



A SURVEY OF HEALTHCARE PROFESSIONALS' PERSPECTIVES ON EDUCATING PATIENTS ABOUT WARFARIN THERAPY

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Article Information

Received 25/01/2023; Revised 15/02/2023;
Accepted 26/02/2023

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ABSTRACT

Using technology (IT) to educate patients about warfarin therapy has benefits and challenges, according to healthcare professionals. Using a tailor-made questionnaire, a cross-sectional study of healthcare professionals in the community and in hospitals (for instance, doctors, pharmacists, nurses) was conducted. For maximum response rates, multimodal distribution was used. 109 surveys were completed out of 300 distributed (43.3%). A majority (59.5%) of the healthcare participants were female, with over half (53.2%) aged between 40-59 years. Among those who had attended IT related patient education resource related to warfarin, 49 participants (54.1%) reported not having used such resources; 19 participants (38.0%) did not use such resources. Patients' ages, cognitive impairments, ethnic backgrounds and language barriers were among the most important factors that healthcare participants described when educating their patients on warfarin therapy. Patients' education about warfarin therapy was also hampered by time constraints. Warfarin therapy presented several challenges to healthcare professionals when it came to educating their patients. A computer and an interactive touch screen kiosk were the most commonly used IT devices in general practices, community clinics, and hospital clinics to provide warfarin education resources. Professionals in healthcare also identified a number of facilitators (e.g., providing reliable and easy-to-understand warfarin education) as well as barriers (e.g., utilizing IT resources takes time and money, operating the resources is difficult) in this way, patient education about warfarin therapy may be ineffective. There is a need for better access to and greater use of IT-based resources for warfarin education among healthcare professionals. This type of IT tool can also help health care professionals educate patients about warfarin therapy by addressing concerns raised in the study.

Key words: Warfarin Therapy, Health Care, Information Systems, Survey.

INTRODUCTION

Education of patients is crucial for medication safety, so they can better understand their diseases and manage their prescribed medications [1]. Patient education in the past provided by healthcare professionals through face-to-face consultations, often supplemented by written materials and audiovisual materials. Using interactive electronic devices, health professionals can now create a more interactive learning

experience for their patients thanks to recent advances in information technology (IT). (e.g., Portable electronic devices, the internet, and computers) Consultations in traditional settings [2-4]. As information technology advances, it can also be used to improvement of patient education through communication between healthcare providers, caregivers, and patients [3,5,6].

The potential utility of IT-based resources for



patient education has been demonstrated [7-10], and more complex therapies, such as warfarin therapy, may be better explained through these tools [11,12]. It often causes life-threatening side effects due to the complex nature of warfarin, patients receiving warfarin therapy need extensive education in order to ensure optimal therapeutic outcomes. [1,13-15] Warfarin education hasn't been adequately provided to patients in different clinical settings, because it has been ineffective. This provides an opportunity for the implementation of new technologies, patients can gain access to effective and useful resources for warfarin education.

Healthcare professionals use technology-based patient education resources in a widely variable manner, which is understandable in an environment where paradigms are changing. [7,10] However, there is limited information available regarding healthcare professionals' perceptions and views regarding tools for educating people about warfarin based on Information Technology. As a result, this study focuses on what healthcare professionals (such as GPs, pharmacists, nurses) think of technology-based education regarding warfarin. Our study had the specific objectives of: identifying perceived facilitators and barriers to educating patients about warfarin using IT resources; identifying perceived facilitators and barriers to using IT resources; and documenting characteristics of healthcare professionals related to their use of IT resources to educate patients about warfarin.

METHODS

Data collection

In order to collect data, a specially-designed questionnaire was used, which included a combination of coded and scaled responses as well as open-ended ones. Based on the 3-point scoring system, the option that was least useful/suitable/effective/impact response was the least useful/suitable/effective/impact response option, and the option that was most useful/suitable/effective/impact response was the best option. Open-ended questions were scored by categorizing the answer options (2=yes; 1=no). Coding questions were scored by categorizing the answer options (2=yes; 1=no).

Multiple distribution methods were used to distribute the questionnaires to achieve maximum response rates, such as mail, direct invitation, and bundles at group meetings (e.g., bundles of surveys were distributed at group meetings, and a box was provided for dropping off completed surveys). Our questionnaires were always accompanied by a prepaid envelope to facilitate their return.

Participants

Physicians, pharmacists, and nurses from community and hospital settings participated in a survey. In a descriptive pilot survey [23], 105 (a target sample size

for a descriptive pilot survey) [23] were stratified to include 60 general practitioners, 25 pharmacists, and 20 nurses based on literature regarding the relative proportion of health care professionals involved in education about warfarin therapy. [11].

For identifying community-based healthcare practices, the same sampling method was employed in the literature for postal sampling based on relevant search terms in the public online telephone directory of Sydney metropolitan area. After that, postal questionnaires were sent to the respondents. [24] Using this sampling methodology, the first 50 addresses of each of the 53 online entries and the third addresses of the 242 online entries were mailed a postal questionnaire. It may be necessary to address questionnaires to the 'Doctor' or 'Pharmacist-in-Charge' when specific names of healthcare professionals are not known. Since postal surveys generally have a low response rate [25], we sent twice as many questionnaires to each practice, i.e., 120 questionnaires for physicians and 50 for pharmacists. Six weeks after posting the questionnaires, I sent a reminder. A primary researcher contacted 20 general practitioners and 30 pharmacists in the Sydney metropolitan area who were known to him and willing to participate in the study. A postal questionnaire was distributed for the survey. In addition to nurses and pharmacists, healthcare professionals from two NSW metropolitan teaching hospitals also took part in the study. The questionnaires were placed in common meeting rooms (generally staff meeting rooms) at respective hospitals where they were distributed to cardiology wards. It took the primary researcher about four weeks to collect the completed questionnaires.

Data Analysis

To perform descriptive and comparative statistical analyses, we used the Statistical Package for the Social Sciences software (e.g., proportions, frequencies, medians). It was considered statistically significant if a study's p-value was less than 0.05.

RESULTS

A total of 300 questionnaires (Nurses and doctors number 140, pharmacists number 120, and pharmacists number 40) were distributed to healthcare professionals in the community and hospitals, and 48 of them were returned unusable (Due to incorrect address information, unavailability, and/or unknown reasons, this assignment has been completed), while the survey was completed by 109 people (43.3% response rate). 68 emails were returned by the participants, so the primary researcher collected the remaining 109 completed surveys. Forty surveys were obtained from doctors for the study, including 37 general practitioners, one cardiologist, one vascular surgeon, and



one respiratory physician; 53 pharmacist surveys (A total of 24 surveys were conducted in community pharmacies and 29 surveys were conducted in hospitals); and 16 nurse surveys (In general practices in community-based settings, three were practice nurses).

A total of 18 participants were categorized according to their age (in years), with 16.5% aged 30-39 (16.5%, n=18), 23.9% aged 40-49 (n=26), 29.4% aged 50-59 (n=32), 10.1% aged 60-69 (10.1%). When asked to identify themselves in the questionnaire, 79.5% of respondents identified themselves as females. Among the 84 respondents (77.1%), 78.4% were males. Study participants included 53 pharmacists, 40 doctors, and 16 nurses. The number of pharmacists among healthcare professionals was 48.6%.

As it turns out, most participants (n=92; 84%) intended to educate their patients about warfarin both verbally and in writing. In addition, two (18%) were referred to another educator. Of the 14 (12.8%), one (9.1%) were provided in writing, and one (12.8%) were verbally provided. Patients whose clinical practices dealt with warfarin lacked patient education software/games and audiovisual materials tailored specifically to the drug.

According to the study, fourteen participants (36.6%) never use IT resources, compared with 41 participants (48.8%) who use IT resources regularly. A significant difference was not found in the use of IT resources among participants of different ages or genders (p=0.48 and p=0.54).

Ninety percent of the physicians, pharmacists, and nurses who were asked to educate their patients about warfarin therapy had never used IT resources. In this study, it was not determined that healthcare professionals used IT resources differently from one another statistically (p=0.43). There were 31 (62.0%) participants who were able to provide their patients with information about warfarin treatment via IT resources.

In order of importance, the following factors ranked as adversely affecting patient education regarding warfarin: older patients, time constraints of healthcare professionals, language barriers, cognitive impairments, and ethnicity. Nurses' instructions on warfarin to patients were not adversely affected by language barriers or ethnicity.

The participants' responses (Table 2) indicated that the following content areas of warfarin education were the most challenging: Interactions between food and warfarin, monitoring the INR, drug interactions, risks associated with warfarin therapy, and dosage and administration. Health professionals reported similar responses

According to those interviewed (Table 3), there are three things that are most important to patients when it comes to identifying appropriate IT resources for educating them

about warfarin: Multiple languages, graphics/illustrations/pictograms, and good quality warfarin information. Despite no significant differences between doctors and pharmacists on most important considerations, nurses placed more importance on information available in multiple languages. (Table 3).

The most common IT device used to educate patients was the computer (A desktop, laptop, tablet, or interactive touch screen kiosks) a kiosk with an interactive touchscreen can be used as well.

Participants indicated that physicians, clinics in hospitals, and local pharmacies would be the most likely places where patients would get access to these IT resources (Table 4).

In terms of warfarin education resources based on information technology, healthcare professionals have reported a number of challenges and facilitators:

In light of the importance of IT resources in educating patients about warfarin, they discussed the importance of IT resources (A median score of 3.0 was obtained). As far as warfarin education goes, study participants emphasized the following roles: improving patients' warfarin education; providing accurate information to patients from diverse cultures and with limited literacy skills, reliable, easy-to-read information. By saving time, nurses, doctors, and pharmacists are the most likely to reduce their workload by using IT resources (median score 3.0, 2.0, and 4.0). Care givers rated patient education as low on their importance scale (median score 2).

In terms of factors that would have a strong impact on providing IT resources (median score 3.0), the following were stated by study participants: the cost of purchasing or installing IT resources, the amount of time it would take to educate patients about IT resources, and the setup of practice settings. According to all three healthcare professionals, IT-based warfarin information is moderately challenging to use in current practice settings (median score of 2.0). A nurse's ability to use IT resources to educate patients about warfarin was greatly impacted by factor-related training they needed to operate and/or navigate these resources. (median score 2.0 versus 3.0, respectively). In terms of patients' use of IT resources, the following factors (median score of 3.0) were highly correlated with their use (median score of 3.0): difficulties and fears of using IT resources, patients' preferences for receiving medical education in person, and the lack of appropriate training required to use IT resources. Patient confidence in IT resource quality was moderately correlated with their use of IT resources across all healthcare professional groups.



Table No. 1. All healthcare professionals cited the following factors as affecting patients' warfarin education, (N=105)

Factors	Citation of stated factor by healthcare professionals			Total
	Doctor	Pharmacist	Nurse	
Time constraints of healthcare providers	13	21	2	36
Language barrier of patients	3	15	11	29
Older age of patients	10	12	0	22
Ethnic background of patients	6	8	4	18
Cognitive impairment of patient	10	5	0	15
Lack of appropriate education materials	5	8	3	16
Poor education level of patients	6	3	3	12
Information overload for patients	2	3	2	7
Patients' lack of understanding about therapy	4	2	1	7
Patients' reluctance to warfarin education	1	3	2	6

Table No. 2. Educating patients about warfarin, as noted by healthcare professionals, is one of the most challenging aspects

Rank	Content Area	Number of healthcare professionals citing stated content area (Percentage of participants within a group)			Total N=55 (%)
		Doctor n=20 (%)	Pharmacist=27 (%)	Nurse n=8 (%)	
1	Warfarin and dietary interactions	16 (40.0)	22 (41)	5 (31.2)	43 (39)
2	Management and monitoring of INR	16 (34)	20(38)	4 (25)	39 (36.2)
3	Interactions between warfarin and other drugs	13 (33)	21(39)	5 (31.3)	39 (35.3)
4	Warfarin therapy may pose certain risks	12 (29)	15 (28)	5 (28.1)	16 (28.4)
5	Taking warfarin and how it is administered	9 (23)	11 (20)	4 (25.0)	24 (21.5)
6	Warfarin missed dose management	8 (19)	10 (19)	5 (31.3)	23 (20.6)
7	Warfarin's mode of action	5 (12)	10 (19.8)	5 (28.1)	19 (17.9)
8	Identifying and responding to emergencies (e.g., bleeding)	7 (18)	9 (17)	2 (12.5)	18 (16.5)
9	Warfarin therapy adherence is important	8 (17)	8 (15.1)	2 (12.5)	18 (32.1)
10	A warfarin therapy's benefits	2 (5)	4 (6.6)	2 (9.4)	7 (6.4)
11	Warfarin use indications	3 (7)	1 (1.9)	1 (6.3)	5 (4.1)

Note: Several content areas were available to participants

Table No. 3. A patient's warfarin education needs should be addressed with a suitable IT resource

Rank	Content Area	Number of healthcare professionals citing stated content area (Percentage of participants within a group)			Total N=55 (%)
		Doctor n=20 (%)	Pharmacist n=27 (%)	Nurse n=8 (%)	
1	Good quality of information	15 (37.5)	18 (33.0)	6 (34.4)	38 (69.7)
2	Graphics/illustrations or images/pictograms relevant to warfarin therapy	11 (26.5)	14 (25.5)	5 (31.2)	29 (26.6)
3	Information in multiple languages	8 (20.0)	14 (50.9)	5 (31.2)	27 (24.3)
4	Logical organization of information	5 (11.25)	12 (22.8)	4 (21.9)	20 (18.3)
5	Audiovisual resources depicting practical aspects of treatment	7 (17.5)	12 (21.9)	1 (3.1)	38 (17.4)
6	Balanced and unbiased information	8 (18.7)	5 (8.5)	2 (6.2)	26 (11.9)
7	Animation components for better visual presentation of information	3 (7.5)	6 (10.4)	1 (3.1)	18 (8.2)



Note: Several content areas were available to participants

Table No. 4. The preferred IT devices for healthcare professionals and the most appropriate practice settings for implementing them, (N=55)

Median Scores	Doctor n=20	Pharmacist n=27	Nurse n=8	Total Score
Potentially useful IT devices [‡]				
Desktop computer	1.5	1.0	1.0	3.5
Tablet computer (e.g., iPad)	1.0	1.5	1.0	3.5
Portable computer (e.g., Laptop)	1.0	1.5	1.0	3.5
Interactive touch screen kiosk	1.0	1.0	1.0	3.0
Wide screen smart phone	1.0	1.0	0.5	2.5
Portable CD*/DVD** player	0.5	1.0	1.0	2.5
Personal Digital Assistant (PDA)	0.7	1.0	0.5	2.3
Handheld audiovisual player	0.5	1.0	0.5	2.0
Suitable settings for implementing IT resources [§]				
Hospital-based clinic (e.g., OPD) ††	1.2	1.5	1.5	4.3
Solo GP surgery	1.2	1.5	1.5	4.3
Community pharmacy	1.0	1.5	1.5	4.3
GP medical centre	1.5	1.5	1.0	4.0
Hospital pharmacy	1.0	1.0	1.5	3.5
Patient's home	1.0	1.0	1.5	3.5
Hospital ward	1.0	1.0	1.5	3.3
Aged care facility	1.0	1.0	1.0	3.0
[‡] 1=Not useful; 2=Moderately useful; 3=Very useful [§] 1=Not suitable; 2=Moderately suitable; 3=Very suitable *CD=Compact Disc; **DVD=Digital Versatile Disc; ††OPD=Outpatient Department				

DISCUSSION

Using IT resources to educate patients about warfarin therapy has been explored in this study from the perspective of health care professionals' perspectives, perceptions, and experiences. Warfarin education resources based on IT are not used as much as they should be, for a variety of reasons, according to this study.

IT-based resources are difficult to access by health care professionals, which leads to underutilization. Almost 50% of the healthcare professionals' Warfarin education resources were not available to participants in this study. According to previous studies, it is estimated that only 17% to 50% of healthcare professionals have access to IT resources for providing better patient care and education. It is unfortunate that this finding has been found, given that IT-based resources for patient education offer many advantages over traditional face-to-face strategies, particularly the fact that they provide patients with relevant information in real-time scenarios that they are in control of (e.g., options to repeat and review information as per individual education needs and learning challenges). Other clinical settings have utilized such resources effectively to enhance patients' understanding of chronic disease conditions and medication therapy. [3, 9] Thus, healthcare professionals are advised to prepare IT-

based warfarin education resources in their practice settings that can enhance patient education and, in turn, improve patient outcomes.

One-third of the healthcare professionals in this study who had access to IT-associated resources were not actively using them. This relates to access to these resources, and active utilization. It has been identified that implementing may find it challenging to use IT resources in their current practices because the resources are costly and time-consuming. Patients could be educated more efficiently and cost-effectively by using IT resources, according to previous studies. [5] Compared to conventional patient education services, IT-based patient education services have relatively low costs, Lo et al. (2010) reported. The use of IT-based patient education has also been shown to be time-efficient, with healthcare professionals spending as little as 40% less time educating patients. [5]

Because warfarin therapy is complex (e.g., frequent monitoring of INRs, dose adjustments, drug-drug interactions, dietary considerations), time-savings in warfarin education would be particularly useful, since comprehensive patient education is required. Because healthcare professionals are limited in time and resources, patients often must undergo extensive education, and this



is further aggravated by patient-related factors whose education needs and efforts might be increased (e.g., older age, cognitive and functional impairment, ethnicity, or poor literacy skills).[11]

As shown in this study, patient factors adversely impact warfarin education, as reported by healthcare professionals. The use of IT-based patient education resources (CDs, websites, computers, etc.) has been shown in a number of studies to improve patient understanding of diseases and drug therapies, especially among older patients, those with limited literacy skills, and ethnically diverse patients. [3] Information technology tools may be useful as supplementary tools to help overcome many of the challenges facing warfarin education today given their ability to provide good quality and authentic information.

When evaluating the potential for using IT resources, one of the key findings of this study was that healthcare professionals (such as physicians, pharmacists, nurses) believe that technology will best be suited for communicating patient-friendly, easy-to-read information. Additionally, IT-based resources are able to incorporate multimedia components as well as visual graphics and images to enhance information transmission, greatly improving patient learning.[36,37] Patients are now more likely to use technology-based patient education resources (such as health websites) in order to educate themselves about chronic diseases and drug therapies.[38] We may consider these advantages important when considering the benefits of using IT resources for teaching patients about medications with low therapeutic indices, such as warfarin.

This study is unique in that it is the first to investigate how multidisciplinary healthcare professionals view the use of IT resources in aiding patient education about warfarin therapy, as well as identifying their current use of such resources. This is the first of its kind, to our knowledge. Due to the limited number of participants and the diverse recruitment methods, study findings may not be generalizable to healthcare professionals and practice settings in general. It remains true, however, that the information gained from this study can prove useful in addressing and facilitating the implementation of IT-based warfarin education resources.

CONCLUSIONS

According to the results of this study, fewer healthcare professionals have access or even use IT-based resources to educate themselves about warfarin. Moreover, healthcare professionals in both hospital and community settings had generally positive views about implementing and using IT resources in their practice settings, although some reservations existed. The study suggests that health professionals need to better access and use IT-based warfarin education resources in their practices in light of these findings. Further, any future initiatives to implement such IT resources need to address the concerns of many healthcare professionals concerning their effectiveness. IT resources should be evaluated for their potential impact on patient knowledge and understanding of anticoagulation therapy, and most importantly on INR control.

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