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Knowledge, perceived benefits, perceived concerns, and predisposition to use telehealth services in Bangladesh: a cross-sectional survey

Humayun Kabir[1,2*], Md. Kamrul Hasan[1,2,3*], Safayet Jamil[4,5], Saifur R. Chowdhury[1,2] and Dipak Kumar Mitra[1]

Abstract

Background Telehealth services are essential to expand healthcare coverage for all in the era of modern technology. Knowledge, willingness, and involvement with the service are also significantly important in the utilization of the service. This study investigated factors associated with knowledge, perceived benefits, perceived concerns, and predisposition to use telehealth services in Bangladesh. This web-based survey was conducted among 1266 adults in Bangladesh. Respondents were enrolled by following a convenience sampling technique.

Results Demographic, telehealth service, and perceived health related information were significantly associated with respondents' knowledge, perceived benefits, perceived concerns, and predispositions. The knowledge was significantly positively correlated with the perceived benefit (p <0.05) and predisposition of telehealth (p <0.05). Albeit, knowledge was significantly negatively correlated with perceived concerns of telehealth (p <0.05).

Conclusion The findings of the study may assist policymakers in implementing telehealth services by addressing the associated factors of knowledge, perceived benefits, perceived concerns, and predispositions.

Keywords Telehealth, Telemedicine, Knowledge, Benefit, Concern, Predisposition, Factors, Bangladesh

*Correspondence:
Humayun Kabir
humayun.kabir03@northsouth.edu; humayun.kabir.mcmaster@gmail.com
Md. Kamrul Hasan
kamrul.hasan11@northsouth.edu; kamrulhasanhridoy205@gmail.com
[1] Department of Public Health, North South University, Dhaka 1229, Bangladesh
[2] Department of Health Research Methods, Evidence, and Impact, McMaster University, Hamilton, ON L8S 4L8, Canada
[3] Department of Biochemistry and Molecular Biology, Tejgaon College, Dhaka 1215, Bangladesh
[4] Department of Pharmacy, Khwaja Yunus Ali University, Sirajganj 6751, Bangladesh
[5] Department of Public Health, Daffodil International University, Dhaka 1216, Bangladesh

Introduction

The healthcare system is transforming from new to newer shapes in response to the advancement of information technology, and therefore, healthcare practitioners nowadays encourage their patients to use such technologies that indeed influence their health outcomes [1]. As a result, the World Health Organization (WHO) emphasizes the implication of information and communication technology (ICT) in their healthcare programs globally [2]. The WHO specifies telehealth as the application of ICT for universal health coverage [3]. Electronic health information, as well as virtual counselling, are all instances of clinical interactions between healthcare practitioners and patients to obtain proper healthcare services [3].

Telehealth essentially endorses the implementation of patient-oriented healthcare services, in particular, the detection and prevention of disease, as well as the future care plan [4]. In addition, telehealth allows people with chronic illnesses to keep track of their health by documenting physiological signs that cannot even be vividly managed while patients visit the doctor in person [5]. To get the service, the patient will typically have an in-person appointment with the physician in many circumstances. Telehealth services are not essentially meant to replace in-person visits but to complement them when in-person service is necessary. Telehealth services complement in-person visits by providing remote consultations for follow-ups, minor issues, and routine check-ins, ensuring patients only need to visit in person when essential for their care. At the time of a telehealth consultation, it is normal and preferred for patients to be accompanied by qualified healthcare professionals on the patient side [6].

Numerous studies have been conducted to determine awareness, practice, and perspectives on telehealth services [3, 5–11]. Healthcare providers recognize the positive impact of telehealth services. Therefore, they see the need to establish infrastructure and integrate telehealth into existing systems [12]. A systematic review reported numerous socio-economic benefits of telehealth, e.g., a better quality of life and less use of in-person services like regular visits [13]. Another systematic review found that telehealth services also provide satisfactory services as conventional healthcare visits [14]. A study conducted in India found that most physicians believe telehealth can play a vital role in the health sector, especially in rural areas [8]. Though most rural people were unaware of telehealth care, it was found that when the concept was described to them, the vast majority of the patients expressed a positive attitude toward telehealth service utilization [11].

In Germany, healthcare professionals were more familiar with telehealth services than non-healthcare professionals [2]. According to Grassl et al., 72% of German healthcare professionals were optimistic about telehealth, whereas non-healthcare professionals were only 36.1% [2]. The University of Colorado and the University of Nebraska reported that knowledgeable telehealth individuals were more likely to utilize the service [15]. A study in China found that awareness and utilization of telehealth were associated with the exposure of commonly utilized types of telehealth [16]. Therefore, the previous exposure to the service seems to enhance the understanding of telehealth.

In Bangladesh, electronic healthcare delivery started in 1998 when the Ministry of Health and Family Welfare (MHFW) launched the Health and Population Sector Program (HPSP) to intensify program management effectiveness in the healthcare system [3]. Telehealth services in Bangladesh are quickly expanding in terms of characteristics and capabilities. The measures of the government of Bangladesh to strengthen the telehealth system have made substantial progress. However, according to Parvin and Shahjahan (2016), the most common obstacles to enhancing telehealth in Bangladesh were insufficient expertise, inadequate education, and lack of advanced training [3].

The successful implementation of telehealth in Bangladesh and its acceptability by patients and healthcare professionals may rely on understanding what they perceive about telehealth. Therefore, it is essential to address the factors that may influence the overall perception related to telehealth services to expand it throughout the country. To the authors' knowledge, no study comprehensively investigated factors associated with the knowledge, perceived benefits, perceived concerns, and predisposition to telehealth among the Bangladeshi population. Hence, this study aimed to investigate factors associated with knowledge, perceived benefits, perceived concerns, and predisposition to telehealth in Bangladesh.

Methods

Study design, participants and settings

Between May 22, 2021, and June 15, 2021, this cross-sectional study was conducted in Bangladesh among 1266 adults. The participants were recruited by following convenience sampling techniques.

Recruitment

We included participants who were (1) at least 18 years old, (2) Bangladeshi nationals, (3) willing to participate, and (4) provided informed consent to participate in the study. We excluded participants who provided (1)

incomplete responses and (2) Bangladeshi nationals who live abroad. We used convenience sampling techniques for participant recruitment. We invited respondents to participate in our study using the following techniques: (1) the research assistants met in person and requested to participate, (2) the research assistants posted and distributed the online questionnaire on Facebook, WhatsApp, and Messengers groups, and (3) the research assistants emailed the online questionnaire. Research assistants approached potential participants on common social media platforms and in person, requesting their friends, family members, and acquaintances to participate by using the online questionnaire. Participants were not required to sign in to their Google accounts to complete the online questionnaire, and no personal information other than the questionnaire items was collected.

Questionnaire development

A self-reported semi-structured questionnaire was developed and transferred to an online questionnaire using "Google Form". The link of the questionnaire was distributed among participants for data collection. The questionnaire includes three sections. In the first section, details of the study, including the inclusion, such as Bangladeshi nationals and exclusion criteria, such as Bangladeshi nationals living abroad, were outlined, and an option for online consent was presented when the participants met the inclusion criteria. In the second section, the items related to demographic information were provided. The third section presented the telehealth service and perceived health status related items. The last section presented the items related to telehealth knowledge, perceived benefit, perceived concern, and predisposition. The Bangla translation version was also provided along with the English version of the questionnaire.

Sample size and power calculation

To the best of our knowledge, no telehealth knowledge studies have been conducted in Bangladesh. Therefore, assuming that 50% of the study participants were knowledgeable about telehealth [17], the calculated sample size was 1067, at a 95% CI of 0.05, 80% power, and a margin of error of 3%, based on the following formula [18]. However, to reduce the margin of error, we included an additional 199 samples, and a total of 1266 samples were included in the final analysis. These additional samples were collected in a subsequent round using the same initial sampling strategies.

$$\text{Sample size} = \frac{Z^2 p(1-p)}{d^2}$$

Study variables

The outcome variables of the study were knowledge, perceived benefit, perceived concern, and predisposition to use telehealth services. To measure the outcomes, we utilize the questionnaire of Gagnon et al., who conducted a study in Quebec, Canada [19]. Gagnon et al., considered, the telediagnosis, telemonitoring, teletriage, teleintervention, remote access, continuing education for health care professionals, cost savings, quality, safety, and confidentiality in developing outcome measure. The outcome measure is structured into four main sections to evaluate various aspects of telehealth. The first section assesses participants' knowledge of telehealth, including specific applications like telediagnosis and telemonitoring, beginning with an introductory question about their awareness and followed by detailed inquiries into each application. In the second section, respondents rate the potential benefits of telehealth, such as improved access in remote areas and cost savings. The third section addresses concerns related to telehealth, such as safety, confidentiality, and the impact on the doctor-patient relationship. Finally, the predisposition to use telehealth services, specifically telediagnosis and teleintervention, is measured. This comprehensive approach helps gauge public perception and concerns regarding various telehealth services. A three-point scale (yes=3, not sure=2, and no=1) was used to measure the knowledge score (range from 5 to 15). A five-point scale was used to measure perceived benefits, perceived concerns, and predisposition to use telehealth services were obtained on. The responses of the items of perceived benefit (range from 4 to 20) and predisposition (range from 2 to 10) were obtained as "strongly agree=5" to "strongly disagree=1" and perceived concern (range from 1 to 5) as "not at all concerned=1" to "extremely concerned=5". For the interpretation, we opted for the median as a cutoff for the moderate level of knowledge, perceived benefit, perceived concern, and predisposition score in the scale. However, the predictor variables include demographics, telehealth service, and perceived health-related information. To measure the perceived health status, we utilized the WHO recommended single-item five-point scale [20–22]. The item responses were obtained from "very bad" to "very good". For statistical analysis, perceived health status was categorized as "poor" "as usual" and "good" [22]. The overall reliability coefficient of the outcome measure, Cronbach's alpha (α) was found to be 0.87. The questionnaire is attached as supporting information (Additional file 1).

Statistical analysis

Data from the study was analyzed using STATA-16, with a p-value of less than 0.05 indicating statistical significance. Descriptive statistics such as frequency

Table 1 Characteristics of study participants ($n = 1266$)

Variables	n	Percent/Mean (SD)
Demographic information		
Mean ages	1266	29.11 (11.25)
Age groups		
<20 years	96	7.58
20-29 years	785	62.01
30-39 years	154	12.16
≥40 years	231	18.25
Sex		
Male	574	45.34
Female	692	54.66
Marital status		
Married	496	39.18
Unmarried	770	60.82
Educational status		
Graduate	515	40.68
Higher secondary	540	42.65
Secondary	211	16.67
Profession		
Employee	628	49.61
Student	638	50.39
Residence		
Urban	1102	87.05
Rural	164	12.95
Division		
Dhaka	1021	80.65
Other than Dhaka	245	19.35
Ever used telehealth service		
No	1044	83.39
Yes	208	16.61
Intention to future use of telehealth service ($n = 1038$)		
Maybe	528	50.87
No	128	12.33
Yes	382	36.80
Perceived health status		
Poor	926	73.14
As usual	236	18.64
Good	104	8.21

distribution, mean, standard deviation (SD), median, and interquartile range (IQR) were performed. The normality of the knowledge, perceived benefit, perceived concern, and predisposition scores were evaluated by using the Shapiro-Wilk test and histogram. Due to non-normal distribution of scores, the Mann-Whitney U test was used for comparing two independent groups, and the Kruskal-Wallis H test was employed for analyses involving more than two groups, instant of the t-test and ANOVA. The Spearman's rank correlation coefficient test was performed to explore the correlation between knowledge, perceived benefit, perceived concern, and predisposition scores. All tests were two-tailed.

Table 2 Distribution of the scores of knowledge, perceived benefits, perceived concerns, and predisposition to use telehealth services

Scores	Mean (SD)	Median (IQR)
Knowledge	13.16 (2.51)	15 (12-15)
Perceived benefits	16.39 (3.19)	17 (14-19)
Perceived concerns	2.75 (1.24)	3 (2-4)
Predisposition	8.07 (1.92)	8 (7-10)

Results

Characteristics of study participants

Table 1 shows the characteristics of the study participants. The mean age of the participants was 29.11 (SD = 11.25). In this study, 54.66% were female, and 90.82% were unmarried. More than 80% were graduates to HSC passed, and almost half were employees (49.61%). Only 16.61% previously utilized the telehealth service, and 36.80% expressed a willingness to utilize the service in the near future. Most of them (73.14%) reported their perceived health status was in the poor category.

Distribution of the scores of knowledge, perceived benefits, perceived concerns, and predisposition to telehealth

The distribution of the scores of knowledge, perceived benefits, perceived concerns, and predisposition toward telehealth is presented in Table 2. The respondents' median score was 15 on the knowledge scale (range: 5-15), which suggests that the participants had more than a moderate level of knowledge about telehealth services. We found the median for the perceived benefits was 17 (range: 4-20), which is more than a moderate level of perceived benefits. The perceived concerns score was found to be 3 (range: 1-5), which indicated participants had a moderate level of perceived concerns. The predisposition score was 8 (range: 2-10), indicating more than moderate perceived predisposition level.

Distribution of study variables by knowledge of telehealth

Table 3 shows the distribution of the study variables by telehealth knowledge. Knowledge was significantly associated with age (p <0.001), with the youngest (20 years) having the highest score (13.52). Participants who were male (p = 0.013) and unmarried (p <0.001) had significantly higher scores. The participants'

Table 3 Distribution of study variables by knowledge of telehealth

Variables	Mean (SD)	Median (IQR)	x^2/z value	*p*-value
Demographic information				
Age				
<20 years	13.52 (2.45)	15 (13-15)	35.04	**<0.001**
20-29 years	13.38 (2.41)	15 (13-15)		
30-39 years	12.94 (2.62)	14 (11-15)		
≥40 years	12.43 (2.64)	13 (10-15)		
Sex				
Male	13.35 (2.41)	15 (12-15)	2.48	**0.013**
Female	13.00 (2.58)	14 (11-15)		
Marital status				
Married	12.73 (2.58)	14 (11-15)	-5.71	**<0.001**
Unmarried	13.44 (2.43)	15 (13-15)		
Educational status				
Graduate	13.45 (2.27)	15 (12-15)	64.03	**<0.001**
HSC	13.38 (2.39)	15 (12.5-15)		
Up to SSC	11.88 (2.95)	13 (10-15)		
Profession				
Employee	12.70 (2.69)	14 (11-15)	6.83	**<0.001**
Student	13.63 (2.22)	15 (13-15)		
Residence				
Urban	13.17 (2.50)	15 (12-15)	-0.49	0.623
Rural	13.09 (2.61)	14 (12-15)		
Division				
Dhaka	13.15 (2.52)	15 (12-15)	-0.19	0.849
Other than Dhaka	13.21 (2.46)	15 (12-15)		
Telehealth service related information				
Utilized the service				
No	13.05 (2.59)	14 (11-15)	-3.35	**<0.001**
Yes	13.76 (1.95)	15 (13-15)		
Planning of utilizing service (*n* = 1038)				
Maybe	12.84 (2.53)	14 (11-15)	154.16	**<0.001**
No	11 (3.09)	11 (9-14)		
Yes	14.11 (1.84)	15 (14-15)		
Health related information				
Perceived health status				
Poor	13.322	15 (12-15)	20.16	**<0.001**
As usual	12.79	14 (11-15)		
Good	13.32	13 (11-15)		

Table 4 Distribution of study variables by perceived benefit of telehealth

Variables	Mean (SD)	Median (IQR)	x^2/z value	*p*-value
Demographic information				
Age				
<20 years	16.44 (3.46)	17 (14-19)	19.65	**<0.001**
20-29 years	16.64 (3.09)	17 (15-19)		
30-39 years	16.08 (3.40)	16 (14-19)		
≥40 years	15.72 (3.14)	16 (13-18)		
Sex				
Male	16.48 (3.05)	17 (15-19)	0.58	0.560
Female	16.31 (3.30)	17 (14-19)		
Marital status				
Married	15.97 (3.31)	16 (14-19)	-3.74	**<0.001**
Unmarried	16.65 (3.08)	17 (15-19)		
Educational status				
Graduate	16.48 (3.10)	17 (15-19)	5.09	0.080
HSC	16.50 (3.11)	17 (15-19)		
Up to SSC	15.85 (3.53)	16 (14-19)		
Profession				
Employee	16.77 (3.31)	17 (15-19)	4.19	**<0.001**
Student	16.01 (3.01)	16 (14-19)		
Residence				
Urban	16.13 (3.20)	16.5 (14-19)	-1.45	0.149
Rural	16.42 (3.10)	17 (15-19)		
Division				
Dhaka	16.50 (3.22)	17 (15-19)	2.51	**0.012**
Other than Dhaka	15.92 (3.34)	17 (14-19)		
Telehealth service related information				
Utilized service				
No	16.30 (3.15)	17 (14-19)	-2.93	**0.003**
Yes	16.84 (3.31)	18 (15-19.5)		
Planning of utilizing service (*n*=1038)				
Maybe	15.91 (2.95)	16 (14-18)	184.50	**<0.001**
No	13.72 (3.56)	14 (12-16)		
Yes	17.81 (2.34)	18 (16-20)		
Health related information				
Perceived health status				
Poor	15.95 (3.10)	17 (14-19)	6.03	**0.040**
As usual	16.10 (3.33)	17 (14-19)		
Good	16.51 (3.15)	17 (15-19)		

educational status was shown to be significantly related to their knowledge (p <0.001). Students (p <0.001) and those who had previously utilized telehealth services (p <0.001) had significantly higher scores. Planning of utilizing the telehealth service (p <0.001) and perceived health status (p <0.001) of the respondents was related to their knowledge.

Distribution of study variables by perceived benefit of telehealth

Table 4 represents the distribution of the study variables by the perceived benefit of telehealth. The perceived benefit of telehealth was significantly associated with age (p < 0.001). The perceived benefit score was significantly higher for unmarried (p < 0.001) and employed (p

Table 5 Distribution of study variables by perceived concerns of telehealth

Variables	Mean (SD)	Median (IQR)	x^2/z value	*p*-value
Demographic information				
Age				
<20 years	2.95 (1.35)	3 (2-4)	12.37	**0.006**
20-29 years	2.69 (1.21)	3 (2-4)		
30-39 years	2.59 (1.81)	3 (2-3)		
≥40 years	2.98 (1.30)	3 (2-4)		
Sex				
Male	2.68 (1.25)	3 (2-3)	2.35	**0.019**
Female	2.84 (1.22)	3 (2-4)		
Marital status				
Married	2.78 (1.25)	3 (2-4)	0.73	0.467
Unmarried	2.73 (1.25)	3 (2-4)		
Educational status				
Graduate	2.69 (1.22)	3 (2-4)	3.87	0.145
HSC	2.75 (1.22)	3 (2-4)		
Up to SSC	2.90 (1.33)	3 (2-4)		
Profession				
Employee	2.74 (1.26)	3 (2-4)	0.24	0.811
Student	2.76 (1.22)	3 (2-4)		
Residence				
Urban	2.72 (1.24)	3 (2-4)	2.30	**0.022**
Rural	2.95 (1.24)	3 (2-4)		
Division				
Dhaka	2.72 (1.25)	3 (2-4)	-1.92	0.055
Other than Dhaka	2.87 (1.17)	3 (2-4)		
Telehealth service related information				
Utilized service				
No	2.80 (1.24)	3 (2-4)	2.66	**0.008**
Yes	2.55 (1.22)	2 (2-3)		
Planning of utilizing service (*n*=1038)				
Maybe	2.84 (1.15)	3 (2-4)	58.83	**<0.001**
No	3.45 (1.27)	4 (3-5)		
Yes	2.50 (1.27)	2 (1-3)		
Health related information				
Perceived health status				
Poor	2.71 (1.22)	3 (2-4)	3.70	0.158
As usual	2.86 (1.25)	3 (2-4)		
Good	2.88 (1.33)	3 (2-4)		

Table 6 Distribution of study variables by predisposition of telehealth

Variables	Mean (SD)	Median (IQR)	x^2/z value	*p*-value
Demographic information				
Age				
<20 years	7.99 (2.08)	8 (7-10)	8.56	**0.036**
20-29 years	8.18 (1.86)	8 (7-10)		
30-39 years	8.07 (1.90)	8 (7-10)		
≥40 years	7.75 (2.03)	8 (6-10)		
Sex				
Male	8.04 (1.95)	8 (7-10)	0.59	0.558
Female	8.11 (1.89)	8 (7-10)		
Marital status				
Married	7.92 (2.00)	8 (7-10)	-2.03	**0.042**
Unmarried	8.17 (1.86)	8 (7-10)		
Educational status				
Graduate	8.22 (1.71)	8 (7-10)	4.73	0.094
HSC	8.06 (1.98)	8 (7-10)		
Up to SSC	7.74 (2.18)	8 (6-10)		
Profession				
Employee	8.19 (1.98)	8 (7-10)	2.01	**0.045**
Student	7.96 (1.85)	8 (7-10)		
Residence				
Urban	7.74 (1.91)	8 (6-10)	-2.52	**0.012**
Rural	8.12 (1.97)	8 (7-10)		
Division				
Dhaka	8.12 (1.90)	8 (7-10)	1.69	0.090
Other than Dhaka	7.88 (2.00)	8 (6-10)		
Telehealth service related information				
Utilized service				
No	7.99 (1.93)	8 (7-10)	-3.90	**<0.001**
Yes	8.49 (1.86)	9 (8-10)		
Planning of utilizing service (*n*=1038)				
Maybe	7.81 (1.77)	8 (6-9)	191.89	**<0.001**
No	6.23 (2.21)	6 (5-8)		
Yes	8.91 (1.41)	10 (8-10)		
Health related information				
Perceived health status				
Poor	7.63 (2.17)	8 (6-10)	7.08	**0.029**
As usual	7.91 (2.03)	8 (6.5-10)		
Good	8.16 (2.17)	8 (7-10)		

= 0.001) participants. The perceived benefit was significantly higher among those who resided outside Dhaka (p = 0.012) and previously utilized the service (p = 0.003). The perceived benefit was significantly associated with the participants' planning to utilize it in the near future (p <0.001).

Distribution of study variables by perceived concerns about telehealth

The distribution of the study variables by perceived concerns about telehealth this presented in Table 5. The participants' age was found to be significantly associated with their perceived concerns (p = 0.006).

The perceived concern score was significantly higher in females ($p = 0.019$), rural residents ($p = 0.022$), and those who had never utilized telehealth before ($p = 0.008$). The plan to utilize telehealth services in the future ($p < 0.001$) was found to be significantly associated with concerns.

Distribution of study variables by predisposition to telehealth

Table 6 represents the distribution of the study variables by the predisposition for telehealth. Age was found to be significantly associated with the predisposition score ($p = 0.036$). The predisposition score of unmarried ($p = 0.042$), working ($p = 0.045$), and rural participants ($p = 0.012$) was found to be significantly higher. Those who used telehealth service previously had a significantly higher predisposition score ($p < 0.001$). The predisposition was significantly associated with the participants' willingness to utilize telehealth services ($p < 0.001$) and their perceived health status ($p = 0.029$).

Spearman's rank correlation coefficient matrix

The Spearman's rank correlation coefficient matrix is presented in Table 7. The knowledge score was significantly positively correlated with the perceived benefit ($r = 0.428$, $p < 0.05$), and predisposition ($r = 0.411$, $p < 0.05$) score. Besides, the knowledge score was significantly negatively correlated with the perceived concerns ($r = -0.180$, $p < 0.05$) score.

Discussion

Telehealth has been implemented across various countries worldwide, and it is expanding in rural settings too, and people have more convenient access to low-cost healthcare services [23, 24]. Paige et al., found that the majority of cancer patients were satisfied with each telehealth service during the COVID-19 pandemic [25]. Keeping pace with the global wind, the field of telehealth is also growing drastically in Bangladesh. Telehealth service has already demonstrated promise and success during the emergence of COVID-19 as the government provided continuous support to COVID-19 infected patients following stay-at-home orders [26]. However, this current study was the first attempt in Bangladesh that investigate the factors associated with knowledge, perceived benefits, perceived concerns, and predisposition to telehealth among the Bangladeshi population.

Table 7 Spearman's rank correlation coefficient matrix

Variables		1	2	3	4
1	**Knowledge**	1.00			
2	**Perceived benefits**	0.467*			
3	**Perceived concerns**	-0.180*	-0.325*		
4	**Predisposition**	0.411*	0.785*	-0.357*	1.00

* $p < 0.05$

This study found that 16.61% of participants utilized the telehealth service previously. Sim et al., in Singapore revealed that 95.6 % had no experience with telehealth service utilization, although the majority also had to lack of effective devices to utilize the services [27]. According to our study, younger people possessed more knowledge of telehealth services. In China, Chen et al., revealed that middle-aged people had adequate knowledge of telehealth services [16]. The male participants were also more knowledgeable than the female in our study. In Saudi Arabia, Albarrak et al., explored that 77% of males had a good knowledge of telehealth [5]. According to our study, the knowledge level was found to be higher among the graduate and HSC passed participants. In Ethiopia, the level of knowledge on telehealth was found to be higher (75%) among bachelor's degree holders [28]. This might be because they gained knowledge of telehealth through different sources of campaigning, conference, or educational institution [23]. Our study found that the maximum number of participants were students with higher knowledge scores on telehealth. This result was because students might be more knowledgeable about online technology and distance learning and communication capabilities than others [29–33]. In our study, participants who already utilized and were planning to utilize the service were significantly more knowledgeable. The possible reason could be their better experience, previous learning, and satisfaction with the prior service they had utilized, as telehealth offers comparatively easy and convenient access to health care for all [34]. However, better explanations and campaigns were reported to be enhanced the understanding of the potential benefits and knowledge of the telehealth service [35]. We found health status was associated with the perceived knowledge in our study. Similar to our findings, Knaepen et al. reported that patients with cardiovascular disease reported having a positive attitude toward telemedicine [36].

According to our study, unmarried participants had a higher perceived benefit of telehealth. On the other hand, Lee et al., reported that married people thought of the advantage of telehealth and felt they benefited from service [37]. This study showed that employees had a better-perceived benefit from telehealth. Ayatollahi et al., revealed that job holders perceived telehealth as beneficial as it is simple to access, and telehealth may be able to boost productivity by saving their time of frequent physician appointments and visits [35]. In our study,

participants planning to utilize telehealth services perceived more benefits of telehealth. Jennett et al., highlighted in a systematic review that those who were aware of the significant advantages of expanded access to quality healthcare were more intended to utilize the service [13].

Our findings showed that most older people had perceived concerns regarding telehealth. Similarly, in England, Kayyali et al., exposed that older residents were more concerned with telehealth services related to their data privacy [38]. In our study, female participants expressed more concern about telehealth. In California, Lee et al., showed that more than half of the females were concerned about telehealth [39]. The study found that females felt very uncertain about any web-based health care and had no previous experience [15]. According to our study findings, rural people were concerned about telehealth. This was because rural people might be less educated and have not received any campaigns or seminars on the importance of telehealth [40]. In our study, those who never utilized telehealth services perceived more concerns about telehealth. In India, Meher et al., revealed that people did not utilize telehealth services as they did not have the proper knowledge and were afraid to get accustomed to it [11].

In this study, the oldest people were more predisposed toward telehealth. On the contrary, in Germany, Grassl et al., showed that young people had a positive attitude and were more predisposed to telehealth [2]. Our study showed that employees felt predisposition toward telehealth services utilization. In Austria, Wernhart et al., revealed that more than a quarter of employees had a positive attitude toward telehealth [9]. Employees were more familiar with utilizing the internet-based service, and they felt more predisposed with these services [10]. Our study found that those who previously used the telehealth service had a higher predisposition toward telehealth. Similarly, Gagnon et al., reported that almost half of the participants receiving telehealth were predisposed toward telehealthcare [19]. In Queensland, Cottrell et al., indicated that 13% of participants were utilizing telehealth services, and 60% of participants were interested in utilizing the telehealth service near future [41].

Our study expressed that people who utilized the service or planning to utilize telehealth were more prone to the predisposition to telehealth care. In Canada, Gagnon et al., revealed that more than half of the participants receiving a telediagnosis were more predisposed to the service [19]. However, Tase et al. mentioned that the end-user should be considered to participate during the development phase of health technology to render it more user-friendly [42]. On the other hand, Liu et al., mentioned that the home environment should be incorporated while designing and implementing patient-centered telehealth systems for disease self-management [43]. Tao et al., found that system weaknesses in design contribute to the reduced use of online self-management systems [44]. To improve usability, the telehealth developers may need to consider practical challenges from the user's perspective [45]. Moreover, the healthcare professionals may also need to collaborate in interdisciplinary teams to improve telehealth services [46].

The study findings showed that telehealth knowledge is significantly positively correlated with perceived benefit and predisposition to telehealth. Telehealth knowledge may enhance its utilization and thus enables perceived benefits and predisposition to telehealth. Besides, telehealth knowledge significantly negatively correlated with perceived concerns. Telehealth knowledge may increase their confidence in utilizing the service, reducing their perceived concerns.

Limitations

The design of the study is cross-sectional, which limits the establishment of causality or the capture of temporal relationships. Another limitation of this study is the relatively young mean age of the participants. The sampling approach employed, which utilized convenient sampling techniques, may have been selection biases that skewed the demographics towards a younger age group. Participants were recruited from friends, family, and acquaintances, which may make the sampling approach highly biased and selective. About half of the participants were students, which further contributes to the youthfulness of the participants. We acknowledge the perceived health status of the participants, with 73% indicating their perceived health as poor despite the relatively young age demographic. This finding is intriguing and plausible, as the convenience sampling techniques employed inadvertently resulted a sample with a higher prevalence of individuals perceiving their health as poor compared to the general population of Bangladesh. For example, Hossain et al., reported 13.9% of the Bangladeshi university students had poor perceived health [47] and Uddin et al., found that the majority of the elderly in the sample (55.7%) were in an average state of health, while only 20.3% were in poor health [48]. This demographic skew could potentially limit the generalizability of the study findings to the broader population of Bangladesh. Furthermore, future research could employ more diverse sampling strategies to better represent various demographic groups within the population.

Data collection for the study was conducted online, based on self-reported responses. Participants were responsible for verifying their own eligibility to participate in this study. The authors were unable to perform secondary verification. As a result, participants who did not meet the eligibility criteria may have still participated. For instance, the eligibility criteria required participants to be Bangladeshi nationals residing in Bangladesh. However, those living outside Bangladesh may have participated in the study and were not able to be identified or excluded. Additionally, the study did not evaluate the psychometric properties of the questionnaire, leaving the validity and reliability of the tool unknown.

Conclusions and recommendations

According to the findings of this study, a number of factors influenced participants' knowledge, perceived benefit, perceived concern, and predisposition for telehealth services. The findings underscore the significant impact of sociodemographic and telehealth service-related factors on the knowledge, perceived benefits, perceived concern, and predispositions toward telehealth. The healthcare policymakers and providers should focus on targeted educational and promotional strategies that address the specific needs and concerns of different demographic groups. Efforts to enhance telehealth literacy, especially among women and rural residents who have expressed significant concerns, could further facilitate the acceptance and widespread adoption of telehealth services. Furthermore, telehealth services are widely acknowledged as a platform that enables easy and equitable access to healthcare services for all citizens in Bangladesh [49]. Our study emphasizes the notion that telehealth is a promising alternative to traditional healthcare delivery methods, with the potential to significantly enhance healthcare accessibility and efficiency, particularly in areas where traditional healthcare services are limited.

Supplementary Information

The online version contains supplementary material available at https://doi.org/10.1186/s44247-024-00106-8.

Additional file 1.

Additional file 2.

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Authors' contributions
Conceptualization: HK, MKH. Data curation: HK, MKH. Formal analysis: HK. Methodology: HK, MKH, DKM. Project administration: HK, MKH. Visualization: HK, MKH, SRC, DKM. Writing - original draft: HK, MKH, SJ. Writing - review & editing: HK, MKH, SJ, SRC, DKM.

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Availability of data and materials
Data of the study can be found in Additional file 2.

Declarations

Ethics approval and consent to participate
The study protocol was reviewed and approved by the Tejgoan College, Dhaka-1215, Bangladesh, Ethical Review Committee (reference number 2021/OR-TGC/0202). The study's aims and objectives were clearly presented among the participants. Before data collection, informed consent was obtained from the participants. The participants' privacy was protected, and the freedom of withdrawal was also confirmed. The research methods adhered to the guidelines outlined in the Declaration of Helsinki [50].

Consent for publication
Not applicable to this study.

Competing interests
The authors declare no competing interests.

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