

## **Original Research Article**

# **Factors Affecting Knowledge and Practice of Hypertension and Medication Use in Hypertensive Pregnant Women**

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### **ABSTRACT**

Hypertension in pregnant women is one of the public health concerns globally and its management requires a consideration of benefits outweighing the risk of treatment. Patients' knowledge and practices regarding the disease and medication is crucial in ensuring the reduction in morbidity and mortality rate in the mother and foetus. This study aimed to assess the level of knowledge and practice of hypertension and its management, the medication use and factors associated with a good level of knowledge and practice in pregnant women with hypertension. This study was a cross-sectional, observational study, using a self-administered questionnaire, involving a total of 70 pregnant women who were attending antenatal checkup in Hospital Al-Sultan Abdullah (HASA), UiTM Puncak Alam, Selangor, Malaysia. Majority of the participants had poor knowledge regarding hypertension during pregnancy (55.71%) but adopted good practice (74.29%) on the disease management. Majority of participants showed a good level of knowledge (68.6%) and practice (82.86%) on the medication use during pregnancy. Pharmacists were the major (35.7%) source of information in seeking information on the medication followed by doctors and online resources. Factors such as higher age, higher education, and having more children are linked to a high level of knowledge on medication use. Good practices in medication use are associated with high education, employment, and having one to three children. Factors related to good knowledge of the disease and its management include being over 30 years old and living in an urban area. In contrast, participants who is over 30 years old is associated with good practices in disease management. It is evident that most participants exhibited good knowledge and practice regarding medication use during pregnancy, despite significant knowledge gaps related to hypertension. This research may project a refine guideline for a comprehensive and targeted patient education aiming good maternal health outcomes.

**Keywords:** Knowledge and practice, Hypertension, Pregnant women, Medication use, Disease management

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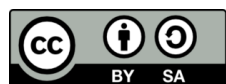
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## 1.0 Introduction

Hypertensive disorders, including chronic hypertension, gestational hypertension, preeclampsia, and eclampsia, collectively affect around 5% to 10% of pregnancies (1). The prevalence of hypertensive disorders in pregnancy (HDP) among Malaysian mothers within the last two years was found to be 6.52% (2). Managing hypertension during pregnancy requires balancing the therapeutic benefits with potential risks, demanding a thorough understanding of the advantages and potential side effects of medications. A study found majority of the patients were unaware of the optimal blood pressure (BP) range, the symptoms of hypertension, and had a poor awareness of hypertension therapy (3).

Nonetheless, medication use remains crucial during pregnancy to protect both maternal and foetal health, particularly for pregnant women with acute or chronic conditions that require treatment (4). The treatment approach is divided into two main categories which are for chronic and acute hypertensive pregnancy disorders which includes preeclampsia and eclampsia (5). The prevalence of medication use, both prescribed and self-administered, among pregnant women has been steadily increasing over time, underscoring the critical importance of proper medication use in public health (6). Owing to the significance of this issue, many research explored pregnant women's knowledge and practices regarding hypertension management and the medication (15). However, only a few studies highlighted factors associated with these knowledge and practices. Addressing this knowledge gap is vital as it may improve the maternal morbidity and mortality rates due to hypertensive complications among pregnant women. A study in Malaysia revealed that majority of the pregnant women possessed moderate knowledge on hypertensive disorder (7).

This study aims to provide a comprehensive understanding of pregnant women's

knowledge and practices regarding the hypertensive condition and the medication use for hypertension management. Additionally, this study explores factors influencing their knowledge and practices on the hypertension and medication, as well as identifying primary sources of information relied upon by pregnant women in managing hypertension.

## 2.0 Materials and methods

### 2.1 Design of the study

A cross-sectional observational study was conducted at the antenatal clinic, Obstetrics & Gynaecology Department, of Hospital Al-Sultan Abdullah, UiTM Puncak Alam, Selangor, Malaysia over a period of 5 months from March 2024 to July 2024. Participants were selected via purposive sampling, targeting all pregnant women with hypertension who were attending their regular antenatal check-up at the clinic during the research period. Participants were considered hypertensive patients if they have been already diagnosed by a physician and their blood pressure was  $\geq 130/80$ mmHg following the latest recommendation of American Heart Association, Hypertension Clinical Practice Guidelines (24).

The study participants comprised of all pregnant women of all ages who were diagnosed with hypertension and with or without other concomitant illnesses, were treated with at least one hypertensive medication, were attending follow-up in HASA antenatal clinic and who could read and understand either Bahasa Malaysia or English. A total of 138 pregnant women were screened and 70 participants were included in this study. Identified participants were approached face-to-face, informed consent was obtained and were given time to complete the questionnaire during the clinic follow up. The excluded patients were those who do not meet the inclusion criteria, had incomplete data and did not give consent to participate in the study.

## 2.2 Research instruments and data analysis

A set of questionnaires which consisted of 3 sections, with a total of 28 questions was used in this study. In the questionnaire, part A contains questions on the participants socio-demographics, part B includes the questions on the knowledge and practice on hypertension and its management and medication use and part C consist of questions regarding the participants preference in obtaining sources of information.

The questionnaire was framed as per the requirement of the study from several studies (8-12) and the questionnaire was validated by four subject experts who were not associated with the study. Reliability test was performed by using Cronbach's alpha coefficient to assess the internal consistency reliability of the questionnaire and the questionnaire was adjusted and cleaned to obtain the value of 0.7. The questionnaire has been made available in both English and Bahasa Malaysia, verified by a certified translator, to make it easier for the participants to understand.

In part B in which the knowledge and practice on management of hypertension and medication use were assessed, the responses were divided into correct and incorrect responses in which 1 mark was given for each correct answer and 0 marks for each incorrect answer. The total score for knowledge were further classified into 2 levels with poor being 0 to1, and good being 2 to3, the practice scoring level was also classified into 2 groups with poor being 0 to1 and good being 2 to 3.

Data were analysed using the Statistical Package for Social Sciences, Version 24.0. Descriptive statistics were used to describe the demographic data, knowledge and practice on the disease, its management and medication use. Source of information regarding medication use was presented by percentages and pie chart. Continuous data presented as mean, and categorical data were expressed as percentages. Binomial logistic regression was used to identify

the association between socio-demographic groups with the good level of knowledge and practice. The level of 0.05 was the cut off point for statistical significance with a confidence level of 95%.

## 2.3 Ethical considerations

Ethical approval was obtained; REC (PH)/UG/102/2024(MR) from the Pharmacy Faculty, Universiti Teknologi MARA (UiTM) and the Research Ethics Committee (REC) of Hospital Al-Sultan Abdullah, UiTM., The goal of the study is to promote knowledge in the area of maternal health without endangering the subjects. A strict policy of confidentiality were adopted during the whole study procedure. Participant's rights, well-being, and dignity were given top priority. The design and conduct of the study incorporate respect for cultural norms and consideration for the special needs of pregnant women with hypertension. All data were kept securely, and participants personal information were kept anonymous coded in which it will only be made accessible to the research team members for research purposes.

## 3.0 Results

### 3.1 Characteristics of the study population

A total of 138 participants were screened and only 70 participants were included into this study. Table 1 presented the main characteristics of the participants. Majority of participants were aged between 31 – 40 years old (48.57%) followed by 41 – 50 years (28.57 %) and 18-30 years (22.86%). Most of the participants were Malay (67.1%), followed by Indian (15.7%), Chinese (14.3%) and others (2.9%). Majority of participants received tertiary education (74.3%), secondary education (17.1%), primary education (5.7%) and no formal education (2.9%).

Employment status were identified among the participants, in which majority of them

(58.6%) were employed, 27.1% unemployed and 14.3% retired. Additionally, 67.1% of the respondents

lived in urban area. 52.9% of participants have 1-3 children while 38.6% have only one child.

**Table 1:** Socio-demographic of pregnant women with hypertension.

Characteristics	N (%)
Age	
a) 18-30	16 (22.86)
b) 31-40	34 (48.57)
c) 41-50	20 (28.57)
Race	
a) Malay	47 (67.1)
b) Chinese	10 (14.3)
c) Indian	11 (15.7)
d) Others	2 (2.9)
Level of education	
a) No formal education	2 (2.9)
b) Primary	4 (5.7)
c) Secondary	12 (17.1)
d) Tertiary	52 (74.3)
Occupation	
a) Employed	41 (58.6)
b) Unemployed	19 (27.1)
c) Retired	10 (14.3)
Residential area	
a) Rural	14 (20)
b) Urban	47 (67.1)
c) Suburban	9 (12.9)
No. of children/deliveries	
a) 1	27 (38.6)
b) 2-3	37 (52.9)
c) Above 3	4 (5.7)
d) Miscarriage	2 (2.9)

### 3.2 Level of knowledge and practice on disease, its management and medication use

As in Table 2, majority of the participants (68.6%) had a good level of knowledge regarding medication use and 32.4% of the

participants possessed a poor level of knowledge on medication use. Majority of the participants also had a good level of practice in medication use during pregnancy (82.86%) and only 17.14% had a poor practice on the medication use during their pregnancy.

Only 44.2% participants had a good level of knowledge on the disease and its management and most of the participants had a poor level of knowledge on the disease and its management. Meanwhile, majority of the participants (74.29%) adopted a good practice in managing their hypertension during pregnancy.

*3.3 Main source of information regarding medication use*

The source of information regarding the medication use among participants were studied Figure 1 showed that participants mostly obtained information regarding medication use during their pregnancy from the pharmacists (35.7%) followed by doctors with 28.6% and 12.9% received most of their information regarding medication from online resources. Meanwhile 10% sought information from nurses, 7.1% from social media platforms and 5.7% were from other sources.

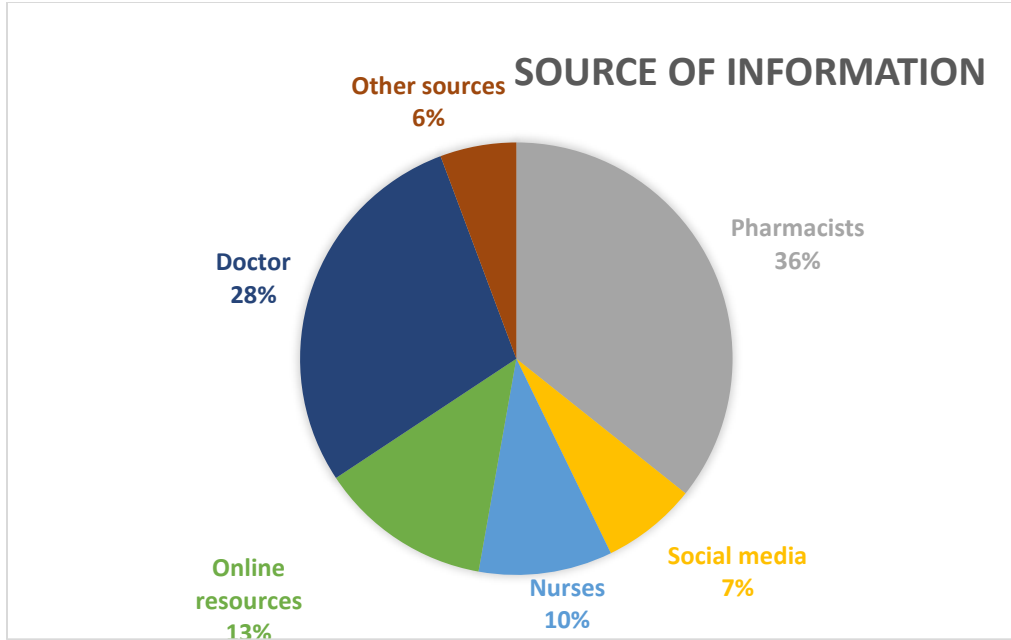
*3.4 Factors affecting knowledge and practice regarding medication use*

As presented in Table 3, participants who were aged more than 30 years old were significantly associated with a good level of knowledge (OR 1, 95% CI) those below 30 (OR 0.560, 95% CI 0.378-0.827,  $p = 0.0167$ ). Participants who received tertiary education were significantly associated with a good level of knowledge on the medication use (OR 1, 95% CI,  $p < 0.001$ ) as compared to other participants from various education levels. Working participants were significantly associated with a good level of knowledge than the unemployed and retired participants (OR 1, 95% CI). Pregnant women with more than three children shown higher knowledge in the medication use (OR 3.879, 95%CI 2.354-6.251,  $p = 0.001$ ) compared to others.

Results presented in Table 4 showed that the level of education, occupation and number of pregnancies were significantly associated with good practice on the medication use. Pregnant women with tertiary education showed better practice (OR 1.546, 95%CI 1.15-1.965,  $p = 0.005$ ) as well as employed women (OR 1) and pregnant women with 1-3 children shown to have better practice (OR 1.351, 95%CI 1.158-40.657,  $p = 0.005$ ) than women with more than 3 children.

**Table 2:** Levels of knowledge, practice among participants regarding medication use and disease and its management.

Characteristics	Number (n)	Percentage (%)
<b>Level of knowledge on medication use</b>		
Good (score: 2 to 3)	48	68.6
Poor (score: 0 to 1)	22	31.4
<b>Level of practice on medication use</b>		
Good (score: 2 to 3)	58	82.86
Poor (score: 0 to 1)	12	17.14
<b>Level of knowledge on disease</b>		
Good (score: 2 to 3)	31	44.2
Poor (score: 0 to 1)	39	55.71
<b>Level of practice on disease</b>		
Good (score: 2 to 3)	52	74.29
Poor (score: 0 to 1)	18	25.71



**Figure 1:** Source of information regarding medication use

**Table 3.** Factors associated with a good level of knowledge regarding medication use.

Characteristics	p-value	OR (95% CI) adjusted
Age (years)		
≤30	0.0167	0.560 (0.378-0.827)
>30		1
Level of education		
a) No formal education	0.999	0.478(0.125-25.35)
b) Primary	0.341	0.235 (0.012-4.624)
c) Secondary	0.001	0.478 (5.72-27.789)
d) Tertiary	<0.001	1
Level of Occupation		
a) Employed	-	1
b) Unemployed	0.005	0.375 (0.156-0.68)
c) Retired	0.02	0.028 (0.278-0.813)
Residential area		
a) Rural	0.813	0.467 (0.258-0.847)
b) Urban	0.657	1 (0.885-1.224)
c) Suburban	0.536	0.638 (0.416-0.948)
No. of children/deliveries		
a) 1	1	-
b) 2-3	0.012	2.345 (1.356-4.657)
c) Above 3	0.001	3.879 (2.354-6.251)
d) Miscarriage	0.678	1.132 (0.684-1.890)

**Table 4:** Factors associated with a good level of practice on the medication use.

Characteristics	<i>p-value</i>	OR (95%CI) adjusted
Age (year)		
≤30	0.718	0.650 (0.463-0.913)
>30	0.657	0.548 (0.745-0.875)
Level of education		
a) No formal education	0.105	0.450(0.252-0.803)
b) Primary	0.029	0.650 (0.457-0.988)
c) Secondary	0.037	0.867 (0.580-0.973)
d) Tertiary	0.005	1.546 (1.15 – 1.965)
Level of Occupation		
a) Employed	-	1
b) Unemployed	0.600	0.600 (0.432-0.912)
c) Retired	0.810	0.723 (0.564-0.965)
Residential area		
d) Rural	0.546	0.807 (0.657-1.050)
a) Urban	0.916	1.257 (1.058-1.437)
b) Suburban	0.468	0.950 (0.865-1.150)
No. of children/deliveries		
e) 1	0.035	0.857 (0.765-1.050)
a) 2-3	0.005	1.351 (1.158-40.657)
b) Above 3	0.055	0.967 (0.756-1.148)
c) Miscarriage	0.076	0.953 (0.855-1.147)

*3.5 Factors affecting knowledge and practice regarding disease and its management*

Sociodemographic characteristics such as age and residential area were significantly associated with the level of knowledge regarding hypertension and its management during pregnancy. Table 5 showed women who are >30 years old generally had better knowledge than those below 30 years old (OR 1, 95% CI 0.388-0.920, *p* = 0.0170). Participants who live in urban areas also

shown better knowledge in managing their hypertension compared to women living in other areas (OR 0.66, 95% CI 0.388-0.920, *p* = 0.0170). Table 6 shows that only age was significantly associated with the good level of practice in disease management in which women aged less than 30 adopted poor practice (OR 0.850, 95% CI 0.700 -1.100, *p* = 0.240) compared to those aged 30 and above had a good practice in the management of their disease.

**Table 5.** Factors associated with the good level of knowledge on the disease and its management.

Characteristics	<i>p-value</i>	OR (95%CI) adjusted
Age (year)		
≤30	0.0170	0.660 (0.388-0.920)
>30	-	1
Level of education		
a) No formal education	0.999	
b) Primary	0.999	-
c) Secondary	0.999	
d) Tertiary	0.999	
Level of Occupation		
a) Employed	0.646	-
b) Unemployed	0.577	1.855 (0.212-16.252)
c) Retired	0.353	2.940 (0.076-1.641)
Residential area		
a) Rural	0.0126	0.800 (0.600-1.050)
b) Urban	0.034	1.2 (1.057-1.466)
c) Suburban	0.257	0.950 (0.865-0.948)
No. of children/deliveries		
a) 1	0.600	1.055(0.901-1.250)
b) 2-3	0.856	0.980 (0.850-1.150)
c) Above 3	0.747	1.020 (0.900-1.150)
d) Miscarriage	0.678	0.900 (1.016-1.890)

**Table 6.** Factors associated with the good level of practice on the disease and its management.

Characteristics	<i>p-value</i>	OR (95% CI) adjusted
Age (year)		
≤30	0.240	0.850 (0.700-1.100)
>30	-	1
Level of education		
a) No formal education	0.180	0.900(0.750-1.050)
b) Primary	0.320	0.950 (0.800-1.150)
c) Secondary	0.450	1.050 (0.900-1.250)
d) Tertiary	-	1.200
Level of Occupation		
a) Employed	-	1
b) Unemployed	0.600	0.600 (0.432-0.912)
c) Retired	0.810	0.723 (0.564-0.965)



Residential area		
a) Rural	0.530	1.050 (0.900-1.250)
b) Urban	0.650	0.980 (0.850-1.150)
c) Suburban	0.700	1.020 (0.950-1.100)
No. of children/deliveries		
a) 1	0.480	1 (0.955-1.250)
b) 2-3	0.650	0.950 (0.858-1.107)
c) Above 3	0.720	1.050 (0.900-1.248)
d) Miscarriage	0.890	0.890 (0.955-1.147)

#### 4.0 Discussion

This study evaluated the knowledge and practice of hypertension and medication use during pregnancy among pregnant women at Hospital Al-Sultan Abdullah (HASA) UiTM. Majority of the participants (68.6%) showed a good level of knowledge regarding medication use during pregnancy while most of participants had poor level of knowledge on the disease and its management. A recent study conducted in Malaysia also found that majority of the participants showed poor knowledge on hypertension (18). A study conducted in India shown that majority of their participants (95%) had good knowledge regarding medication use (12).

This study found several factors associated with good knowledge in medication use. Women who are more than 30 years old, with higher education level have better knowledge on medication use. This finding is similar to a study that was conducted in India (4). This maybe because this group of pregnant women may have experienced more access to prenatal care, where they received adequate information and guidance on medication use from healthcare professionals. Higher levels of education are associated with increased health literacy and the ability to navigate health information effectively.

Women's parity status significantly influences their knowledge on their medication. Women who have more than

three children has shown to have better knowledge on medication. This can be because those with higher pregnancy numbers had more experience and may have received sufficient information during their previous pregnancies. A study conducted in 2018 found similar findings where pregnant women who have already gave birth more than three times in their life have a higher level of knowledge (4), while another study found pregnant women with more than one child have more knowledge on medication (16). A study in Sweden on the other hand found that there is no significant association between parity level and knowledge of pregnant women on medication use (14).

This study found that there is no significant association between a good level of knowledge in medication use and the residence area. This might be because this study only focusing on one health care centre and most patients may reside within the same areas where they have almost similar access to healthcare providers and exposure to health education programs. Our study however had contrast finding compared to a study in India where residential area was significantly associated with the level of knowledge and that study found that pregnant women living in urban areas had better knowledge compared to those in rural areas (4). A study conducted in Malaysia, also found that there is an association between the level of knowledge with residential area. However, this study contradicted the previous study in which the

results indicate that pregnant women living in rural areas have a higher level of knowledge compared to those in urban area (15). Differences in healthcare infrastructure, services, and availability of health education programs between the different hospitals in Malaysia may have contributed to contrasting findings.

Pregnant women with tertiary education demonstrated good practices in medication use compared to others, as most participants reported taking medications prescribed by their doctors or after consulting with pharmacists. These highly educated women however were less likely to self-medicate, as most adhered to taking medications prescribed by their doctors or after consulting with pharmacists. Only 48% admitted to occasionally using over-the-counter medications without seeking professional advice. Another study has the same findings, in which those with lower educational background are more prone to self-medicating compared to higher educational level (21). Our findings contradict with a recent study found that pregnant women with higher educational background were found to practice self-medicating compared to pregnant women with lower educational background (22). Aligning with the previous findings, another study also found that higher educational background is one of the factor that promotes self-medicating (23). Women who have children in the range of 1-3 were shown to have the best practice regarding medication use in this study. This can be due to the lifestyle of the mothers in which managing few children allows for more structured routines and better adherence to medical advice and prescriptions.

Participants were asked about their main source of obtaining information about their medication. Majority women obtained information from pharmacists (35.7%) and doctors (28.6%) while the rest of the participants (12.9%) obtained information

from online resources, nurses, social media and others. Our findings show a consistency with another study in Malaysia in which majority of the participants obtained information regarding their medication from physicians, pharmacists or their gynaecologists (15). However, these two findings are inconsistent to a systematic review in which majority of the participants received information regarding medication from their doctors while minority of them do not believe in the medical system in providing the most accurate information (20). Another study conducted in 2014 concluded that majority of the respondents obtain information regarding medication from their doctors followed by pharmacists (10). It can be inferred from these that the different practices showed varying degrees of public trust, confidence, and methods for medication information seeking.

In this study, factors that shows a good level of knowledge on the disease and its management are the age of the participants and residential area. A similar study in India reported the same finding as this study (4). This study also found that pregnant women who had a tertiary education level tend to have a better knowledge on hypertension and its management. Another study also agreed that having a higher education will result in having a higher level of knowledge about hypertension (18). Those living in the urban areas were found to have a better knowledge on the hypertension and its management. This finding is similar to a study that was conducted in Kuala Lumpur, Malaysia, in which pregnant women living in urban area have better knowledge regarding hypertension (18). This could be because, unlike people living in rural areas, those in urban areas have easier access to the healthcare system, leading to better health information and a higher awareness of disease prevention and treatment.

This study found that there is significant relationship between a good level of practice in the management of hypertension and the

age of the pregnant women. Majority of the women aged > 30 years old (74.29%) tend to show a good practice for example, most of them agreed that going to see a doctor is the most accurate action when encountering any symptoms. However, 38% responded that they would wait for a day to see their progress when encountering any symptoms. Our study can be supported by a study conducted in Iran, in which participants relatively had high practice about their disease but their hypertension was still not under control (17). Only age was significantly associated with practice of managing hypertension in which women aged >30 years old tend to have more knowledge and this finding was supported with another study in Kuala Lumpur, Malaysia found a similar trend whereby women within the similar age group tend to have better knowledge because it is easier for them to access to the internet which will help to enhance their health information (18).

This study had some limitations. The study had a small sample size due to resource constraints, and this could affect the generalisability of the findings to a wider population. Participants in this study were patients who were currently going to the hospital for follow-up, and the study was only carried out in one hospital setting. The results might not accurately reflect the variety of people in various healthcare settings hence bias could be introduced. We recommend conducting future research at several locations in order to obtain a more accurate representation of the population. Because of social desirability, recall bias, or low self-awareness, using a questionnaire that is entirely self-reported may result in biased or erroneous responses from participants. To address these limitations, we have considered to refine the questionnaire with pilot study, although in the future, researcher may consider combining self-limited questionnaires with other data collection methods, for example interviews.

## 5.0 Conclusion

It is found that most participants exhibited a good knowledge and practice regarding medication use during pregnancy. Despite significant knowledge gaps specifically related to hypertension disease and its management, they largely adopted good practice in the management of hypertension. Sociodemographic factors such as being over 30 years old, having a tertiary education, and having more than three children are linked to a high level of knowledge about medication use. Good practices in medication use are associated with tertiary education, employment, and having one to three children. Factors related to good knowledge of the disease and its management include women who are aged over 30 years old) and living in an urban area. Women at this age group is also adopted with good practices in their disease management. Pharmacists were identified as the primary source of information, followed by physicians and online resources.

These findings however unable to draw a strong conclusion based on a small number of sample size and may not be able to be generalised into a larger population. The findings however can be used as the primary findings for the local population. It can be useful to plan educational efforts in promoting medication awareness among pregnant women with hypertension, while also highlighting the need for targeted interventions especially to women who are younger than 30 years old and living in rural area as to improve their knowledge on how to manage hypertension among pregnant women.

## Authorship contribution statement

**FAS:** Data analysis, Methodology, Formal analysis, Writing—original draft. **NAJ:** Visualization, Methodology, Writing –

review & editing. **AAH:** Visualization, Resources, Draft corrections.

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### Conflict of Interest

The authors declared that they have no conflicts of interest to disclose.

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