

RESEARCH ARTICLE

ICT use and preference among hypertensive patients during COVID -19 pandemic in Selangor: A cross-sectional study

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Abstract:

Patients with hypertension acquire health information from healthcare practitioners or online sources. During the pandemic, patients are likely to search for health-related information primarily through information and communication technologies (ICTs). This paper aims to assess the use and preference of ICTs among hypertensive patients. We conducted a cross-sectional online survey-based study from April to October 2020 involving 96 patients with hypertension. The questionnaire collected information regarding demographics, patients' preference for ICTs platforms, quality of online information and belief towards the use of ICTs. A Pearson chi-square test for association and adjusted regression analysis were performed. Among all patients who participated, 99% reporting owning smartphone, with an active internet connection. The most used ICT for obtaining information about hypertension was web browsers, followed by YouTube and Facebook. Social media use was significantly associated with education level and residential area. The outcome of the regression analysis indicated that males were 1.31 times more likely to use social media platforms than females. Finally, females were three times more likely to associate internet-based health education with better blood pressure control. Understanding how people with hypertension utilise and prefer ICTs may aid in improving their outcomes through the possible uses and benefits of ICTs. By determining the most frequently used ICT platform, health practitioners can devote more attention to it.

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1. INTRODUCTION

Hypertension (HPT) is globally the most significant changeable risk factor associated with premature death and cardiovascular problems (Mills et al., 2020). Systolic and diastolic blood pressure (BP) values of ≥ 140 mmHg and ≥ 90 mmHg are categorised as hypertension. Presently, about one billion individuals have hypertension, accounting for seven million deaths annually. The Institute of Public Health (2019) places hypertension prevalence in Malaysia at 30% or 1 out of three Malaysian might suffer from hypertension (Institute for Public Health (IPH), 2019). Another prevalence study in rural area in Indonesia found that almost half of the participants were diagnosed hypertension (Diana et al., 2018). Hypertension is a growing global problem attributed to poor lifestyle aspects like improper diet (e.g., high sodium but low potassium intake) and a sedentary lifestyle (Zaki et al., 2021). Additionally, inadequate education and income levels contribute to rising hypertension prevalence (Fongwa et al., 2019).

The COVID-19 pandemic has increased people's reliance on the internet in all facets of their daily lives. This includes

relying on the internet for guidance on health issues via teleconferences, websites or health applications (Quesada-Arencibia et al., 2018; Simon, 2021; Tirosh et al., 2019). Patients with hypertension continue to seek health information during the pandemic, according to a previous study, and patients seek health information via online and offline platforms (Ab Hamid et al., 2022). Globally, Internet use has increased, and there are estimated to be approximately 5.1 billion Internet users. In Malaysia, many platforms are used to disseminate health information and provide clinical services such as face-to-face intervention and the use telehealth. Currently, the government has increased the use of digital healthcare services to counteract the adverse implications of the pandemic (Lee, 2020). Several government-run clinics and hospitals have chosen virtual consultation to keep patients on track with their doctors (Lee, 2020; Simon, 2021). The introduction of this latest consultation modus operandi reduces the need for the physical meeting of patients and health care providers. As the number of patients seeking online health information for illness management such as health-related websites grows (Ab Hamid et al., 2020a; Ab Hamid et al., 2020b), it is the

responsibility of healthcare practitioners to provide reliable, validated, and fact-based information.

The present digital era has seen extensive adoption and offers individuals several ways to access health-related information. Presently, individuals access much information using Information, Communication and Technologies (ICTs) platforms. ICTs comprise computing and mobile-device based technology for information retrieval and exchange (e.g., text messaging, email, and social media platforms) (Perron et al., 2010). About 80% of US individuals admit to using online modes to access health and lifestyle information (Harris et al., 2011). ICT provides several benefits like minimal cost, user privacy, convenience, and data privacy, thereby making individuals comfortable searching for information they might not share with others. Moreover, individuals rely on online information to understand health needs, diagnoses, therapy approaches, and identify medical alternatives (Chen et al., 2020). Allam and colleagues conducted a review and reported that ICT use was positively correlated with hypertension management (Baderol Allam et al., 2021). It was also discovered that a majority of the patients manage systolic blood pressure levels using electronic counselling provided by experts (Liu et al., 2020). This finding indicates that the use of ICT for health information is increasing, thereby requiring health educators to have better ICT working knowledge to better offline and online patient health consultations. Put differently, bedside manners have been vital for patient education for more than 100 years. It is now required to have an ICT-specific approach seamlessly integrated with the consultation process (Gray et al., 2020).

Despite the probable advantages of ICTs in the health sector, there is little research concerning ICT utilisation and patient choices for managing hypertension in Malaysia. Nonetheless, limited study was done to investigate the ICT preferences among patients especially in Asian region, such as in Malaysia and Indonesia. In a qualitative study by Ab Hamid et al. (2022) discovered that patients with hypertension seek health information through intrapersonal and online resources. It is hypothesised that numerous demographic aspects, such as gender, age, place of stay, and highest education are correlated to ICT use, belief, and preference. Accordingly, the present study is designed to ascertain ICT preferences, correlations between ICT and identified demographic aspects, the degree of belief in ICT for Malaysian patients suffering from hypertension. The researchers believe that enhanced understanding concerning ICTs and patient choices might lead to better health-specific results in the future.

2. MATERIALS AND METHODS

The present study uses a survey-based approach to obtain cross-sectional information between April and October 2020. During this time, Malaysia was on the Movement Control

Order (MCO) due to the Covid-19 pandemic. The sample consisted of 96 hypertensive patients who indicated personal ICT preferences. The recruitment criteria comprised more than 18 years old and diagnosed with hypertension. Patients associated with psychiatric ailments or illiteracy were kept out of the scope of the study. The Research Ethics Committee from research institution approved the study (UiTM Research Ethics Committee, 600-IRMI (5/1/6). Patients were recruited after obtaining informed consent. Moreover, it was ensured that patients' personal and medical information was kept discreet.

The research by Chérrez-Ojeda and colleagues was referred for preparing the questionnaire. It comprises patient demographics and clinical data (Cherrez-Ojeda et al., 2019). The questionnaire was prepared to evaluate how patients gathered disease-specific information; furthermore, data concerning patient propensity for using ICT to obtain health-specific information was collected. Questionnaire validity was established using pilot testing; subsequently, data gathering was commenced. Twenty hypertensive individuals and eight experts were enrolled for questionnaire validity. Item-level-face validity index (I-FVI) based scale-level face validity index (S-FVI/Ave), comprehension and clarity-based S-FVI/Ave, and universal-agreement based S-FVI/UA scores were over 0.80 for the two groups; hence, validity was established. Respondents were required to indicate their preferences concerning hypertension-specific information gathering using a particular technology. They were also asked to indicate information quality. Additionally, the respondents were asked to quantify their belief concerning the positive effect of health information on blood pressure.

Study details were advertised online for recruiting interested individuals. The coverage for advertisement is only in Malaysia. Before individuals updated the form, they were informed about the study objective and their participation. The questionnaire had researchers' contact details, thereby facilitating communication if more information or clarification was required. An online link was provided to patients to fill in the study questionnaire.

The evaluation comprised descriptive analysis. Categorical parameters were indicated using percentage and occurrences. In addition, standard deviation and mean values were reported for continuous parameters. ICTs were considered using three categories: 1. Web-based (blogs, browsers, and YouTube), 2. social media (Twitter, Facebook, and Instagram), and 3. messaging platforms (WhatsApp, Skype, Email, and Telegram). The respondents responded yes or no for every ICT category for the platforms utilised for gathering hypertension-specific information. Usage frequency comprised three categories: less-than-three, three-to-five, and more than five hours per day. ICT quality was ascertained using a five-point scale: 1 (not useful, nor interesting, poor quality), 2 (Mildly interesting and useful but low quality), 3 (moderately interesting and useful but average quality), 4 (very interesting, useful, good quality),

and 5 (extremely interesting, useful, very good quality). A Likert-type measure was used for assessing the degree of belief: 1 (strongly disagree), 2 (Agree), 3 (Not sure), 4 (Agree), 5 (Strongly agree). There were two education categories: tertiary or higher and secondary or lower. Residence and work demographics were studied using two categories: urban or non-urban, and working or not working, respectively. Gender, age, residential area, work status, and education were independent parameters for every analysis. ICT platform choice and usage were indicated descriptively. In addition, the effect of independent variables (gender, education level, residential area and working status) on ICT platforms was assessed using the Pearson chi-square test; this assessment was conducted to gather details about hypertension.

ICT platform choice was analysed using binary logistic regression; on the other hand, multiple logistic regression was used to evaluate the degree of belief associating ICT use with an improvement in hypertension; blood pressure was analysed using gender, age, highest education level, working status, and residential region. The confidence interval was set 95%, and the adjusted odds (AO) ratio values were computed. SPSS v26 (Statistical Package for Social Sciences) was used for data analysis. The significance level was set at <0.05 for all tests.

3. RESULTS AND DISCUSSION

The sample had a mean age of 49 years (SD = 11), comprising 52% males; 64% of the respondents were educated to the tertiary level. About 56% of the sample comprised the urban population; 62% of the respondents were working (Table 1).

Table 1. Demographic characteristics (n=96)

Variable	n (%)	Mean (SD)
Age		49 (11)
Gender		
• Female	46 (48)	
• Male	50 (52)	
Education level		
• Secondary and lower	35 (37)	
• Tertiary and above	61 (64)	
Residential area		
• Urban	54 (56)	
• Non-urban	42 (44)	
Working status		
• Working	59 (62)	
• Not working	37 (38)	

3.1. Choice and quality rating of ICT platforms

Considering the studied sample, 90.6% (n=87) of individuals indicated using websites to look for information about hypertension; Facebook, 62.5% (60 people) and YouTube, 63.5% (61 people) were other information sources (Figure 1). Moreover, Skype was the least popular (15.6%, n=15).

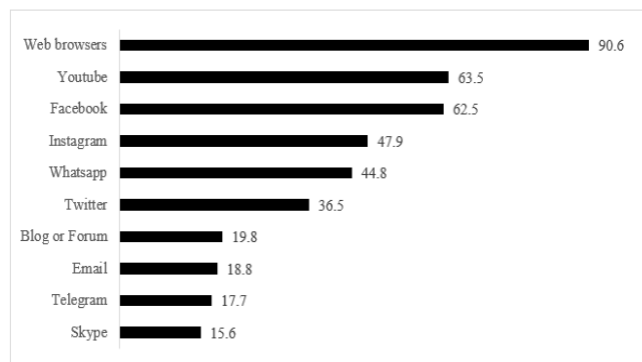


Figure 1. Choice of ICT platform among patients with hypertension

A majority (63.2%) of the respondents suggested that websites were useful, very interesting, and offered good quality information; Instagram (63%) was the second preferred information source by the respondents (Figure 2). Majority of respondents graded blogs to be moderately interesting, useful, and of average quality. In contrast, most respondents rated Skype as not interesting, nor useful or very low quality. On the other hand, Whatsapp and Skype were considered moderately interesting and useful for messaging applications.

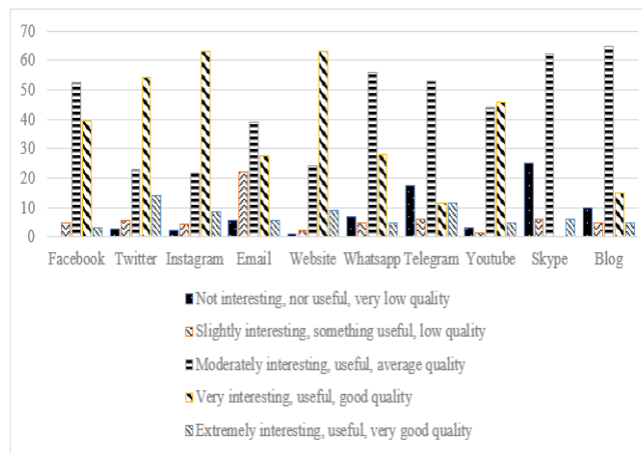


Figure 2. Percentage of quality rating of the health information according to ICT platform

3.2 Association between the use of ICT platforms and demographics

Social media use was significantly affected by education level and residential aspects (p < 0.01; p < 0.03, respectively). Nevertheless, education level, residential aspects, gender, and work status were not significantly correlated to ICT platforms (Table 2).

Table 2. Association between the use of ICT platform and gender, education level, residential area and working status to seek information about hypertension

Platform	Gender N (%)		p-value	Education level N (%)			Residential area N (%)			Working status N (%)		
	Female	Male		Tertiary and above	Secondary and below	p-value	Urban	Non-urban	p-value	Working	Not working	p-value
Social Media	34 (50)	34 (68)	0.52	50 (82)	18 (51)	<0.01	43 (80)	25 (30)	0.03	46 (78)	22 (60)	0.05
Web-based platform	42 (91)	47 (94)	0.61	58 (95)	31 (89)	0.24	49 (91)	40 (95)	0.40	57 (97)	32 (87)	0.06
Messaging apps	17 (37)	17 (34)	0.76	19 (51)	15 (43)	0.25	18 (33)	16 (38)	0.63	19 (32)	15 (41)	0.41

3.3. Likelihood of chosen demographic aspects and the use of ICT platforms

The outcome of the binary logistic regression indicated that males were 1.31 times more likely to use social media platforms than females; this observation was statistically significant with $p = 0.02$ (Table 3). Education, residential, and work aspects had no significant effect on ICT platform usage likelihood.

Table 3. Likelihood of gender, education level, residential area and working status to the use of ICT platforms

Parameter	Social media applications		Messaging applications		Web-based platforms	
	OR (95 CI)	p-value	OR (95 CI)	p-value	OR (95 CI)	p-value
Gender	1.31 (0.50-3.38)	0.02	1.16 (0.50-2.70)	0.73	0.65 (0.13-3.37)	0.61
Education	3.39 (1.12-9.75)	0.22	1.53 (0.57-4.14)	0.40	0.50 (0.08-3.20)	0.46
Residential area	1.86 (0.69-4.98)	0.75	1.06 (0.43-2.62)	0.90	4.36 (0.65-29.18)	0.13
Working status	1.19 (0.41-3.50)	0.46	1.16 (4.43-3.11)	0.78	0.20 (0.02-1.34)	0.10

Binary logistic regression. P-value was set at 0.05

3.4. Patients' belief that using ICT to get HPT information could improve BP reading

Females were three times more likely to associate internet-based health education with better blood pressure; this observation was statistically significant with $p < 0.01$. Also, individuals with tertiary education levels were five times more likely to associate online health information with better BP compared to their less-educated counterparts; this observation was statistically significant with $p < 0.01$ (Table 4).

Table 4. Likelihood of gender, education level, residential area and working status to the use of ICT platforms

Parameter	Adjusted OR (95% CI)	p-value
Gender	3.34 (1.48-2.52)	<0.01
• Female		
Education level	5.31 (1.93-14.59)	<0.01
• Tertiary and above		
Residential area	1.33 (0.58-3.04)	0.50
• Urban		
Age	1.00 (0.96-1.04)	1.00

Multiple logistic regression. P-value was set at 0.05

Ninety-six participants in this study used ICTs to seek health information; among all platforms, websites were the most preferred choice. ICTs offer numerous advantages to patients. For instance, ICT use may facilitate the formation of peer groups aimed at sharing similar circumstances, cultivating better problem-solving capability, and enhancing assurance to work towards life improvement (Cherrez-Ojeda et al., 2019). Health-seeking propensity might determine how patients select specific ICT platforms. Policymakers and healthcare practitioners are increasingly concerned about offering health education preferred by and appropriate for a broad and diverse population. Choices concerning health information platforms vary with sociodemographic aspects (Schmidt et al., 2021). A previous qualitative study identified during the COVID-19 pandemic, the majority of hypertensive patients relied on online health information (Ab Hamid et al., 2022). Present research emphasizes ICT platform choice and its correlation with specific demographic aspects and individual beliefs concerning ICT advantages for managing hypertension. The present research comprised a sample where 99% of individuals could access the internet. There are numerous platforms for searching and accessing health-specific information online; however, the web browser was the most popular choice. Web-based health information was rated as good quality, useful, and very interesting. Research conducted in Ecuador indicated that the website was the most popular platform used by patients suffering from hypertension (Cherrez-Ojeda et al., 2019). Another study also found that patients with chronic kidney disease preferred web-based Internet to obtain information regarding their disease (Cherrez-Ojeda et al., 2018). This observation could be attributed to web browsers' numerous benefits; browsers allow patients to access health portals easily, without time and place restrictions. Moreover, browsers can be used on numerous devices that allow remote access and anonymity (Shepherd et al., 2000). Furthermore, numerous websites created by the private sector, governments, or individual bloggers provide rich medical education (Ab Hamid et al., 2020b). For example, the Malaysian Ministry of Health offers the MyHealth portal that can be used to know hypertension-specific medical information. The present study suggests that Facebook was the most popular information-seeking platform, next only to

websites. Facebook offers support group functionality where patients can narrate experiences and receive support from group members; it could be the reason for Facebook's popularity among hypertension patients.

WhatsApp was the most popular messaging application used by patients wanting health-specific information. Using WhatsApp, patients can share text, audio, video, images, and other information without paying. The messaging app is easy to use, and all individuals can utilise the features, notwithstanding educational aspects. Our observation aligns with the present data concerning Malaysian WhatsApp users. In May 2020, 98.7% of Malaysian internet users preferred using WhatsApp for messaging; Telegram and Skype were other popular platforms used by 40.1% and 14.5% of users, respectively (Muller, 2020). Furthermore, a Malaysian study indicates that using WhatsApp for health information had a beneficial outcome in disease treatment (Noor Haslinda I. and Muhamad Hanafiah J., 2019). In comparison, another study in Korea found that there was an increasing trend of consumers using Twitter to post about mhealth between 2010 and 2016 (Lee et al., 2019). Our study indicates that urban residents with tertiary or higher education had a greater likelihood of using social media platforms for gathering health information. The observation might be because of the urban and educated lifestyle where individuals operate social media profiles and access the internet through this platform type. In addition, research conducted in China suggests that better-educated individuals have a higher likelihood of utilising digital health facilities for managing hypertension (Chen et al., 2020). We determined that social media use among men is about 50% more than women. Nevertheless, residential, educational, and work aspects have no statistical significance concerning ICT platform use. We assert that most patients rely on ICT platforms for online health education, thereby justifying the above observation. All subjects enrolled in this study were smartphone owners having internet access; therefore, these people could access online health information regardless of time and place. Nevertheless, this observation should be relied upon cautiously because of the study sample size. On the other hand, the use of health information technology platforms varied significantly between rural and urban population (Greenberg et al., 2018). The non-urban population has relatively less digital health awareness; this digital divide might explain this difference. Lesser health literacy, poor digital skills, handicaps, income differences, and poor English proficiency might explain the digital divide. Also, structural aspects like internet access, geographical restrictions, and electronic hardware availability might add to the digital divide.

Our observations suggest that tertiary education raises a positive patient outlook about online health information and hypertension management by 5 times more as compared to lower education levels; females were three times more likely to associate online health education with positive outcomes concerning hypertension management. Stronger belief

encourages patients to utilise ICT and seek health information online (Holden and Karsh, 2010). Our findings align with a study that correlated females with a higher likelihood of internet use for gathering health information (Schmidt et al., 2021). Additionally, a meta-analysis outcome associates females and more educated individuals with a higher propensity for internet use for health information. Information quality concerning online health significantly affects patient belief and tendency to seek health information using the internet (Wang et al., 2021). Nevertheless, considering the abundance of health information present on the internet, there are concerns about information accuracy, quality, and reliability. The research was conducted to assess website quality, understandability, and actionability pertaining to hypertension-specific portals available on the Malaysian web; it was found that about 50% of the surveyed websites had average quality and poor actionability (Ab Hamid et al., 2020b). In addition, a study assessed 122 websites to understand online information quality related to pulmonary arterial hypertension. The results indicated a lack of comprehensiveness, readability, and information transparency (Saleh et al., 2020). Moreover, there are few quality standards plagued by quality consensus and restricted checks, thereby leading to health-specific information being conflicting, unreliable, and, at times, wrong (Chen et al., 2020).

The present study has some limitations. Firstly, the patient sample comprised individuals from Malaysia; hence, there might be a difference between the characteristics of this sample and other ethnicities. Also, study sampling was not performed at a large scale to support generalisations for all Malaysian hypertension patients. Furthermore, it is possible that health information platforms assessed for this study might face obsolescence in the future. In addition, this study did not quantify the specific platforms used by patients and the factors contributing to this use. Nevertheless, to the best of the researchers' knowledge, this is the first study that evaluates online health information use and choices pertaining to Malaysian hypertension patients. The study also used an expert-assessed and approved online questionnaire.

4. CONCLUSION

In conclusion, Malaysian internet users resorting to online health information is increasing over time. The study indicates web browsers are the most popular choice for obtaining online information concerning hypertension; patients reported a very high preference for web browsers. Also, males were found to use more ICTs as compared to females. Further research having a larger sample must be conducted to substantiate the observations. Hypertension-specific health information categories and website types used by patients should be considered information extracted using web browsers.

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