Engaging Patients for Patient Safety: The Effect of Digital Information Transformations (QR Code) on Patients Fall Prevention. How much aid does it provide?

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ABSTRACT

Patients who were recently discharged from the hospital expressed a need for nurses to give and repeat directives regarding fall prevention.

These patients found that when nurses left a brochure on the topic but did not provide any (or limited) verbal explanations about the content or the importance of the information, they felt that the information was insufficient.

Inadequate patient engagement in hospital care inhibits high-quality care and successful transitions to home. Engaging patients in their health care management, specifically fall prevention, could be translated into a measurable improvement in safety and quality that entails excellent nursing care.

A Quick Respond (QR) Scan as a Web-based software application is an innovative approach that is used to engage the patients and family members in their own fall prevention care throughout hospitalization.
In addition, QR code scanners can be easily downloaded on mobile devices and efficiently decode these barcodes.

Keywords: Patient, hospital, safety and quality, fall, nursing care, QR code.

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INTRODUCTION

Patients fall in hospital may lead to physical, psychological, social and financial impacts. According to the WHO, falls are the second leading cause of accidental injury and unintentional deaths worldwide.

Understanding patients' perceptions of their fall risk will help to direct fall prevention strategies and understand patient behaviors. Empowering patients to become active participants in their own fall prevention care could be a solution.

To achieve this, the team have initiated intense efforts to improve transitions of care an innovation utilizing Quick Response (QR) Codes to replace paper information leaflets allowing patients to immediately access the required information on Hospital Fall Prevention Program video using their own personal device. These QR codes are placed at patients bedside to engage patients and relatives in taking an active role in fall prevention during hospitalization (Figure 1).
This video is one of the tools that we implement in the hospital wide with a duration of 4 minutes.
A compatible mobile device is used to scan and ready for viewing.
Thus, the aim of the study was to explore:
(1)Patient awareness of the QR code and the modality of use;
(2)The efficiency of QR code as a digital tool in delivering patients information;
(3)Patient preferences of receiving electronic versus paper.

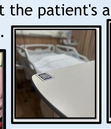


Figure 1: QR code

METHODS AND MATERIALS

To participate in this study, patients are required to scan the QR code provided by the hospital to engage their awareness. The QR code is available at the patient's area and accessible for patients to view on their own mobile device. This QR code will direct them to the educational video of "Fall Prevention Awareness".





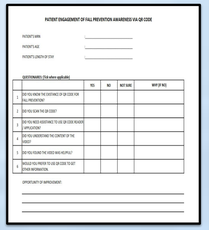


What behaviors do participants report in promoting their safety while receiving care in the hospital?
Our team members will do routine nursing rounds to identify patients who are at risk of falls, formulate individualized fall prevention intervention plans and managing the patients who fell.
This is an important component in the implementation of inpatient falls prevention programmes.



Our team conducted a prospective study using specialized questionnaires (Figure 2) to investigate patients' understanding of QR code scanning techniques, their perceptions of how simple it is to utilize an electronic approach as an opposed to a paper leaflet, and their preferences.

Participants completed the structured questionnaires at the end of the interviews upon admission or during the nurse's ward round.


PATIENT ENGAGEMENT OF FALL PREVENTION AWARENESS VIA QR CODE

PATIENT'S NAME: _____
PATIENT'S AGE: _____
PATIENT'S LENGTH OF STAY: _____

QUESTIONNAIRES (Tick where applicable)

		YES	NO	NOT SURE	WHY [IF NO]
1	DID YOU KNOW THE EXISTANCE OF QR CODE FOR FALL PREVENTION?				
2	DID YOU SCAN THE QR CODE?				
3	DID YOU NEED ASSISTANCE TO USE QR CODE READER/ APPLICATION?				
4	DID YOU UNDERSTAND THE CONTENT OF THE VIDEO?				
5	DID YOU FOUND THE VIDEO WAS HELPFUL?				
6	WOULD YOU PREFER TO USE QR CODE TO GET OTHER INFORMATION.				

OPPORTUNITY OF IMPROVEMENT: _____

Figure 2 : Structured Questionnairre

RESULTS

A qualitative/quantitative exploratory study was conducted to explore patients' knowledge and perceptions of their falls risk. Both qualitative and quantitative data were collected simultaneously; however, this paper presents the findings of the qualitative component only.

Participants were from acute medical, surgical and general wards in KPJ Johor Specialist Hospital, Johor Bahru, Malaysia.To participate in this study, the eligible patients as per inclusion criteria required to scan the QR code provided by the hospital to engage their awareness. The Pediatric Ward and Critical Care Unit was excluded from the study.

QR codes have a wide range of applications such as education, practice management and product promotion by (Kafadarova et al., 2019).This is contactless and therefore preferred to reduce viral transmission, as well as having several other advantages.

Our findings demonstrated that the QR codes are a familiar, easy-to-use system, an interactive and a preferred tool for delivering patients information over paper leaflets and this was shown in the table (figure 3) that 89% of our patients overall reported with high levels of satisfaction and preferred to use the QR code.

From the study, as shown in the table, the patients involved and engaged through viewing the video presentation via QR code, understood the content well and found it was very helpful. Thus, the effectiveness of these approaches in inpatient clinical care settings was proven.

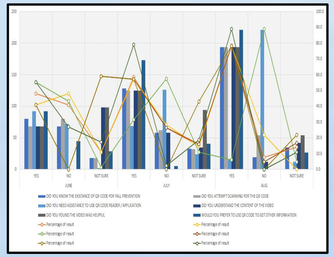
As a result, this tool and the application is the easiest way for patients and relatives who are involved directly in fall prevention while hospitalized.

GRAPHS AND TABLES

PATIENT ENGAGEMENT OF FALL PREVENTION AWARENESS VIA QR CODE

	JUNE			JULY			AUG		
	YES	NO	NOT SURE	YES	NO	NOT SURE	YES	NO	NOT SURE
DID YOU KNOW THE EXISTANCE OF QR CODE FOR FALL PREVENTION	80	68	18	126	58	32	194	19	35
Percentage of result	48.2	41.0	10.8	59.4	26.8	14.1	78.2	7.7	14.1
DID YOU ATTEMPT SCANNING FOR THE QR CODE	68	80	18	125	62	32	194	54	0
Percentage of result	41.0	48.2	10.8	57.1	28.3	14.6	78.2	21.8	0.0
DID YOU NEED ASSISTANCE TO USE QR CODE READER/ APPLICATION	92	72	2	89	126	25	55	221	12
Percentage of result	55.4	43.4	1.2	51.5	57.5	11.4	22.2	89.1	4.8
DID YOU UNDERSTAND THE CONTENT OF THE VIDEO	68	0	98	125	58	35	194	52	42
Percentage of result	41.0	0.0	59.0	57.1	26.5	16.0	78.2	21.0	16.9
DID YOU FOUND THE VIDEO WAS HELPFUL	68	0	98	125	0	96	194	0	54
Percentage of result	41.0	0.0	59.0	57.1	0.0	42.9	78.2	0.0	21.8
WOULD YOU PREFER TO USE QR CODE TO GET OTHER INFORMATION	92	45	29	173	5	41	221	0	27
Percentage of result	55.4	27.1	17.5	79.0	2.3	18.7	89.1	0.0	10.9

Figure 3 : Patients Feedback



The table showed the results of patients feedback collected from June 2023 till August 2023. There's an increasing trend in data collection on fall prevention awareness using QR code.

Total of 166 patient's approached in June, 219 in July and 248 in August. There were 68 (41%) patients and relatives who did the scanning in June, 125 (57%) in July and 194 (78%) in August.

Some of the patients or relatives expressed that they need assistance in using QR code readers and it was shown in the table where 55% in June, 32% in July and 6% in august. The percentage reduced in trend as the patient's relative helped to do it.

On an average, 59% of patients gave good responses in understanding the fall prevention video and most of them found that it was very helpful.

Nearly all participants (89%) were satisfied or very satisfied with their experience using the QR code in the hospital (Figure 3), and were able to independently complete an interactive health education module on fall prevention as for hospital safety.

DISCUSSION

The QR codes were generated using a free website application, printed and laminated for the patient to scan, and therefore it's free to generate and utilize and supportive to the environment. Ultimately, scale up for our intervention were the QR codes scanner and content eventually improved and replaced the current practices by hospital staff (especially nurses) in a way that streamlines, rather than compounds current workflow.

These advantages are confluent with the current literature where the use of QR code and smartphone technology were reported to improve knowledge, be more convenient, accurate, secure and environmentally friendly by (*Dixon et al., 2013; Uzun and Bilgin, 2016; Koh et al., 2017*).

Most of the patients, especially the younger generation verbally preferred the QR code system in getting other information as it can be their preference and linked to fall prevention is warranted to increase digital search efficiency. However, there are limitations especially for elderly and those patients or relatives with non compatible devices.

In order to serve as a linguistically appropriate patient education tool for fall prevention, the content of the video may be translated into other languages after the effectiveness of its English version in preventing falls during hospital stays is demonstrated.





CONCLUSIONS

We are embracing innovation and new technologies due to concerns around confidentiality, infrastructure, patient safety and ethics amongst other considerations. Inpatients are highly satisfied with the use of QR code scanner and access their task independently and completed with an interactive educational module on hospital patient safety for better patients monitoring, engagement, and quality of care in the healthcare setting.
The QR codes provide an exciting opportunity and preferred platform, to excite and engage learners in ways we have not been able to, thus far. Majority of participants agreed that there was room for improvement in our ongoing work regarding the implementation of the patient safety initiatives that were endorsed and supported, substituted for, or modified our platform. Patients fall prevention engagements made as continuous and essential efforts or protocols being implemented in the hospital setting.

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