



Internet Based Health Information Seeking Behaviour and its Effect on Mental Health among Medical Students of Jodhpur city, India: a questionnaire-based cross-sectional survey.

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ABSTRACT

INTRODUCTION

The trend of seeking health information through the Internet has been continuously increasing worldwide among college youth, especially during the ongoing Covid19 pandemic.

OBJECTIVE

The objective of this study was to assess the Internet-based Health Information Seeking Behaviour, its perception and effects on mental health.

METHODS

It was an observational quantitative cross-sectional survey of 120 undergraduate medical students from medical colleges of Jodhpur who have ever used the Internet for their health-related problems. Information was obtained on Likert's-five point scale, through a questionnaire using Google form. Data were presented as frequencies and the association of perception was evaluated with various factors by Chi-square.

RESULTS

Internet-based self-diagnosis and self-medication were reported by 42 (35%) and 24 (20%) students respectively. Two-thirds of participants searched online for symptoms. A hundred students (83.33%) used Google/Yahoo/YouTube search engines. The reliability of the online searched data was checked by 70 (58.33%) participants. Health-related online searching led to more confusion among 58 (48.33%), over thinking in 73 (60.33%), stress in 50 (41.67%), restlessness/anxiety in 49 (40.83%), depressed feeling in 47 (39.17%), and sleeplessness in 35 (29.17%) participants. However, reassurance and decreased confusion were reported by 40 (33.33%) and 26 (21.67%) participants respectively. Internet search was perceived as a good option for a solution to health-related problems by 42 (35%) participants. The perception was significantly associated with the change in mindset as feeling reassured or confused ($P < 0.05$).

CONCLUSION

The Internet has become an important source for Health Information Seeking and affects mental health negatively as well as positively.

KEYWORDS: Internet, Health Information Seeking Behaviour, Medical students, Mental health.

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INTRODUCTION

Internet use has dramatically increased over the past two decades. Since the year 2020, Covid 19 pandemic sent everyone home and forced us to rely on digital technology more than we ever had before. In July 2022, 69.0% of the 7.9 billion whole world population had access to and used the Internet frequently.^[1] The total number of Internet subscribers in India also reached 825.30 million at the end of Mar-21 with an Internet penetration rate of 59%.^[2] The Internet provides users privacy, convenience, anonymity, immediacy, and a variety of inaccessible information from different sources simultaneously at a low cost.^[3] Individuals seek health information on the Internet for health education, health promotion activities, and health-related problems.^[4,5] Health information seeking behaviour (HISB) refers to how individuals seek information about their health, risks, illnesses, and health-protective behaviours.^[6] Studies from India and abroad suggested that college students, females, highly educated individuals, and younger individuals search for online health information more often than others.^[5, 7-9]

Nowadays, enormous and easy access to health information may lead to many different reactions in individuals, such as emotional, motivational and behavioural changes or various actions which are crucial for their health-related decisions.^[10,11] The data relating to the Internet based health information seeking behaviour and its effects on college students from the Indian subcontinent are still ambiguous and insufficient. Therefore, the study aimed to investigate the seeking of health information on the Internet and its effect on the mental health and mindset of the undergraduate medical students of Jodhpur city of Western Rajasthan, India.

MATERIALS AND METHODS

It was an observational quantitative cross-sectional survey done during October and November 2020. Undergraduate medical students (of any semester) from medical colleges of Jodhpur city who have ever used the Internet for their health-related problems were included.

Those students, who didn't use the Internet for their health-related problems, didn't give informed consent and who were already suffering from any psychiatric disorder was excluded from the study. Taking reference to 38% of the expected proportion of individuals who changed decisions after searching online for health-related problems with a 95% confidence interval and 10% relative error, the estimated sample size was 91, which was increased to 120 subjects.^[12] The study was conducted within the bounds of the Helsinki Declaration. Ethical approval for conducting the study was obtained from IEC of the institution (Ethical Approval Number: NMC/IEC/2020/1040-1042). A random selection of participants from the two government medical colleges located in Jodhpur district was done using simple random sampling. The aim of the study was explained to the eligible participants by sharing the participant information sheet and then the link of the questionnaire was shared through whatsapp/email. The questionnaire was designed as the Google doc form as the digital means was the only option for communication due to the Covid19 pandemic lockdown. The consent was obtained through digital means only via the Google Doc form questionnaire. The semi-structured questionnaire was adopted from the previous studies, modified and validated by two renowned experts, and pretested.^[12,13] The subjects who submitted the filled forms were finally considered for the study and the data were entered in the Microsoft excel spreadsheet. The link of the questionnaire was shared to randomly select 140 medical students. The consent was denied by 12 students. The first submitted 120 filled Google form questionnaires were included in the study for further analysis.

The questionnaire contained questions regarding the demographic profile, preference of various sources for health information seeking, preference of Internet sources, and pattern of Internet use for seeking health information before and after visiting physician. The responses to the questions related to health information seeking behaviour were obtained on Likert's-five point scale ranging from Never, Hardly, Occasionally, Often, and Always. Data regarding the most common searched symptom was acquired through an open end question. The

perception of the participant regarding the Internet search as a good option for finding a solution to health-related problems was asked as a dichotomous question with two options of 'Yes' or 'No'. Further, a question was asked regarding opting for the opinion of the doctor or the Internet after surfing on Internet and visiting doctor. The responses to this question were also obtained on Likert's-five point scale ranging from Never, Hardly, Occasionally, Often, and Always. The next analyzed questions were related to the consequences of the online health information seeking on the mental health of the students and their change in mindset. The responses to these consequences were obtained

on Likert's-five point scale (Strongly disagree, Disagree, Undecided, Agree, and strongly agree). The information collected through the questionnaire was filled in appropriate databases. The data were summarized as frequency and percentage. All statistical analyses were done using the Open Epi software version 3.01.^[14] The association of perception of online health information seeking behaviour with basic demographic data, consequences of online health information searching on mental health, and mindset were evaluated by Chi-square (χ^2) test. *P*-value ≤ 0.05 was taken as statistically significant.

RESULTS

Basic demographic details are given in Table 1.

Table 1 Basic Demographic data

Category	Sub category	Medical students	n (%)
Age(in years)	17-20 years	42	(35)
	20-22 years	64	(53.33)
	22-24 years	11	(9.17)
	24-26 years	3	(2.5)
Gender	Male	49	(40.83)
	Female	71	(59.17)
Background	Rural	28	(23.34)
	Urban	65	(54.17)
	Semi-urban	27	(22.5)

Health information seeking

Detailed health information seeking behavior was obtained. [Table 2] After searching the Internet, self-diagnosis was done by 42 (35%) students and self-medication by 24 (20%) students. For health-related problems, 98

students (81.67%) preferred to visit doctor, 71 students (59.17%) also self-diagnosed on their own/through family/peer group, and 57 (47.5%) students also self-medicated themselves on

their own/through family/peer group, whereas 56 students (46.67%) visited chemists directly.

Table 2 Health information seeking behavior

Item:	Never/ Hardly n(%)	Occasionally n(%)	Often/Always n(%)
Q: For your health related problems you:			
Visit doctor:	22 (18.33)	59 (49.17)	39 (32.5)
Visit chemist :	64 (53.33)	37 (30.83)	19 (15.83)
Self diagnose on your own/through family/peer group:	49 (40.83)	44 (36.67)	27 (22.5)
Self diagnose after surfing Internet:	78 (65)	22 (18.33)	20 (16.67)
Self medicate on your own/through family/peer group:	63 (52.5)	31 (25.83)	26 (21.67)
Self medicate after surfing Internet:	96 (80)	15 (12.5)	9 (7.5)
Q: Which Internet resource do you prefer for searching solutions?			
Internet search engines (eg. Google, Yahoo, Youtube):	20 (16.67)	27 (22.5)	73 (60.83)
Online discussion forums (e.g., medical-related online forum, bulletin board system (BBS):	76 (63.33)	25 (20.83)	19 (15.83)
Medical websites/hospital websites:	66 (55)	34 (28.33)	20 (16.67)
Doctor's websites:	79 (65.83)	27 (22.5)	14 (11.67)
Q: How often do you check for the reliability of the surfed site/data available online?			
Q: Before visiting doctor you surf online for :			
Your symptom and its causes	41 (34.17)	29 (24.17)	50 (41.67)
Previously diagnosed disease (by health professional)/treatment/medical procedure concerning it.	54 (45)	25 (20.83)	41 (34.17)
Self diagnosed (from Internet) disease/treatment/medical procedure regarding it.	67 (55.83)	26 (21.67)	27 (22.5)

Q: After visiting doctor you surf online for :

Crosscheck the diagnosis whether it is correct or not.	76 (63.33)	22 (18.33)	22 (18.33)
Check whether the given treatment by doctor is safe/accurate or not .	72 (60)	24 (20)	24 (20)
Check for the other brands of same drugs or alternate of the prescribed drug.	73 (60.83)	22 (18.33)	25 (20.83)
Check medical reports details and terminologies.	30 (25)	35 (29.17)	55 (45.83)
Change your medication without discussing it with your doctor.	105 (87.5)	8 (6.67)	7 (5.83)

Q: Do you think Internet search is a good option for finding solutions to health related problems? Yes: 42 (35%) No: 78 (65%)

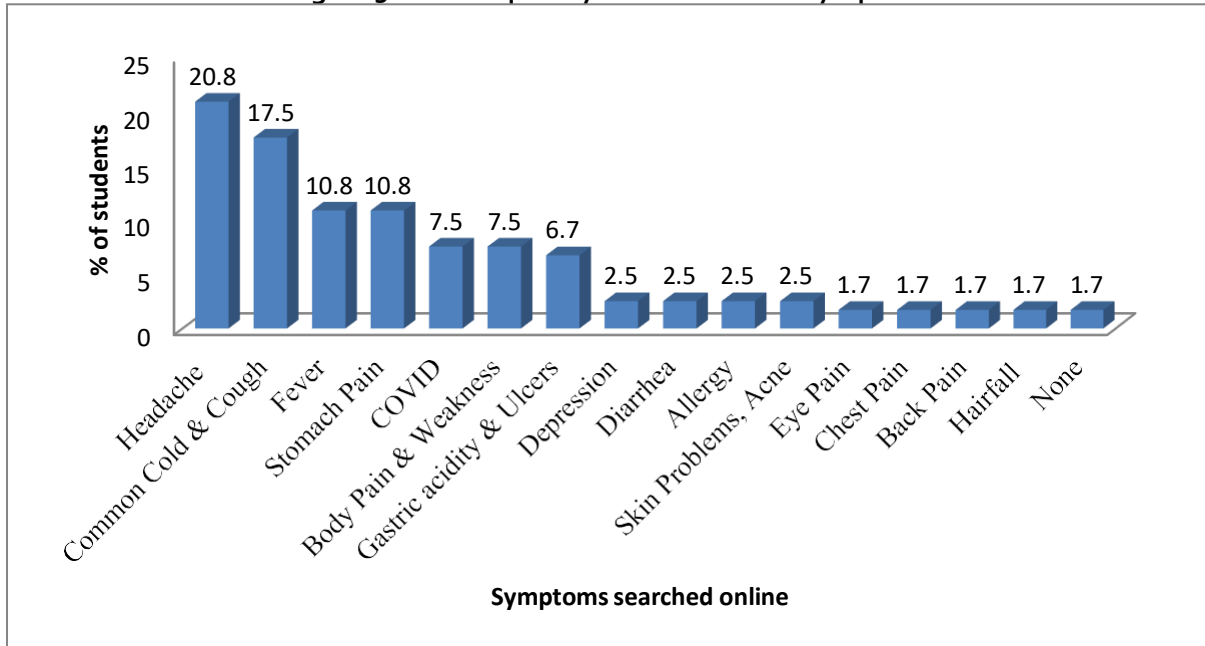
Internet source preference

The most popular Internet resource for solutions to health problems were Internet search engine like Google, Yahoo and Youtube as it was adopted by 100 students (83.33%), followed by medical websites opted by 54 (45%), online discussion forums and social media platforms opted equally by 44 (36.67%). Doctor's websites were preferred least only by 41 (34.17%) students. The reliability of the surfed site/data available online was checked by 70 (58.33%) participants.

Searching Internet before and after visiting doctor

The majority of the students, i.e., 79 (65.83%) searched online for their symptoms and their causes before visiting doctor. After visiting the doctor, 44 (36.67%) students surfed the Internet to crosscheck the diagnosis given by the doctor. The safety and accuracy of the given treatment were checked by 48 (40%) students. Alternatives or other brands of the prescribed drug were searched by 47 (39.17%) students. 90 (75%) students checked online the details and terminologies of the medical reports. Only 15 (12.5%) students changed their medications without discussing them with their doctor. Headache (20.8%) was reported as the most common online searched symptom followed by common cold and cough (17.5%). [Figure1].

Figure 3 Most frequently online searched symptom



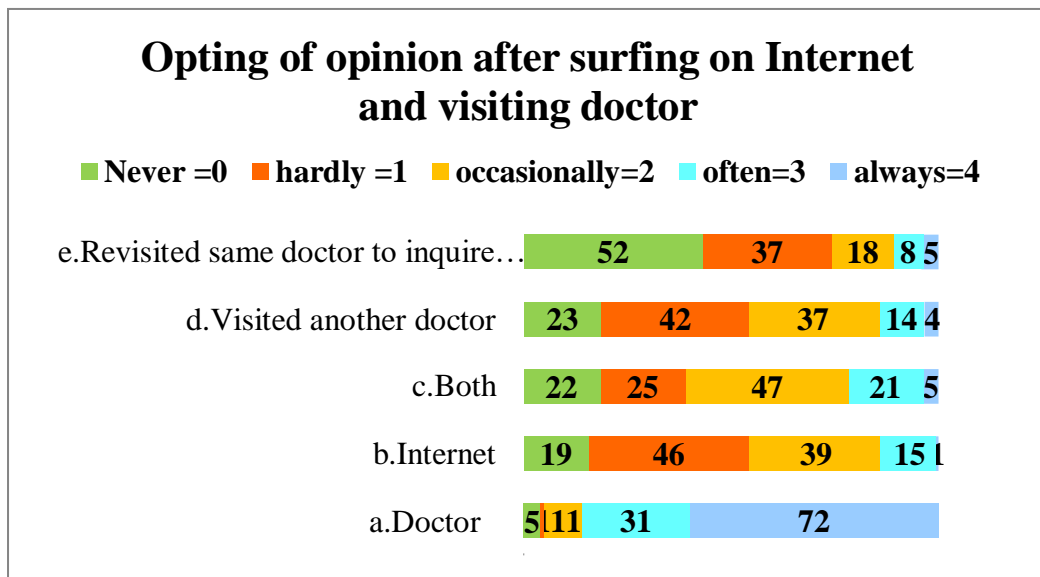
Perception of the Internet as a good source of health information

Internet search was perceived as a good option for a solution to health-related problems by 42 students (35%). This perception was not significantly associated with the basic demographic data (details not shown).

Opting for opinion after surfing on Internet and visiting doctor

After surfing the Internet and visiting doctor, 114 (95%) students reported the doctor’s opinion to be optimum whereas 55 (45.83%) students found the Internet’s opinion to be optimum. However, 73 (60.83%) students considered the opinion from both the resources. 55 (45.83%) students also visited another doctor and 31 (25.83%) students revisited same doctor to inquire about Internet search results. [Figure2]

Figure 2. Q: After surfing on Internet and visiting doctor, whose opinion did you find was optimum?

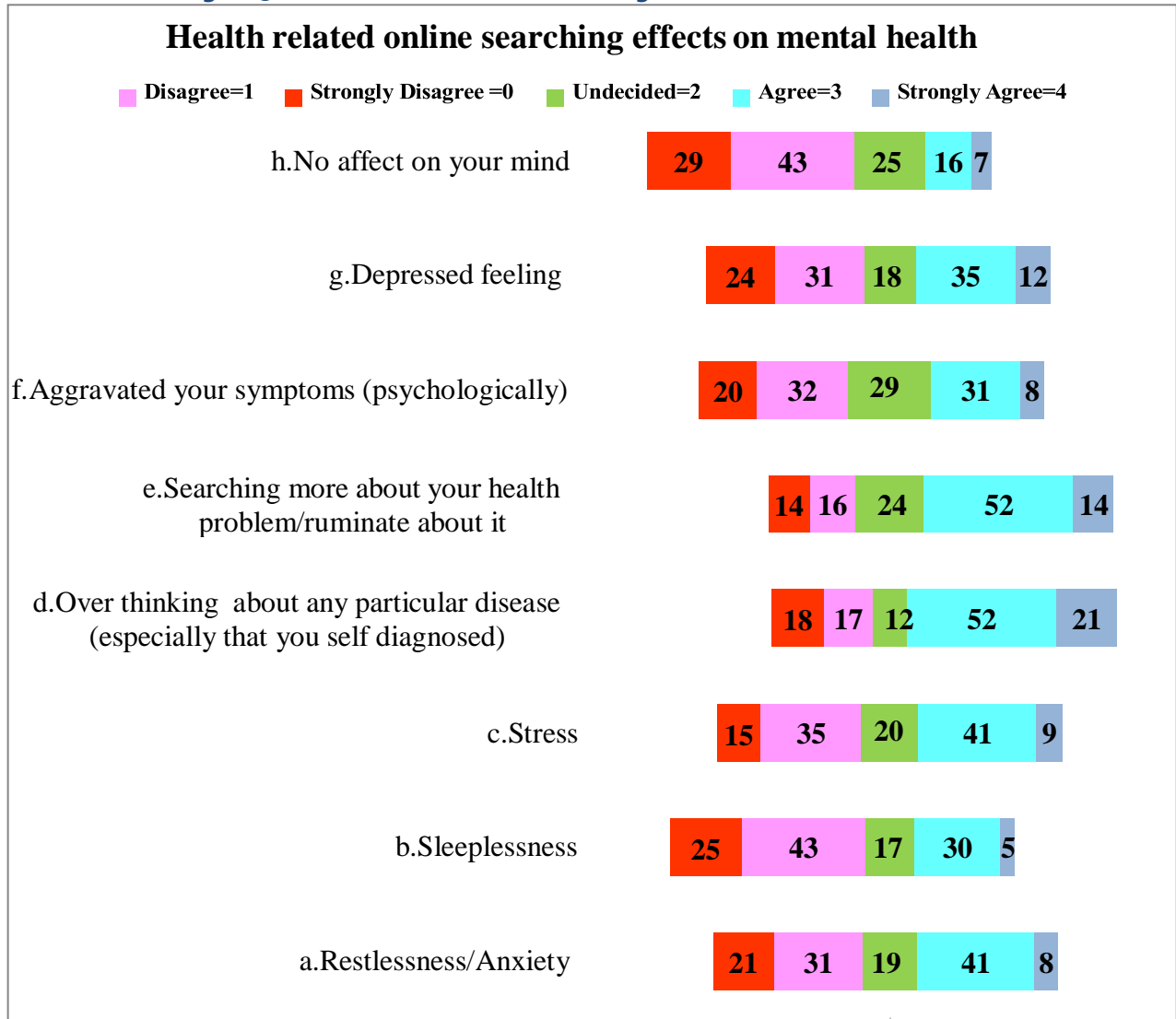


Effects of health information seeking on mental health:

Health-related online searching adversely affected students' mental health as illustrated in Figure 3, leading to over-thinking in 73 students (60.33%) and searching more about their health problems in 66 (55%) students. It led to stress in

50 (41.67%), restlessness/anxiety in 49 (40.83%), depressed feeling in 47 (39.17%) and sleeplessness in 35 (29.17%) students. Further, no significant association was found on Chi-square between the perception of the Internet for health information seeking and effects on mental health (data not shown).

Figure 3. Health related online searching effects on mental health



Change in the mindset of the students due to online health information seeking

Health-related online searching also changed the thinking/mindset of the participants about their health. After searching the Internet, majority of the students, i.e., 69 (57.5%) took health problems more seriously. Also it led to more confusion among 58 (48.33%) students. However, the information sought on the Internet led to reassurance among 40 (33.33%) students and decreased confusion among 26 (21.67%)

students. Twenty-eight participants also felt overwhelmed.

Statistically significant association was found between participants' perception of the Internet as a good option for finding solutions to health-related problems and feeling reassured ($P<0.05$); and also between participant's perception of the Internet as not a good option for finding solutions to health-related problems and feeling more confused ($P=0.01$). [Table 3]

Table 3 Change in thinking/mindset due to Internet based Health Information Seeking**Q: Did the information you found on the Internet change the way you think about your health?**

	IsInternet search a good option?:- YES, n (%)		IsInternet search a good option?:- NO, n (%)		χ^2 Value	P-Value
	Strongly Disagree	Strongly Agree	Strongly Disagree	Strongly Agree		
a. You felt reassured	11 (9.17)	20 (16.67)	29 (24.17)	20 (16.67)	4.266	0.03
b. You felt overwhelmed	15 (12.5)	13 (10.83)	37 (30.83)	15 (12.50)	2.473	0.1158
c. You took problems more seriously	10 (8.33)	26 (21.67)	24 (20)	43 (35.83)	0.6851	0.4078
d. You took problems less seriously	35 (29.17)	03 (2.50)	51 (42.50)	07 (5.83)	-----	-----
e. You felt more confused	22 (18.33)	16 (13.33)	21 (17.5)	42 (35)	5.849	0.0156
f. You felt less confused	23 (19.17)	12 (10)	48 (40)	14 (11.67)	1.562	0.2117

DISCUSSION

In this digital age where any type of information is available with just one click, the current study evaluated the health information seeking behavior in a group of undergraduate medical students who have ever used the Internet for searching information for their health-related problems.

The study population, i.e., the students using the Internet for seeking health information comprised more female students (59.17%). This

finding was in concordance with multiple previous studies from India and abroad that reported females were more likely to use the Internet for health information.^[8,9,13]

In our study, 98 students (81.67%) also preferred to visit a doctor for their health-related problems. Fifty-nine percent students self-diagnosed on their own/through family/peer group. Our findings were comparable to a previous study done in the U.S., where 70% of

adults consulted health care professionals and 60% of adults got health information from friends and family. ^[5]

In our study, for their health-related problems 42 (35%) students self-diagnosed themselves based on the Internet search which was similar among U.S. adults (35%), American college students (31%), and less when compared to 63% of students of a medical university in Iran. ^[5,7,15] We also reported self-medication among 24 (20%) students through the Internet.

The most popular source of Internet reported in our study was the search engine Google/Yahoo used by 100 (83.33%) students followed by medical or hospital websites by 45% of participants. Similar findings were reported in previous studies. The use of Google was reported by 77% of participants and 13% of participants used specific sites specializing in health information like WebMD in American National Survey by Pew Research Centre. ^[5] In an Iranian study on students of a health sciences university, 71% of participants used Google, and 35% of participants used specialized or official websites. ^[15]

Before visiting doctor, 79 (66%) participants searched online for their symptoms in our study which was in concordance with the Iranian college students study (70%) but much greater than the urban population survey study from Delhi (40%) and Ghanaian university students study which reported 40% participants consulted health professionals after obtaining online information. ^[15-17] Our study reported the most common online searched symptoms headache (21%) followed by common cold and cough (18%). As the study period coincided with the Covid19 pandemic the findings reflected the most prevalent symptoms of Coronavirus disease. Our findings were also supported by a recent study reporting headache, followed by common cold and sore throat as the most common ailments encountered by university students in Malaysia. ^[18] Previously diagnosed disease/treatment given was searched online by 55% of participants in our study which was comparable with another study in which more than 60% of Iranian college students searched for similar information. ^[15] Whereas, in Chandigarh based study among the young

population, 35% of Internet users searched for information on prevention and treatment options of different medical conditions and 17% of respondents searched information related to medicines. ^[8] However, in our study, 44% of participants searched for the self-diagnosed (from Internet) disease/treatment/medical procedure.

We reported 70 (58.33%) participants to check the reliability of the surfed site/data available online. Similarly, 53% of online health information seekers from the U.S. national survey and 67.1% of participants from the study on the urban Delhi population verified the retrieved health information from a healthcare provider which was quite comparable. ^[5,16] Medication was changed by 12.5% of participants in our study whereas by 23% of participants in Ghanaian university students study after seeking online health information. ^[17] In our study, 26% of students revisited same doctor to inquire about Internet search results. Our findings suggested that the medical college students explored the symptoms and their causes, previously diagnosed diseases before visiting doctor and checked the reliability of searched data. They also stressed checking medical report details and terminologies after visiting doctor. But, they reported a much lower prevalence of self-diagnosis and self-medication as compared to other university students. This observation may be justified by their knowledge of the disadvantages of such behavior.

Information related to health and disease obtained from the Internet significantly influenced patients' emotions, intentions, and self-reported behaviors. Online searching for health information can affect positively as well as negatively. Previously in U.S. based survey, health-related Internet use was found to be associated with a small but reliable increase in depression. ^[10] Health information obtained from the Internet can also cause feelings of anxiety or fear. As more recently also in a national survey study on Polish adults, one-third of respondents felt anxious or experienced fear whereas one-fourth of participants felt relieved by health-related Internet use. ^[11] Similarly, our study revealed complaints of restlessness/anxiety and depressive feelings in around 40% of participants

whereas one-third of participants reported reassurance due to online health information searching.

Changes in intentions and self-reported pro-health behaviors were found among health Internet users in a previous study.^[11] Trust in online health information was reported to be associated with behaviors relating to online seeking of information.^[9] In our study also perception of the Internet as a good option for a solution to health-related problems was positively associated with the feeling of reassurance and negatively associated with the feeling of more confusion.

Lastly, it's necessary to emphasize the increasing role of digital technologies, including the Internet, smart phones, mobile applications and others in digitalizing healthcare having the potential to improve the overall health of the community.^[19] Further, there is a grave need to conduct special training of medical students to teach them to efficiently use the Internet to access accurate health information from reliable sources and use it for their well-being as well as for the betterment of society.

LIMITATIONS

As the study was performed on a limited number of medical students of Jodhpur city, its generalization to other students of different colleges/cities can be challenging. It was a cross-

sectional study, so the effects of the Internet based health information seeking on behavior need to be further evaluated. Further subjects with different health conditions might have different requirements and thus vary in their health information seeking behavior.

CONCLUSION

The overall conclusion revealed that the Internet use for seeking health information has become more popular for enriching the knowledge for health-related issues rather than as a source only for self-diagnosis and self-medication among medical students with certain limitations of creating more confusion as well as leading to negative behavioral feelings like over-thinking about the health-related problems, stress, restlessness, and anxiety. The Covid19 pandemic could be one of the reasons for the increased exploration of the Internet for seeking health information. Internet search was also perceived as a good option for a solution to health-related problems by more than one-third of participants and further led to reassurance among one-fifth of the participants. A statistical significant association was found between good perception of the Internet search and feeling reassured ($P=0.03$), and not good perception and feeling more confused ($P=0.01$). Further, we need to have more detailed prospective studies to fill the lacuna in the field of health information seeking on Internet and its effects on mental wellbeing.

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