https://doi.org/10.53964/jmnpr.2024018

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Journal of
Modern Nursing Practice and Research

ISSN 2708-2202 (Online)

Open Access

Research Article

Online Health Services: Attitudes and Behaviors among Adults in Israel

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Received: June 11, 2024 **Revised:** August 13, 2024 **Accepted:** October 21, 2024 **Published:** November 6, 2024

Abstract

Objective: Online Health Services (OHS) emerged in the last decade and currently encompass technologies that facilitate patient-practitioner communication in medical fields such as diagnosis, treatment, counseling, and monitoring, including for chronic patients. The current study aims to describe attitudes and behaviors related to OHS and identify variables that explain online technology use.

Methods: A descriptive cross-sectional study among Hebrew-speaking, computer-literate adults, with data collected via online questionnaires. The convenience sample included 700 respondents, of whom 57.4% were female. Respondents' mean age was 64 years, with most being married (59.3%), secular (75.9%), academically educated at the undergraduate, graduate and postgraduate levels (59.1%), and having a chronic illness (65.7%).

Results: Despite high OHS use among nearly half the participants, most were undecided whether they preferred in-person or online treatment. Preference for in-person treatment was negatively associated with the perceived efficiency and safety of online treatment, online health literacy, and the extent of OHS use. Key variables explaining OHS use were perceived efficiency and safety of online treatment, online health literacy, preference for in-person treatment, and chronic illness. The explained variation of the OHS consumption model was 40.4%.

Conclusion: The variables explaining OHS use are not necessarily linked to classic background variables, e.g. gender, age, and education, but rather to variables related to the use of OHS for therapeutic purposes. OHS are not perceived as substitutes for in-person meetings with healthcare providers but as a supplementary service. Therefore, to enhance OHS use rates, decision-makers should improve online health literacy and design services integrating OHS with in-person treatment.

Keywords: telemedicine, health literacy, efficiency, safety, in-person

Citation: Reicher S, Madar G, Toren O. Online Health Services: Attitudes and Behaviors among Adults in Israel. *J Mod Nurs Pract Res*, 2024; 4(4): 18. DOI: 10.53964/jmnpr.2024018.

1 INTRODUCTION

In recent years, many countries have been facing healthcare challenges related to aging populations, an increase in chronic diseases, unhealthy lifestyles, and rising healthcare technology costs. In response, Online Health Services (OHS) are increasingly seen as a way to save resources, streamline the system, and make it more user-friendly[1]. Leaning on the Digital Israel initiative, Israel's Health Ministry has undertaken the mission of transforming the healthcare system into one that is sustainable, advanced, innovative, and constantly improving, by optimally leveraging Information and Communication Technology resources[2].

OHS comprise a growing range of applications and services such as two-way video, email, smartphone health apps, and other communication technologies, which enable the provision of health services, including treatment, consultation, monitoring, etc. These technologies are efficient and cost-effective in situations involving geographical distance[3] and for reducing Emergency Room visits and hospitalization rates[4]. Beyond cost reduction and increased service availability, research findings point to other significant advantages, including improving doctors' efficiency in providing treatment and accessibility to care[5]. They also show promise for improving medical care for chronic conditions such as hypertension, obesity, diabetes, depression, and cancer[6]. Furthermore, Shigekawa et al.[7] suggest that telemedicine can produce outcomes comparable or even superior to in-person medical care, especially in mental health assessment and treatment, rehabilitation counseling, and elderly nutrition management.

These advantages facilitated increased OHS consumption during the COVID-19 pandemic globally, providing an efficient solution for safe patient-practitioner communication. Data from the USA Department of Health show that telemedicine use among patients with government health insurance increased from 11,000 to 1.3 million between March 7 and April 18, 2020[8]. Similarly, Mann et al.[9] report that while only 8% of Americans used OHS in 2019, there was a significant increase in use during the USA lockdown (March 2 to April 14, 2020). For example, in one of New York's major healthcare providers, daily telemedicine use via video rose from 102.4 to 801.6 contacts, marking a 683% increase, particularly in emergency medicine and among patients aged 22-44. In Australia, as the pandemic spread, access to OHS was extended to the entire population, mainly for initial triage, assessment, and treatment of common cases[10]. In Germany, findings showed that only 20% of the population used online medicine, primarily for consultation via telephone rather than video (15.4% vs. 7.6%)[11].

Satisfaction with OHS does not negate the preference for in-person treatment. While patients who participated in telemedicine initiatives expressed high satisfaction, they still considered their relationship with their regular healthcare provider as equal or more important than service availability. In a national study conducted in South Carolina, USA, thousands of patients indicated that their relationship with their doctor was more important than the method of communication[12]. A German study conducted during the COVID-19 pandemic found that 43% of those who used telemedicine as a supplementary service to regular medical care were satisfied[11]. A study conducted in Israel during the pandemic at the country's largest medical center examined patient satisfaction with ambulatory medical care provided via video. The findings revealed that 89.9% of patients were satisfied with this technology, with only 21% experiencing technological difficulties. Over 90% were highly satisfied with the doctor's courtesy, expressed a high level of trust, felt that the clinician understood their problem, and found the doctor's explanations and recommendations to be clear. Moreover, the majority (86.5%) reported that they would recommend video use to family and friends[13]. A study[14] investigated the attitudes of the adult population in Israel toward telemedicine in general and particularly during the first wave of the pandemic. The study found that most participants, including those with chronic diseases, preferred digital healthcare services over in-person visits to the clinic, expressing high satisfaction with the service and an intention to continue using OHS. Similarly, patients with chronic illnesses showed a high interest in OHS regardless of their health status and age[15]. A systematic review examining the added value of telephone consultation and treatment for chronic patients during the pandemic found that as long as the physician adhered to pre-pandemic criteria and treatment principles and did not overprescribe tests and antibiotic treatment, online treatment was perceived as high-quality and efficient[16]. Ward et al.[17] found that consultation and diagnostic activities, including in-person physical examinations, had been successfully translated into the online format during the pandemic. However, they argue that in-person interactions between family physicians and patients remain vital. Hence, OHS can replace or supplement regular treatment[18].

Another factor linked to OHS consumption is online health literacy. The WHO defines health literacy as "*the cognitive and social skills that determine the individuals' motivation and ability to gain access to, understand, and use information in ways that promote and maintain good health*[19]." Health literacy and access to digital health technologies have been identified as key determinants of healthcare service quality. Studies show that online health literacy is not necessarily related to education level. For example, a study conducted in the USA among students[20] found that only 57% of those who consumed online medical information related to preventive medicine were characterized as online health literate. Other studies indicate a negative correlation between age, education

level, and online health literacy[5]. Adults aged 45-46 were found less likely to use these services compared to younger populations[21].

A survey conducted in Sweden among the general population found that one-third of the participants had limited health literacy despite half of them having an academic education, and that those with good health literacy were more likely to use OHS. Based on a national survey conducted in Sweden, Sundell et al.[22] argue that compared to health-literate individuals, those with limited health literacy do not access their personal health information nor actively search for health information on the national health portal. Additionally, various population groups such as older adults or individuals with chronic diseases were found to have low online health literacy, tending to participate less in online meetings with healthcare providers, such as nutrition monitoring and physical activity sessions[23]. Similarly, rheumatologists from 64 countries expressed concern that the health of low Social and Economic Status populations with rheumatic diseases might deteriorate during the pandemic as a result of the transition to online treatment, due to their low online literacy[24] or, alternatively, may avoid online treatment due to language barriers and living in rural areas[16].

Despite the significant development of OHS, information is still lacking regarding patients' attitudes toward OHS, the role of socio-demographic characteristics, and the factors that may increase OHS use. This study tries to describe attitudes and behaviors of adult healthcare consumers, related to OHS use and identify variables that explain it.

2 METHODS

2.1 Design

A descriptive cross-sectional and correlational study was conducted among Hebrew-speaking, computer-literate adults.

2.2 Data Collection

Data was collected between April and May 2020 via an internet questionnaire after obtaining ethical committee approval from Ono Academic College (Approval No.202001). A pilot study was conducted prior to data collection to assess the questionnaire's clarity, reliability and validity, and was conducted in two stages. The first stage was to validate the content and check the statements for clarity. Senior nurses and policymakers were asked for their opinion regarding the clarity of statements and whether the statement suited the target content. As a result, we updated some questions. For example, we clarified what digital technology included (e.g. smartphone, computer, smartwatch, etc.), what is meant by monitoring measurements (e.g. blood pressure, pulse, E.C.G., etc.) and the meaning of virtual diagnosis compared to in-person encounters. In the second step, we tested the updated questionnaire's reliability in a convenience sample that included 33 participants. The age range was 28-79 (mean=56; SD=14.4), with 51% women. Reliability (Alpha Cronbach) of the whole questionnaire was 0.78.

Study participants were recruited through convenience sampling from two internet sites: "Motke" - an Internet portal and unique social network platform supporting the elderly population in Israel[25], and "Camoni" - a social network that aims to empower patients and their families in taking an active part in disease management[26]. We also used networks such as Facebook and WhatsApp. Respondents were asked for their informed consent before completing the full questionnaire. That is, the participants from the two sites, Motke and Camoni received a link to fill out the Qualtrics questionnaire, sent to them by the site's administrator. Clicking on the link led them to informed consent. They were asked to indicate that they had read and understood the explanation and were ready to answer the questionnaire. The explanation emphasized that participation in the study is voluntary, and they are free to stop answering at any time they choose. When they finished filling out the questionnaire, they had to click the submit button. This action confirmed their consent to participate in the study.

2.3 Study Population

About 73% of those who opened the link responded to the questionnaire. The final sample included 700 respondents, of which 57.4% were women and 42.6% were men. Respondents' age ranged from 20 to 90 (mean=64.14, SD=12.97), with most participants aged 55 and above (82.7%). Most were married (59.3%), secular (75.9%), academically educated at the undergraduate, graduate and postgraduate levels (59.1%), and had children (82.7%). 65.7% reported having a chronic illness (Table 1).

2.4 Research Tool

A structured questionnaire consisting of two parts, compiled by the researchers based on the literature regarding online health treatment globally. The questionnaire's final version included 31 statements, which participants were asked to rate on a scale of 1 to 5, where 1=strongly disagree and 5=strongly agree. Additionally, demographic information was collected, including variables such as age, gender, sector, level of religiosity, marital status, number of children, etc. Respondents were also asked to indicate whether they had a chronic illness.

A factor analysis conducted to test validity identified four factors related to attitudes and behaviors, for which reliability calculations were performed. The factors are as follows:

Attitudes toward OHS

(1) Perception of efficiency and safety of online treatment:

Table 1. Frequency and Percentages for the Demographic Variables

Variable	Categories	Frequency	Percentages (%)
Gender	Male	297	42.6%
	Female	401	57.4%
Age	20-34	33	4.7%
	35-44	34	4.9%
	45-54	54	7.7%
	55-64	143	20.5%
	65+	435	62.2%
Marital status	Single	67	9.6%
	Married	415	59.3%
	Divorced	127	18.1%
	Widow / er	72	10.3%
	Other	19	2.7%
Level of religiosity	Secular	529	75.9%
	Traditional	109	15.6%
	Religious	41	5.9%
	Ultra-orthodox	18	2.6%
Education	High school	229	32.7%
	Academic (Bachelor's / Master's / PhD)	414	59.1%
	Other education	57	8.1%
Chronic illness	Yes	460	65.7%
	No	240	34.3%

This variable assessed perceived efficiency of OHS and comprised 11 statements, e.g., "Digital communication makes medical treatment more readily available." Cronbach's alpha reliability: 0.87.

(2) Preference for in-person treatment: This variable examined respondents' perceptions regarding their preference for in-person medical treatment versus online medical care, and comprised four statements, e.g., "I always prefer a direct encounter with the doctor (at the clinic)." Cronbach's alpha reliability: 0.78.

(3) Online health literacy: This variable examined respondents' perceptions regarding their online health literacy, and comprised five statements, e.g., "I know where to look for information on proper nutrition." Cronbach's alpha reliability: 0.69.

Behaviors

OHS use: This variable examined OHS use for various purposes and comprised four statements, e.g., "I usually renew my prescriptions or request various medical approvals through the computer or app." Cronbach's alpha reliability: 0.67.

3 RESULTS

Table 2 shows that about half the respondents used OHS extensively (49.29%), while only a few preferred in-person treatment (14%). Furthermore, it demonstrates that most participants perceived the efficiency and safety of online treatment and their online health literacy as moderate (57.14% and 56.29%, respectively).

Table 3 indicates a significant moderate positive correlation between OHS use and online health literacy ($r=0.54$, $p<0.01$) and between perceived efficiency and safety of online treatment ($r=0.51$, $p<0.01$). Additionally, the results demonstrate a significant moderate negative correlation between preference for in-person treatment and OHS use ($r=-0.37$, $p<0.01$) and a positive correlation with perceived efficiency and safety of online treatment ($r=0.50$, $p<0.01$) and online health literacy ($r=0.51$, $p<0.01$).

Table 4 presents OHS use predictors. The analysis was conducted using hierarchical regression in two stages, keeping background variables constant. In the first stage, background variables (age, gender, chronic illness, education) were entered into the model. In the second stage, independent variables (perceived efficiency and safety of online treatment, preference for in-person treatment, and online health literacy) were added.

Model 1 shows that background variables explain 2.6% of the variance in OHS use; academically educated respondents ($\beta=0.94$, $p<0.01$) are more likely to use OHS, while those with a chronic illness ($\beta=-0.096$, $p<0.05$) and older respondents ($\beta=-0.104$, $p<0.01$) are less likely to use OHS.

Model 2 shows that the variables explaining OHS

https://doi.org/10.53964/jmnpr.2024018

Table 2. Attitudes and Behaviors in the Context of OHS

Variable	Disagree	Undecided	Agree
Efficacy and safety of online treatment	12 (%1.715)	400 (%57.14)	288 (%41.14)
Preference for in-person treatment	63 (%9.00)	539 (%79.00)	98 (%14.00)
Online health literacy	12 (%1.71)	394 (%56.29)	294 (42%)
OHS use	20 (%2.86)	335 (%47.86)	345 (%49.29)

Notes: N=700.

Table 3. Pearson's Correlation Matrix of Study Variables

Preference for In-person Treatment	Efficacy and Safety of Online Treatment	Online Health Literacy	OHS Use	Variable
OHS use	•			
Online health literacy	0.54**	•		
Efficacy and safety of online treatment	0.51**	0.46**	•	
Preference for in-person treatment	-0.37**	-0.21**	-0.50**	•
Mean	3.96	3.91	3.86	3.16
SD	0.82	0.70	0.66	0.82

Notes: ** p<0.01.

Table 4. Two-stage Hierarchical Regression for Predicting OHS use

		Model 1				Model 2			
		B	Std. Error	Beta	t	B	Std. Error	Beta	t
Model 1	(Constant)	4.192	0.181						
	Age	-0.007	0.002	-0.104	2.707**				
	Gender (Male=1)	0.033	64	0.02	0.518				
	Chronic illness (No=1)	-0.165	0.065	-0.096	2.53*				
	Education	0.131	0.052	0.094	2.51*				
				f(4,693)=4.6, p<0.01					
Model 2	(Constant)	1.599	0.297			1.599	0.297		
	Age					-0.002	0.002	-0.024	0.79
	Gender (Male=1)					0.019	0.05	0.012	0.385
	Chronic illness (No=1)					-0.131	0.051	-0.076	2.56*
	Education					0.056	0.041	0.04	1.36
	Online health literacy					0.454	0.039	0.388	11.57***
	Efficacy and safety of online treatment					0.297	0.047	0.239	6.322***
	Preference for in-person treatment					-0.168	0.034	-0.167	4.9***
				f(7,690)=66.86, p<0.001					
Explained variance R^2=2.6%						R^2=40.4%			

Notes: * p<.05, ** p<.01, *** p<.001; N=700.

use are chronic illness, online health literacy, perceived efficiency and safety of online treatment, and preference for in-person treatment. Higher online health literacy (β=0.38, p<.001) and perceived efficiency and safety of online treatment (β=0.24, p<0.001) increase OHS use. Conversely, having a chronic illness (β=-0.076, p<.005) and preference for in-person treatment (β=-0.167, p<0.01) decrease OHS use. The independent variables add 37.8% to the variance of the dependent variable, beyond demographic variables. Overall, the model explains 40.4% of the variance in the dependent variable.

4 DISCUSSION

Online medical technology, which dramatically increased during the COVID-19 pandemic, enables the provision of health services based on patient-practitioner

communication, including diagnostic, treatment, and disease prevention services[27]. In the current study, only half of the respondents used OHS extensively. This finding is lower than that of a previous Israeli study conducted in 2017, among individuals aged 65 and older in one of the four national health funds, where 63% of the respondents reported using these services[28]. The sample population could explain this difference: while the current study's sample included health consumers from all the health funds, the previous study only involved patients from one fund. Studies from the United States and Germany found pre-pandemic use rates to be around 7-8%[9,11]. The main reason for the gaps in pre-pandemic use rates, between Israel and those countries, might be the Israeli Health Ministry's policy of promoting digital technologies and making online health services accessible[2]. Chaet et al.[29] add that as technological innovation advances, patients' perceptions of time, distance, and methods of communication change, leading to a shift in the way medical services are consumed. Accordingly, and given the high pre-pandemic rates in Israel, OHS use is expected to continue increasing after the pandemic.

Three variables represent patients' attitudes toward OHS: perceived online health literacy, perceived efficiency and safety of online treatment, and preference for in-person treatment. Health literacy as a factor influencing OHS use has been found to empower individuals and communities to efficiently manage and improve their health and well-being[30]. In the current study, most participants were undecided about their level of online health literacy, and less than half believed they had adequate online health literacy, suggesting that some respondents require further guidance on searching for information online, and more information on diseases and treatments. This contrasts with the results of another study on the older population in Israel, where 43% reported needing guidance[28]. The difference may lie in the type of question assessing the literacy level. In our study, we examined participants' perceived level of online health literacy, which might be lower than their actual ability. Alternatively, and as aforementioned, the difference could be due to the sample populations. Health literacy and access to digital health technologies have been identified as key factors in determining the quality of health services. Low health literacy can lead to low compliance and incorrect use of medications[31]. Therefore, the healthcare system should focus efforts on promoting technological literacy and establishing knowledge and abilities related to technology use.

Perceiving online treatment as safe and effective is crucial for promoting and establishing OHS. The current study shows that only a few participants disagree that online treatment is effective and safe. This aligns with other studies demonstrating significant advantages of OHS, including improvements in treatment delivery, efficiency, and accessibility[3,5], especially in chronic conditions such as hypertension, obesity, diabetes, depression, and cancer[6]. Moreover, Shigekawa et al.[7] suggest that online medicine can produce results comparable or even superior to in-person medicine, especially in mental health assessment and treatment, rehabilitation counseling, and elderly nutrition management.

However, the findings also reveal that most participants were undecided whether online treatment was effective and safe for them. This may be due to the sample characteristics, namely that most participants had a chronic illness and were accustomed to in-person interactions with their healthcare provider. The regression findings indicate that participants with chronic illness tended to use telemedicine less, suggesting that even though more people agree that telemedicine is effective and safe, those with chronic conditions may still prefer in-person treatment. Similarly, a study examining perceptions, willingness, and practices regarding telemedicine among chronic patients in Northern Ethiopia showed that despite positive perceptions and willingness to use telemedicine, actual implementation was low[32]. Furthermore, only 14% of participants reported a preference for in-person treatment, while most respondents (79%) were undecided whether they preferred online or in-person medical care. This finding is significantly negatively correlated with perceived literacy, efficiency and safety, and OHS use. In other words, people with lower online health literacy who perceive online services as less effective and safe prefer in-person treatment. This finding may be related to the adoption rate of OHS. Despite substantial evidence of their potential, the adoption rate of online health technologies in Israel was initially perceived as slow during the pandemic, contributing to the indecision in choosing between in-person or online treatment[14]. Another explanation is that people do not see OHS as a replacement for in-person treatment but as a supplementary service[11,12,33]. The Mayo Clinic has implemented the current approach of integrating OHS with in-person medical care at various stages of treatment, combining traditional care and virtual interactions with the treatment team between appointments or planned visits[34].

The variables explaining OHS use are perceived online health literacy, perceived efficiency and safety of online treatment, preference for in-person treatment, and chronic illness. As the second stage of the regression indicates, these variables explain 37.8% of the variance of the dependent variable. Notably, and consistent with other research findings[15,30], the background variables introduced in the first stage of the regression had a low and insignificant contribution to explaining the variance of the dependent variable (except for chronic illness). For instance, age contributed little to the explained variance of OHS use, in line with other studies[35,36] Therefore, decision- and policymakers should work to promote online health

literacy, encourage OHS use among patients with chronic illnesses, and design healthcare services that integrate online medicine with in-person treatment.

5 CONCLUSION

The COVID-19 pandemic created a shift in people's attitudes toward the consumption of OHS. Despite this, only about half of the respondents reported using OHS and agreed that their level of online health literacy was adequate. This implies that the healthcare system should focus specific efforts on promoting online health literacy and establishing knowledge and skills related to technology use. Furthermore, the fact that most patients are undecided regarding their preference for online versus in-person treatment suggests that OHS are not perceived as a replacement for in-person encounters with healthcare providers but as a supplementary service. Therefore, to improve OHS use rates, including among patients with chronic illnesses, decision-makers should work to improve patients' online literacy and design health services that integrate OHS with in-person care.

Ethical Statement

The study was approved by the Ethical Committee of Ono Academic College (Approval No.202001).

Conflicts of Interest

The authors declared that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Data Availability

All data generated or analyzed during this study are included in this published article.

Author Contribution

Reicher S and Toren O was responsible for designing the study, collecting data, interpretating data, and writing the manuscript. Madar G was responsible for analyzing data and interpretating data. All authors contributed to the article and approved the submitted version.

Abbreviation List

OHS, Online Health Services

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