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ORIGINAL ARTICLE

# Evaluation of telemedicine and health tourism awareness of healthcare professionals

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## ABSTRACT

**Background:** Electronic infrastructures are important for improving the quality of health services. For this reason, our study wanted to evaluate the attitudes of healthcare professionals toward the use of electronic infrastructure and their awareness of telemedicine and health tourism.

**Methods:** This cross-sectional study, conducted among 108 healthcare professionals in a local hospital, analyzed the data obtained from the survey using the student t-test and the GraphPad Prism 9 statistical program.

**Results:** 42 male and 66 female volunteer healthcare workers participated in the study. When the participants' responses regarding the training they received regarding service provision to foreign patients were evaluated, the subject in which the training was most inadequate was foreign language (2.1%) ( $p<0.05$ ). Physicians (50.1%), health license holders (69.8%), and non-healthcare workers (55.6%) thought that they could use telemedicine applications due to their profession ( $p<0.05$ ). In addition, while healthcare professionals with less professional experience were more willing to use electronic infrastructure, their awareness levels were low ( $p<0.05$ ).

**Conclusion:** More studies should be planned to eliminate deficiencies in health policies by effectively matching local needs with global expectations, especially health tourism and electronic health service provision.

**Keywords:** Healthcare Education, Medical Tourism, Telemedicine

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## INTRODUCTION

Since ancient times, individuals have constantly migrated or traveled for centuries to regain health (1). The concept of health, which is very important, has been defined by the World Health Organization (WHO) as a state of complete mental, physical, and social well-being of individuals. This definition sets out the many goals of WHO, such as ensuring social welfare, preventing disease, and improving medical outcomes (2). With the beginning of seeing the individual's health as a concept above everything else, the health literacy of society has increased day by day to improve the state of physical or mental well-being. Parallel to this, "health tourism" emerged and promised people hope for complementary treatments in many areas, such as getting rid of diseases, fighting stress, and improving aesthetics (3). When health tourism is evaluated broadly, it has become a global industry (4).

As a reflection of digitalization in the healthcare sector, telemedicine provides benefits in supporting patient treatment and facilitating care services. These applications, which allow individuals to communicate with health institutions electronically without the distance barrier, offer various cost and quality advantages (5). As such, telemedicine is a technology that enables individuals to communicate with healthcare professionals by overcoming geographical barriers and bringing healthcare personnel together in the same environment (6). Telemedicine includes many applications, including information technologies, communication, and interactive video systems. While the first comprehensive examples of telemedicine were encountered in the 1960s, it showed significant development, especially in the 1990s (7). Since telemedicine is a vast field, various studies on field effectiveness, advantages, and costs continue. While facilitating access, increasing the quality of service, and reducing the cost of care are positive opinions, the deficiencies in the communication, organization, and quality structure between health professionals and patients, problems with health services, and data privacy protection are the aspects criticized (8).

While telemedicine applications were used in many health units, these applications had to be revised due to the significant expansion of the user universe during the global epidemic (9). Different opinions have been put forward regarding the use of telemedicine applications, especially in medical tourism; it is a common view that infrastructure

investments such as call centers, support systems, and a qualified workforce are needed to integrate them into health tourism. Various studies show that integrating telemedicine and health tourism will affect tourists' travel behavior, and they can approach health tourism more broadly (10). Since telemedicine in health tourism will eliminate language-related, cultural, or geographical barriers, e-hospitals can serve more tourists (11).

Although electronic infrastructures have the potential to improve the quality of healthcare delivery, we do not have sufficient information about service providers' attitudes and awareness toward these technologies. For this reason, we planned our study to determine the knowledge levels and attitudes of health professionals who directly participate in providing health services. The research only includes the statistical evaluation of the results of the answers given to the survey questions and does not include the answers to all questions related to the field. The research is limited to August 2022 and was carried out at the local level. For this reason, it should be supported by more regional, national, or international studies.

## MATERIALS AND METHODS

### Study Design and Sampling

It is a cross-sectional survey study conducted among healthcare professionals in Bozyazı State Hospital of Mersin City in 2022. The universe size (N) is 150. The sample size was 108, considering the 95% confidence interval and margin of error  $\alpha=0.05$ . There are 42 male and 66 female participants in the study population. Due to different demographic groups, the sample size ( $f: n/N$ ) of the number of individuals to be included in the subsets of the universe was determined with a coefficient of 0.72 (Table 1).

**Table 1. Determination of sample size and stratified sampling**

$N t^2 p$		150 x (1.96) <sup>2</sup> x 0.50 x 0.50	144
$n = \frac{N t^2 p}{d^2(N-1) + t^2 p q}$		$n = \frac{150 \times (1.96)^2 \times 0.50 \times 0.50}{(0.05)^2 \times (150-1) + (1.96)^2 \times 0.50 \times 0.50}$	$= \frac{144}{1.33} = 108$
<b>(f: n/N): 108/150: 0.72</b>			
Profession	n		
Medical Doctor	16x0.72=11.52		
Graduate	2x0.72=1.44		
Undergraduate	87x0.72=62.64		
Associate degree	4x0.72=2.88		
Elementary school, high school	3x0.72=2.16		
Non-health worker	38x0.72=27.36		

Demographic strata were selected using a simple table of random numbers, in line with the principle of equal representation. After the informed consent form was obtained from the volunteers participating in the research, they were informed about the research by the researcher (S.C), and it was stated that they could withdraw from the research at any stage of the study if they wished.

### *Analysis of data*

The survey questions were prepared by considering the academic data presented before and scientific studies in the literature on health tourism and telemedicine. The data obtained in the survey were analyzed using the GraphPad Prism 9 statistical program, and the difference between the groups was examined using the student-t test. The difference between the groups was considered significant when  $p < 0.05$ . This study was approved by Alaaddin Keykubat University Scientific Research and Publication Ethics Committee (Date: 25.05.2022, Number:12) and Mersin Provincial Directorate of Health (Date: 28.07.2022 Number:55)

## **RESULTS**

The answers of the health professionals who volunteered in our study to the survey questions about their awareness of health tourism and their views on the integration of telemedicine applications into health tourism were evaluated statistically.

42 male (38.9%) and 66 female (61.1%) female volunteer health workers participated in the study. 11.1% of the participants are physicians, 63.9% are health personnel, and 25% are administrative personnel. The numerical distribution of the participants is related to the number of personnel working in the hospital and the power of representation. When the distribution by age group is evaluated, 44.5% of the participants are in the 20-40 age range, and 55.5% are over 40. While 17.6% of the participants had 0-5 years of working life experience, it was seen that 54.6% had more than 16 years of professional experience (Table 2).

When the participants' answers were evaluated regarding the training received for providing services to foreign patients, it was revealed that 35.4% had yet to receive training on this subject. The subject in which the most inadequate

**Table 2: Demographic information of participants**

		n	%
Gender	Male	42	38.9
	Female	66	61.1
	Total	108	100.0
Profession	Medical Doctor	12	11.1
	Graduate	1	0.9
	Undergraduate	63	58.3
	Associate Degree	3	2.8
	Elementary school, high school	2	1.9
	Non-health worker	27	25
	Total	108	100.0
Age	20-29	21	19.5
	30-39	27	25
	40-49	51	47.2
	+50	9	8.3
	Total	108	100.0
Professional Experience	0-5	19	17.6
	6-10	10	9.3
	11-15	20	18.5
	+16	59	54.6
	Total	108	100.0

training was reported was foreign language (2.1%). It was observed that examination services (71.3%) could benefit more through electronic infrastructures compared to consultation (24.1%), nutritional health services (17.5%), and rehabilitation services ( $p<0.05$ ). The preference for using electronic infrastructures for health tourism (71.3%)

was found to be significantly positive ( $p<0.05$ ) (Table 3).

**Table 3: Evaluation of the training received by participants for service delivery and their preferences in using telemedicine applications**

		n	%	Sum	p##
◇ Distribution of training received to serve foreign patients	Health services to be provided to the patient (a)	33	22.9	a-c a-d	<0.05
	Patient rights (b)	30	20.8	a-e a-f	
	Services to be provided to the patient's relatives (c)	15	10.4	b-c b-d	
	Foreign Language (d)	3	2.1	b-e b-f	
	None (e)	51	35.4	c-d	
	Other (f)	12	8.4	c-e	
	Total	144	100.0	d-e	
Regarding the use of applications and electronic infrastructures such as telephone/video calling in various healthcare services	In Pre-Inspection Services (a)	73	44	a-b	<0.05
	Tele Consultation (b)	40	24.1	a-c	
	Nutrition and Healthy Living Services (c)	29	17.5	a-d	
	Rehabilitation Services (d)	16	9.6	a-e	
	Other (e)	8	4.8	b-d	
	Total	166	100.0	b-e	
Inspective controls can be evaluated using electronic infrastructures	Strongly Disagree (a)	1	0.9	c-d	<0.05
	Disagree (a)	19	17.6	d-e	
	Neither agree nor disagree (b)	11	10.2	d-f	
	Agree (c)	53	49.1		
	Strongly Agree (c)	24	22.2		
	Total	108	100.0		
Telemedicine integration is required in health tourism	Strongly Disagree (a)	1	0.9	a-b	<0.05
	Disagree (a)	3	2.8	a-c	
	Neither agree nor disagree (b)	27	25		
	Agree (c)	46	42.6		
	Strongly Agree (c)	31	28.7		
	Total	108	100.0		

## Student t-Test

◇ Participants were able to tick more than one option.

a, b,c: Responses were combined according to the strength of certainty statements and compared with apparent approval, disapproval, or indecision.

Male participants (54.7%) prefer the pre-inspection more (72.7%) prefer the post-inspection more than male than female participants (48.5%), while female participants participants (69%) ( $p < 0.05$ )

**Table 4: Participants' evaluations of telemedicine use in gender variable telemedicine applications**

		n	%	Sum	p##
I prefer the use of electronic infrastructure for my pre-inspective examination (woman)	Strongly Disagree(a)	4	6.1	a-c a-b b-c	<0.05 <0.05 <0.05
	Disagree(a)	19	28.7		
	Neither agree nor disagree (b)	11	16.7		
	Agree(c)	25	37.9		
	Strongly Agree(c)	7	10.6		
	Total	66	100.0		
I prefer the use of electronic infrastructure for my pre-inspective examination (men)	Strongly Disagree(a)	2	4.8	a-c a-b b-c	<0.05 <0.05 <0.05
	Disagree(a)	9	21.5		
	Neither agree nor disagree (b)	8	19		
	Agree(c)	19	45.2		
	Strongly Agree(c)	4	9.5		
	Total	42	100.0		
I prefer the use of electronic infrastructure for my post-inspective examination (woman)	Strongly Disagree(a)	0	0	a-c a-b b-c	<0.05 <0.05 <0.05
	Disagree(a)	16	24.3		
	Neither agree nor disagree (b)	2	3		
	Agree(c)	32	48.4		
	Strongly Agree(c)	16	24.3		
	Total	66	100.0		
I prefer the use of electronic infrastructure for my post-inspective examination (men)	Strongly Disagree(a)	1	2.4	a-c a-b b-c	<0.05 <0.05 <0.05
	Disagree(a)	3	7.2		
	Neither agree nor disagree (b)	9	21.4		
	Agree(c)	21	50		
	Strongly Agree(c)	8	19		
	Total	42	100.0		

## Student t-Test

a, b,c: Responses were combined according to the strength of certainty statements and compared with apparent approval, disapproval, or indecision.

Sum: Comparison between groups

Physicians (50.1%), healthcare licensees (69.8%), and non-health workers (55.6%) assumed that they could use telemedicine practices in terms of their profession ( $p < 0.05$ ). 100% of the physicians, 82.6% of the health licensees,

and 70.4% of the administrative staff expressed positive opinions about the benefits of integrating these practices into health tourism ( $p < 0.05$ )

**Table 5: Evaluation of telemedicine applications in health tourism in occupational variable**

		n	%	Sum	p##
Considering professionally, i can use telemedicine applications in my profession (physician)	Strongly disagree(a)	1	8.3	a-c	<0.05
	Disagree(a)	1	8.3		
	Neither agree nor disagree (b)	4	33.3		
	Agree(c)	4	33.3		
	Strongly agree(c)	2	16.8		
	Total	12	100.0		
Considering professionally, i can use telemedicine applications in my profession (Undergraduate)	Strongly disagree(a)	1	1.6	a-c	<0.05
	Disagree(a)	8	12.7		
	Neither agree nor disagree (b)	10	15.9		
	Agree(c)	33	52.4		
	Strongly agree(c)	11	17.4		
	Total	63	100.0		
Considering professionally, i can use telemedicine applications in my profession (non-health worker)	Strongly disagree(a)	0	0	a-c	<0.05
	Disagree(a)	4	14.8		
	Neither agree nor disagree (b)	8	29.6		
	Agree(c)	13	48.2		
	Strongly agree(c)	2	7.4		
	Total	27	100.0		
In the future, telemedicine applications should be integrated into health tourism (physician)	Strongly disagree(a)	0	0	a-c	<0.05
	Disagree(a)	0	0		
	Neither agree nor disagree (b)	0	0		
	Agree(c)	9	75		
	Strongly agree(c)	3	25		
	Total	12	100.0		
In the future, telemedicine applications should be integrated into health tourism (Undergraduate)	Strongly disagree(a)	3	4.8	a-c	<0.05
	Disagree(a)	4	6.3		
	Neither agree nor disagree (b)	4	6.3		
	Agree(c)	28	44.5		
	Strongly agree(c)	24	38.1		
	Total	63	100.0		
In the future, telemedicine applications should be integrated into health tourism (non-health workers)	Strongly disagree(a)	0	0	a-c	<0.05
	Disagree(a)	0	0		
	Neither agree nor disagree (b)	8	29.6		
	Agree(c)	13	48.2		
	Strongly agree(c)	6	22.2		
	Total	27	100.0		

## Student t-Test

WW ♦ Participants were able to tick more than one option.

a,b,c: Responses were combined according to the strength of certainty statements and compared with apparent approval, disapproval, or indecision.

In addition, considering the age of the participants, it was observed that healthcare professionals with less professional experience were more willing to use electronic infrastructure, but their awareness level was low ( $p < 0.05$ )

**Table 6: Definition of telemedicine in age variable and use of technological infrastructure**

		n	%	Sum	p <sup>##</sup>
The state of knowing the definition of tele-medicine (20-29)	I know exactly (a)	6	28.6	a-c	<0.05
	Neither agree nor disagree (b)	6	28.6		
	I don't have enough information(c)	9	42.8		
	Total	21	100.0		
The state of knowing the definition of tele-medicine (30-39)	I know exactly (a)	14	51.9	a-c	<0.05
	Neither agree nor disagree (b)	6	22.2		
	I don't have enough information(c)	7	25.9		
	Total	27	100.0		
The state of knowing the definition of tele-medicine (40-49)	I know exactly (a)	26	51	a-c	<0.05
	Neither agree nor disagree (b)	7	13.7		
	I don't have enough information(c)	18	35.3		
	Total	51	100.0		
The state of knowing the definition of tele-medicine (50+)	I know exactly (a)	4	44.4	a-c	>0,05
	Neither agree nor disagree (b)	1	11.2		
	I don't have enough information(c)	4	44.4		
	Total	9	100.0		
I prefer to use technological devices and applications that contain my health information (20-29)	Strongly Disagree(a)	0	0	a-c	<0.05
	Disagree(a)	1	4.7		
	Neither agree nor disagree (b)	0	0		
	Agree(c)	13	62		
	Strongly Agree(c)	7	33.3		
	Total	21	100.0		
I prefer to use technological devices and applications that contain my health information (30-39)	Strongly Disagree(a)	0	0	a-c	<0.05
	Disagree(a)	0	0		
	Neither agree nor disagree (b)	1	3.7		
	Agree(c)	16	59.3		
	Strongly Agree(c)	10	37		
	Total	27	100.0		
I prefer to use technological devices and applications that contain my health information (40-49)	Strongly Disagree(a)	1	2	a-c	<0.05
	Disagree(a)	4	7.8		
	Neither agree nor disagree (b)	3	5.9		
	Agree(c)	31	60.8		
	Strongly Agree(c)	12	23.5		
	Total	51	100.0		
I prefer to use technological devices and applications that contain my health information (50+)	Strongly Disagree(a)	1	11.1	a-c	<0.05
	Disagree(a)	0	0		
	Neither agree nor disagree (b)	1	11.1		
	Agree(c)	4	44.5		
	Strongly Agree(c)	3	33.3		
	Total	9	100.0		

## Student t-Test

Sum: Comparison between groups



## DISCUSSION

E-applications developed today have become an integral part of health systems. On the other hand, telemedicine includes integrating some of these applications into health service delivery and modifications specific to this field. In addition to aiming to reveal a local result in this field by evaluating the awareness levels of health tourism and telemedicine at a cross-sectional level in terms of health workers, our study also aims to determine the target groups we will focus on in terms of providing better quality service and our shortcomings in this regard, based on the results obtained.

While evaluating the place of telemedicine in health services, Zywiets's study stated that innovative applications should be included in health and tourism. He noted that improving devices and infrastructure services would benefit service quality (12). In the study of Martinez et al., an alternative e-application design in health tourism was presented. The application considered to be developed in this study offers solutions for the problems that patients may encounter during travel and health care (13). When our study results are evaluated, our results suggest that telemedicine and health tourism integration will support positive results in this field.

Telemedicine is a clinical practice that connects a patient to specialist care counselors via electronic platforms, potentially improving patient self-management and allowing the care of patients with limited access to healthcare (14). Artificial intelligence-supported telemedicine applications are used in many fields, from ophthalmology (15) to migraine treatment (16), from respiratory diseases (14) to addiction treatment (17). Shih et al. conducted a study on tele-organ transplants using a face-to-face interview with 50 people in 3 different institutions. 80% of the participants stated that, in this case, a violation of the medical law might be in question, 74% said that tele-systems could be integrated into this field, and 36% stated that there might be cost fluctuations (18). Moving some medical interventions from a central location to the patient's home can reduce healthcare costs (14). When patients are disadvantaged in receiving specialist access or advanced care, telemedicine models can offer an opportunity to equalize care at different levels. Telemedicine services are expanding, but empirical research on best practices and consequent problems for telemedicine models and subsets still needs to be done (19). Research highlights deficiencies in the accessibility of telemedicine among older people, particularly in West African countries (20).

Our study shows that physicians and health licensees similarly support integrating telemedicine applications in the professional field. When the study results are evaluated at the local level, it shows that the target of education planning should be young health workers, especially those at the beginning of their careers, and improvements should be made for all health professionals working in this field. The deficiency is mainly in knowing a foreign language and serving foreign patients.

All doctors working at an online e-hospital that opened in 2015 were bilingual doctors who provided services from teleconsultation to international transfer and treatment to the United States. Such telemedicine platforms for medical tourism save patients the trouble of identifying and connecting with an appropriate healthcare provider and minimize language and cultural barriers (11). However, Sorensen reported that traveling to another country carries some risks. This situation has been associated with the absence of information about the patient's health history in the hands of healthcare professionals (21). The greatest challenge to the combined use of telemedicine and health tourism applications is the inability to reliably assess healthcare quality across borders. The increasing complexity of healthcare delivery and the rapidly rising cost of medical care require transparency in pricing and standardization of quality assessment. There is a particular need for a reliable cross-border comparable assessment system for international patients. As Shaw argues, we need to standardize healthcare delivery, and more effort is required to improve regulation, institutional licensing, accreditation, and transparency (22).

On the other hand, although the studies on patient satisfaction are very new, in a study evaluating the telemedicine service offered to epileptic patients during the COVID-19 pandemic, 39.1% of the patients stated that they were unaware of this service. In addition, 95% of the service recipients indicated satisfaction with this application (23).

All these data show that with the increase in age and professional experience of healthcare professionals, awareness of telemedicine applications increases, and healthcare personnel generally have a favorable opinion on this issue. However, when the training received is considered, it has been observed that the health personnel received training in a foreign language at a lower level than other training. It is seen that this education on approaching foreign patients and service delivery requirements needs to catch up with the education in different fields. In general, it is seen that integrating telemedicine services into health

tourism, especially in pre-examination service, is welcomed more positively, followed by services related to consultation and nutrition counseling. Female participants are more optimistic about performing post-inspective controls using electronic infrastructures.

In conclusion, our study reveals regional health professionals' views, expectations, and attitudes regarding providing electronic infrastructure services, especially in health tourism. Providing a quality service seems closely related to language education, cultural situations, and technical infrastructure support. However, since cultural structure is a crucial component in service delivery, differences between countries may cause differences in the attitudes and views of health professionals. When the literature data is evaluated, it is seen that more research is needed in this area.

## Declarations:

The authors received no financial support for the research and authorship of this article. There is no conflict of interest. This article was produced from S.C.'s M.Sc thesis study.

This study was approved by Alaaddin Keykubat University Scientific Research and Publication Ethics Committee (Date: 25.05.2022, Number:12) and Mersin Provincial Directorate of Health (Date: 28.07.2022 Number:55)

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