital health tool identified was Artificial Intelligence (AI) in healthcare (69.5%), followed by wearable health devices (62.2%), mobile health applications (57.3%), electronic health records (31.7%), and telemedicine (36.6%). Further, 71.1% of participants indicated that they had knowledge of government initiatives for digital health like Ayushman Bharat Digital Mission (ABDM). The mean self-rated awareness score was 3.04 ± 1.08 on a five-point scale, which means that participants were moderately aware of digital healthcare technologies.

The majority of students had a positive attitude towards the incorporation of digital education to medical education. Overall, 81.3% (*n*=200) felt that digital health should be included in the curriculum, with 27.2% (*n*=67) who agreed strongly and 54.1% (*n*=133) who agreed. Few students disagreed or strongly disagreed, with 16.7% (*n*=41) being neutral.

There was a very high perception of the inclusion of digital health in the curriculum, with a mean Likert score of 4.06 out of the 5 possible (and a cumulative score of 998 out of 1230, which is the highest possible). Students were very accepting of the inclusion of digital health in the curriculum.

In terms of future use of digital health tools in the clinic, 84.1% (*n*=207) of respondents indicated they would be willing to use such tools while 15.9% (*n*=39) were unsure or unwilling.

The results showed that medical students are highly prepared and they had positive attitudes towards digital health technologies, which underscores the need to embrace structured learning about digital health in undergraduate medical education.



Table 1. Sociodemographic Characteristics of Participants (n=246)

Variable	Frequency (n)	Percentage (%)
Age <18 years	5	2.0
Age 18–25 years	226	91.9
Age >25 years	15	6.1
Male	155	63.0
Female	91	37.0
First Year	47	19.1
Second Year	17	6.9
Pre-final Year	155	63.0
Final Year	7	2.8
Internship	20	8.1

Table 2. Awareness Regarding Various Digital Healthcare Tools Among Participants (n=246)

Digital Healthcare Tool	Aware n (%)	Not Aware n (%)
Artificial Intelligence (AI) in healthcare	171 (69.5)	75 (30.5)
Wearable Health Devices	153 (62.2)	93 (37.8)
Mobile Health Applications (mHealth)	141 (57.3)	105 (42.7)
Telemedicine	90 (36.6)	156 (63.4)
Electronic Health Records (EHRs)	78 (31.7)	168 (68.3)

Interpretation: AI in healthcare was the most common digital health technology by which participants (69.5%) are aware, whereas awareness regarding Electronic

Health Records (31.7%) and telemedicine (36.6%) was comparatively lower.

Table 3. Perception Regarding Inclusion of Digital Health in Curriculum (n=246)

Response	Frequency (n)	Percentage (%)
Strongly Agree	67	27.2
Agree	133	54.1
Neutral	41	16.7
Disagree/Strongly Disagree	5	2.0
Total Support (Agree + Strongly Agree)	200	81.3

Table 4. Willingness to Use Digital Healthcare Tools in Future Practice (n=246)

Response	Frequency (n)	Percentage (%)
Willing	207	84.1
Not Willing/Unsure	39	15.9

Table 5. Association between Gender and Willingness to Use Digital Healthcare Tools in Future Practice (n=246)

Gender	Willing n (%)	Not Willing n (%)	Total	χ^2	p-value
Male (n=155)	134 (86.5)	21 (13.5)	155	1.82	0.177
Female (n=91)	73 (80.2)	18 (19.8)	91		
Total	207 (84.1)	39 (15.9)	246		

No statistically significant association was observed between gender and willingness to use digital healthcare tools in future practice ($p>0.05$).

Table 6. Association between Academic Year and Willingness to Use Digital Healthcare Tools in Future Practice (n=246)

Academic Year	Willing n (%)	Not Willing n (%)	Total
First Year	37 (78.7)	10 (21.3)	47
Second Year	13 (76.5)	4 (23.5)	17
Pre-final Year	135 (87.1)	20 (12.9)	155
Final Year	6 (85.7)	1 (14.3)	7
Internship	16 (80.0)	4 (20.0)	20
Total	207 (84.1)	39 (15.9)	246

$\chi^2 = 3.67$, $df = 4$, $p = 0.452$

Willingness to use digital healthcare tools did not differ significantly across academic years ($p>0.05$).



Table 7. Association between Gender and Support for Inclusion of Digital Health in Medical Curriculum (n=246)

Gender	Support* n (%)	Neutral/Disagree n (%)	Total	χ^2	p-value
Male	129 (83.2)	26 (16.8)	155	0.94	0.332
Female	71 (78.0)	20 (22.0)	91		
Total	200 (81.3)	46 (18.7)	246		

*Support = Agree + Strongly Agree

Support for inclusion of digital health in the medical curriculum was high among both genders, with no statistically significant difference observed ($p>0.05$).

DISCUSSION

The present study has shown that there was an average awareness of the medical students towards Digital Healthcare technologies. The most familiar digital health tools were artificial intelligence in healthcare (69.5%), wearable health devices (62.2%) and mobile health applications (57.3%). Comparatively lower awareness was found for: telemedicine (36.6%) and electronic health records (31.7%). Moreover, over two-thirds of the respondents (71.1%) knew about any Government digital health initiatives, including Ayushman Bharat Digital Mission. The mean self-rated awareness score of 3.04 out of 5 indicates that participants have a moderate level of awareness of digital health technologies.

The results are similar to the findings of Machleid *et al.*, which revealed medical students' awareness of the value of digital technologies, but they expressed varying degrees of knowledge about specific digital health applications [5]. In a similar way, Edirippulige *et al.* found that while students recognized the significance of eHealth, formal digital health education was lacking in numerous medical schools. Similarly, the lack of awareness about telemedicine and eHealth in the current study could be attributed to a lack of structured teaching on these topics in many medical schools, as noted by Edirippulige *et al.* [8].

This degree of support could be explained by the growing significance of telemedicine, EHRs, mobile health apps, and AI in healthcare. In addition, digital health has gained a lot of attention from all quarters with the ongoing digital transformation of the healthcare sector in India, including the Ayushman Bharat Digital Mission, and the need to build the capacity of healthcare professionals [1].

In the current study, it was also found that 84.1% of the participants were interested in implementing digital health tools in their future clinical practice. This is in line with other studies that have reported positive attitudes of medical students towards technology-based healthcare. Other studies also have found that medical students have generally positive attitudes towards health technologies and saw informatics as relevant for clinical practice [7]. Walpole *et al.* reported that future physicians have become more aware of the importance of health informatics and digital tools in healthcare [6].

The adoption of digital technologies for healthcare among students could partially be attributed to the growth of telemedicine and digital health services over the past few years, with a particular focus on the COVID-19 pandemic. A study by Keesara *et al.* and Hollander and Carr reported that the pandemic spurred digital transformation in healthcare and raised the awareness of healthcare workers and students to the telemedicine care models, which could have also influenced the positive attitudes found in this study [2,3].

For willingness to use digital healthcare tools and support digital health in curriculum there was no statistically significant association between gender ($p=0.177$ and $p=0.332$, respectively). Likewise, there was no significant difference in the likelihood of using digital healthcare technologies by academic year ($p=0.452$). The results indicate that positive attitudes towards digital health are prevalent among medical students across different gender and training levels. Similar findings are reported in other studies, in which use of digital technologies was seen as high among medical students and was not confined to any specific group of students [5,7].

The results of this study have implications for medical education. While students were accepting and prepared to use digital healthcare technologies, a positive attitude does not necessarily lead to effective use, unless they are properly trained. Structure and embedding of digital health courses in medical undergraduate programs could improve digital literacy and equip medical students with the skills needed for a technologically driven healthcare system, as noted in previous studies [5,8].

There are some limitations of the study. The study was carried out in a single medical college through convenient sampling and this may make the results not widely applicable. Further, the assessment was self-reported, and may have included social desirability and response bias.

The results suggest that the overall perception of medical students on digital Health tools is positive and they also have an understanding of the value of digital Health in healthcare delivery. Improving the digital health education in undergraduate medical education could help build a digitally competent healthcare



workforce to meet the changing needs of the healthcare systems of today and tomorrow.

CONCLUSION

The present study demonstrated a positive perception and readiness toward digital healthcare tools among medical students of Shyam Shah Medical College, Rewa. More than four-fifths of participants supported the inclusion of digital health education in the medical curriculum and expressed willingness to utilize digital technologies in their future clinical practice. These findings indicate that medical students recognize the growing importance of digital health in modern healthcare delivery. Incorporating structured training on telemedicine, electronic health records, artificial intelligence, mobile health applications, and related technologies into undergraduate medical education may enhance digital competency and better prepare future physicians for technology-enabled healthcare systems.

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