Nursing students as agents of change: Empowering patients using mobile technology in health promotion

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Abstract

***PROBLEM**: An integral part of the nurses' role is to educate and empower patients to make lifestyle changes, which can in turn decrease their risk of disease. In our constantly evolving environment, engaging patients to modify their lifestyle is of utmost importance in disease prevention. Alongside this creating appealing yet, functional student learning opportunities to increase engagement of patients and student's in health education is necessary.*

***AIM**: To increase engagement with students and patients through education using mobile devices in a clinical setting. An additional objective was to increase understanding of cardiac risk.*

***METHODS:** This study was a retrospective survey using descriptive statistics and institutional ethics approval was granted as part of a larger project. Tablets with internet connectivity were available to students performing health assessments in workplaces to allow access to online health promotion tools via the New Zealand Heart Foundation website. Student nurses used this resource coupled with health assessment information to calculate individual cardiac risk and educate patients of their results. A survey asking about this experience was then distributed to students and patients.*

***OUTCOMES**: 504 health assessments were performed in workplaces around Auckland during September - November 2013. A survey was distributed to those receiving health assessments (patients, n = 504) and those performing health assessments (students, n = 130). 125 patients and 61 students returned surveys. Cardiac risk information was delivered using online tools via a tablet for 40% of patients (n = 50) and 66.6% (n = 37) of students reported using this resource. Patients rated the usefulness online education using a Likert scale (0 = not useful / 10 = very useful) with a mean (SD) of 8.5 (1.6) whereas students rated usefulness with a mean (SD) 7.9 (1.8). Knowledge of patients was also measured pre and post health assessment Likert scale (0 = no knowledge / 10 = very knowledgeable) with a difference of 1.8 (SD 1.9, 95% CI 1.5 - 2.1, P < 0.0001).*

***CONCLUSION**: Patients and students felt that individualised education using tablet / web based tools was useful. Presentation of information in this manner has contributed to an increase in patients' knowledge of their own health.*

Introduction

Cardiac Heart Disease (CVD) is the leading cause of death in New Zealand [1]. Changing this statistic requires educating patients around the risk of CVD along with the lifestyle changes required to improve their risk of a heart attack (Myocardia Infarction) or Stroke (Cerebrovascular Accident). Many authors claim that those who are informed about their healthcare are more likely to produce positive health outcomes [2-5]. A part of the nurses' role in health promotion is educating a patient about their own health and provide information that will allow them to change health behaviours [6]. In New Zealand Ministry of Health has developed an initiative using the patients General Practitioner or Registered Nurse to screen and educate patients about their risk of CVD in the community [7]. Therefore preparation of students for registration requires knowledge and skills for patient health education with a focus on the national health priorities, one of which is CVD prevention.

Problem

Nursing students from AUT University perform health assessments in the workplace as a part of their clinical learning experience. within the 45 minute appointment time there is a brief opportunity to provide health information relevant to their personal health data. A part of this health assessment is the calculation of a CVD risk score based on each patient's results and further care, education and lifestyle changes are based on this outcome. The students were provided a range of tools and resources to accommodate a range of learning styles and levels of literacy.

Barriers exist around understanding of the information given, for example, paper based information can be difficult to interpret for illiterate and non-English speaking workers and some office-based workers preferred to receive their health information electronically.

Solution

The solution was to allow the nursing students' to educate patients about their risk of CVD using an alternative to verbal information and print resources alone. This was achieved by using iPad mini's and a Vodafone Pocket Wi-Fi (3G network) at the point of care to access to the online Heart Health Forecast (HHF) tool provided by the New Zealand Heart Foundation. The aim was to present individualised information using pictorial, graphical, audible and written techniques to allow interactive exploration of patients health on the spot.

Methods

AUT University Ethics Committee approval (13/363) was obtained for this retrospective survey using descriptive statistics an on 26 September 2013 as part of a larger project.

Students received theoretical grounding in adult health assessment weekly in a two-hour lecture and an eight-hour clinical lab session for 6 weeks preceding data collection for this project. In particular, the theoretical component of CVD risk assessment was taught in two lectures based on guidelines from the New Zealand Primary Care Handbook 2012 [7]. Technical skills associated with blood testing along with interpretation of results were practiced two clinical lab sessions. Alrere Cholestech LDX blood testing machines (calibrated daily) were used to measure lipids and blood glucose using a capillary blood sample and results printed and attached to patient assessment forms.

Students were coached to use the online HHF tool to facilitate education of patients about their CVD, however a paper based version of this tool created by the New Zealand Guidelines Group was available as an alternative [8, 9]. Also a link to the HHF website was included on the patient assessment form to allow patients to similarly utilise this tool at home.

IPad's were supplied to the Clinical Educators who undertook training in their use before beginning this project. Issuing the iPad's to teachers meant that patient information was contained and allowed teachers to provide basic technical support as well as clinical education for students.

At the conclusion of each health assessment, an anonymous survey gathering information about their health assessment experience was distributed to patients (n = 504). This included a self addressed, prepaid envelope allowing them to return these free of charge. An online anonymous survey was distributed to all students

enrolled in this paper (n = 130) to gather information about their learning during health assessments they provided.

Results

Student nurses performed health assessments in workplaces around Auckland during September - November 2013. A survey was distributed to those receiving health assessments (patients, n = 504) and those performing health assessments (students, n = 130) and return rates indicated that 24.8% (n = 125) patients and 46.9% (n = 61) of students completed the survey.

Figure 1 and Figure 2 show this process in action with student's performing blood testing and interpreting results using mobile technology and the HHF website.

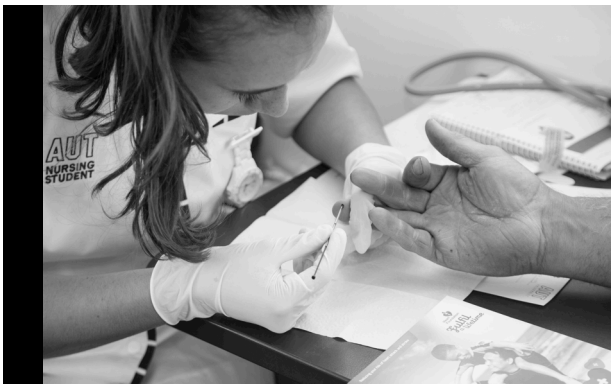

Figure 1 - Student Victoria Lelo takes blood to analyse, which will be used to calculate cardiac risk.

Figure 2 – Aleshia Sneap (student) explains implications of blood test results and cardiac risk to Wes Namizono (truck driver) using NZ Heart Foundation online resources.

Gender of patients was predominantly female in patients (64.2%) and students (93.4%). Ethnicity exhibited a similar trend in patients and students with the majority reporting their main ethnicity as NZ European followed by Asian / Indian, Pacific, Maori, Other and Middle Eastern, Latin American or African (MELAA) a detailed breakdown of ethnicity is available in Appendix A. Table 1 shows the distribution of participants by age and indicates a consistent spread across work-aged health assessment recipients, whereas, students were predominantly under the age of 30 years.

Table 1 - Distribution of age for students and patients

	n	
Age (years)	**Patients**	**Students**
< 20	2	30
21 - 30	21	23
31 - 40	44	3
41 - 50	27	0
51 - 60	20	0
> 60	4	0

A HHF was completed for 40% of patients (n = 50), patients were asked to indicate the usefulness of this process in explanation of their CVD assessment results using a Likert scale (0 = not useful / 10 = very useful). Figure 3 shows that patients rated the usefulness with a mean (SD) score of 8.5 (1.6). Furthermore, over half of the students surveyed (66.6%) used the tablet and online resources in explanation of results and Figure 4 illustrates the student rating of usefulness with a mean (SD) score of 7.9 (1.8).

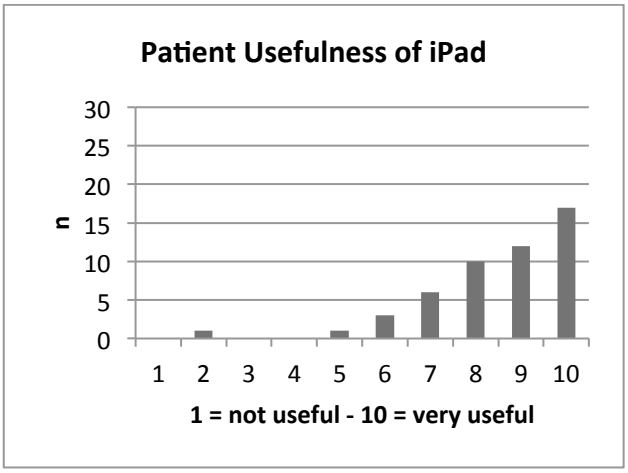

Figure 3 – Patients rating of usefulness of iPad and online education about CVD

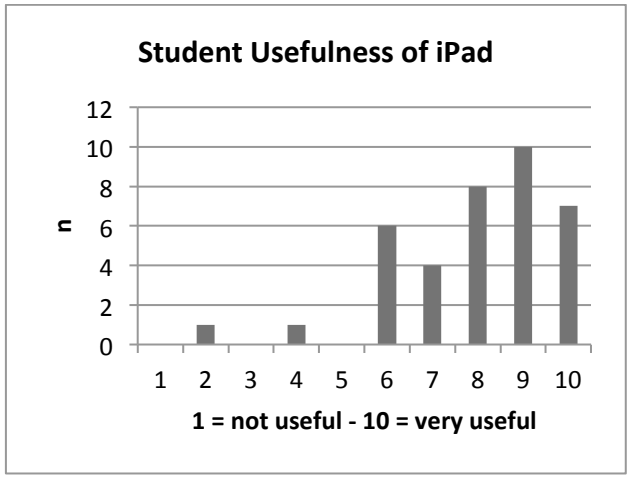

Figure 4 – Students rating of usefulness of iPad and online resources when educating about cardiac risk.

Knowledge of patients' health was also self-reported pre and post health assessment Likert scale (0 = no knowledge / 10 = very knowledgeable). **Figure 5** illustrates the difference between knowledge before and after each patient's health assessment. A paired two-tailed t-test revealed a mean difference between these scores of 1.8 (SD 1.9, 95% CI 1.5 - 2.1, $P < 0.0001$) showing a general increase in knowledge after their health assessment and education using the HHF tool.

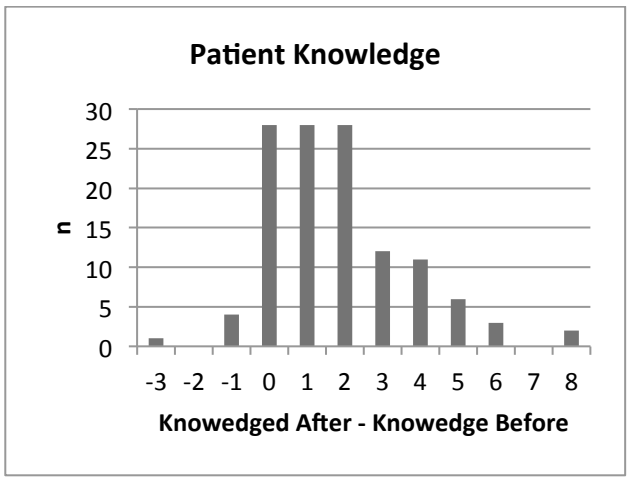

Figure 5 - Difference in knowledge before and after a health assessment

Students reported problems related to connectivity, which was the main reason students chose not use the iPad in patient education. Unfortunately, lack of detail meant that student responses were often non-specific such as "not working" (9.8%) or "website down" (1.6%) or related "Wi-Fi" connectivity (26.2%). This meant it was difficult to determine where the connection problems originated for example, software, hardware, iPad to Pocket Wi-Fi or 3G coverage / connectivity. Figure 6 is a graphical depiction of reasons students chose not to use the iPad in education.

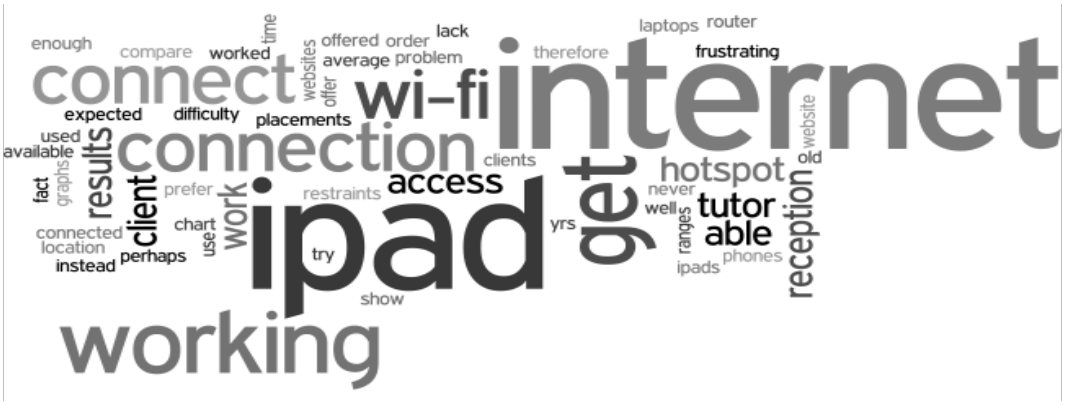

Figure 6 -
Why students did not use the iPad for patient education. (Text size correlates with occurrences of that word in student answers. Large words indicate more occurrences while smaller words indicate fewer occurrences).

Discussion

This study evaluated the usefulness of mobile devices in a clinical setting using an online tool to educate patients. The point of difference of this study was that the student facilitated use of the HHF tool at the point of care rather than directing the patient to do this alone later. Literature is sparse on the use of mobile technology and online tools in this type of facilitated patient education. This study extends current research by identifying the usefulness of this teaching method as an aid for client education of CVD risk in particular and its ability to increase patient knowledge.

While the value of technology in health education is recognised, its novelty in clinical practice has been reported to contribute to patient and health educator distraction. Distraction can create distance in the relationship between the health professional and client [10]. However, techniques to decrease distraction such as an explanation of the use of technology to a patient prior to beginning a consultation have successfully reduced this occurrence [11]. In this study, each student began the consultation with an explanation of the technology to decrease the risk of distraction. Anecdotally, it was found that the process of students' teaching the use of this technology to patients provided students the opportunity for developing facilitative communication skills. Facilitative communication techniques are shown to help guide patients to solutions in healthcare while building confidence [12].

The use of mobile technology and online information and led to positive changes in health behaviour and has increased patients ability to manage their own health needs in several studies [4, 13-15]. Acquisition of knowledge, such as lipid and blood sugar readings is a common theme in existing studies and links to the patient's ability to make lifestyle changes based on their knowledge and associated confidence [3, 4, 13, 16]. Interestingly, the reason most often cited by patients in this study for booking a health assessment was to have lipid and blood sugar testing performed (36.8%), closely followed by general interest / check up (24.0%).

Health professionals have traditionally moderated patient access to health information. With the advent of access to online health information patients need no longer be passive recipients of select health information but are active consumers of large quantities of unregulated information [16-18]. However the plethora of health information available online is not necessarily useful to patients without skills in identifying reliable information and accurately interpreting this information [16, 17]. One study investigated the information provided within smartphone apps for cancer and found a lack of consistency in the advice available [19]. Alongside this a British study in 2003 found that 97% of participants (n = 1322) reported accessing information on the internet related to a specific health condition, whereas, 57% accessed online health information to supplement information received from their GP [20]. Furthermore, in India, only 25% of those searching for health information checked the validity of information [21]. These examples show the need for health care providers to direct patients to appropriate and validated online resources. Therefore, the role of the health professional has shifted to one of guiding clients to validated online health information and supporting interpretation of information to increase health literacy. The risk of students and patients using inconsistent information was addressed in this study by presenting information using one standardised tool the HHF available on the New Zealand Heart Foundation website.

An increase in patient engagement was noted when using online mobile technology [5]. Similar results using different types of media such as audio, video, graphs with personalised support to increase health literacy and engage with patients have been reported. However, the link between increased knowledge and improved health outcomes is less clear in some cases [3, 22]. In this study, engagement was achieved by making this tool available at the point of care, enabling the client to input their personal data to predict CVD risk. This combination applicability and availability of the HHF allowed this process to be a catalyst in engaging patients.

Understanding the patient's learning style and adapting education to meet these needs can influence retention of health information and compliance in healthcare [14, 16]. For example, using mobile technology such as photographing supplies required for wound care at home to supplement written information has been shown to increase patient knowledge and compliance [23, 24]. Other factors could also influence change in health behaviour or ability to learn, such as the learning style and age of the educator and patient [3]. Students included in this study were aged 18 – 45 years (mean 22.8 years) whereas patients were generally older aged 25 – 63 years (mean 39.4 years).

Limitations

The use of a survey via mail has been associated with low return rates which are reported to affect the generalizability of studies [25]. However, an Australian literature review in 2008 found the opposite, where paper based surveys produced a higher return rates than online surveys [26]. In this study return rate of patient surveys in this study was 24.8% regardless of being provided with stamped, self-addressed envelopes. Whereas the online survey completed by students had a return rate of 46.9%.

Internet connectivity was a limitation of this study. The HHF tool relied on 3G Internet access and coverage was not available in some workplaces. This, coupled with the variance in technological abilities of student and staff participants could alter the results of this study. In particular, this was evident when data analysis was performed on responses related to why student's choice to not use iPad in patient education where broad answers such as "Wi-Fi connectivity" and "not working" were given. Answers that are more detailed would have allowed more in depth data analysis.

Although, the CVD education was the main focus of this study, the self rated knowledge of patients before and after their health was based on knowledge learned throughout the entire health assessment. Further research could include implications of mobile technology and online content alone.

Conclusion

Patient education is often facilitated by the nurse in a clinical setting, assessing the usefulness of mobile technology is a timely intervention as little research is available in this area. Student nurses who provided education using mobile technology and the patients who received education felt that this was useful in understanding their risk of a heart attack or stroke in the next 5 years. An increase in patients' knowledge of their own health was apparent after facilitated education using mobile technology to display the HHF from the New Zealand Heart Foundation.

Conflict of Interest

None

Acknowledgments

The Centre for Learning and Teaching at AUT University funded this project and provided an advisor (Nickel Narayan).

Clinical educators supported students with technology as well as ensuring that surveys were distributed to patients. This team included Sally Britnell, Glennis Best, Susan Johns, Caroline McKinney, Faith Reed, Jaga Maya Shrestha-Ranjit, Kay Shannon and Annie Tatton.

A written release was gained from those pictured in Figure 1 and Figure 2 and returned by the photographer to AUT University (Marketing). These photographs have also been published in two suburban newspapers.

Author Contributions

Sally Britnell was responsible for the design and implementation of this study, contributed to the ethics proposal, data collection, data analysis, writing of this paper. Jo Conaglen and Susan Johns assisted writing the ethics proposal, data collection and editing the final manuscript. Vickel Narayan provided project design and implementation advice.

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Appendix A

Table 2 - Demographic data (patient)

Age		
< 20 years	2	1.6%
21 - 30 years	21	16.8%
31 - 40 years	44	35.2%
41 - 50 years	27	21.6%
51 - 60 years	20	16.0%
> 60 years	4	3.2%
Not specified	7	5.6%
Ethnicity		
NZ Eurpean	59	47.2%
Asian / indian	24	19.2%
Pacific	20	16.0%
Maori	16	12.8%
MEELA	2	1.6%
Other European	4	3.2%
Gender		
Female	78	62.4%
Male	46	36.8%
not valid	1	0.8%

Table 3 - Demographic data (student)

Age		
< 20 years	30	49.2%
21 - 30 years	23	37.7%
31 - 40 years	3	4.9%
41 - 50 years	4	6.6%
51 - 60 years	0	0.0%
> 60 years	0	0.0%
Not Specified	1	1.6%
Ethnicity		
NZ Eurpean	29	47.5%
Asian / indian	18	29.5%
Pacific	8	13.1%
Maori	3	4.9%
MEELA	1	1.6%
Other European	2	3.3%
Gender		
Female	57	93.4%
Male	4	6.6%