UTILISATION OF HEALTH INFORMATION TECHNOLOGY AMONG DIETITIANS IN THE WORKPLACE: A QUALITATIVE STUDY

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Abstract

Dietitians play an important role in advocating lifestyle changes, such as dietary modifications and physical activity, to effectively prevent chronic diseases and avoid complications. The use of information technologies (IT) helps dietitians to engage with their patients. This paper explores the use health information technology among dietitians in the workplace. Four focus group sessions involving fifteen dietitians from hospitals and universities were conducted using an online platform. Participants were recruited using purposive and snowball sampling. A semi-structured questionnaire was used to facilitate the interview to understand better dietitians' health IT practices. Interviews were videotaped, verbatim transcribed, and emerging themes and subthemes were thematically analysed. Inductive and deductive content analysis were used. Four themes emerged from the data: 1. utility of health IT tools, 2. factors that influence the use of health IT, 3. frequency of use, and 4. perceived barriers to adoption of health IT. Participants used health IT through health-related mobile applications, web-based platforms, and social media applications. Participants cited self-motivation, advertisement, training, peers, patients, content, ease of use, developers, quality, and functionality as factors in their use of health IT. Some barriers to utilising health IT included not disease-specific tools, inappropriate for all age groups, inaccurate information, inconvenient, required a paid version, and being overloaded with information. This study demonstrates how dietitians make use of health information technology in their practice. Support is required to overcome information technology barriers to be applied successfully in practice. It is important for dietitians to stay current with technological advancements. Dietitians will be able to stay relevant and continue to support evidence-based practice if they do so now and in the future.

Keywords: Dietitian, Health Education, Information Technology, Malaysia, Qualitative Study

Introduction

The World Health Organisation (WHO) reported that each year, almost 15 million people aged 30 to 69 years die due to non-communicable diseases (NCDs) such as hypertension, diabetes, and cardiovascular disease. For instance, uncontrolled hypertension can cause stroke or, worse, sudden death (1). Eighty-five percent of "premature" deaths occur in low- and middle-income countries (2). In Malaysia, the National Health and Morbidity Survey in 2019 reported that 1.7 million people suffer from diabetes, hypertension and hypercholesterolemia, which diabetes and hypercholesterolemia are on the rise (3). The non-communicable diseases can be controlled using pharmaceutical and non-pharmaceutical approaches (4-6). Thus, many guidelines recommend lifestyle changes to prevent or control diseases (7, 8). Healthcare practitioners play a vital role in advocating for lifestyle modifications, such as dietary modification and physical activity, which can effectively prevent and manage chronic disease complications (9). However, primary healthcare professionals, including dietitians, report challenges in providing adequate care because of time (10) and Movement Control Order (MCO) imposed by the government to control the COVID-19 pandemic (11), which limits the number of patients attending the healthcare institutions. Moreover, most Malaysians, especially those living in rural areas with chronic disease sufferers and low

education status, are more likely to acquire poor health information on NCDs (12). As a result, dietitians must leverage technology to deliver efficient and effective care to their patients to maintain the quality and healthcare services support.

Nowadays, a plethora of e-health tools is accessible in almost every health promotion field, including sports applications, weight management, and healthy diet. Health Information Technology (IT) offers great potential to improve healthcare quality, safety, efficiency, and cost-efficiency (13). According to the World Health Organisation (WHO), e-health is a term used to describe the use of information and communication technology (ICT) refers to the use of information and communications technology to support health and healthcare system (14). It encompasses a wide range of applications, from mobile health (m-health) to telemedicine, and increasingly underpins all healthcare activities. A study found that using e-health in dietetics practice could be beneficial in improving intervention (15). For example, a scoping review found that tele-health, targeted client interventions, personal health monitoring and on-demand client information services were the most commonly used in interventions (16). IT use increases healthcare productivity by reducing the time required to complete tasks (17). For example, IT has been used to promote behaviour change through the electronic delivery of didactic material, skill-building tasks, feedback, decision support, risk self-assessments or other interactive features (18). Dietitians can benefit from using e-health in term of electronic health records, consultations to perform automatic calculations such as body mass index, calories and macronutrients and store patient information electronically (15). Moreover, e-health has been utilised to enhance dietetics care outside consultations, such as motivating patients, providing feedback, and carrying out remote dietary monitoring (19, 20). However, understanding of the application of e-health by dietitians in practise is still limited in Malaysia. A recent study showed that patients seek health information through IT and intrapersonal sources during the COVID-19 pandemic (21). This justifies the importance of exploring the use of IT among dietitians.

Globally, the increasing use of IT is reshaping traditional dietetics services, enabling more responsive and high-quality nutrition care. The application of technologies can assist in the delivery of individualised nutrition care through the standardised Nutrition Care Process (NCP) by leveraging personal data and utilising technology-enabled delivery methods (22). Despite the potential benefits of information technology for effective practice, more is needed to know about how dietitians use it in daily practice. Increased use of information technology by dietitians, such as electronic health records, could facilitate reporting of patient outcomes at the national level, improving policy development and dietetics advocacy (15). Therefore, this study aims to explore dietitians' practice of using health IT in their workplace.

Materials and Methods

Sample collection

The qualitative approach was chosen in order to gain a better understanding of dietitians' use of health information technology in their practice. Factors of using health IT and perceived barriers were explored in this study. Non-probabilistic mixed purposeful sampling was used to select dietitians in our study by email invitation. Dietitians must have a minimum of five years of clinical practice experience to be considered for recruitment. Recruitment was continued until the data set reached saturation. The interviews were recorded with permission using a built-in recording tool in the platform and transcribed verbatim.

The study was conducted using an online platform due to movement control order (MCO). A total of 15 dietitians working in universities and hospitals were invited and involved in four focus group discussion (FGD) sessions. Each session took 45 to 60 minutes to complete. The FGD session was determined based on the availability of the dietitians. The interviews were conducted between September and December 2020. A semi-structured questionnaire was used to guide the interview in this study. The questionnaire was face-validated by two experts before the data collection commenced. Two convenors moderated the focus groups: a moderator and a facilitator. The moderator had experience working as a dietitian and also a senior lecturer in a university, while the other facilitators were students in Dietetics. The participants were aware of the researchers' backgrounds.

Data analysis

The focus group interviews were analysed by deductive and inductive content analysis (21). In the deductive approach, the themes were determined before the analysis began. The inductive approach was used when new themes emerged during the analysis. The process of analysis involved; first, meaningful units of the transcripts were manually coded. Next, categories were derived from these units and finally condensed during the analysis. The data were considered saturated if no new additional data were found. Moderator did the initial coding and analysis. All authors read the transcripts and results, and the conclusions were confirmed by discussion and consultation. The study was conducted in accordance with good scientific practice (23).

Results

Demographic characteristics of respondents

Four focus groups, with a total of 15 dietitians, were convened, and the characteristics of the participants are presented in Table 1. 80% of the dietitians were aged 18-35 years, and the majority of them working in the university. The majority of dietitians participated in this study worked in the university (67%) and others in the hospital (33%).

Table 1: Characteristics of the dietitians interviewed in the focus groups

Description	n (%)
Gender	
Male	4 (27%)
Female	11 (73%)
Age (years)	
18-35	12 (80.0%)
36-55	3 (20.0%)
Place of employment	
University	10 (67%)
Hospital	5 (33%)

Theme 1: Utility of health IT tools

The first theme we explored was the use of health IT used among dietitians. Based on the interview with dietitians, we managed to group the health IT tools into three main categories (Table 2), namely, (1) health-related mobile applications, (2) web-based platforms, and (3) social media applications.

1. Health-related mobile applications

According to the focus group discussion, dietitians were using several health-related apps in their practice. Some apps provide nutrition information, fitness tracking or both. They shared several applications that were beneficial to the patients for disease management. Usually, the dietitians will try the applications themselves before suggesting them to patients. Some patients also shared and asked dietitians' recommendations about the health application that they have used.

"So, among the apps I have suggested include MyNutriDiary 2 and HealthifyMe. MyFitnessPal as well. Freeletics, which is used for workouts, is also good. So these are some of the apps I have used and recommended to my patients or clients". (P8)

"Other than that, we use mobile apps such as step counter for step counts and MyFitnessPal for food diary". (P6)

"My patients usually use MyFitnessPal and HealthifyMe". (P3)

According to the dietitians, apps such as MyFitnessPal or HealthifyMe would help patients to monitor their dietary intake. The apps were easy to function and contained all information commonly required for dietary intervention. Besides, some apps were developed by the ministry of health or frequently used, increasing the trust among dietitians and patients to use the apps.

"I used FitnessPal because it is convenient for us. It has many food databases. It is easy to search. This means that there are many foods available there compared to MyNutriDiari 2". (P3)

"But I usually suggest the patient use it mainly for exercise, such as Strava, Fitness or other apps that can help the patient track their physical activity". (P2)

"Among the apps, MyNutriDiary2 is number one after weighing the pros and cons. This is because it was developed by the Nutrition Department (Ministry of Health Malaysia) and uses the Malaysian food database, so it is more reliable for the Malaysian database". (P8)

2. Web-based platforms

Dietitian utilises the web-based platform in the dietetics practice. The websites were either general about medical information or disease-specific provided by the government, association, or private institutions. In addition, Dietitians used the website as references for their educational materials or asked the patient to go to the website themselves to obtain more information about managing the disease.

"There are many providers such as the Academy of Nutrition and Dietetics, American Heart Association, Malaysian Dietetics' Association, or MayoClinic. But Mayo Clinic is the one I always mentioned to my patients. Sometimes the Canadian Diabetes Institute is also considered reliable for diabetics". (P8)

"We usually use the Ministry of Health website as a reference. For example, if we want to ask about our patient's input or food intake". (P15)

Dietitians used trusted websites such as the Academy of Nutrition and Dietetics, Malaysian Dietetians' Association or American Heart Association to get the latest updates on the management of the disease. Besides, dietitians use a government-linked website to get nutrition information because the content is more suitable for local patients.

3. Social media platform

Dietitians make full use of social media for their nutrition education programme. Some dietitians created accounts that represent their organisation. These efforts ensure patients keep updated with recent updates and obtain the latest activity by the institutions.

"Then I also used YouTube because my clinic uses it to make patients aware of the disease. The appointments with patients have become fewer, have not they? So our clinic set up the YouTube channel to raise awareness". (P12)

"Even now that we are focusing more on social media, because we have a Facebook page for our diet clinic. You can follow us on Instagram. We also have a YouTube channel". (P13)

Dietitians elaborated on why they chose social media to aid patients' education. For instance, some dietitians are good at writing, frequently update nutrition information on social media such as Facebook, and have many followers. Therefore, the explanation was easy to follow and understand.

"When it comes to social media, I recommend that patients follow dietitians who like to write, especially patients in their 30s to 40s". (P8)

A few dietitians reported not using any health IT platform in their nutrition education programme. Instead, they used the health IT for their own reference only.

"I use it to find information for my own use". (P9)

Table 2: Categories of health IT used by dietitians

Health IT platform	Example	Example quotes
Health-related mobile applications	MyFitnessPal, HealthifyMe, MyNutriDiari 2, Step tracker, Calorie Counter, Freeletics, Glucometer Freestyle, EAT, Nike Run Club	*"Other than that, we use mobile apps such as step counter for step counts and MyFitnessPal for food diary".* (P6)
Web-based platforms	NutriWeb, the Academy of Nutrition and Dietetics, American Heart Association, Malaysian Dietitians' Association, Mayo Clinic, Canadian Diabtets Association.	*"We usually use the Ministry of Health website as a reference. For example, when we want to ask the input or food intake of our patient".* (P15)
Social media applications	YouTube, Facebook, Instagram	*"If social media, I would suggest patients follow dietitians who like to write, especially to patients in their 30s to 40s".* (P8)

The health IT was categorised into three; 1. Health-related mobile applications, 2. Web-based platforms, and 3. Social media applications.

Theme 2: Frequency use of health IT

The frequency use of health IT in practice varied among dietitians. Overall, we found that the frequency of usage mostly depends on the frequency of their appointments with patients and patients' background such as age and education level. The range of frequency was mentioned based on a weekly to yearly basis. The most frequent use of health IT was 1-2 times per week, but most dietitians reported using it 1-2 times per month.

"Once per week for 20-30 years old patients". (P5)

"About two times/month, depending on the patient that comes to the clinic". (P14)

"Depends on the client. 1-2 times/month". (P15)

"1-2 times/year. Seldomly used during counselling sessions. If to suggest it to patients, it was half of the number of patients I met in a year". (P8)

Theme 3: Factors that influence the use of health IT

Table 3 describes the factors and barriers among dietitians to use the health IT in their workplace.

1. Self-motivation

Based on the interview, we found several factors influencing dietitians' use of health IT. Some dietitians had self-motivation to search for nutrition information on various health IT platforms. Also, dietitians would like to experience using certain health IT tools, such as smartwatches to track fitness levels.

"Actually, I rarely use the health IT. But I do use the health IT to look for information when I am in the ward, but only for my learning". (P15)

"I used apps for myself only, such as MyFitness Pal. And I use Freelatics apps for exercise". (P8)

"We have to do active searching because of limited information". (P1)

2. Advertisement

Some dietitians mentioned they found information about the health IT platform via an advertisement on social media apps such as Facebook.

"Because we found the advertisement on Facebook. I also found MyFitnessPal from social media". (P5)

"The advertisement on Facebook". (P2)

3. Demonstration to use health IT

Some dietitians shared they were exposed to and influenced to use health IT after attending a training, event, or conference.

"The course we had attended. They showed us the apps, then we went through the appropriate apps and showed them to patients". (P6)

"In our institution, we were trained by the organisation. We have a webinar to learn to use Webex application". (P9)

4. Peers influence

Dietitians also shared they were using health IT due to peer influences. Their colleagues informed and asked them to try health IT devices such as fitness applications.

"I knew MyFitnessPal from my friends, and colleagues". (P4)

"I knew MyFitnessPal from my colleagues because they always used it". (P7)

5. Patients

Several dietitians were informed about the health IT from their patients. As patients shared about the health

IT platforms, the dietitians became interested in trying them out.

"What influenced me to use it was because some clients were interested in calculating themselves". (P15)

"Okay, I took the information from the patient. The patient knows the latest apps better than us". (P14)

6. Content quality

The majority of dietitians agreed that the content of the online information is paramount to their usage in nutrition education. Dietitians prefer if the content is suitable for the local population and provides accurate information. Apart from that, the content must always be updated and based on scientific evidence.

"MyFitnessPal was commonly used because it contains Malaysian foods but not because the data in it is 100% correct. So, we re-educate our patients about the information in the app". (P3)

"It is because the content is based on scientific evidence". (P10)

"Most of the data used by MyfitnessPal is Malaysian food, and there are also many types of food and brands. Therefore, I think I can trust the programme and recommend it to patients". (P4)

Due to many health IT platforms available online, dietitians were very particular about the quality of the tools. Some applications or tools come at lower prices and have poor quality. However, there are tools with affordable prices but high in quality.

"And then I also look at the price of the applications. Sometimes I suggest a cheap application to the patients, but it has minimal requirements or standard quality". (P13)

7. Ease of Use

Several participants highlighted the importance of ease of use of the health IT tools. For example, health IT applications must be easy to use, simple and require minimum effort. Some dietitians explained they are likely to use tools that are free to users. Patients may not be interested in paying for the tools.

"Simple and not complicated, beneficial for patients, requires minimal effort and is easy to monitor". (P1)

"User-friendly, easy to read apps, easy to find information and use a simple language". (P12)

"If patients cannot afford a smartwatch, we suggest them to use free app". (P13)

8. Developer

Most dietitians were very cautious at choosing health IT tools. They will check the developer of the tools, such as health-related mobile applications. The health IT tools developed by professional bodies or governments, are the most trusted and preferred by dietitians.

"Check the developer who created the apps so we know if the apps are valid or not". (P2)

"At first, I do not simply trust it. But will check the developer of the apps". (P5)

9. Functionality

The dietitian also shared that they prefer tools for health IT that can be connected to multiple devices. For example, a freestyle application for measuring blood glucose levels can be connected to multiple devices so that dietitians can monitor their patients' blood glucose levels. In addition, tools that can connect to multiple users are also recommended.

"I prefer when it can connect to another device. Several devices can be connected in one application. Then it is easier for us. The patient is also easy to monitor". (P12)

"So, the applications can be signed in as a doctor, dietitian, or layperson with different interfaces. The hospital system did have that system, but the apps are unavailable. For example, when we want to access our patient, the app will show us the information about the patient and the appropriate consultation". (P14)

Table 3: Factors and barriers affecting the adoption of health IT in dietetics practice

Factors	Barriers
1. Self-motivation	1. Tools are not disease-specifics
2. Advertisement	2. Tools are not suitable for all age group
3. Demonstration to use health IT	3. The contents of the tools are inaccurate
4. Peers influence	4. Inconvenience or less practical
5. Patients	5. Requires paid version
6. Content quality	6. Information overload
7. Ease of use	
8. Developers	
9. Functionality	

Participants stated the factors and barriers in adopting the health IT in their workplace.

Theme 4: Perceived barriers to the adoption of health IT

Dietitians shared six main problems in using health IT. First, some tools were not disease-specific, second, some tools were not suitable for all age groups, third, some online information contains inaccurate information that misled patients, fourth, inconvenience or less practical to use, fifth, they required paid version for full function and last, information overload. For example, some apps may be

very limited for certain diseases, such as chronic kidney disease. Also, some tools may only be suitable for some age categories.

"There is no specific apps to manage chronic kidney disease case". (P5)

"Because I like these apps and we do not have many of these apps yet. Because even for a certain disease we do not have many yet". (P6)

"Apps cannot be used for all patients such as older people. Online tools are difficult. Most of my patients are elderly". (P1)

"But for the website, I rarely ask patients to open and read it themselves because I am worried about misleading information". (P7)

"for the section on diet, I prefer a more practical means such as a food diary, if possible in book form. If you want to use a telephone, that is also possible. But if the patient wants to come to us, it is difficult for us to discuss". (P7)

"But HealthifyMe need to pay if I am not mistaken to use the service". (P8)

"MyFitnessPal, I think people say it's easy to use. But for me, the information in this tool is too much or overloaded, so I rarely use it". (P12)

Discussion

This study was among the first to use a qualitative methodology to explore dietitians' practice of information technology in the dietetics field in Malaysia. Overall, participants agreed that these applications would improve the efficiency of dietetics practice. The use of health IT-enabled dietitians to quickly access information during consultations and help patients find healthy recipes (10). Most participants preferred to use health-related mobile applications. Health-related applications should be reliable, easy to use, portable, and perform multiple functions to increase dietetics practice efficiency. However, sophisticated apps may confuse and detract from the patient's ability to use them (19, 20). The participants and patients mostly used the MyFitnessPal app to record and analyse their dietary intake and physical activity level daily. A similar result was found in another study on using MyFitnessPal among most dietitians in Australia, New Zealand and the United Kingdom (20). By using this app, patients can discuss their dietary and physical activity data with dietitians, improving the effectiveness of nutrition education and could optimise the counselling session. Another study confirmed that using health IT is beneficial for increasing the efficiency of consultation tasks such as analysing dietary data and help patients track their dietary behaviours and progress between consultations (10). However, it is critical to recognise that many commercial health applications are not validated or recommended by recognised authorities and frequently lack evidence-based behaviour change approaches (21). In addition, another study found that nutrition apps may contain inaccurate food composition databases and lack of local food composition databases (22).

Dietitians prefer to use health agencies and government websites for nutrition education because the sources are reliable, information can be easily understood, and the content is always up to date. The previous study rated all websites in Malaysia's internet space that provides information on hypertension had a higher score on understandability (24). Besides, dietitians also suggest patients refer to these websites to get more information on disease management. Nonetheless, one participant argued that allowing patients to read from the website independently would result in misleading information due to the vast number of online websites. This is supported based on a study that evaluated websites concerned with Ebola were unreliable and should be used cautiously (25). In addition, website sponsorship may affect the quality of its health-related content and users' perceptions of its quality (26). Therefore, dietitians must continue to educate patients about the importance of selecting websites based on established norms and quality criteria in their dietetics practice.

Additionally, dietitians use social media platforms such as Facebook, Instagram, and YouTube to raise and educate the public. Participants mentioned that social media was used, especially during COVID-19 because of fewer patient appointments. Furthermore, participants noted that the trend of using social media as a source of information is growing, implying that it might be used as a medium for nutrition education. Our finding is consistent with another study that discovered various health-related information was provided via Facebook pages and groups to educate, empower, and disseminate public awareness and understanding of healthcare issues (27). The use of social media also enabled participants to interact with patients outside of the formal consultation. For example, dietitians can share supplemental materials, such as the latest nutritional evidence, through support groups, and patients can find moral support among individuals who have faced similar medical issues (15). Nevertheless, health information on social media should only be used under the guidance of healthcare practitioner. In a previous study, participants rated the reliability of health information on social media at 51% (28). Moreover, Individuals and non-profit organisations can be influential sources of health information on social media, which affects the credibility of the sources.

Our study revealed that participants have the initiative to explore suitable online tools for patient education, such as formal training. Another study highlighted that training and support increase the self-efficacy to use health IT in dietetics work processes (29). Therefore, the dietetic association needs to play their role in providing education, training, and advocacy to encourage better use or development of IT within the profession. Also, tertiary institutions must address the professional training that the next generation of dietitians will require to be equipped

with the knowledge and confidence to optimise the use of technology in the digital era (22).

Six participants investigated the developer IT tools to assess the information's validity. Two participants favoured the government-owned MyNutriDiari 2 app because it provides a complete nutrition resource, including videos, guidelines, tutorials, safe cooking recipes, and estimation of calorie requirements based on age and gender (30). One participant used websites for patient nutrition education, such as dietitians.org.my. This website is reliable because maintained by the Malaysian Dietitian' Association. The website offers up-to-date medical nutrition therapy guidelines for dietitians to use, as well as nutrition information for the public. Finally, one participant stated that he also favoured social media and usually suggested it to his patients.

The increasing use of smartphones, tablets, and other devices has led to the expansion of mobile health applications (31). However, the use of health IT in dietetics practice has been limited due to various barriers, including a lack of disease-specific health applications. For example, participant claimed that application focusing on dietary management for chronic kidney disease is still limited. Additionally, several health IT gadgets were inappropriate for all patients of all ages and impractical to utilise during nutrition consultations. The use of applications may be stressful for patients, especially the elderly since they will be required to enter a large amount of information into the apps (15). Additionally, specific app databases cause patients to struggle to recognise meal quantities (for example, when only weight-based units are accessible), quantify food size owing to the absence of food images, and use ambiguous wording.

The current study has several limitations. First, interviews were conducted over the internet via a video conferencing application, which limited the ability to monitor body language and other interpersonal cues. Nevertheless, online interviews allowed the researchers to expand the participants' geographical reach. Second, the lack of diversity of participants from other races may influence the outcome, as all participants in this study were Malay. However, this research was designed to investigate the use of online tools within the dietetics profession, reflecting the demographics of the dietetics workforce. In other words, this research may have limited generalisability to the dietetics profession in Malaysia.

Conclusion

Overall, dietitians recognise the critical role of health information technologies in dietetics practice. They used technology to aid in the dietary management of patients. Therefore, dietitians must stay current with technological advancements such as the use of mobile or web applications in the disease management. Dietitians can stay relevant and continue supporting evidence-based practice if they do so now and in the future. It is recommended to explore the difference of acceptance and usage in health IT between rural and urban patients.

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