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IMPACT OF DIGITAL EDUCATIONAL PROGRAM ON CLINICAL OUTCOMES

Sami Al-Shakhshir (a)*, Syed Azhar (b), Mahmmoud Alhaddad (c), Mohd Pazudin (d)
*Corresponding author

(a) School of Pharmaceutical Science, USM, Penang, Malaysia, Smsa15_pha010@student.usm.my
(b) Institut Perubatan & Pergigian Termaju, USM, Penang, Malaysia, sazhar@usm.my
(c) College of Pharmacy, Taif University, Taif, KSA, mahmoudlink@yahoo.com
(d) School of Medical Sciences, Hospital of Universiti Sains Malaysia, Kelantan, Malaysia,
pazudin@usm.my

Abstract

This study aims to identify the impact of clinical pharmacist's digital educational program on drug adherence and clinical outcomes among Malaysian hypertensive pregnant women. A quasi-experimental study was undertaken at the antenatal clinic of Hospital Universiti Sains Malaysia (HUSM). The study was carried out with 51 hypertensive pregnant women who were conveniently interviewed. The intervention was an educational program that included 4 video clips and 30 short educational messages. The educational program was started immediately after recruitment through sending the video clips and short messages by WhatsApp application. Descriptive and inferential analyses were performed using SPSS version 22. Total score of drug adherence domain and diastolic blood pressure among hypertensive pregnant women showed significant improvements after the intervention (P=0.001, P<0.001), respectively. The study reinforced the essential role of the clinical pharmacist in patient education. Moreover, using digital technology to deliver a structured educational program for hypertensive pregnant women was an effective method in increasing drug adherence rate and improving diastolic blood pressure.

Keywords: Pregnant women, WhatsApp, Hypertension, Digital Education.

1. Introduction

Pharmacists are specialists in medications and can play a main role in the health care system due to their accessibility, experience, and expertise. Patient education and counselling is the main pillar in pharmaceutical care and must be achieved in highly professional and suitable ways.

Patients education is not basically transferring certain information to patients and then asking them to follow up the instructions. However, effective education could be achieved by motivating patients for education by using simple, convenient, and enjoyable educational tools (Jahromi, 2016).

Nowadays, people are lucky since they are living in an era of technology that changed their life in different ways. For an instant, using digital technology in education make it more convenient, attractive and effective. As well, using smartphones in patient's education is an important addition to education (Short, Lin, Merianos, Burke, & Upperman, 2014) because these phones are widely used among the community and have many grateful features such as simplicity, movability, ability to update, and compatibility to different social applications. WhatsApp is one of the most public social media applications. In Malaysia, using WhatsApp is very common and appropriate among all population ages and classes.

2. Problem Statement

Pregnant women usually rely on their experience, internet, family or friends as main sources of health information. Thereby, they might use untrusted drug information resources that lead to wrong, incomplete or misleading information that consequently increase the harmful risks on their health and their unborn baby (Finer & Henshaw, 2006; Nordeng, Ystrøm, & Einarson, 2010).

Moreover, the traditional methods of patient's education might face many obstacles which might influence on the educational process such as working overload, insufficient time, lack of privacy places, and a shortage of health professional staff (Al Laif, Ahmad, Naqvi, & Ahmad, 2017).

On the other side, the studies about drug adherence in pregnant women are scattered and vary among different countries. It was noticeable that more than 50% of pregnant women using medications for chronic diseases were non-adherent (Sawicki et al., 2011). Also, the non-adherence rate in the pregnant population is much higher than the general population (DiMatteo, 2004).

In Malaysia, particularly in Kelantan region (area of study), the rate of hypertension disorders among pregnant women was 3.52% in 2012 (NOR, 2012). Hypertension in pregnancy has many complications on mother. Therefore, hypertension is considered the most common cause of maternal mortality and morbidity (Khan, Wojdyla, Say, Gülmezoglu, & Van Look, 2006; Roberts, Pearson, Cutler, & Lindheimer, 2003). According to National Obstetrics Registry third report 2011-2012, Ministry of Health Malaysia, the average incidence of hypertension in pregnancy-related maternal death was 13.6% from 1997 to 2008.

3. Research Questions

Would the digital educational program improve hypertensive pregnant women's drug adherence rate and their clinical outcomes?

4. Purpose of the Study

To measure the impact of clinical pharmacist's educational program using digital technology on drug adherence rate and clinical outcome among hypertensive pregnant women in Kelantan, Malaysia.

5. Research Methods

5.1. Study design and site

A quasi-experimental study was conducted at Hospital University Sains Malaysia (HUSM) antenatal clinics. HUSM is a very famous hospital among Malaysian people since it is the best tertiary and teaching hospital on the East coast of Malaysia (Kamari, 2009).

5.2. Study population

All pregnant women (age more than 18 years old, have hypertension disease, able to read in the Malay language and used WhatsApp application) who visited the antenatal clinic during the study period (10/2017-10/2018) were voluntarily invited to participate in the study. However, all pregnant women (in critical or labor situation, refused to participate, or did not meet the inclusion criteria) were excluded from the study.

5.3. Sample size estimation

Since the number of pregnant women with hypertension at HUSM was small (NOR, 2012), the researchers approached to invite all patients who met the inclusion criteria.

5.4. Research tools

Three research tools are used in this study. The first tool was a validated structured Morisky-Green-Levine (MGL) questionnaire (Morisky, Green, & Levine, 1986). The tool was translated to Malay language according to World Health Organization (WHO) Process of translation and adaptation of instruments (WHO, 2016). The second tool was a clinical outcomes data collection sheet which was developed to follow the clinical outcomes (Systolic and diastolic blood pressure, and pulse) of participants. The sheet was prepared by a gynaecologist and clinical pharmacists depending on the Malaysian clinical practice guidelines (management of hypertension 4th edition 2013) and standard routine check-up at HUSM antenatal clinic during each visit. The third tool was educational program which consisted of 4 video clips and 30 messages about the medications, drug adherence, hypertension disease and lifestyle modification. All the educational materials were adapted from evidence-based resources (Eyers, Weatherall, Jefferies, & Beasley, 2011; Kozer et al., 2003; NHS, 2009; Oladejo & Bewley, 2013; Poehling et al*.,* 2011; Scialli, 2006; Zaman et al., 2008) then were translated to Malay language using simple, short, and positive sentences.

5.5. Data collection method

Three phases are used to collect the data in this study. Phase one was before starting the education, when trained nurses interviewed participants at the waiting area of the antenatal clinic by using the adherence questionnaire. Simultaneously, the researchers reviewed the medical records of pregnant women who agreed to participate in the study to collect their baseline clinical outcomes. Phase two was sending educational materials to pregnant women immediately after recruitment. Providing educational materials were in a structured way where participants received one daily message and one weekly video clip. However, phase three was started at the end of intervention where participants filled up the same questionnaire that they filled before the education. As well, the same clinical data collection sheet was used to follow up the clinical results within two antenatal visits after completing the intervention.

5.6. Data analysis

Drug adherence levels were categorized according to MGL adherence tool (Morisky et al., 1986) as high level (yes to zero items), medium level (yes to 1 or 2 items), and low level (yes to 3 or 4 items). In addition, different inferential statistical tests were used to measure the influence of the intervention on drug adherence levels and clinical outcomes such as (Friedman's One-Way Test, and McNemar test). Data was analysed using SPSS version 22 and all P-values of less than 0.05 were considered significant.

6. Findings

Only 39 pregnant women, out of 51 patients completed all the study phases. All participants were Malay with age of more than thirty years old. As well, most of them were living in a village, had an unplanned pregnancy and had a secondary education level. Moreover, majority of them were in the last gestational age when they participated in the study and most of them never visit or had only one visit to the dental clinic during pregnancy. However, it was necessary to say that; none of all participants was smoker or alcohol drinker (Table 01).

Table 01. Demographic variables of pregnant women

Demographic characteristics		Hypertensive pregnant N (%)
Ages	<25 years	2(5.1)
	25 – 30 years	6(15.4)
	31 – 35 years	10(25.6)
	>35 years	21(53.9)
Race	Malay	39(100%)
	Chinese	0(0.0%)
	Indian	0(0.0%)
	Other	0(0.0%)
Educational level	No formal education	0(0.0%)
	Primary	4(10.3%)
	Secondary	18(46.2%)
	Tertiary	13(33.3%)

	Graduate	4(10.3%)
Area of Residence	Village	26(66.7%)
	City	13(33.3%)
Smoking cigarettes during pregnancy	No	39(100%)
	Yes, but less than before pregnancy	(0.0%)
	Yes, same or more than before pregnancy	0(0.0%)
Gestational age	1st trimester	6(15.4%)
	2nd trimester	14(35.9%)
	3rd trimester	19(48.7%)
Planned pregnancy	Yes	16(41%)
	No	23(59%)
Alcohol use after awareness of pregnancy	Yes	0(0.0%)
	No	39(100%)
Number of dental clinics visits during the pregnancy period	None	20(51.3%)
	Once	13(33.3%)
	Twice	3(7.7%)
	More than two	3(7.7%)

Nevertheless, while most of the pregnant women reported that they did not use self-medication during pregnancy, paracetamol was the common drug used as over the counter (OTC) drug (30.8%) followed by aspirin (10.3%) (Figure 01).
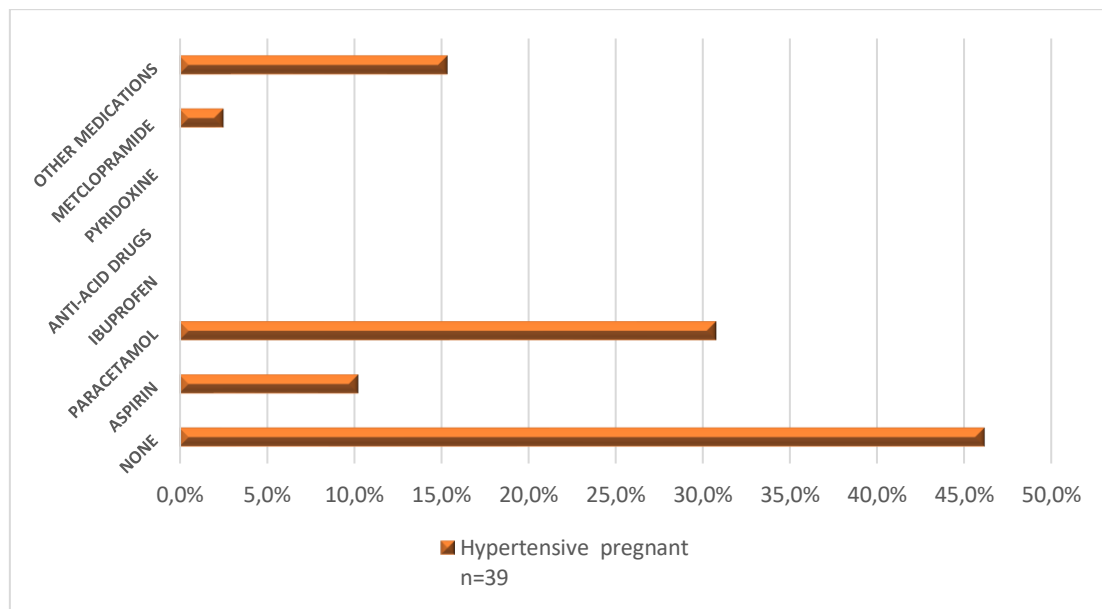

Figure 01. The common OTC drugs among pregnant women

As well, the primary sources of drug information among most of participants were the physicians followed by the internet, and family/friends whereas only a small percentage of pregnant women (12.8%) who rely on pharmacists as a source of drug information as illustrated in Figure 02.
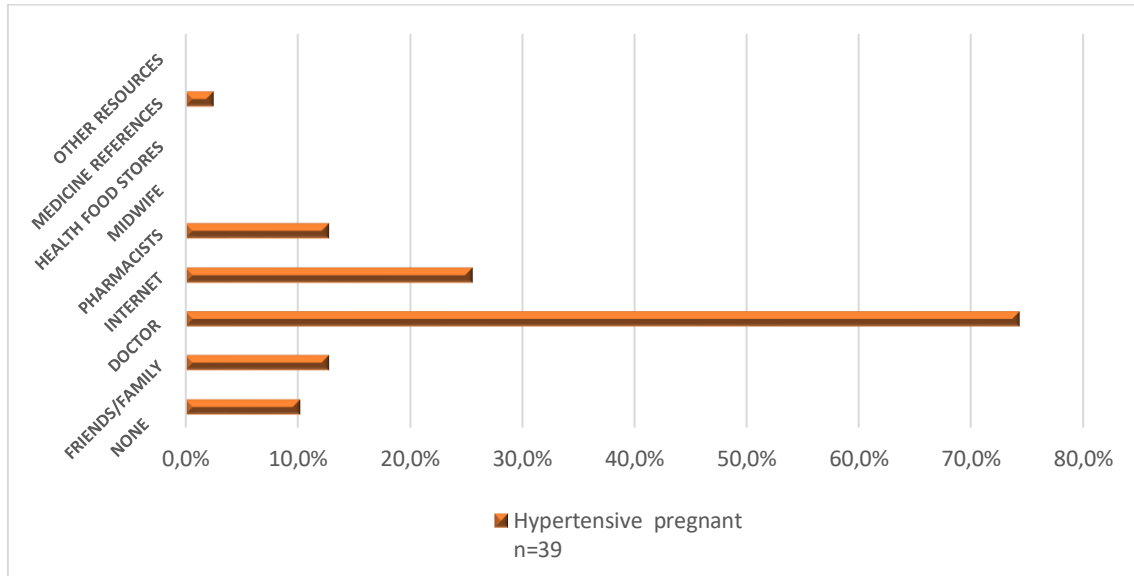
Figure 02. The common drug information resources used among pregnant women

When the clinical outcomes of pregnant women measured at different periods (baseline, end of the intervention, and follow up), a significant improvement in diastolic blood pressure was noticed ($P<0.001$) (Table 02).

Table 02. Summary comparisons of the impact of educational program on participant's clinical outcomes

Clinical outcomes	Hypertensive pregnant women			
	Before Median (IQ)	After Median (IQ)	Follow up Median (IQ)	P-value
Systolic blood pressure	130(11)	133(10)	130(18)	0.168
Diastolic blood pressure	90(10)	87(10)	80(6)	**<0.001**
Pulse	82(12)	84(10)	86(10)	0.456

*Note: The scores were compared by using Friedman's One-Way Test

Similarly, significant improvement was seen among participants with low drug adherence level where their number at this level significantly decreased at the end of the intervention ($P=0.012$) (Table 03).

Table 03. Impact of educational programs on participants' drug adherence levels

Respondents	Drug adherence level	Before n (%)	After n (%)	P-Value
Hypertensive pregnant	Low	11 (28.2)	2 (5.1)	**0.012**
	Moderate	20 (51.3)	28 (71.8)	0.077
	High	8 (20.5)	9 (23.1)	0.625

*Note: The levels were compared by using McNemar Test

7. Conclusion

Using digital technology in education is an effective method which significantly improved drug adherence rate and diastolic blood pressure among hypertensive pregnant women. The study pointed out the important role of the digital technology in education processes and using it as a tool for delivery the educational material was effective and promising.

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