Factors associated with hypertension among pregnant women in Dili Municipality, Timor Leste

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Abstract

Purpose - Hypertension in pregnancy is one main cause of maternal morbidity among pregnant women worldwide, and it is one of significant public health concerns. This study aimed to find factors associated with hypertension among pregnant women in Dili municipality of Timor Leste.
Design/methodology/approach - A cross-sectional study was conducted among 438 pregnant women at the Five Community Health Centre in Dili municipality, Timor Leste between April and May 2018. Face to face interview was conducted. Chi-square and binary logistic regression were performed to analyze the data.
Findings - The prevalence of hypertension among pregnant women was 23.5%. Salty food intake (p=0.027), noise disturbance during daytime (p=0.027), and the distance to the main road (p=0.004) were associated with hypertension among pregnant women. In the multivariate analysis, increasing a week of pregnancy (AOR = 1.031; 95% CI: 1.004, 1.058) increased risk of developed hypertension status among pregnant women. Quite noise during daytime was a protective factor of developed hypertension status among pregnant women (AOR = 0.393; 95% CI: 0.183, 0.841).
Originality/value - Having a salty food during pregnancy may increase a risk of high blood pressure among pregnant women. Nevertheless, quiet noise during daytime is a protective factor for hypertension. Health education program to prevent high blood pressure among pregnant women should be concerned.

Keywords Hypertension, Pregnant women, Timor Leste

Paper type Research paper

Introduction

High blood pressure during pregnancy is an important cause of severe morbidity, long-term disability, and death among both mothers and their babies [1]. Hypertensive Disorders of Pregnancy (HDP) affect 5-10% of all pregnancies worldwide and cause a substantial maternal and perinatal morbidity and mortality. Around10-15% of maternal mortality in developing countries is due to HDP [1].

According to World Health Organization (WHO), there are approximately 585,000 mothers die per year in the worldwide during pregnancy or childbirth and have high blood pressure. Women experience form of hypertension during pregnancy may be preexisting or pregnancy-induced [2]. Preeclampsia is the most common of the clinical outcomes among pregnant women in the world. Approximately, 10% of women develop a preeclampsia or gestational High Blood Pressure (HBP) during their pregnancy. Furthermore, 7 of 10 people with hypertension are not being treated adequately [3].

In Timor Leste, there is no definitive data on hypertension in pregnant women. But hypertension in pregnant women as a common case that is still found in every health facility. Even from every case of hypertension that existed to result in death due to delayed treatment. This is because of the lack of awareness and knowledge of mothers on health care during pregnancy.

Few studies had been explored the determinants of hypertension during pregnancy in Timor Leste. Given an increased understanding on factors associated with hypertension during pregnancy, it is crucial to access risk factors related to high blood pressure among pregnant women in Dili Municipality Timor Leste.

Materials and methodology

Study design and study population

A cross-sectional study was conducted among 438 pregnant women at the Five Community Health Centre in Dili municipality, Timor Leste between April and May 2018. Taro Yamane's formula was performed to calculate sample size from a total of mothers who visited community health center because prevalence of hypertension among this group had not been established. Systematic random sampling with proportion to size was used to selected participants. Pregnant women aged 18-40 years, living permanently in this municipality and speaking local language were included in the study. Maternal with mental health problem and disease complication such as HIV-AIDS, Diabetes Mellitus, and Cardiovascular were excluded from this study. Dili municipality was chosen because high attendance rate and people living in Dili Municipality utilize the ANC to the maximum level.

This study was approved by Human Research Ethics Committee (HREC) of National Institute of Health, Ministry of Health Timor Leste, with the reference number: 271 MS-INS/DE-DEP/CDC-DEP/III/2018. Permission letter was obtained from National Institute of Health for Five CHC. Verbal consent was taken from each respondent after explained the purpose of the study.

Questionnaire

Face to face interview by questionnaire was conducted among pregnant women who visited ANC during a study period. General characteristics of pregnant women were included age (years), primary care taker (husband/mother/others), education level (Primary school/Secondary school/High school/University), religion (Catholic/ Christian Protestant/Muslim), occupational (unemployed/employed), resident (urban/rural), income (≤115/month, >115/month), weight (kilograms) and height (centimeters). The reproductive health factors aimed to find out parity (times), diseases complication related to reproductive health (yes/no) and week of pregnancy (weeks).

Sleep quality, sleep duration and sleeping medication were investigated. Pregnant women were asked to rate their sleep quality in a past month (very good/fairly good/fairly bad). Sleep duration was reported by average sleeping hours per night during the past month. Using sleeping medication during the past month was reported as (yes/no). Stress was accessed by using stress part of Depression Anxiety Stress Scales (DASS-21) questionnaire [4]. It composed of 7 items. Total score in each item was ranked between zero and three [5]. Pregnant women were asked to reported exercise (yes/no), hypertension genetic (yes/no), alcohol consumption (yes/no), smoking (yes/no), and their salt food consumption (like/neutral/do not like).

Environmental factors regarding noise exposure were included noise disturbance during daytime (very noise/quite noise/no noise), noise disturbance during nighttime (very noise/quite noise/no noise), and source of the noise from motorbike (yes/no), drunker (yes/no), car (yes/no). Personal perception regarding noise disturbance (very disturbed/disturbed/not disturbed), and noise conditions enough to affect health (yes/no). In addition, air pollution exposure was investigated through distance from the house to the main road (meters), cooking duration per day (minutes), type of cooking fuel used wood (yes/no), stove(yes/no), gas (yes/no), and electricity (yes/no). Place of cooking was asked as inside and outside the house (yes/no). Secondhand smoking was investigated as anyone smoking in your household (yes/no), anyone smoking inside a house (yes/no), how often do pregnant women close to smoking people in a day (very often/quite often/not often).

Blood pressure measurement

Blood pressure of the respondents were measured by an automatic blood pressure monitor (Omron HEM 7111) in millimeters of mercury (mmHg). Pregnant women rest in sitting position after take rest at ANC clinic for five minutes. Nurses measured pregnant women two times. If the result of the measurement is different, data collector took the result from an average of measurement as a valid result [6]. The result of the blood pressure measurement were considered as hypertension during pregnancy when the current systolic blood pressure was ≥ 130mmHg and diastolic ≥ 80mmHg (AHA, 2017) [7].

Statistical analysis

SPSS version 22 (licensed by Chulalongkorn University) was performed for data analysis. Frequency, percentage, mean and standard deviation (SD) were assessed for descriptive analysis. Chi-square and Fisher Exact test were used to assess and association between independent and dependent variable. T-test were used to compare a differences of continuous data between independent and dependent variables. In multivariate analysis, binary logistic regression was performed to assessed an association between hypertension status and independent variables. Independent factors with p-value less than 0.25 from bivariate analysis were recruited into the final models as a predictor of hypertension. Three final models were analysed including general characteristic model, reproductive and behavioural characteristic model and environmental factor model. Adjusted Odds Ratio (AOR) and 95% confident interval (CI) were reported. Statistically significant in this study was considered at p-value < 0.05.

Results

The prevalence of hypertension disorder among pregnant women in Timor-Leste was 23.5%. Table 1 showed an association between general characteristic and hypertension status of pregnant woman. The average age of pregnant women with hypertension is 27.05 (± 5.21) years old which is higher than non-hypertension women. For the caretaker, the higher one is (75.1%) pregnant women with non-hypertension who are cared by husband compared to pregnant women with hypertension (24.9%). While for the education, the higher one is (80.9%) pregnant women with non-hypertension at the university level compared to pregnant women with hypertension (32.1%) in primary school. In this present study was no significant association between education level and hypertension status. Regarding occupational, the number of pregnant women who had hypertension with unemployed status was 24%, this percentage is lower than the percentage for pregnant women which non-hypertension (76.0%). In terms of the resident, the higher one is (79.9%) pregnant women non-hypertension who are resident in urban. However, there was no significant association between general characteristic and hypertension status of pregnant women.

Table 2 presented an association between maternal reproductive and behavioral factors and hypertension status. Pregnant women who had ever been diagnosed with hypertension during pregnancy was associated with hypertension status (P<0.001). Preferable of salty food was also associated with hypertension status (P=0.027). Pregnant women with hypertension and non-hypertension reported almost equal sleep duration per night. Stress score among hypertension group was higher than non-hypertension group however statistically significant difference was not achieved. Few pregnant women reported smoking and drinking behavior therefore associations were not achieved with hypertension.

Table 1. Association between mother characteristic and hypertension

Variables	Yes n=103	No n=335	*p*-value
Age			
Mean (±Std. Deviation)	27.05 (± 5.21)	26.75 (± 4.80)	0.279[a]
Care taker			
Husband	97 (24.9%)	293 (75.1%)	
Mothers	5 (16.7%)	25 (83.3%)	0.110[b]
Others	1 (5.6%)	7 (94.4%)	
Education			
Primary School	17 (32.1%)	36 (67.9%)	
Secondary school	12 (26.7%)	33 (73.3%)	0.242[b]
High school	43 (24.3%)	34 (75.7%)	
University	31 (19.1%)	131 (80.9%)	
Religion			
Catholic	95 (22.7%)	324 (77.3%)	0.091[c]
Christian Protestant /Muslim	8 (42.1%)	11 (57.9%)	
Occupational			
Unemployed	82 (24.0%)	259 (76.0%)	0.623[b]
Employed	21 (21.6%)	76 (78.4%)	
Resident			
Urban	48 (20.1%)	191 (79.9%)	0.063[b]
Rural	55 (27.6%)	144 (72.4%)	
Income (month)			
≤115	82 (24.6%)	251(75.4%)	0.330[b]
>115	21 (20.0%)	84 (80.0%)	
Weight			
Mean (±Std. Deviation)	55.64 (± 9.61)	52.31(± 9.26)	0.338[a]
Height			
Mean (±Std. Deviation)	153.33 (± 6.16)	151.29(± 6.27)	0.641[a]

Note: [a] Independent T – Test; [b] Chi – Square Test; [c] Fisher's Exact Test

Table 2. Association between maternal reproductive health and behavioral factors and hypertension

Variables	Yes (n=103; 23.52%)	No (n=335; 76.48%)	*p*-value
Parity			
Mean (±Std. Deviation)	2.51 (± 1.70)	2.41(± 1.52)	0.332[a]
Week of pregnancy			
Mean (±Std. Deviation)	27.42 (± 8.65)	25.21(± 9.36)	0.245[a]
Ever been diagnosed hypertension during pregnancy			
Yes	11 (73.3%)	4 (26.7%)	<0.001[b]
Sleep quality			
Very good	43 (28.7%)	107 (71.3%)	
Fairly good	57 (20.7%)	218 (79.3%)	0.182[b]
Fairly bad	3 (23.1%)	10 (76.9%)	
Sleep duration			
Mean (±Std. Deviation)	8.35 (± 1.22)	8.37(± 1.39)	0.157[a]
Stress			
Mean (±Std. Deviation)	3.66 (± 3.19)	3.55 (± 2.81)	0.430[a]
Exercise			
Yes	62 (23.7%)	135 (76.7%)	0.929[b]
Genetic			
Yes	9 (22.5%)	31 (77.5%)	0.874[c]
Smoking			
Yes	1 (50.0%0)	1 (50.0%)	0.415[c]
Alcohol drinking			
Yes	0 (0.0%)	2 (100.0%)	0.100[c]
Nutritional status – salty food			
Like	27 (19.7%)	110 (80.3%)	
Neutral	31 (34.1%)	60 (65.9%)	0.027[b]
Do not like	45 (21.4%)	165 (78.6%)	

Note: [a] Independent T – Test; [b] Chi – Square; [c] Fisher's Exact Test

Table 3. Association between residential environments and hypertension

Variables	Yes n=103	No n=335	*p*-value
Noise disturbance during day time			
Very noise	21 (15.4%)	115 (84.6%)	
Quite noise	26 (28.3%)	66 (71.7%)	0.027[a]
Not noise	56 (26.7%)	154 (73.3%)	
Noise disturbance during night time			
Very noise	20 (18.2%)	90 (81.8%)	
Quite noise	19 (25.7%)	55 (74.3%)	0.312[a]
Not noise	64 (25.2%)	190 (74.8%)	
Source of noise			
Motorbike	31 (17.7%)	144 (82.3%)	0.020[a]
Drunker	9 (25.7%)	26 (74.3%)	0.749[a]
Car	17 (17.3%)	81 (82.7%)	0.102[a]
Feel disturbed by these noise			
Very disturbed	18 (26.1%)	51 (73.9%)	
Disturbed	20 (17.7%)	93 (82.3%)	0.237[a]
Not disturbed	65 (25.4%)	191 (74.6%)	
Distance to the main road (meter)			
Mean (±Std. Deviation)	141.65 (±204.15)	111.75 (±159.06)	0.004[b]
Cooking behaviour (minute)			
Mean (±Std. Deviation)	63.04(±2.01)	58.14 (±2.01)	0.618[b]
Type of cooking fuel			
Wood	59 (25.3%)	174 (74.7%)	0.342[a]
Stove	42 (22.5%)	145 (77.5%)	0.653[a]
Gas	5 (26.3%)	14 (73.7%)	0.783[c]
Electricity	75 (21.8%)	269 (78.2%)	0.106[a]
Cook inside	88 (23.0%)	294 (77.0%)	0.537[a]
Anyone smoking in household			
Yes	60 (22.8%)	203 (77.2%)	0.671[a]
Anyone smoking inside house			
Yes	29 (23.4%)	95 (76.6%)	
Sometimes	17 (22.4%)	59 (77.6%)	0.960[a]
No	57 (23.9%)	181 (76.1%)	
How often do you close to smoking people in a day			
Very often	9 (17.3%)	43 (82.7%)	
Quite often	28 (23.7%)	90 (76.3%)	0.522[a]
Not often	66 (24.6%)	202 (75.4%)	

Note: [a] Chi – Square; [b] Independent T Test; [c] Fisher's Exact Test

Table 3 showed an association between residential environment and hypertension status among pregnant women in this study. Noise disturbance during day-time was observed to be significantly associated with hypertension status (P=0.027), the source of the noise by the motorbike (P=0.020) and distance from the house to the main road (P=0.004). Among hypertension group (141.65(±204.15) meter) reported longer distance to the main road than non-hypertension group (111.75(±159.06) meter). Second hand smoking status was not associated with hypertension.

Binary logistic regression models were reported in Table 4. The finding indicated that care taker, education level and living in urban or rural area were not associated with hypertension status among pregnant women in this study. For reproductive and behavioral factors, increase a week of pregnancy was more likely to increase 1.031-fold odd of increased risk of hypertension (AOR=1.031; 95%CI: 1.004, 1.058). Pregnant women who ever been diagnosed with hypertension during pregnancy is

Table 4. Factors associated with hypertension among pregnant women by binary Logistic regression model

Characteristics	AOR	95% CI		Sig
		Lower	Upper	
General characteristics				
Care taker				
Husband	Reference			0.217
Mother	0.657	0.240	1.794	0.412
Other	0.197	0.026	1.504	0.117
Education				
University	Reference			0.503
High school	1.7	0.829	3.485	0.148
Secondary school	1.429	0.657	3.108	0.368
Primary school	1.229	0.723	2.088	0.446
Religion				
Catholic	Reference			
Christian Protestant/Muslim	2.173	0.832	5.675	0.113
Resident				
Urban	Reference			
Rural	1.381	0.877	2.177	0.164
Reproductive characteristic				
Week of pregnancy	1.031	1.004	1.058	0.023
Ever been diagnosed hypertension during pregnancy				
No	Reference			
Yes	10.297	3.133	33.840	0.001
Sleep duration	0.984	0.827	1.171	0.857
Sleep quality				
Very good	Reference			
Fairly good	0.734	0.438	1.229	0.240
Fairly bad	0.868	0.223	3.375	0.838
Nutritional status				
Do not like	Reference			
Neutral	0.953	0.547	1.658	0.864
Like	1.790	0.987	3.248	0.055
Environmental factors				
Cooking behavior	1.008	0.999	1.018	0.082
Noise disturbance during day time				
Not noise	Reference			
Quite noise	0.393	0.183	0.841	0.016
Very noise	1.006	0.533	1.896	0.986
Feel disturbed of noise				
Not disturbed	Reference			
Disturbed	1.905	0.881	4.119	0.101
Very disturbed	1.062	0.511	2.206	0.5873

increased 10.297-fold odds of having hypertension (AOR=10.297; 95%CI: 3.133, 33.840). Women who reported like salty food was increased 1.790-fold odd of having hypertension than don't like salty food. Feeling disturbance of noise was increased risk of hypertension. Pregnant women who reported noise disturb were increased 1.905-fold odd of having hypertension and who reported noise very disturb were increased 1.062 -fold odd of having hypertension than without any noise disturb however statistical was not achieved.

Discussion

The study found that prevalence of hypertension disorder among pregnancy was 23.5%. Increasing a week of pregnancy and ever diagnose hypertension during pregnancy were significantly increased risk of hypertension. Lower education, living

in rural area and preferable of salty food were more likely to increase risk of hypertension.

According to the result, this prevalence higher than prevalence that reported in several studies have been done in India 5.38% [8], in South Africa 20.7% [9], in Ethiopia ranges from 1.2% to 18.25% [9], and in developing countries the ranges from 1.8% to 16.7% [9]. While this prevalence lower than the prevalence from Indonesia in the year of 2014 it was 27.1% [10], 44% in Zimbabwe [11], and about 47% in Thailand [12]. The finding of this study showed the average age of pregnant women with hypertension was around 27 years old. Although the association between age and hypertension status was not significant. This study contradicting with the study that has been done in Thailand, the aged of pregnant women ≥35 years old was consistently reported to be the concurrent risk of hypertensive disorder in pregnancy [12].

Our study suggested that less educated pregnant women were more likely to having hypertension during pregnancy. This study is consistent to study has been conducted in Ghana, pregnant women in Ghana are less educated and this is more likely to get hypertension during pregnancy [13]. The previous study was conducted in Cameroon found that illiteracy was associated with hypertension status during pregnancy is about 2-fold risk [14]. The low level of the education was associated indirectly with limited access to health information and healthcare. As the data showed the high percentage of the pregnant women who have hypertension in the primary school level, respondent has less knowledge to self-care during pregnancy and sometimes do not understand the health education that given by the health staff in the health facilities. Another possible reason is that less educated women may not receive a full ANC visit. According to data available in the health statistics report in 2016, more pregnant women visit the CHC for ANC on the first visit with 93% and the fourth visit with 56% [15].

In terms of the resident, 27.6% respondent was resident in the rural area. The possibility of increasing hypertension in rural communities may be due to several factors related to the condition of a rural area such as education, economic, social, environmental, unhealthy lifestyles (lack of information on health from social media and limited access to health facilities), lack of physical activity or exercise. Therefore it is important to know what the cause of the existence of hypertension in rural communities to know what to do to overcome them [16]. This study consistent with the previous study was conducted in Ethiopia reported that the proportion of hypertensive disorder more develops in rural area (56.5%) [17]. However this study conflicting with the study was conducted in Cameroon, 80% of pregnant women living in urban areas with the hypertensive disorder [18].

Increasing a week of pregnancy was significantly associated with increased risk of having hypertension (AOR = 1.031; 95% CI: 1.004, 1.058). The possible reason is that increased a week of pregnancy will increase of having hypertension in pregnancy because of the changes and new things that are perceived by every pregnant woman such as nausea, vomiting, weight gain, difficulty sleeping and others symptoms [16]. However, our study could not find an association between sleep quality and sleep duration with hypertension among pregnant women.

Several studies have analyzed the risk factors for hypertensive disorder in pregnancy and the identified risk factors include the family history of hypertension, alcohol intake, and smoking [19]. However, this study found that no association between these factors with hypertension status. Our study suggested that pregnant women who like to consume salty food was not associated with hypertension during pregnancy. Our finding was inconsistent to one of the studies conducted in

Indonesia, pregnant women who have the chance of having hypertension was consumed salty food, consumption of fat, fried food and instant noodles [20].

Regarding to residential environment, our study found that pregnant women who reported noise disturb were increased risk of having hypertension than without any noise disturb but statistical was not achieved. Noise can be associated with a number of health effects such as distinguishing psychological responses such as annoyance, sleep disturbances, daily activity disorders, and physical responses such as hearing loss, hypertension, and ischemic heart disease. Noise due to loud noises generated from motorcycles or cars constantly will interfere with the physiological processes of muscle tissue in the human body and will trigger unstable emotions. [21].

Several limitations could be noted in this study. First, a cross-sectional study cannot confirm the factors that may influence on hypertension. Further study may consider case-control or cohort study to identify casual relationships. Second, information bias should be considering for interviewing pregnant women. Third, measurement of blood pressure was investigated at a single point of time without specific semester of pregnancy period. Therefore, hypertension status should be further confirmed by physician. Fifth, the way of screening for the respondent who had chronic hypertension only by verbal consent. Sixth, the record result is reading in the first measurement of the blood pressure measurement. Used a new standard of AHA which is the systolic and diastolic blood pressure was ≥ 130mmhg and ≥ 80mmhg, the cut point can be for prevention. Seventh, No investigation about the history of hypertension in the previous pregnancy. Lastly, this study could not generalize to other urban areas because general characteristic of pregnant women may not be similar.

Conclusion

The prevalence of hypertension among pregnant women in five Community Health Centre in Dili municipality, Timor Leste was higher than other countries. Less education, living in rural area, more likely to have salty food and feeling noise disturbance were increased risk of hypertension. Therefore, further intervention for food consumption should be taken into consideration. Friendly educational program for low educated mother should be provided by local government authority. Improving environment for controlling noise level might be suggested for enhancing pregnant women health.

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