Awareness, Attitude and Readiness of Clinical Staff Towards Telemedicine: A Study in Mashhad, Iran

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Abstract. A questionnaire was used to survey Iranian clinical staff about telemedicine. The score for awareness was 13 ± 5.5 out of 35 and indicated low awareness about telemedicine. Only 43.7% stated they had heard about tele-consultation. The figure for tele-monitoring was 20.1%. Awareness about other types of telemedicine services was even lower. The most frequently-used sources of information about telemedicine were friends (51.4%) and public media (30.3%). Attitudes were generally positive about telemedicine (63.42 ± 9.5 out of 95). It was found that a significant positive correlation exists between attitude and awareness ($p = 0.027$). In conclusion, Iranian clinical staff has little knowledge about telemedicine services; however, they have a positive perception of this type of service. Providing appropriate education and information resources to them is necessary.

Keywords. Telemedicine, Clinical staff, Awareness, Attitude, Readiness

1. Introduction

Increased demand for healthcare services in developing countries and lack of resources to meet this demand has focused efforts on the use of modern technology and telemedicine [1, 2]. Telemedicine is one method of improving service quality [3-5]. It is defined as the exchange of health information between a patient and health care providers using telecommunication devices for diagnosis, evaluation, treatment, and training [6]. The readiness and perspectives of healthcare workers play an important role in the success of such health information systems [7]. Progress in the use of

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telemedicine has been slow in both developed and developing countries such as Iran [1-3]. One reason is the lack of preparation of healthcare workers to accept and use telemedicine [2, 3, 8]. The present study examined the readiness of clinical workers and their attitudes about the benefits and disadvantages of using telemedicine.

2. Methods

This study was conducted in 2015 at three randomly-selected teaching hospitals in the city of Mashhad in Iran. The study population comprised physicians, nurses, and laboratory and radiology technicians. A total of 250 randomly-selected staff members were invited to participate and 213 (92.4%) ultimately participated. The 5-point Likert scale questionnaire used contained questions about awareness of telemedicine (9 questions), attitudes (19 questions), and self-reported readiness (3 questions). The initial questions were based on a literature review. The content validity was determined by five medical informatics and health information specialists who were asked to provide feedback on the format, clarity, and meaning of the questions and response options. The reliability was determined by asking 30 staff members (out of the sample) to complete the tools and then calculating the Cronbach's alpha (0.85). The data was analyzed using in SPSS using the Mann-Whitney, Kruskal-Wallis, and Spearman correlation tests.

3. Findings

Most participants (55%) were female; 44.6% were nurses and 31.6% were physicians. The most common educational level of participants (50%) was a bachelor degree. Most participants (50.5%) were less than 40 years of age.

Most participants (60%) preferred to write reports electronically, 90.9% stated that they had not had any training courses for telemedicine, and only 7.9% considered previous training useful. Fifteen staff members said they had already participated in telemedicine. Some (6.9%) had experience with telemedicine in Iran and a few (3.9%) outside Iran. Of those surveyed, 43.7% were aware of teleconsultation. This figure for other type of services was telemonitoring (20.1%), telesurgery (11.7%), teledermatology (3%), teleradiology (4.7%), and telepathology (3.5%).

Most frequent sources of information about telemedicine were friends and colleagues (51.4%), public media (30.3%) and the Internet (22.3%). Other sources included journal articles (10.9%), workshops (8.6%), continuing education (8%), formal education (6.9%), books (6.3%), and conferences (4%).

As Table 1 shows, awareness about telemedicine was low (less than 2.2 out of 5). Total awareness of employees was 13 ± 5.5 out of a score of 35 which signified low awareness. The knowledge was not related to gender, age, or work experience, but knowledge of physicians and nurses was higher than of other groups ($p < 0.05$). Knowledge of those who used articles, workshops, or training courses was significantly higher ($p < 0.05$). Table 2 shows the staff attitudes about telemedicine. The score for most questions was above 3.2 and reflected a positive attitude. Employee attitudes were weaker for revealing staff weaknesses, creating new responsibilities for employees, and legal challenges. Total score was 63.42 ± 9.5 out of 95 (65%) which indicates a total positive attitude. There was a significant correlation between knowledge and attitude (r

= 0.14, p = 0.027). Employees were asked to express their own, their ward's, and the organization's preparation for telemedicine. The mean scores of 3.01 ± 0.9, 2.83 ± 0.9, and 2.74 ± 1.0 reflect relatively good readiness of the staff.

Table 1. Clinical staff awareness about telemedicine

Awareness of	very little N (%)	a little N (%)	some N (%)	enough N (%)	very much N (%)	mean ± SD
Overview of telemedicine	68(29.4)	86(37.2)	68(29.4)	7(3)	0	2.06± 0.8
Effect of telemedicine on practice	68(29.4)	86(37.2)	61(26.4)	12(5.2)	2(0.9)	2.1 ± 0.9
Effect of telemedicine on income	80(34.6)	90(39)	38(16.5)	10(4.3)	2(0.9)	1.93±0.89
Effect of telemedicine on quality	69(29.9)	78(33.8)	62(26.8)	13(536)	4(1.7)	2.14±0.98
Effect of telemedicine on the number of staff members needed	77(33.3)	82(35.5)	55(23.8)	8(3.5)	3(1.3)	2.01±0.92
Effect of telemedicine on patient education	84(36.4)	74(32)	53(22.9)	13(5.6)	2(0.9)	2 ± 0.96
Telemedicine infrastructure	93(40.3)	88(38.1)	35(15.2)	7(3)	3(1.3)	1.85±0.96

Table 2. Clinical staff attitude about telemedicine

I believe that telemedicine may ….	completely disagree N (%)	disagree N (%)	agree somewhat N (%)	agree N (%)	completely agree N (%)	mean ± SD
Reduce medical errors	8(3.5)	32(13.9)	100(43.3)	71(30.7)	17(7.4)	3.25± 0.9
Facilitate job duties	5(2.2)	27(11.7)	103(44.6)	78(33.8)	13(5.6)	3.3 ± 0.8
Increase communication among providers	4(1.7)	16(6.9)	111(48.1)	79(34.2)	16(6.9)	3.38±0.8
Increase information for patients	1(0.4)	14(6.1)	96(41.6)	98(42.4)	18(7.8)	3.52±0.75
Increase the speed service	1(0.4)	19(8.2)	70(30.3)	100(43.3)	38(16.5)	3.68±0.86
Increase timely access to information	1(0.4)	11(4.8)	78(33.8)	98(42.4)	43(18.6)	3.74±0.83
Improve quality of healthcare information	2(0.8)	9(3.9)	85(36.8)	108(46.8)	27(11.7)	3.65±0.77
Improve clinical decisions	3(1.3)	15(6.5)	99(42.9)	90(39.0)	21(9.1)	3.49± 0.8
Improve clinical work flow	3(1.3)	16(6.9)	109(47.2)	88(38.1)	12(5.2)	3.4± 0.75
Provide more comprehensive healthcare services	3(1.3)	14(6.1)	103(44.6)	92(39.8)	15(6.5)	3.45±0.77
Improve tracking of patient health status	3(1.3)	22(9.5)	97(42)	75(32.5)	29(12.6)	3.46±0.88
Threaten staff positions	12(5.2)	106(45.9)	73(31.6)	31(13.4)	6(2.6)	3.38±0.88
Reveal weak points	11(4.8)	71(30.7)	87(37.7)	47(20.3)	8(3.5)	3.13±0.92
Increase staff work load	27(11.7)	113(48.9)	64(27.7)	23(10)	0	3.63±0.82
Create new responsibilities for staff	6(2.6)	37(16)	99(42.9)	73(31.6)	14(6.1)	2.77±0.88
Threaten information confidentiality	15(6.5)	87(37.7)	82(35.5)	38(16.5)	6(2.6)	3.29± 0.9
Threatening patient privacy	12(5.2)	94(40.7)	76(32.9)	39(16.9)	8(3.5)	3.28± 0.9
Increase costs	98(42.4)	0	81(35.1)	34(14.7)	14(6.1)	3.59± 1.3
Increase legal challenges	6(2.6)	61(26.4)	99(42.9)	41(17.7)	17(7.4)	2.99± 0.9

The more familiar participants were with a computer, the more positive was their attitude about the effect of telemedicine on employee job position, privacy, and legal challenges (p < 0.05). Those who used technology to consult with colleagues at work or at home had a more positive overall attitude toward telemedicine (p < 0.01). In addition, those with greater aptitude for information technology and those who considered their training for telemedicine to be most adequate assessed their or their organization's preparation more positively. Participants who had participated in telemedicine outside Iran had the most positive attitude toward telemedicine (p < 0.05).

4. Discussion

The results of the study indicate a relatively positive attitude but low awareness of healthcare workers about telemedicine. Rho et al. suggested that understanding of the usefulness of telemedicine directly affects the intention to use it [2]. One study showed that only 14.1% of physicians were aware of the benefits of telemedicine and only 6% believed that telemedicine can reduce the cost of care [9]. Other studies have shown that knowledge of providers about telemedicine is low [10-12]. The present study showed that the level of awareness of physicians and nurses was higher than of the other groups, but the total rate of awareness was low. In Iran, no specific courses are provided about this technology for clinical staff. Graduates of clinical fields have not been highly trained in this regard. The results show that the most positive attitudes were about timely access to information and improved quality of information. Better access to patient records can improve the quality of documentation and timeliness of information [13]. Physicians feel that telemedicine is useful if it improves patient care, documentation, and speed and when it provides patient monitoring at a low cost and high accuracy [13, 14].

The most negative attitudes were toward uncovering weaknesses, increasing staff responsibilities, and legal challenges. Researchers concluded that the lack of strong and stable evidence for the clinical benefits of Tele-ICU and the possibility of jeopardizing physician independence and privacy were the main reasons for employee resistance [10]. Judi showed that protection of confidentiality was the most important factor in creating a secure network for telemedicine [15]. Another study found that participants were concerned about the ethical and legal issues of telemedicine [9], which is consistent with the results of the present study. In Iran, the legal and managerial frameworks of telemedicine have not been defined. This should be addressed during the development of telemedicine to decrease staff concerns.

Most people considered the effect of telemedicine on an increase in income to be low or very low. Previous research has shown that a lack of an appropriate incentive system for telemedicine is a barrier [16]. In Iran, there are no specific guidelines on reimbursement for telemedicine services. It appears that the development of such guidelines and improvement in the IT skills of the clinical staff could increase readiness to accept this technology. In addition, previous studies in Iran indicated that infrastructure such as bandwidth, the Internet and videoconferencing facilities should be improved for telemedicine [17,18]. Additionally, patients' attitude and satisfaction is important, however, there is not enough information in this regard in Iran. The present study was conducted in a large city; however, it cannot be generalized to the country.

5. Conclusion

Clinical personnel in Iran lack a thorough understanding of telemedicine. It may have increased their resistance to acceptance of this technology, but it can be improved by adequate training, management and support, step-by-step implementation, and a demonstration of the potential benefits of this valuable technology.

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