Attitude and Obstacles of Community Dwelling Older Adults toward Using Mobile Technology for Health Care

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Abstract:
Aging is associated with increased incidence of chronic diseases resulting in reduced older adults physical and psychosocial health which need frequent and regular monitoring and follow up. Mobile health technology use associated with improved their health literacy, self-care, independence, and wellbeing. **Aim of the study:** To identify the attitude and obstacles of community dwelling older adults toward using mobile technology for health care. **Setting:** This study was conducted in the outpatient clinics of Damanhour National Medical Institute. **Subjects:** Convenience sample of one hundred twenty-two older adults who were eligible for the study. **Tools**: Three tools were used to collect the study data: 1) Basic Data Structured Interview Questionnaire, 2) The Digital Health Scale and 3) Community Dwelling Older Adults Perceived Obstacles to Learning and Using Mobile Health Technology check list. **Results:** 54.1% of the studied older adults have negative attitude toward using the mobile technology for health care and the most prevalent obstacles were lack of smart phone and Wi-Fi connection, rare use of electronic device, low educational level, lack of trainer to teach mobile technology, and complex hospital online system, applications and technology. **Conclusion:** The majority of the studied older adults have negative attitude toward using the mobile technology for health care and reported some obstacles for its use. **Recommendations**: Developing an educational program for older adults, and other health team members at different health care settings about importance of applying mobile technology for health care and how to overcome the obstacles of using it.

Keywords: Attitude, Community Dwelling, Health Care, Mobile Technology, Obstacles & Older Adults.

Introduction
With rapidly growing older adult's population, new information and communication technologies is particularly crucial as risks for functional decline and independence loss increase with aging process and development of chronic diseases. Using mobile technology for health care may help in compliance with medication by prompting alerts, provide older adults with self-care guidance, facilitate self-monitoring of various biometrics or provide education on disease management **(Kim, et al., 2016; Hoque, & Sorwar, 2017)**. It also offers many advantages for the health care system as is low in cost and reduce the older adult's visits to the health care services, thus it can reduce the burden on the healthcare system. **(Kuerbis, et al., 2017)**

Mobile technology is also known as mobile health (mHealth) which is portable or wearable transmitting device with multifunctional abilities to send, receive, and store health information. These devices include cell phones, smart phones, tablets, or wearable sensors that, can gather data related to health, enhance communication; and provide prompt interventions to the users **(Izmailova, et al., 2018; et al., 2022).**

An attitude is a judgment of an object, ranging from the mundane to the abstract; it also refers to cognitions, feelings and behaviors to an object **(Otto, 2021)**. Attitude toward the use of mobile technology in health care represent the various components of attitudes such as feeling, behavior and cognition and the various aspects and issues related to technology use in the health care, such as ease of use, reliability and privacy **(Cassidy, 2021)**. Most studies on the attitude toward technology often focus on feelings of older adults or beliefs toward electronic technology and the cause of such feelings **(Jinbo, & Zihao, 2021).**

Older adults also experience actual obstacles to use and accept mobile health technology. Normal changes associated with ageing in physical and mental status may affect their acceptance and usage of mobile health technology **(Kuerbis et al., 2017)**. Older adult with visual and motor impairments may perform task using technology more slowly than individual without such impairments. Using mHealth is challenging for those with visual impairments **(Gromisch, et al., 2021)**.

Age-related declines in vision acuity, color perception, and contrast sensitivity impede the older adults' ability to read online pages, mobile applications and mobile screens that have complicated fonts, too many visual elements, or colors that are not sharply contrasted. In addition, limited eye movement makes older adults to

unintentionally neglect the periphery on websites and work more slowly on web-based tasks **(Romano Bergstrom, et al. 2016).**

The older adults' ability to comprehend synthetic sounds may be hindered by hearing impairment, which is also frequent in aging as difficulty hearing high frequency sounds, deciphering fast speech, and understanding speech over a noisy background **(Kuerbis et al., 2017).**

As well, the ability of older adults to properly use touch screens with small or too close together buttons can also be hampered by deterioration of fine motor coordination or the presence of tremors which cause high rates of error **(Kuerbis et al., 2017)**. Fluid intelligence, which includes short-term memory, problem-solving in new situations, inhibitory control, and processing speed, also decreases with age. As a result, older adults may find it more difficult to filter out unnecessary data (such as animated software components) and learn how to use technology to happen a slower rate than younger adults **(Ray, 2021).**

Additionally, older adults have little experience with and knowledge about mobile devices. They also have low confidence in and underrate their competence to use devices. The majority of hardware and software technology is not prepared for older adults. As a result, older adults frequently struggle to understand icons, get lost in device menus, have poor response to tap functions on touch screens, and are worry about battery depletion **(Takemoto et al., 2018; Wilson, et al., 2021).**

Another barrier is limited or constant income such as a pension which cause lack of access to purchase and upgrade the smart phone, as well as high cost to afford an internet/mobile data or wi-fi service bills **(Wilson, et al., & Kay-Lambkin, 2021).**

Despite the acceptance and intention of older adults to use mobile health technologies, studies demonstrated that actual use and adoption of mobile health technologies by older adults is low and inconsistent **(Georgsson, & Staggers, 2016; Athilingam, Labrador et al., 2016)**. Gerontological nurses have a significant role to play within the multi-disciplinary health-care team in training older adults through mobile use in a variety of topics including diet, social activities, and exercises that can enhance their health, independence, and limit disabilities related to ageing**(Deng, Liu, 2014)**. It is also important for the gerontological nurse to help the older adults to overcome the obstacles for learning and using mobile technology in the health care **(Ma et al., 2022).**

Aim of study:
The aim of this study was to identify the attitude and obstacles of community dwelling older adults toward using mobile technology for health care.

Research questions:
1. What is the attitude of community dwelling older adults toward using mobile technology for health care?
2. What are the obstacles of community dwelling older adults toward using mobile technology for health care?

Subjects and Methods:
Research Design: This study followed a descriptive research design.

Setting: The study was conducted in five outpatient clinics of Damanhur National Medical Institute El-Behaira Governorate namely medical, urologic, ophthalmic, orthopedic, dental outpatient clinics. These clinics receive patients from El-Behaira Governorate. The working hours of these clinics are from 9 am to 12 pm all week days except Friday. The estimated number of older adults attending these clinics ranges from 70 to 92 per month.

Subjects:
The study subjects consisted of convenience sample of 122 older adults attending the previously mentioned setting and fulfilling the following criteria:
- Aged 60 years and above.
- Able to communicate effectively.
- Has working telephone

The Epi info V 7.0 program was used to estimate the sample size based on the following parameters: Population size during the three months (from October to December 2022) was 243 older adults, Expected frequency: 50%, Acceptable error: 10%, Confidence coefficient: 95%. The program revealed a minimum sample size of 112 older adults. However, this study was conducted on a sample size 122 older adults for the purpose of improving validity of the research results.

Tools of the study:
In order to collect the necessary data, three tools were used.

Tool (I): Basic data structured interview Questionnaire.
This tool was developed by the researchers based on the relevant literature and includes three parts:

Part 1: Demographic data of the older adults such as age, sex, marital status, educational level, occupation before retirement, residence and monthly income.

Part 2: Health profile of the older adults which includes medical history, medications used and use of hearing aids and eye glasses.

Part3: Telephone data such as type of phone, duration and frequency of mobile use, problems related to mobile use and uses of mobile

Tool II: "The Digital Health Scale (DHS)"
The DHS Scale was developed by **Cassidy (2021)**. It is a self-report measure of attitudes toward digital

health technology (the use of electronic systems and devices, including smart phones and apps, computers, telephone booking systems and the internet, for diagnosis and treatment of illnesses and more general healthcare organization and education). This scale consists of 20 statements representing the various components of attitudes, i.e., emotion, behavior and cognition and the various aspects and issues related to the use of technology in health care such as ease of use, reliability and privacy. Subjects respond to each statement along a 5-point likert scale from strongly agree to strongly disagree. This scale contains a mix of positively and negatively worded statements, with scores for positive statements (2,4,5,9,11,13,14,16,18) reversed so that a high DHS score indicates a positive attitude towards digital health. The total score of the scale ranges from 20 to 100 classified as follow:-

- Score 20-59 indicate negative attitude.
- Score 60-79 indicate neutral attitude.
- Score 80-100 indicate positive attitude.

The author has tested the internal consistency and reliability of the entire tool. The Cronbach's alpha reliability coefficients for the entire tool was 0.84 **(Cassidy, 2021)**

Tool III: Community Dwelling Older Adults Perceived Obstacles to Learning and Using Mobile Health Technology Checklist"

This tool was developed by the researchers based on review of relevant literatures **(Navabi, et al., 2016, & Tu, et al., 2021)** to evaluate the obstacles of community dwelling older adults for using mobile technology for health care. It contains 13 items and has 4 dimensions: health problems (4 items), electronic devices obstacles (3 items), learning difficulties (4 items), and other obstacles (2 items). Each question was answered with yes or no. Zero is for no or absence of obstacles while 1 is for yes or presence of obstacles. The total score is calculated for each question using number and percent.

Method

1. Official letter was issued from the Faculty of nursing, Damanhur University and forwarded to the head of the study setting of Damanhur National Medical Institute at El-Behaira Governorate to obtain assistance and approval to carry out the study after informing him about the purpose of the study, the date and the time of data collection.
2. The researchers developed tool I **(Basic data structured interview Questionnaire)** and tool III (**Community Dwelling Older Adults Perceived Obstacles to Learning and Using Mobile Health Technology Checklist**) after a thorough review of relevant literature.

The researchers translated tool II (**Digital Heath Scale)** into Arabic language.

3. Five experts in the related fields of Gerontological Nursing and Medical Surgical Nursing tested tools II and III for content validity and the required modifications were carried out accordingly.
4. Cronbach's coefficient alpha test was used to test the reliability of tools II and III. The reliability result for tool II was r=0.78 and tool III was r=0.81.
5. A pilot study was carried out on 13 older adults (those older adults were not included in the study subjects) selected from the study setting to assess for the applicability and clarity of the tools, also to estimate the approximate time needed to complete the study tools. In the light of the findings of the pilot study, the necessary modifications were done. Then, the tools were put into their final form.
6. The researchers interviewed individually the older adults who attending the study setting and fulfilling the inclusion criteria after explaining the purpose of the study in the waiting area of the outpatient clinics to collect necessary data.
7. Attitude and obstacles of older adults toward using mobile technology for health care were assessed using tools II and III.
8. The researchers were used to go to the outpatient clinics Sunday, Tuesday and Thursday every week from 9 Am to 12 Pm. About four to seven older adults were interviewed daily by the researchers, the time of interview ranged from 20 to 30 minutes to complete the tools of the study according to the understanding level and cooperation of the study subjects.
9. The period of data collection took a two months started from end of March till the end of May 2023.

Ethical consideration:

After explanation of the study purpose, verbal consent was obtained from each subject in the study. Each subject was assured about the confidentiality of the collected data. The privacy and anonymity of each subject was maintained.

Statistical analysis:

IBM SPSS software package version 26.0 were used to feed data to the computer and analyzed (Armonk, NY: IBM Corp). Number and percent used to describe qualitative data. Range (minimum and maximum), mean, standard deviation used to describe quantitative data. The level of significance was ≤ 0.05

Results

Table (1): Distribution of the studied older adults according to their socio demographic characteristics:

Demographic characteristics	n= 122	
	No	%
Age in years:		
60-	75	61.5
75-	39	32.0
≥85+	8	6.5
Mean ±SD	74.56±8.35	
SEX:		
Male	56	45.9
Female	66	55.1
Marital status:		
Married		59.8
Widow	73	26.2
	32	9.8
divorced	12	4.1
Single	5	
Level of education:		
Illiterate	40	32.8
Read and write	35	28.7
Basic education	21	17.2
Secondary	8	6.6
university education	18	14.8
Occupation before retirement:		
Employee	43	37.7
Housewife	46	35.2
Private work	4	3.3
Worker	23	23.8
Living arrangement:		
Living with family\ children	60	49.2
Spouse	55	45.1
Living alone	4	3.3
Relatives	3	2.5
Residence:		
Rural	73	59.8
Urban	49	40.2
Income:		
Enough	70	57.4
Not enough	52	42.6
Source of income		
Children	58	47.5
Pension	50	41.0
Current work	8	6.6
Social assistance	6	4.9

Table (2): Distribution of the studied older adults according to their medical history

Medical history	n=122	
	No	%
Presence of comorbidities:		
Yes	104	85.2
No	18	14.8
Type of medical disease: #(104)		
Musculoskeletal diseases	82	78.8
Cardiovascular diseases	81	77.9
GIT diseases	78	75.9
Endocrine diseases	73	70.2
Kidney and urinary system diseases	22	21.1
Respiratory diseases	21	20.2
Psychological diseases	7	6.7
Parkinson disease	2	1.9
Current medication used: #		
Yes	104	85.2
No	18	14.8
Type of medication used:#(104)		
Musculoskeletal medications	82	78.8
Cardiovascular medications	81	77.9
GIT medications	78	75.9
Endocrine medications	73	70.2
Kidney and urinary system medications	22	21.1
Respiratory medications	21	20.2
Psychological medications	7	6.7
Parkinson medications	2	1.9
wearing eye glasses		
No	113	92.6
Yes	9	7.4
Wearing hearing aid		
No	119	97.5
Yes	3	2.5

Table (3): Distribution of the studied older adults according to their mobile characteristics

Mobile' characteristics	n= 122	
	No	%
Type of phone :		
Usual	93	76.2
Smart	29	23.8
Duration of mobile use(in years):		15.6
1 -	19	34.4
3 -	42	40.2
6 -	49	9.8
≥9+	12	
Number of mobile use hours per week:		
1 hrs-	82	67.2
5 hrs-	32	26.2
10 ≥ 15hrs	8	6.6
Mobile use: #		
Calling others	100	82.0
Using an alarm to alert specific time	57	46.7
Sending text messages	39	32.0
Using mobile phone memory to write notes	38	31.1

| Mobile' characteristics	n= 122	
	No	%
Using the radio on a mobile phone	26	21.3
Location tracking or GPS	23	18.9
Using a mobile phone to record	18	14.8
Taking pictures	16	13.1
Using mobile games	16	13.1
Using the social network for social interaction	12	9.8
Searching for health problems	10	8.2
Transfer medical information	8	6.6
Complain related to mobile use:		
No	55	45.08
Yes	(n=67)	54.92
Eye strain	42	62.68
Headache	42	62.68
Muscle and joint pain	32	47.76
Fatigue	26	38.8
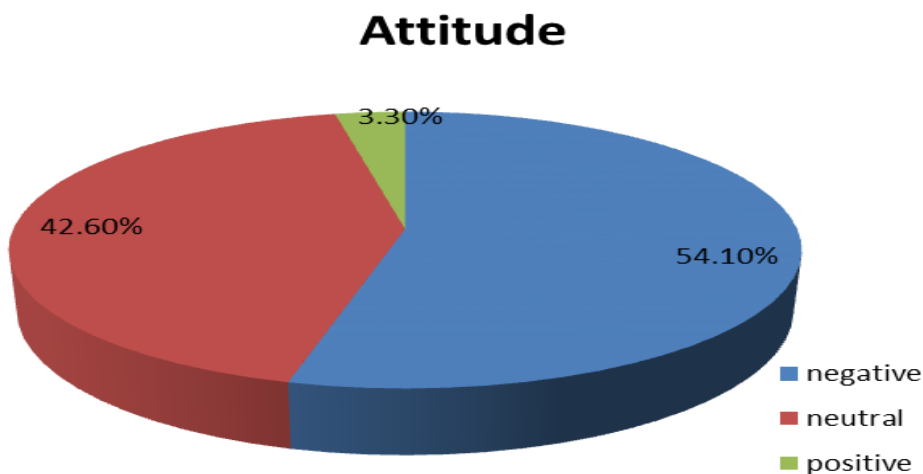
Figure (1): Distribution of the studied older adults according to their attitude toward using mobile technology for health care (n= 122).

Table (4): Distribution of the studied older adults according to their perceived obstacles for mobile use in health care:

Obstacles	n= 122	
	No	%
Health status:		
Perceived health risks related to using mobile technology as harmful radiations, eye strains and headache.	31	25.4
Sensory problem(vision\ hearing impairment)	38	31.1
Memory / cognitive problem	50	41.0
Motor skills problems making typing on phone difficult	51	41.8
Devices:		
Lack of smart phone	93	76.2
Rare use of electronic device	94	77.0
Lack of network or Wi-Fi connections	110	90.2
Learning difficulties:		
Low educational level	66	54.1
low self confidence in one's ability to learn(under estimate their ability to learn)	60	49.2
Lack of trainer to teach mobile technology	110	90.2
Complex online hospital system, applications and technology (not prepared for older adults)	115	94.3
Other obstacles		
Lack of time to learn (multiple responsibilities and obligations)	44	36.1
Fear of data security and privacy	37	30.3

Table (5): Relation between attitude toward using mobile technology for health care and older adults' demographic and health history

Demographic characteristics	Attitude (n=122)						χ^2	^{MC}p
	Negative (n = 66)		Neutral (n = 52)		Positive (n = 4)			
	No.	%	No.	%	No.	%		
Age in years								
60-	43	65.2	28	53.8	4	100.0		
75-	17	25.8	22	42.3	0	0.0	6.033	0.165
≥85	6	9.1	2	3.8	0	0.0		
Sex								
Male	28	42.4	24	46.2	4	100.0	4.720	0.093
Female	38	57.6	28	53.8	0	0.0		
Marital status								
Married	39	59.1	30	57.7	4	100.0		
Widow	18	27.3	14	26.9	0	0.0	8.263	0.177
Divorced	4	6.1	8	15.4	0	0.0		
Single	5	7.6	0	0.0	0	0.0		
Level of education								
Illiterate	22	33.3	18	34.6	0	0.0		
Read and write	21	31.8	14	26.9	0	0.0		
Basic education	13	19.7	8	15.4	0	0.0	17.592*	0.008*
Secondary	6	9.1	2	3.8	0	0.0		
University education	4	6.1	10	19.2	4	100.0		
Occupation before retirement								
House wife	34	51.5	12	23.1	0	0.0		
Employee	17	25.8	22	42.2	4	100.0	16.055*	0.006*
Worker	13	19.7	16	30.8	0	0.0		
Private work	2	3.0	2	3.8	0	0.0		
Living arrangement:								
Living with family\ children	34	51.5	26	50.0	0	0.0		
Spouse	29	43.9	22	42.3	4	100.0	12.331*	0.033*
Living alone	0	0.0	4	7.7	0	0.0		
Relatives	3	4.5	0	0.0	0	0.0		
Income								
Enough	36	54.5	30	57.7	4	100.0	2.871	0.241
Not enough	30	45.5	22	42.3	0	0.0		
Source of income								
Children	20	30.3	26	50.0	4	100.0		
Pension	32	48.5	26	50.0	0	0.0	19.552*	0.001*
Current work	8	12.1	0	0.0	0	0.0		
Social assistance	6	9.1	0	0.0	0	0.0		
Residence								
Rural	33	50.0	36	69.2	4	100.0	6.823*	0.024*
Urban	33	50.0	16	30.8	0	0.0		
Presence of comorbidities: Yes No	58 8	87.9 12.1	44 8	84.6 15.4	2 2	50.0 50.0	3.860	0.164
Eye glasses No Yes	63 3	95.5 4.5	46 6	88.5 11.5	4 0	100.0 0.0	2.112	0.398
Hearing aid No Yes	63 3	95.5 4.5	52 0	100.0 0.0	4 0	100.0 0.0	2.790	0.323

χ^2:*Chi square test*   *MC:* **Monte Carlo** *: Statistically significant at p ≤ 0.005*

Table (6):   **Relation between attitude toward using mobile technology for health care and older adults' mobile characteristics**

Mobile characteristics	Attitude(n=122)						χ^2	MCp
	Negative (n = 66)		Neutral (n = 52)		Positive (n = 4)			
	No.	%	No.	%	No.	%		
Type of phone								
Usual	51	77.3	40	76.9	2	50.0	1.756	0.412
Smart	15	22.7	12	23.1	2	50.0		
Duration of mobile use(in years)								
1 -	19	28.8	0	0.0	0	0.0	28.747*	<0.001*
3 -	18	27.3	24	46.2	0	0.0		
6 -	25	37.9	22	42.3	2	50.0		
≥9 years	4	6.1	6	11.5	2	50.0		
Number of mobile use hours per week:								
1 hrs	52	78.8	28	53.8	2	50.0	10.397*	0.022*
5 less than 10	10	15.2	20	38.5	2	50.0		
10 less than 15	4	6.1	4	7.7	0	0.0		
Mobile use#								
Calling others	58	87.9	40	76.9	2	50.0	5.196	0.062
Using an alarm to alert specific time	27	40.9	26	50.0	4	100.0	5.369	0.054
Sending text messages	19	28.8	26	50.0	0	0.0	7.509*	0.017*
Using mobile phone memory to write notes	18	27.3	20	38.5	0	0.0	3.060	0.213
Using the radio on a mobile phone	12	18.2	14	26.9		0.0	1.862	0.408
Location tracking or GPS	10	15.2	8	15.4	0	0.0	0.236	1.000
Using a mobile phone to record	13	19.7	10	19.2	0	0.0	0.432	1.000
Taking pictures	8	12.1	6	11.5	2	50.0	4.090	0.148
Using mobile games	8	12.1	8	15.4	0	0.0	0.453	0.883
Using the social network for social interaction	4	6.1	6	1.5	2	50.0	6.433*	0.032*
Searching for health problems	2	3.0	6	11.5	2	50.0	9.306*	0.012*
Transfer medical information	2	3.0	2	3.8	4	100.0	22.651*	0.001*
Complain related to mobile use								
No	32	48.5	23	44.2	0	0.0	3.308	0.188
Yes	34	51.5	29	55.8	4	100.0		
Complains eye strain	22	33.3	18	34.6	2	50.0	0.672	0.825
Headache	18	27.3	22	42.3	2	50.0	3.540	0.157
Muscle and joint pain	16	24.2	14	26.9	2	50.0	1.538	0.481
Fatigue	16	24.2	8	15.4	2	50.0	3.488	0.146

χ^2:*Chi square test*   *MC: Monte Carlo*   *: Statistically significant at $p \leq 0.05$*

Table (7): Correlation between the studied older adults' attitude toward using mobile technology for health care and their perceived obstacles:

	Obstacles	
	r	P
Attitude toward using mobile technology for health care	-0.241*	0.007*

r: Pearson coefficient   *Statistically significant at $p \leq 0.05$*

Table (1): Shows the distribution of the studied older adults according to their demographic characteristics. The older adults age ranged from 60 to 87 years with a mean age of 74.56±8.35 years and 61.5% of them were young old (between 60 to less than 75 years). 55.1% of older adults were female and 59.8% of them married. Illiteracy was reported by 32.8% of older adults followed by basic education (26.2%). Only 37.7% of the studied older adults were employee and 57.4% of them had enough income. Older adults who live with their families and children represented 49.2% and 59.8% of the studied older adults live in rural area. The main source of income reported by 47.5% of them was their children.

Table (2): Portrays the distribution of the studied older adults according to their medical history. Regarding presence of comorbidity, it appears from the table that 85.2% of older adults suffered from chronic diseases. The most common reported diseases were musculoskeletal diseases followed by

cardiovascular diseases (78.8% and 77.9%) respectively. Concerning prescribed medications, it was noticed that 78.8% of older adults used musculoskeletal medications followed by cardiovascular medications 77.9%. Regarding wearing eye glasses and hearing aids, only 7.4% and 2.5 % of the studied older adults were using it respectively.

Table (3): Shows the distribution of the studied older adults according to their mobile characteristics. It was observed that 76.2% of the studied older adults had usual mobile. Concerning duration of mobile use, 40.2% of the studied older adults reported using mobile for 6 years to less than 9 years. 67.2% of them reported using mobile from one hr to less than 5 hrs per week. As regard the uses of mobile, it is also observed from this table that the main uses of mobile were calling with others, using alarm to alert specific time and sending text massage (82%, 46.7% and 32.0% respectively). Finally, 54.92% of the studied older adults reported presence of complains related to mobile use and the most prevalent complains related to mobile use were headache and eye strain (62.68%).

Figure (1): Portrays the distribution of the studied older adults according to their attitude toward using mobile technology for health care. 54.10% of the studied older adults had negative attitude toward using mobile technology for health care, 42.60% of them had neutral attitude and positive attitude reported by only 3.30%

Table (4): Reveals the distribution of the studied older adults according to their obstacles for mobile use. Regarding obstacles related to health status, it was observed that 41.8% of the studied older adults reported motor skills problems making typing on phone difficult while 41% reported memory problem. Concerning the devices obstacles, 90.2% of the studied older adults reported lack of network or Wi-Fi connections. Moreover, 77% reported rare use of electronic device. In relation to learning difficulties: complex hospital online system reported by 94.3%. While, other obstacles reported by older adults included lack of time to learn mobile health technology reported by 36.1%.

Table (5): Shows the relation between attitude toward using mobile technology for health care and older adults' demographic and health history. It reveals that positive attitude toward using mobile for health care was high among those aged from 60 to less than 75 years, male, married, university educated, previously worked as employee, living with their spouse and in rural area and those who did not wear eye glasses or hearing aids.

The table also shows that, level of education (p=0.008), occupation before retirement (p=0.006), living arrangement (p<0.033), source of income

(p=0.001) and residence (p=0.024) of the studied older adults are significantly correlated with their attitude toward using mobile technology for health care.

Table (6): Shows the relation between attitude toward using mobile technology for health care and older adults' mobile characteristics. The table shows that negative attitude toward using mobile for health care was high among those who had usual phone, use mobile since 6 to less than 9 years, and for one to less than 5 hrs per week, using mobile for calling with others, had complains related to mobile use specially eye strain. Also, there were a statistically significant relations between duration of mobile use (p<0.001), number of hrs for mobile use per week (p=0.022), using the mobile for sending text massage (p=0.016), for social interaction (p=0.032), searching for health problems (p=0.002) and transfer medical information (p=0.001) and attitude of the studied older adults toward using mobile technology for health care

Table (7): Shows the Correlation between the studied older adults' attitude toward using mobile technology for health care and Obstacles. Perceived obstacles by the studied older adults were significantly affected their attitude toward using mobile technology for health care (p=0.007).

Discussion:

Application of mobile technology in the health care system are becoming urgent issue to assist older adult to monitor their health, transmit the health-related information and manage their chronic diseases independently **(Kuerbis et al., 2017)**. So, the aim of this study is to identify the attitude and obstacles of community dwelling older adults toward using mobile technology for health care. The present study results revealed that; the majority of the studied older adults had unfavorable attitude toward using mobile technology for health care. This finding may be related to several causes as reported by the study participants including presence of mobile technology related physical damage as eye strain, headache, and fatigue as reported by about two thirds of the studied older adults.

Also, presence of some obstacles to learn and use mobile health technology reported by the studied older adults as low educational level, lack of smart phone, no Wi-Fi connection and complex online hospital system. Another reason may be that older adults had inadequate skills to use mobile application in addition to reduced physical and cognitive capabilities with aging, that affect their ability to learn. This finding is supported with the study done by **Navabi, et al., (2016)** at Iran who reported that; 44% of the female and 42.80% of the male older adults had poor attitudes toward mobile use.

Similar finding was reported by **Haase et al, (2021)** at Canada who reported that difficulty of new technologies had always prevented older adults from using it. Moreover, a study done by **Dutton &Blank, (2013)** at United Kingdom reported that; older adults had poor attitude toward using the technology due to previous exposure to mobile viruses and loss of data and the inability to cope with these difficulties. In contrast, **Cajita et al., (2018)** at the USA reported that; the majority of older adults had intention to use mHealth technologies and show a strong readiness to learn how mHealth technologies can promote their care.

Concerning the perceived obstacles for using mobile health technology, the current study findings also showed that; motor skills problems (difficulty typing on a mobile phone) was the greatest physical barrier to mobile phone use. This may be explained by the fact that the majority of the studied older adults suffered from chronic diseases that may affect the older adult's ability to use the mobile phone. In addition to; the aging process may be associated with a wide range of deficits including hand and motor functions. This result is in line with the findings of study done by **Wildenbos et al., (2018)** at Netherlands who reported that; barriers to mobile use include deterioration of motor skills.

In relation to the device's obstacles, lack of network or no Wi-Fi connection and rare use of electronic devices were the most common barriers among the studied older adults. This may be related to the majority of older adults don't work because of retirement, had limited income and were dependent on their children for income and this hinders their ability to use mHealth. Also, more than two thirds of the studied older adults use mobile from one hour to less than five hours weekly. This result is supported by **Tu et al., (2021)** at China who stated that, no Wi-Fi connection is one of the barriers related to older adults' adoption of health information technology.

With regard to the learning difficulties it was reported that difficulty of applications and low self confidence in one's ability to learn how to use it were more common. This can be explained by lack of confidence leaves older adults doubting their ability to learn, making them hesitant to learn and use the mHealth. This result stands in accordance with the finding of a study done by **Kruse et al., (2016)** at the USA who reported that; complexity of the technology is one of the barriers to adoption of mHealth for older adults. In addition, another study done by **Lee et al., (2020)** at South Korea concluded that older adults with greater self-confidence in using mHealth functionality were more likely to be mHealth users. Despite these obstacles; a study done by **Joe & Demiris, (2013)** at the USA concluded that the use of mobile health with

older adults were spread across many clinical domains to manage the health problems of older adults and improve their independence and well-being.

The attitude of older adults in the present study is influenced by many factors including; level of education, occupation before retirement, living condition, source of income and place of residence. This may be due to older adults who are highly educated and previously worked as employee had a positive attitude toward use mobile health technology as those who had previous exposure to or experience with technology show high level of comfort with new technology, living with their family (presence of a lot of individuals to help older adults to teach and use mobile health technology) and in rural areas(due to they live in far areas and need transportation to go to hospitals thus using mobile health technology will save their time and effort). These factors affect the older adult's ability to accept, learn and use the mHealth technology.

This finding is supported by other studies done by **Tu et al., (2021)** at China and **Awan et el., (2021)** at United Kingdom who reported that older adults' attitudes toward using new technology were influenced by many factors including technology literacy, level of education, and past experiences in work, which affect their self-perceived ability to technology adoption. Moreover, the duration of mobile use was significantly associated with the older adults' attitudes toward mHealth technology. This may be due to older adults who use the mobile phone for longer duration may have greater knowledge, experience, and self-confidence in use of mHealth technology, thus impact positively on their attitude as reported by **Lee et al., (2020)**.

In addition, the present study also showed a statistically significant correlation between perceived obstacles by the studied older adults and their attitude toward using mobile technology for health care. This fining may be due to presence of obstacles such as the age-related memory impairment, lack of smart phone, no Wi-Fi connections, low educational level and lack of time to learn how to utilize technology make older adults form wrong imagination that using mobile health technology is difficult and form negative attitude toward it thus inhibit the older adults' ability to interact, learn and use the mHealth technology. This result is consistent with a study done by **Cham et al., (2022)** at Malysia who demonstrated that presence of barriers influencing older adults' resistance, attitude and non-adoption intention of mobile. Also, another study done by **Zin, et al., (2023)** at Korea found that facilitating conditions such as training programs, technical support, and

financial aids is positively related to attitude toward using health care technology.

The current study results showed that the most use of mobile by older adults were calling others and using an alarm to set a specific time, such as when to take medication or when to see a doctor. This can be rationalized by managing medications can be a burden and could lead to medication non-adherence thus the older adults were dependent on mobile reminder as an assistive device. This result is consistent with other studies done by **Navabi et al., (2016)** at Iran and **Kang et al (2016)** at Korea who stated that the largest use of mobile phones by older adults includes making phone calls and setting reminders with alarms for doctors' appointments.

Conclusion:

It can be concluded from the findings of the present study that, the majority of the study older adults had negative attitude toward using the mobile technology for health care, and reported some obstacles for using mobile technology for health as memory and motor skills problems, complex online hospital system and lack of network connections.

Recommendations:

▪ Promoting the older adult's knowledge about various applications of mobile health technology through ongoing training programs can improve their attitude toward the use of mobile health technology, overcome the barriers and increase the actual use of these devices in health care.

▪ Coordination with different health care settings and heath care team members to facilitate integration of mobile health technology in the care of older adults.

▪ Developing an educational program by the gerontological nurses to be implemented for older adults, and other health team members at different health care settings about importance of applying mobile technology for health care and how to overcome the obstacles of using it.

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