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DISTINGUISHING TRUE HYPERTENSION FROM WHITE COAT HYPERTENSION IN PREGNANT JORDANIAN WOMEN

AMAL K. SULEIMAN[1]*AND SALWA S. ABOGALAMBOU[2]

[1]Pharmaceutical Practices Department, Pharmacy College, Princess Nora bint Abdul Rahman University, Riyadh, Saudi Arabia
[2]Pharmacy College, Qassim University, Al- Qassim, Saudi Arabia

ABSTRACT

The aim of the present study was to identify the practices for using ambulatory blood pressure monitoring to diagnose hypertension and white coat hypertension in pregnant women in Jordan. The study included all obstetricians (Jordanian Medical Association Members) who accepted to be emailed a structured, pre-validated piloted questionnaire. The questionnaire included 4 parts: characteristics of obstetricians, methods for blood pressure assessment responses, diagnosis and management of WCH in pregnancy responses, as well as open-ended questions enquired about barriers faced against the use of self or ambulatory BP monitoring. Data collection took place between May and October 2013. A coding frame for each response in the questionnaire was made and data were entered in Microsoft Excel Software, checked for accuracy then loaded in SPSS (version 18). Response rate was 79.0 %. Out of all obstetricians: (91.4%) reported that they “almost always” or “often” attempt to differentiate WCH from true hypertension in pregnancy, (81.7%) considered Self BP monitoring methods for WCH from true HTN, not sure about the validity and accuracy of home BP devices was the most frequently cited response about barriers to the use of self BP monitoring. Obstetrical in Amman are aware that WCH is an issue among pregnant women. While ABPM is chosen in a minority of cases, as well as strong preference to use self BP monitoring for further BP evaluation.

KEYWORDS: Blood pressure monitoring, hypertension, ambulatory monitoring, pregnancy, Jordan

AMAL K. SULEIMAN
Pharmaceutical Practices Department, Pharmacy College,
Princess Nora bint Abdul Rahman University, Riyadh, Saudi Arabia

INTRODUCTION

Hypertensive disorders are the most common complications of pregnancy, and are a major cause of maternal, fetal, and neonatal morbidity and mortality worldwide; hypertension is estimated to occur in 6–8% of all gestations[1]. This finding is supported by O'Brien et al.[2], who state that pregnant woman with chronic hypertension (essential or secondary) should be observed frequently by an experienced obstetrician and a physician. The clinical practice guidelines established by the Jordanian Society of Obstetricians and Gynecologists(JSOG) classify the hypertensive disorders associated with pregnancy as pre-existing or gestational hypertension, with or without preeclampsia. Apart from this, isolated office or white coat hypertension (WCH) commonly occurs in pregnancy: it is characterized by elevated BP (diastolic BP > 90 mm Hg) in the clinical setting but normal BP (<135/85 mm Hg) otherwise[3].The main approach for diagnosing and treating hypertension during pregnancy is taking BP measurements at scheduled antenatal visits. However, the reliability and accuracy of conventional clinical BP measurements during pregnancy is debated [4]. Most hospitals still use a mercury sphygmomanometer, which has certain drawbacks associated with WCH, variation between products (also, differences between automated and manual equipment), instrument defects, improper cuff size, lack of calibration, digit preference, and differences between arms, all of which can result in discrepancies in BP values[5,6]. Moreover, clinic visits only provide a snapshot of the BP profile, which varies throughout the day; for example, Denolle et al.[7] reported that in a group of pregnant women diagnosed with HTN based on three BP readings in the clinical setting, 76% were found to have WCH according to readings taken at home. It has also been reported that 29–32% of women with high BP as per clinical assessments had normal pressure at home[8]. Another issue with clinical BP measurement is that physicians and even obstetricians are not very highly skilled in taking accurate BP measurements [4]. Most read BP only to the nearest 5 or 10 mm Hg, and many never use a large cuff [9]. In addition, observer error may influence the readings, because there is a tendency either to normalize BP or to allow insufficient time for appropriate positioning of the patient[10]. Real-life issues with BP measurement during pregnancy have been nicely captured by a report from Johns Hopkins Hospital [11]. BP recorded by a project coordinator equipped with a Hawksley random-zero device was compared against readings taken by the clinic staff: with regard to systolic pressure, the project coordinator obtained significantly lower readings throughout the study (20–40 weeks of pregnancy), with differences of ~10 mm Hg during the second trimester and 5 mm Hg during the third; with regard to diastolic pressure, the readings taken by the project coordinator were higher than the staff readings, and were greater during the third trimester (~10 mm Hg). In addition to all these drawbacks, it is also known that BP assessment depends on extraneous factors, such as prior food intake, caffeine use, smoking, exercise, temperature of the room, the patient's position, and time of day [6]. Based on the above studies, it seems that there is a clear need for obstetricians to distinguish between true HTN and WCH. It is important that antihypertensive medication is not prescribed to women with WCH, as this condition is limited to clinical appointments and typically has a better outcome than true hypertension[12]. On the other hand, patients with the persistently high BP outside of the clinical setting need to identified as they have more chances of developing preeclampsia, having longer hospital stays, delivering at an earlier gestational age, and giving birth to significantly lower birth weight infants [13]. When gestational hypertension is diagnosed, the fetus needs to be

delivered, but depending on the gestational age, this may not be the optimal approach. Additionally, antihypertensive therapy is associated with risks such as excessive BP lowering, which may lead to intrauterine growth restriction and low birth weight [14]. Another method of BP monitoring is self BP monitoring, in which patients self-record BP using an automated device intermittently throughout the day. This method has been deemed to be a useful adjunct to clinical assessment for management of hypertension outside pregnancy[15]. An alternative to clinical BP monitoring is continuous ambulatory blood pressure monitoring (ABPM) at home, which is believed to more accurately reflect BP patterns and variability; it also overcomes many of the problems associated with clinical BP measurement [16]. One of its advantages is that it allows multiple BP measurements to be taken over a 24-h interval, which is more reliable compared with less frequent snapshot readings obtained by conventional office BP or self BP monitoring at home [16]. Also, it is possible to obtain a much more detailed BP profile from the multiple measurements, and patients usually become accustomed to the presence of the instrument [17]. APBM therefore provides a “real-life” BP profile outside of the medical environment, and allows for more reliable diagnosis of individuals with WCH. However, the validity of these findings in different cultures and communities remains to be shown. Yet data on investigation of practices with regard to ABPM and self BP monitoring in pregnant women in less developed countries such as Jordan are scant. Thus, the aim of this study was to identify the practices for using ambulatory blood pressure monitoring to diagnose hypertension and white coat hypertension in pregnant women in Jordan.

MATERIALS AND METHODS

A survey was conducted from May to October 2013 in community obstetricians located in Jordan. A structured, pre-validated piloted questionnaire based on a literature review was used in this study[18]. The questionnaire included 4 parts: characteristics of obstetricians, methods for blood pressure assessment responses, diagnosis and management of WCH in pregnancy responses, as well as open-ended questions enquired about barriers faced against the use of self or ambulatory BP monitoring. A sample-frame was obtained from the Directorate of obstetricians, Ministry of Health, Kingdom of Jordan. The study was included all obstetricians (Jordanian Medical Association Members) where received a phone call asking his/her email to participate as volunteer. Only e-mail have been send it with questionnaire attached to obstetricians who voluntarily accepted to participate in this study. As this survey was executed in Jordan, the questionnaire was translated from English to Arabic. To ascertain the accuracy of the translation, the questionnaire was translated into Arabic by two bilingual Arabian (Arabic/English) lecturers at the Jordan University Language Center. The double-translation method was employed to ensure proper translation of this survey, in order to avoid confusion or misinterpretation and also to ensure that the Arabic questionnaire adequately represented the English version on which it was based Hair[19]. The questionnaire was pretested for repeatability and validity using a convenience sample of nine obstetrics and gynecology residents. Answers obtained in the pretest were not included to the study. Those who were not able to fill the questionnaire within the specified period were considered as non-respondents. A coding frame for each response in the questionnaire was made and data were entered in Microsoft Excel Software, checked for accuracy then loaded in SPSS (version 18).Questionnaires were e-mailed to a total of 133 physicians. The first e-mail included a cover letter, the questionnaire. The same package was sent as necessary at two and three weeks after

the initial e-mail for cases have not received reply. Therefore, the respondents themselves read and answered the questions, with no interviewer asking the questions or guiding the respondents.

RESULTS

The questionnaires were mailed to a total of 133 physicians; with a response rate was 79.0 %.The characteristics of the respondents according to the type of practice are shown in Table 1. Of the physicians surveyed, 96.5% stated that they considered diastolic BP values greater than 90 mm Hg to be an indication of hypertension in pregnancy. In addition, 71% of the obstetricians considered a systolic BP value ≥140 mm Hg to be an important for clinical decision making.

Table 1
Characteristics of the survey respondents = 104

Characteristic		n(%)
• Gender	Male	53 (50.9)
	Female	51 (49.1)
• Clinical practice based in private clinic setting	Yes	71 (68.3)
	No	33 (31.7)
• Population of the municipality	<100 000	24 (23.1)
	≥100 000	80 (76.9)
• Estimated number of pregnant patients seen per week	<50	28 (26.9)
	50–99	61 (58.7)
	≥100	15 (14.4)
• Estimated number of deliveries per month	<5	12 (11.6)
	5–9	7 (6.7)
	10–14	16 (15.4)
	≥15	69 (66.3)
• Estimated number of patients diagnosed with hypertension in pregnancy per month	<5	63 (60.6)
	5–9	39 (37.5)
	≥10	2 (1.9)

Table 2, shows (77%) of the obstetricians reported using self BP monitoring to identify hypertension. However, only a minority of physicians reported using ABPM to evaluate hypertension in pregnancy.

Table 2
Physicians' responses about their preferred methods for blood pressure assessment in pregnant patients

	***n* = 104 (%)**
Diagnosis of hypertension in pregnancy	
• Self BP monitoring	81 (77.0)
• ABPM	18 (17.3)
Treatment of hypertension in pregnancy	
• Self BP monitoring	62 (59.7)
• ABPM	14 (13.4)
Surveillance of hypertension in pregnancy	
• Frequent office monitoring	74 (71.1)
• Self BP monitoring	71 (68.2)
• ABPM	13 (12.5)
• Referring the patient to an expert	14 (13.2)
• Other (laboratories, home care, hospital admission)	30 (28.8)

Obstetricians were most likely to select frequent clinical monitoring as their preferred method for surveillance of hypertension, with self BP monitoring being their next preferred method. Only 12.5% of the obstetricians recommended ABPM for BP surveillance. With regard to classifying hypertension, as shown in Table 3, a majority of the obstetricians (91.4%) indicated that they "almost always" or "often" attempted to differentiate WCH from true HTN in pregnant patients. The most popular method for this was self BP monitoring at home (81.7%). BP measurement at a pharmacy or fire station was the second most common recommendation (33.5%). In cases where WCH was confirmed, 91.7% of the obstetricians reported that their management decisions were likely to change prior to delivery, while 39.8% obstetricians stated that they were likely to alter their management strategy during labor.

Table 3
Physicians' responses regarding the diagnosis and management of WCH in pregnancy

Frequency of attempts to differentiate WCH from true HTN	**n = 104 (%)**
• *Almost always*	53 (51.0)
• *Often*	42 (40.4)
• *Sometimes*	5 (4.8)
• *Occasionally*	3 (2.9)
• *Never or rarely*	1 (0.9)
Preferred methods for differentiating WCH from true HTN	
• *Self BP monitoring*	85 (81.7)
• *ABPM*	10 (9.6)
• *At a drug store or fire station*	35 (33.5)
• *No specific intervention*	7 (6.7)
• *Other*	28 (26.9)
Influence of confirmed WCH on management decisions or pregnant patients	
• *Yes, management was likely to change prior to delivery*	96 (91.7)
• *Less likely to treat with medication*	16 (15.3)
• *More likely to delay induction of labor*	21 (20.1)
• *More likely to increase the frequency of home BP monitoring*	5 (4.8)
• *Yes, management was likely to change during labor*	41 (39.8)

Some questions allowed for multiple responses, so the summed frequencies might have exceeded 100%
Statistical analyses excluded missing values

Table 4 shows the responses to the open-ended questions regarding the barriers that came in the way of advocating self BP monitoring or ABPM: the three most frequently cited responses are shown.

Table 4
Physicians' top three responses with regard to the barriers faced against the use of self or ambulatory BP monitoring in pregnant patients

1. Not sure about the validity and accuracy of home BPdevices
2. No standard protocol for measuring and recording home readings
3. Patients may become preoccupied with their BP or become anxious
4. Patients sometimes misreport the results of home monitoring

DISCUSSION

Our study confirmed that the majority of obstetricians across Jordan conduct their practice in accordance with the recommendations of the JSOG guidelines. From the survey findings, it seems that despite the inherent drawbacks of office BP measurement (mentioned in the Introduction), this method continues to be the most frequently used one to diagnose and monitor hypertension. This research found that the majority of physicians reported office BP measurement to be the most important BP assessment tool for surveillance of hypertension in pregnancy. Self BP monitoring was the next preferred method for the diagnosis, treatment, and monitoring of hypertension. The diagnosis of WCH in pregnancy is potentially difficult but clinically important, as the differentiation between true HTN and WCH may prevent unnecessary treatment for transiently elevated BP in the clinic setting and ensure that patients with true hypertension are given appropriate treatment. The majority of our survey participants indicated that they "almost always" or "often" attempt to differentiate WCH from true HTN in pregnant patients. This indicates that physicians in Jordan are well aware of the possibility of WCH in pregnant patients. Moreover, the majority of the physicians preferred self BP monitoring at home; they were therefore aware that WCH cannot be diagnosed based on clinic readings alone.

The Society of Obstetricians and Gynecologists Guidelines (SOG) guidelines state that ABPM using either 24-h or home measurements may be useful to detect WCH (Magee et al., 2008). However, to date, no studies have assessed the impact of ABPM on maternal or perinatal outcomes relative to standard care based on office BP monitoring. Moreover, the possible risks and advantages of ABPM during pregnancy have not been evaluated [20]. We think that while ABPM provides detailed evaluation over a 24-h period, it is not designed to provide serial data over days or weeks, which may be required to monitor development of hypertensive disorders at a later stage. Moreover, from our survey responses, we think that since automated BP machines of reasonable quality have become affordable and widely available, self-monitoring of maternal BP with automated home BP devices has become a more popular option with physicians and patients. Therefore, the high cost of ABPM, the lack of its prompt availability and uncertainty regarding its usefulness have resulted in more limited use of this methodology compared to self BP monitoring. In contrast to ABPM, self BP monitoring is widely possible, reasonably cheap, and comfortable, and it has previously been shown to be preferred to ABPM by pregnant women[20]. Self-monitored BP values have also not been validated with regard to adverse pregnancy outcomes, but as our study has demonstrated, physicians appear

much more likely to choose this measurement technique. With regard to the management of WCH, 33.8% of the total survey respondents reported that they were less likely to use antihypertensive medication in patients with WCH. This survey also suggests that detection of WCH may reduce the likelihood of early labor induction in these patients: in total, 33.5% of the survey respondents reported that they are more likely to delay induction of labor in patients with known WCH. Prior to this survey, we were not aware of the factors that would be the most common barriers to physicians' use of ambulatory or self BP monitoring at home in the care of hypertensive pregnant patients. Interestingly, obstetricians were also concerned about the validity and accuracy of the home monitoring devices, and worried that the patients might become preoccupied with their BP and become anxious. This study has a few limitations. The results may lack generalizability since the response rate was 79.0%. Furthermore, since the findings are self-reported responses, it is possible that the participants may have provided a best-case response to queries regarding their clinical practices and that an audit of their patient records might reveals a more diverse and inconsistent application of these beliefs and attitudes in actual practice.

CONCLUSION

Obstetrical care providers in Jordan are well aware that WCH is an important condition that needs to be identified in pregnant women. Obstetricians appear to have a strong preference for self BP monitoring than ABPM for further BP evaluation. To shed more light on the efficiency of these methods, future research should address the utility of self BP monitoring in the prediction of pregnancy outcomes. Moreover, educational efforts should focus on the quality of self BP monitoring, by providing patients with information about the timing of and technique for BP measurement.

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CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

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