

Medical Students Viewpoints towards Development of Telemedicine Methods at Army University of Medical Sciences

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Abstract

Aim: The study aimed to investigate the viewpoints of medical students towards the development of telemedicine methods at the Army of the Islamic Republic of Iran (AJA) University of Medical Sciences.

Method: This cross-sectional, descriptive-analytical study, which lasted 4 months, was performed on 117 medical students of AJA University of Medical Sciences in 2021. In doing so, a Stratified sampling method and researcher-made questionnaire were used to collect data. Thus, the inclusion criterion was being a medicine student and the exclusion criterion was the incomplete completion of the questionnaire.

Results: Students showed the most positive view (90.6%) regarding organizational factors to having a codified program in telemedicine development, and the most positive view towards high-speed Internet access (92.3%) concerning technology factors. In addition, as far as the stakeholders were concerned, they had the most positive view (70.1%) on community support for telemedicine development. As for information literacy, 88.9% emphasized computer and Internet skills. Also, 83.8% had the most positive view on raising awareness for telemedicine development regarding environmental factors.

Conclusion: To sum up, the students had the most positive attitudes towards comprehensive telemedicine development plan, high-speed Internet access, and community support for telemedicine development, computer skills, Internet, and awareness. Hence, it is recommended to enhance these factors to help the development and implementation of telemedicine in medical education.

Keywords: Telemedicine; Viewpoint; Medical Students; Army University

Information and communication technology are used worldwide to enhance professionalism, service delivery, and employee performance (1). Medical centers are all indebted to technology, especially telemedicine technology (2) such as information management systems, patients' vital signs, physician call systems, and many other cases (3).

Telemedicine refers to modern communications and information technology applications to provide clinical services, health care, and data transfer to care for patients from long distances (4). Telemedicine uses electronic communications and telecommunications technology to render and backup services such as remote clinical care, education, and training in health-related fields to professionals and patients, and development of public health and the implementation of health management (5).

It is needless to say, that prescription and medical care is possible using telemedicine through video and data such as photographs, videos, laboratory results, and radiology. Even remote surgery will be feasible in near future (6). Computer diagnosis and chronic patients' healthcare can also facilitate clinical decisions (7).

A lot of studies show that the planning for and implementation of telemedicine in different countries share similarities and discrepancies. Unfortunately, many developing countries cannot yet have the capacity to support telemedicine projects (8). For example, Alipour et al. (2021) reported in their study that despite a favorable executive culture, inadequate existing infrastructure and current level of expertise prevent the university from providing telemedicine services (9). In addition, Maleki et al. (2018) concluded that organizational structure, appropriate infrastructure, and the health care workers' attitudes towards telemedicine technology are one of the factors promoting this strategy in medical centers (10).

Also, Kong et al. (2020) studied medical students' attitudes toward telemedicine and reported that only 17.4% of students had experience in the field of telemedicine. The students believed that technical knowledge, TM, and technological infrastructure influenced their attitudes towards telemedicine technology (11). Medical students can be considered the main providers of telemedicine, and they may successfully use this technology in the clinic to optimize the quality of diagnosis and treatment. For this reason, their views in this field can be used as a basic approach for strategic planning, especially in the armed forces and the military.

Method

This descriptive-analytical, cross-sectional study was conducted to investigate the viewpoints of 117 medical students studying at the Army of the Islamic Republic of Iran (AJA) University of

Medical Sciences in terms of developing telemedicine methods. The underlying sampling method was stratified sampling. Also, the sample size was calculated using the formula. In which Z equals 1.96, P equals 73.3%, and d was considered equal to 0.08 (12).

Having been granted the necessary permits from the Research Council and the Ethics Committee of AJA University of Medical Sciences, the researcher referred to the University School of Medicine. After making arrangements with the faculty officials, the number of entries for each course was determined. In the first step, the objectives of the study were explained to the students, which were followed by a completed form of informed consent. Then a questionnaire was administered and collected on the same day. Students studying medicine were entered into the study and those who returned incomplete questionnaires were excluded. The Likert scales were regarded as very high, high, medium, low, very low. For data analysis purposes, high and very high were considered positive viewpoints, and low and very low were considered negative viewpoints. The collected data were analyzed using descriptive statistical methods such as frequency, mean percentage, and standard deviation through SPSS statistical software 26.

The data collection tool consisted of two questionnaires. The first questionnaire included demographic questions concerning age and school year, and the second one contained questions about five factors including organizational, technology, stakeholder, information literacy, and environmental factors. It should be noted that the validity of this questionnaire was confirmed in previous studies (12). To evaluate reliability, the questionnaire was administered among 30 individuals, and an acceptable Cronbach's alpha was obtained at 0.08 (80%).

Results

117 students (all of whom were males)

participated in this study. The mean age of students was 20.73. The youngest respondent was 17 years old and the oldest was 25 years old. 82 respondents were majoring in basic sciences (semesters 1, 3, and 4), 16 in physiopathology (semesters 5 and 7), and 19 in internships and extras. The respondents showed the most positive opinion (high and very high) (90.6%) regarding organizational factors having a codified program in telemedicine development, structural changes in organizations concerning

telemedicine admission (88 %), and exhibited the most positive view towards high-speed Internet access (92.3%) concerning technology factors, as well as the necessary hardware to access telemedicine (87.2%). In the field of stakeholders, students had the most positive opinion in terms of supporting the community for the development of telemedicine, which was 70.1%, and for material and non-material incentives for the development of telemedicine, it was (69.2%). (Table 1 and 2)

Table 1: Medical Students Viewpoints towards Development of Telemedicine Method

How valuable is the following for the development of telemedicine?		Positive Viewpoints (%)	No.	Negative Viewpoints (%)	No.
Organizational factors	Structural changes in organizations for telemedicine admissions	88.0	103	2.6	3
	A codified program in telemedicine development	90.6	106	0.9	1
	A vision for telemedicine	86.3	101	0.9	1
	University-level information for the development of telemedicine	77.8	91	6.9	8
Technological factors	High-speed Internet access	92.3	108	2.6	3
	Necessary hardware to access telemedicine	87.2	102	1.7	2
	A system that facilitates the work of physicians and patients	85.4	100	0.9	1
	Localization of systems with no or little dependence on foreign companies or a specific country	60.7	71	13.7	16
Stakeholders	Empowerment of the private sector in telemedicine	65.8	77	6	7
	Community support for the development of telemedicine	70.1	82	2.6	3
	Material and non-material incentives for the development of telemedicine	69.2	81	3.4	4
	Families' desire to develop telemedicine	64.1	75	4.3	5
Information literacy	Students' skills in using computers and the Internet	88.9	104	2.6	3
	Developing communications using e-mail	55.5	65	11.1	13
	Electronic interaction between physician and patient	84.6	99	0.9	1
	Medical staff's skills in using computers and the Internet	87.1	102	0.9	1
Environmental factors	Value of economic factors (cost-benefit analysis) for project implementation	76.9	90	4.3	5
	Environmental changes at universities for the deployment of telemedicine	83.7	98	0.9	1
	The transition from traditional systems to network environments	83.8	98	0.9	1
	Raising awareness for the development of telemedicine	82.1	96	1.7	2

As for information literacy, the most positive attitudes towards telemedicine were students' skills in using computers and the Internet (88.9%), and the medical staff's skills in using computers and the Internet (87.1%). Environmental factors included a development background for telemedicine (83.8%) and environmental changes in universities for the establishment of telemedicine (transition from traditional systems to network environments)

(83.7%). Additionally, the factors affecting the use of telemedicine in medicine are organizational (82.37%), technology-related (81.46%), environmental (81.25%), information literacy (78.71%), and stakeholders (72.43%). It was also found that students had the most usage of the Internet, computers, e-mail, medical question design on websites, personal physicians' websites, and finally the medical software and books about telemedicine, respectively.

Table2: Usage Rate of Telemedicine in Different Fields

Usage Rates in different fields	Very Low (%)	Low (%)	Average (%)	High (%)	Very High (%)
Computer	4.3	6.8	29.9	41.9	17.1
Internet	3.4	0.9	8.5	32.5	54.7
E-mail	9.4	29.1	41	16.2	4.3
Medical information websites	6.0	27.4	35.9	23.1	7.7
Doctors websites	17.1	29.9	40.2	0.4	3.4
Medical questions on the phone	23.9	35.9	24.8	10.3	5.1
Searching articles in telemedicine	23.9	22.2	29.9	15.4	8.5
Designing medical questions on websites	23.9	17.9	41	14.5	2.6
Internet chat about medical issues	16.2	19.7	36.8	22.2	3.4
Use of medical software and books	6.0	6.8	17.9	38.5	30.8
Participating in medical webinars (online seminars)	17.1	17.9	29.1	29.9	6.0
Asking medical questions by e-mail	33.3	34.2	19.7	12.8	0.0
Searching for new topics in telemedicine	20.5	30.8	32.5	10.3	6.0

Discussion

Today, telecommunication and information technology are widely used in medicine and related sciences. Hence, Physicians give consultations to their patients on a landline or mobile phone daily (13). Moreover, Specialists teach specialized tips to general practitioners or students through video conferencing systems or Internet sites. Additionally, Physicians store patients' records on personal computers and send them to other physicians when necessary (14).

This study was conducted to examine the viewpoints of medical students in terms of developing telemedicine methods and evaluated their views on the five underlying factors including organizational, technological,

stakeholders, information literacy, and environmental factors.

According to the results, medical students stressed upon a written program in telemedicine development concerning organizational factors. Similarly, Taheri et al. found that physicians would give importance to a codified program in telemedicine development (15). In another study, medical students placed the greatest importance on structural changes in organizations for telemedicine admission (16).

The management and implementation of telemedicine require infrastructures such as broadband expansion in all parts of the country (17). However, the high price and volume of medical data for transmission over the Internet and low connection speed in Iran have continued

to hamper the development of this technology and restricted it to certain areas (18). In this regard, a study assessed the capability of specialized university hospitals regarding telemedicine counseling, and it was found that a small number of these centers were prepared to implement the telemedicine counseling network (19). Also, Hosseini et al. studied the hospitals under the supervision of Tehran University of Medical Sciences which could establish and develop telemedicine for remote surgery. It was found that only 14 out of 32 hospitals under the study utilized remote surgery techniques (20).

Besides, it was revealed in another study that despite sufficient information about telemedicine, only 9.3% of professionals had experience in providing distance counseling, and 7.1% had experience rendering distance education. Also, Hayavi Haghghi et al. assessed the level of knowledge and the university's specialists' access to counseling and distance education at Hormozgan University of Medical Sciences and found that the current bandwidth of the university was merely suitable for the lowest levels of Telemedicine (21). One of the limitations of this study was the gender factor of the students under study. Because AJA University of Medical Sciences does not admit female students, the students were all males. For this reason, the results of this study did not reflect the views of different groups in terms of gender, and female students may have had different views.

Conclusion

In this study, the respondents showed the most positive opinion regarding organizational factors having a codified program in telemedicine development and structural changes in organizations concerning telemedicine admission and showed the most positive view towards high-speed Internet access concerning technology factors as well as necessary hardware to access telemedicine. In the field of stakeholders, students have the most positive opinion towards supporting the community for the development of

telemedicine regarding material and non-material incentives for the development of telemedicine. The most positive attitudes towards telemedicine were about the students and the medical staff's skills in using computers and the Internet. Environmental factors included a development background for telemedicine and environmental changes in universities for the establishment of telemedicine. The factors affecting the use of telemedicine are organizational, technology-related, environmental, information literacy, and stakeholders' factors. It was also found that students had the most usage of the Internet, computers, e-mail, medical question design on websites, personal physicians' websites, and finally the medical software and books about telemedicine, respectively.

The present study was conducted to examine the viewpoints of medical students in terms of developing telemedicine methods at AJA University of Medical Sciences. The findings showed that students had the most positive viewpoints regarding a written program in medical development for telecommunication, high-speed Internet access, community support for the development of telemedicine, computer skills, the Internet, and an acceptable background for telemedicine development. Consequently, it is recommended to improve these factors to develop and implement the entire telemedicine infrastructure in medical education. Given the fact that today's wars are based on technology and information technology and dominance, the importance and necessity of telemedicine in martial medicine should be taken into consideration.

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