

FACTORS ASSOCIATED HYPERTENSION AMONG PREGNANT WOMEN
IN DILI MUNICIPALITY TIMOR LESTE

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บทคัดย่อและแฟ้มข้อมูลฉบับเต็มของวิทยานิพนธ์ตั้งแต่ปีการศึกษา 2554 ที่ให้บริการในคลังปัญญาจุฬาฯ (CUIR)
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ปัจจัยที่มีความสัมพันธ์กับภาวะความดันโลหิตสูงในหญิงตั้งครรภ์ เมืองดิลี ประเทศติมอร์เลสเต



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เอสเตลา ลาอ็อท เปรอร์ปีตัว แอนนา มีรี : ปัจจัยที่มีความสัมพันธ์กับภาวะความดันโลหิตสูงในหญิงตั้งครรภ์ เมืองดีลี ประเทศติมอร์เลสเต (FACTORS ASSOCIATED HYPERTENSION AMONG PREGNANT WOMEN IN DILI MUNICIPALITY TIMOR LESTE) อ.ที่ปริกษาวิทยานิพนธ์หลัก: ผศ. ดร. ญัฎฐา ฐานินพานิชสกุล, 102 หน้า.

บทนำ ภาวะความดันโลหิตสูงในหญิงตั้งครรภ์เป็นภาวะเจ็บป่วยของมารดาที่สำคัญ และเป็นปัญหาสำคัญทางด้านสาธารณสุข การศึกษาครั้งนี้มีวัตถุประสงค์เพื่อหาความชุกของภาวะความดันโลหิตสูง และหาปัจจัยที่ความสัมพันธ์กับภาวะความดันโลหิตสูงในหญิงตั้งครรภ์ เมืองดีลี ประเทศติมอร์เลสเต

ระเบียบวิธีวิจัย การศึกษาแบบภาคตัดขวางในกลุ่มหญิงตั้งครรภ์จำนวน 438 คนที่เข้ารับบริการในศูนย์สุขภาพชุมชนจำนวน 5 ศูนย์ในเมืองดีลี ประเทศติมอร์เลสเต ระหว่างเดือนเมษายน ถึงพฤษภาคม 2561 การสัมภาษณ์ได้ถูกนำมาใช้เพื่อสอบถามข้อมูลจากหญิงตั้งครรภ์หลังจากการวัดความดันโลหิต การวิเคราะห์ข้อมูลเชิงพรรณนา และเชิงวิเคราะห์โดยสถิติ ไคสแควร์ และสมการถดถอยโลจิสติกได้ถูกนำมาใช้เพื่อหาความสัมพันธ์ระหว่างปัจจัยต่างๆ และภาวะความดันโลหิตสูงในหญิงตั้งครรภ์

ผลการศึกษา ความชุกของภาวะความดันโลหิตสูงในหญิงตั้งครรภ์คิดเป็นร้อยละ 23.5 ปัจจัยที่มีความสัมพันธ์กับภาวะความดันโลหิตสูงในการวิเคราะห์ไคสแควร์ ได้แก่ การรับประทานอาหารรสเค็ม ($p=0.027$) เสี่ยงรบกวนในช่วงกลางวัน ($p=0.027$) และระยะทางจากบ้านถึงถนน ($p=0.004$) และการวิเคราะห์หลากหลายตัวแปร พบว่าจำนวนสัปดาห์ของการตั้งครรภ์ที่เพิ่มขึ้นหนึ่งสัปดาห์ส่งผลต่อการเพิ่มความเสี่ยต่อ 1.031 เท่าต่อการเกิดภาวะความดันโลหิตสูง (AOR = 1.031; 95% CI: 1.004, 1.058) และความดังของเสียงระดับต่ำในช่วงเวลากลางวันเป็นปัจจัยป้องกันต่อการเกิดภาวะความดันโลหิตสูงของหญิงตั้งครรภ์ (AOR = 0.393; 95% CI: 0.183, 0.841)

บทสรุป การรับประทานอาหารรสเค็มเป็นปัจจัยเสี่ยงต่อภาวะความดันโลหิตสูงในหญิงตั้งครรภ์ และปัจจัยเสี่ยงในสิ่งแวดล้อมเป็นอีกหนึ่งปัจจัยที่มีความสัมพันธ์กับความดันโลหิตในหญิงตั้งครรภ์ จากผลการวิจัยสามารถสรุปได้ว่าควรมีการจัดโปรแกรมให้ความรู้ และจัดสิ่งแวดล้อมให้เหมาะสมเพื่อลดภาวะความดันโลหิตสูงในหญิงตั้งครรภ์เมืองดีลี ประเทศติมอร์เลสเต

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ESTELA LAOT PERPETUA ANA MERY: FACTORS ASSOCIATED HYPERTENSION AMONG PREGNANT WOMENIN DILI MUNICIPALITY TIMOR LESTE. ADVISOR: ASST. PROF. NUTTA TANEEPANICHSKUL, Ph.D., 102 pp.

Purpose: Hypertension in pregnancy is one main cause of maternal morbidity among pregnant women worldwide and is also a significant public health concern. 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. Descriptive analysis, bivariate analysis, and multivariate analysis logistic regression were performed by SPSS version 22.0 were used 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 ($pP=0.004$) were associated with hypertension among pregnant women.

In the multivariate analysis, increased a week of pregnancy (AOR = 1.031; 95% CI: 1.004, 1.058), ever been diagnosed with hypertension during pregnancy (AOR = 10.297; 95% CI: 3.133, 33.840), and quite noisy during daytime (AOR = 0.393; 95% CI: 0.183, 0.841) were increased risk of conducted developed significant associated with hypertension status among pregnant women.

Conclusion: The prevalence rates were lower than pregnant women with non-hypertension within Dili municipality, Timor Leste. Having a salty food during pregnancy and noise disturbance may increase a risk of high blood pressure among pregnant women. The adequate health education program in preventive high blood pressure and promotion knowledge about related factors and counseling is extremely needed in order to reduce hypertension and the factors may influence hypertension in pregnancy.

Field of Study: Public Health

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Student's Signature

Advisor's Signature

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LIST OF ABBREVIATION

ACOG	American College of Obstetricians and Gynaecologists
AHA	American Heart Association
ANC	Ante Natal Care
BP	Blood Pressure
CHC	Community Health Centre
DHSO	District Health Services Office
DALYs	Disability Adjust Life Years
DASS	Depress Anxiety Stress Scale
HREC	Human Research Ethics Committee
FAS	Fetal Alcohol Syndrome
GBD	Global Burden Disease
GH	Gestational Hypertension
HLA-DR	Human Leukocyte Antigen – D related
HTN	Hypertension
HDP	Hypertension Disorders Pregnancy
HMIS	Health Management Information system
HBP	High Blood pressure
IUGR	Intra Uterine Growth Restriction
MMR	Maternal Mortality Ratio
MoHTL	Ministry of Health Timor Leste
PE	Pre-Eclampsia
PIH	Pregnancy Induced Hypertension
SPSS	Statistical Package for Social Sciences
SBP	Systolic Blood Pressure
UNMDG	United Nations Millennium Development Goals
USD	United Stated Dollar
WHO	World Health Organization

CHAPTER I INTRODUCTION

1.1 Background and Rational

Pregnancy is a process experienced by all women in the world. However, there are still many pregnant women who experienced disorder during pregnancy. One of them is the hypertensive disorder.

Hypertensive disorders of pregnancy are an important cause of severe morbidity, long-term disability and death among both mothers and their babies. In Africa and Asia, nearly one tenth of all maternal deaths are associated with hypertensive disorders of pregnancy, whereas one quarter of maternal deaths in Latin America have been associated with those complications. Among the hypertensive disorders that complicate pregnancy, pre-eclampsia (PE) and eclampsia stand out as major causes of maternal and perinatal mortality and morbidity. The majority of deaths due to pre-eclampsia and eclampsia are avoidable through the provision of timely and effective care to the women presenting with these complications. (1)

Hypertensive disorder during pregnancy also increases the risk of cardiovascular disease because of long-term metabolic and vascular changes. (2) Hypertensive disorder during pregnancy affect the function and morphology of the kidney.(3)

Hypertension developing in the second half of pregnancy is subdivided according to the presence or absence of co-existing significant proteinuria into PE and Gestational Hypertension (GH). Recent evidence suggests that PE can be further subdivided into early-PE and late-PE with the former being associated with a higher incidence of impaired placentation, (4) fetal growth restriction (5) and both short-term and long-term maternal mortality and morbidity. (6)

According the American College of Cardiology (ACC) / American Heart Association (AHA) guideline 2017, update of the “Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation and Treatment of High Blood Pressure” (JNC 7), healthcare providers follow the standards for accurate BP measurement which defined as a Systolic Blood Pressure (BP) of ≥ 130 mmHg and

higher, and a diastolic BP of ≥ 80 mmHg and higher. (7) Being the second leading cause of maternal death in the USA, almost 15% of maternal deaths are related to hypertension (HTN). Severe HTN raises the risk of heart attacks, cardiac failure, cerebrovascular accidents and renal failure in the mothers. The fetuses of hypertensive mothers are also at increased risks, such as inappropriate placental oxygen transfer, Intra Uterine Growth Restriction (IUGR), premature delivery, placental abruption, stillbirth, and neonatal death. The hypertensive disorders of pregnancy affect 5% - 22% of all pregnancies. Hypertension, bleeding, and infection are the triad of lethality that greatly contributes to maternal mortality and morbidity. (8)

The American College of Obstetricians and Gynecologists (ACOG) has classified Pregnancy Induced Hypertension (PIH) into four groups of disorders:

1. Gestational hypertension, where resting BP is 140/90 mmHg or higher after the 20th week of gestation;
2. Chronic hypertension, that exists before pregnancy or begins in the first 20 weeks of gestation;
3. Pre-eclampsia (raised BP and oedema or proteinuria)/eclampsia (pre-eclampsia and seizures);
4. Moreover, pre-eclampsia superimposed on chronic hypertension. (9) (10)

In spite of the high incidence and outcomes of hypertensive disorders of pregnancy, their pathogenesis, clinical manifestations, and clinical courses greatly vary and at times complicate the diagnosis. (11) Based on this theory, an immunologic disorder leads to an unnatural implantation and secretion of substances that activate vascular endothelial cells or damage them, leading to vascular constriction and eventually a raised BP. PIH is more commonly seen in nulliparous women, and older women (owing to the risk of chronic HTN) are at greater risk of preeclampsia being superimposed. Evidence shows that discrete pathophysiological changes begin from the moment fertilization takes place. In addition, if delivery does not take place these changes lead to the involvement of multiple organs and present with dangerous clinical signs in both the mother and fetus. (12)

In Timor Leste, the main direct causes of maternal death are hemorrhage, infection, obstructed labor, complications of unsafe abortion and hypertensive disorders (pre-eclampsia and eclampsia). (13)

Based on the data of Health report statistic in Timor Leste, period January to December 2016 showed that the complication during pregnancy for hemorrhage are 43 cases (0.3%) and pre-eclampsia are 104 cases (0.8%), (14) there is no definitive data on hypertension in pregnant women. However, 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.

Even though there are a few studies exploring on the determinants of hypertension during pregnancy in Timor Leste, there is no any study conduct yet in the current study area of interest. Moreover, lack of specific epidemiologic data that related to the hypertension cases to pregnant women of Timor Leste. Therefore, the researcher would like to conduct this study to identify the factors that associate with hypertension among pregnant women in Dili Municipality Timor Leste.

1.2 Research question

- 1.2.1 What is the prevalence of hypertension among pregnant women in Dili Municipality, Timor-Leste?
- 1.2.2 Do general characteristic of pregnant women associate with hypertension in Dili Municipality, Timor Leste?
- 1.2.3 Do reproductive health factors associate with hypertension among pregnant women in Dili Municipality, Timor Leste?
- 1.2.4 Do personal factors associate with hypertension among pregnant women in Dili Municipality, Timor Leste?
- 1.2.5 Do residential environments factors associate with hypertension among pregnant women in Dili Municipality, Timor Leste?

1.3 Hypothesis

Ho:

- 1.3.1 There is no association between general characteristic and hypertension among pregnant women in Dili Municipality, Timor Leste.
- 1.3.2 There is no association between reproductive health factors and hypertension among pregnant women in Dili Municipality, Timor Leste.
- 1.3.3 There is no association between personal factors and hypertension among pregnant women in Dili Municipality, Timor Leste.
- 1.3.4 There is no association between residential environments factors and hypertension among pregnant women in Dili Municipality, Timor Leste.

Ha:

- 1.3.5 There is an association between general characteristic and hypertension among pregnant women in Dili Municipality, Timor Leste.
- 1.3.6 There is an association between reproductive health factors and hypertension among pregnant women in Dili Municipality, Timor Leste.
- 1.3.7 There is an association between personal factors and hypertension among pregnant women in Dili Municipality, Timor Leste.
- 1.3.8 There is an association between residential environments factors and hypertension among pregnant women in Dili Municipality, Timor Leste.

1.4 Objectives

- 1.4.1 To estimate the prevalence of hypertension among pregnant women in Dili Municipality, Timor-Leste.
- 1.4.2 To assess an association between general characteristic and hypertension among pregnant women in Dili Municipality, Timor Leste.
- 1.4.3 To assess an association between reproductive health factors and hypertension among pregnant women in Dili Municipality, Timor Leste.
- 1.4.4 To assess an association between personal factors and hypertension among pregnant women in Dili Municipality, Timor Leste.
- 1.4.5 To assess an association between residential environments factors and hypertension among pregnant women in Dili Municipality, Timor Leste.

1.5 Conceptual Framework

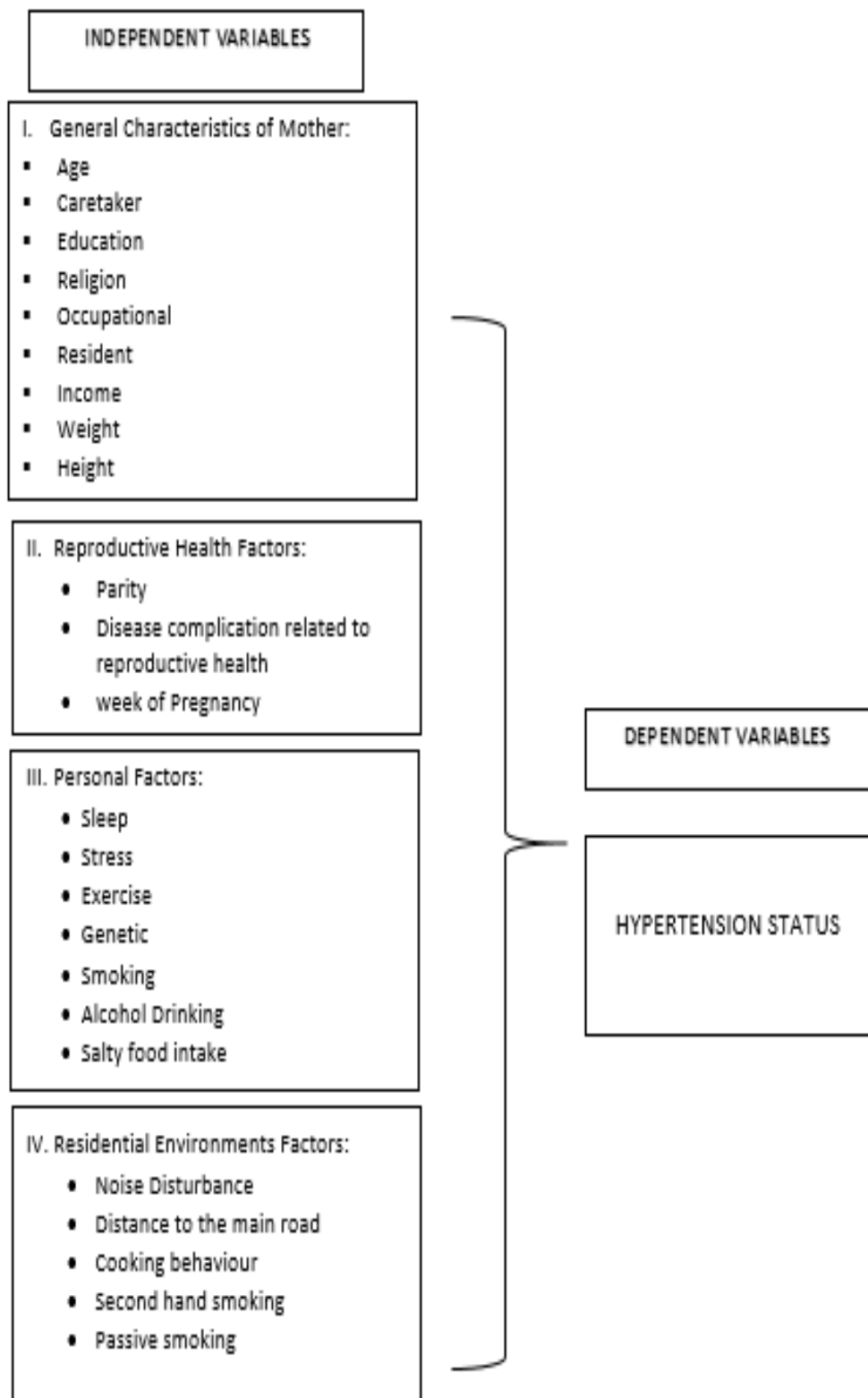


Figure 1. Conceptual Framework

1.6 Operational Definitions

Table 1. Operational Definitions

Term	Operational Definition
INDEPENDENT VARIABLE - General characteristic of the Mother	
Age	It is chronological age defined ranges from birth to the last birthday
Caretaker	Refer to status of the respondent, include legally married (church registered and civil registration), couple (unregistered), -, divorced /widowed.
Education	Defined as number of education years completed in formal education system. The higher education the individual easily will receive the information.
Religion	Refers to the religion of the respondent at the time during interview. It is classify into Catholic, Christian protestant, Muslim and others.
Occupational	Refers to the main activity, which is conducted by respondent every day as the main source of income.
Resident	Refers to the place of the respondent settled in everyday life in urban and rural area.
Income	Refers to take home income level of the respondent. The income level is measured in United States Dollar (USD)(15).
Weight	The body mass of respondents includes muscle, bone, fat, body fluids, organs, and others that are measures using digital scale (accuracy 0,1kg).
Height	The results of the measurements of the bones of the body of respondent are measured with a standardized microtoice with a precision of 0.1 cm.
INDEPENDENT VARIABLE - Reproductive health factors	

Parity	Refers to the number of pregnancies ever experienced by the respondent and can be grouped into Primigravida and Multigravida.
Term	Operational Definition
Disease complication related to reproductive health	Refer to the diseases that related to the reproductive health of the respondent during her pregnancy. The complication disease include, Molahidatidosa, Urinary Tract Infections (UTI), Toxoplasmosis and any others diseases. (Will find the others complication disease in the Ante Natal Care (ANC) register book in the health facilities).
Week of pregnancy	Refers to the weeks of the pregnancy of respondent based on health personnel record.
INDEPENDENT VARIABLE - Personal factors	
Sleep	Refers to the sleep quality, sleep duration and sleeping medication of the respondent. 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 report as “yes” or “no”.
Stress	Response to conditions that occur when the respondent feels pressured by her inability to adjust to the demands given to her (used Depress Anxiety Stress Scale (DASS-21) standard for questionnaire).
Exercise	The accumulation concept of physical activity refers to meeting the goal of 150 minutes per five day in the week. It is mean that 30 minutes regular exercise per day continuously (WHO, 2018). (16)
Genetic	Hereditary factors where there is a history of hypertension in the family i.e. parents or siblings.

Smoking	The behavior, habits, or exposure of pregnant women to smoking cigarettes daily during pregnancy defined as an active smoker.
Alcohol drinking	Alcoholic beverages consumed by pregnant women during her pregnancy and before.
Salty food intake	Refer to the different foods or food groups consumed by respondent during past 30 days. We ask for perception of salty food and classify it to (like/neutral/do not like).
Term	Operational Definition
INDEPENDENT VARIABLE - Residential Environments factors	
Noise disturbance	Refers to the noise felt by the respondent every day at the residence. Determine by location of residence whether in the main road or not.
Distance to the main road	Refers to the distance of respondent residence to public road.
Cooking behaviour	Refers to the time of the respondent to do cooking activities during 24 hours in the residence.
Second hand smoking (Passive Smoking)	Refers to respondents which smoke and inhaled cigarettes from the people who smoke nearby.
DEPENDENT VARIABLE	
Hypertension disorder	Current situation blood pressure of the pregnant women defined as a systolic ≥ 130 mmhg and diastolic ≥ 80 mmhg (AHA, 2017)(7)

CHAPTER II LITERATURE REVIEW

This part focus on the factors that associate with hypertension among pregnant women in Dili Municipality. Therefore, the literature review will address several issues that related to this study and divided into four parts as follows:

- 1. Hypertension in pregnancy Globally**
- 2. Hypertension prevalence during pregnancy**
- 3. Health system related ANC in Dili Municipality**
- 4. Related factors associated with hypertension**

2.1 Hypertension in pregnancy globally

Hypertensive Disorders of Pregnancy (HDP) affect 5-10% of all pregnancies worldwide and cause a substantial maternal and perinatal morbidity and mortality. It is believed that 10-15% of maternal mortality in developing countries is due to HDP. (17)

Globally half a million women die each year because of pregnancy and childbirth. Of these deaths, 50% occur in Africa, about 42% in Asia, about 4% in Latin America and Carribeans and less than 1% in the developed countries. Worldwide an estimated 600,000 women die each year of pregnancy-related causes, with 99% of these deaths in developing countries. Every minute of the day at least one woman dies from a complication of pregnancy and childbirth and at least 1,600 women die in the same mysterious circumstances every day. (17)

According to WHO there are approximately 585,000 mothers die per year in the worldwide during pregnancy or childbirth and have high blood pressure and nearly 3 million dies every year as a direct result. Yet seven out of every 10 people with hypertension are not being treated adequately.

The fifth goal of the United Nations Millennium Development Goals (UNMDG) for 2015 is to reduce the Maternal Mortality Ratio (MMR) by three

fourths. (18) This is because about 350.00 women die every year from pregnancy-related causes globally. (19)

Hypertension disorders of pregnancy include gestational hypertension, defined as new-onset hypertension in pregnancy, and preeclampsia, gestational hypertension with proteinuria, both of which present in mid-pregnancy. In terms of maternal health, hypertensive disorders are the second leading cause of maternal mortality, accounting 19% of pregnancy-related deaths for women following the live birth and 20% of pregnancy-related deaths for women following a stillbirth. (20)

In the Global Burden Disease (GBD) 1990 hypertensive disorders of pregnancy ranked 75th in term of Disability-Adjusted Life Years (DALYs) and were responsible for 6% of the burden of all maternal conditions. It was estimated that deaths due to hypertensive disorders of pregnancy represented 13% of all maternal deaths. (21)

2.2 Hypertension prevalence during pregnancy

According to WHO, 9.1% of women develop a preeclampsia or gestational High Blood Pressure (HBP) during their pregnancy, with preeclampsia being the most common of the clinical outcomes affecting about 3 to 4% of all pregnant women in the world. (22)

The incidence and prevalence of PIH vary from one country to another and might have the genetic predisposition. In some previous study have reported an increased prevalence of pregnancy in women who had a hypertensive disorder during pregnancy. The prevalence showed in some countries, such as:

Among African-Americans it is 6.4% of deliveries; in Sweden, 1.5% of pregnancies; in West-Africa 0.64 per 100; in South Africa, HDP is number one cause of maternal deaths (20%) (23). In the United Kingdom, hypertension in pregnancy is the most frequently cited cause of death. (17)

In India, the cases of the pre-eclampsia 44% and eclampsia 40%, the incidence of hypertension were 5, 38%.(24)

In South Africa, according to a population based-study, the incidence of hypertensive disorders of pregnancy (HDP) was 12% and contributed 20.7% as a the commonest cause of maternal death in the country (24)

In Ethiopia, the prevalence is around 5% hypertension during pregnancy of which majority was due to severe eclampsia and a major causes of maternal and perinatal morbidities and mortalities (24).

Maternal mortality in Indonesia is still dominated by three major causes of death: bleeding, hypertension in pregnancy, and infection. The proportion for hypertension during pregnancy is more than 25% by 2013 and in 2014, the proportion increases by 27.1%. (25)

2.3 Health system related ANC in Dili Municipality

The health services delivery system in Timor Leste has four levels of community Health Centers are available in every district,(26) (27) as follow:

Level 1:

In order to provide basic health services to the whole population, a network of level 1 health post and mobile clinics has been deployed. These centers are within 4-8 km from the house of the population. The services provided include:

- Curative consultation
- Ante Natal and postnatal care
- Immunization
- Growth monitoring health education and
- Health promotion activities.

Level 2:

In every sub-districts, there is a community health center providing promotive, preventive and curative services. These include external consultations supported with a simple laboratory, maternity (including antenatal and postnatal care) to preventive (including immunization) and promotive services.

Level 3:

From the sub-district facility and always within a distance of less than two hours by medical transport (ambulance that can be activated through a radio communication network), there is a level 3 district facility. In this facility, the services provided include, apart from those provided at lower levels, basic emergency obstetric care such as manual removal of placenta, forceps or vacuum-assisted delivery treatment of other obstetric complication. These facilities are located in districts which bordering to Dili District.

Level 4:

This facility is available in others district include an inpatient department with 10 to 20 beds where medical cases can be diagnosed, treated and referred to higher levels if needed. Complete laboratory services and other diagnostic means are available. Minor surgical procedures such as stitching, drainage of abscesses or any other surgical procedure not requiring general anaesthesia are available. Other surgical cases requiring general anaesthesia are referred to the referral hospital, which are located within two hours driving time.

In relation to improve maternal and health in Timor Leste, will increase access to high quality prenatal, delivery, post-natal and family planning health services. Pregnant women received antenatal care at four times during pregnancy and at least once visited from pregnancy. (26)

2.4 Related factors associated with hypertension

Several studies have been carried out in the past to identify the risk factors associated with each type of pregnancy-related hypertension. The risk factors are:

2.4.1 General characteristic of the mother**2.4.1.1 Age**

In Ethiopia, Age of pregnant women between 31 to 49 years old are mostly have affecting pregnancy-induced hypertension (24) while in Indonesia showed that there is a relationship between maternal age and incidence in pregnancy, where

pregnant women with age ≥ 35 years old have a chance to cause hypertension in pregnancy (28) the results of this study were in line with the results of cohort study conducted in Latin America and the Caribbean found that the age of mothers ≥ 35 years old are at risk of hypertension. (29) The increase in blood pressure with age is mostly associated with structural changes in the arteries and especially with large artery stiffness.

2. 4.1.2. Education

Education is considered to developed hypertensive disorder. Many authors have identified women has no formal education or the illiteracy rate was also a greater risk of having hypertension during pregnancy, because they do not have sufficient knowledge to control health during pregnancy. (20, 24, 30)

2. 4.1.3. Occupational

According to some research results, hypertension occurs in many pregnant women who work as housewives and farm workers, because they always work during pregnancy. Work as a farmer and housewife is a day-to-day job and does not have much time to rest. (30, 31)

2. 4.1.4. Resident

In the previous study showed that a high proportion of hypertensive disorder for pregnant are women living in the urban areas (80%). (32) This is because of the unhealthy lifestyle choices may lead to high blood pressure. Being overweight or obese, or not staying active, are major risk factors for hypertension during pregnancy (33) and frequent salt consumption more likely develop PIH. (24)

2. 4.1.5. Income

The results found that pregnant women classified as having low per capita income, suffering from hypertension in pregnancy. The prevalence of hypertension in pregnant women with low socioeconomic status is greater than those with high income. This income of the family is related to the nutritional intake in a family. (34)

2. 4.1.6. Weight

According to the WHO, the healthiest level of pregnancy weight gain occurs in women with a pre-gestational BMI of 20-24kg/m². A global maternal anthropometry study that considered births found that weight gain significantly associated with birth weight and intrauterine growth. While maternal weight gain during pregnancy will be increased maternal complication such as hypertensive disorders. (35)

2. 4.1.7. Height

Maternal height showed similar but less strong association with some outcomes. Both the weight and height indices showed similar and significant increased risk with lower indices. In the British 1958, Perinatal Mortality Survey found that 21% of pregnant women were shorter than 155cm, it may be affect to condition mothers during pregnancy. (36)

2.4.2 Reproductive health factors

2.4.2.1. Parity

In some studies, show that first pregnancy has more risk to get hypertension because in primigravida/primipara occurred blocking antibodies formation to antigen imperfect so that interfere with placental function. (37)

2.4.2.2. Disease complication related to reproductive health

One of the factors that affect hypertension during pregnancy is diseases complication related to reproductive health. It is associated with an increased risk for maternal complications such as Molahidatidosa, Urinary Tract Infections (UTI), Toxoplasmosis and any others diseases. In some previous studies showed that women with complication diseases and women with histories of sibling hypertension and women with histories of chronic hypertension are the greater risk of having hypertension during pregnancy (30) and the risk of developing hypertension-related to pregnancy is higher for women who had already suffered from hypertension during a previous pregnancy. (32) These women also face a

higher risk for poor birth outcomes such as preterm delivery, having an infant small for his/her gestational age, and infant death.

2.4.2.3 Week of pregnancy

Pregnant women with gestational hypertension usually develop high blood pressure after 20 weeks of pregnancy or second trimester in the pregnancy(38). However, in some studies it has been shown that hypertension during the first trimester is higher than in the second or third trimester of pregnancy.(39) it is associated with the preeclampsia includes first pregnancy, age less than 18 years old or over 35 years, preeclampsia history in previous pregnancy, family history with preeclampsia, and space of pregnancy less than 2 years or more than 10 years.

2.4.3. Personal factors

2. 4.3.1. Sleep

The association between sleep disturbances and elevated blood pressure has been extensively studied in the general population. However, relatively few studies have investigated this relationship in the pregnant population. Pregnancy predisposes women to a variety of sleep disturbances. In addition to sleep disturbance, several psychosocial factors are recognized correlates of increased blood pressure. These factors may also exacerbate the occurrence and the negative consequences of sleep disturbance during pregnancy.(40)

2. 4.3.2. Stress

Stress in pregnancy does not contradict but corroborates all physiopathology theories for eclampsia. Maternal stress during pregnancy is associated with increased risk of hypertensive disorders during pregnancy. (39) In the last 5 years, several studies have examined the relationship between physical activity, occupational stress during pregnancy, and PIH. In a large survey by doctors found that female residents, who work long hours in a stressful environment, have a higher incidence of preeclampsia. (41).

2. 4.3.3. Genetic

There is a genetic role in pregnancy hypertension. This can happen because there is a family history of hypertension in pregnancy. Familial predisposition for pregnancy-induced hypertension has been recognized, single gene model and polygenic inheritance has been suggested. Sixty percent (60%) concordance in monozygotic female twin pairs has been reported by a Swedish study. Some have reported a HLA-DR4 association with proteinuria in pregnancy-induced hypertension (17)

2.4.3.4. Smoking

Smoking during pregnancy is a risk factor for various adverse birth outcomes but lowers the risk of preeclampsia. (42) Studies have shown that the number of women who had smoking before pregnancy or during pregnancy is greater to have hypertension due to the chemicals contained in tobacco, can occur damage to blood vessels. (41)

2. 4.3.5. Alcohol intake

Alcohol has a similar effect to carbon monoxide, which can increase blood acidity. Blood becomes more viscous and the heart is forced to pump stronger blood and blood pressure increases. One of the studies conducted by the researcher identified that about 40% of the persons with the abuse factor present are at high risk for drinking while pregnant. One-half (42.9%) of those believing that any amount of drinking was acceptable were identified as high risk. Additionally, survey participants who felt they are able to hold four or more drinks were at risk for alcohol consumption during pregnancy. Women who have had a previous child with FAS are at extremely high risk for drinking during pregnancies and are at very high risk for maternal substance use. (43)

2.4.4 Environmental factors

2.4.4.1. Noise Disturbance

One of the environmental factors that cause hypertension is noise. The noise itself is the occurrence of unwanted sounds that are very disturbing to health. 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. The noise received by someone continuously will cause disruption of the physiological processes of muscle tissue in the body and trigger unstable emotions. Road traffic is the main sources of both air and noise pollution and mutual confounding is of concern. Noise that can cause hypertension occurs in some at-risk populations. One of the cases occurred is in pregnant women. Exposure to road traffic noise may be relevant to abroad a range of hypertension disorders in pregnancy. It is has been associated with adverse birth outcome. (39)

2.4.4.2. Second hand smoking

According to one study conducted by the Department of Health Research in Indonesia analyzed that almost pregnant women become passive smokers every day and are associated with hypertension. (29) This happens because passive smokers inhale cigarette smoke at home and this will be significantly increased blood pressure. Because the exposure happens every day.

CHAPTER III RESEARCH METHODOLOGY

3.1 Study Design

This study used Cross-Sectional Study design with a quantitative method to examine blood pressure status and to assess factors influencing high blood Pressure for pregnant women. The period of this study was conducted from April to May 2018.

3.2 Study Area

The study was conducted in Five Community Health Centre (CHC) in Dili Municipality, Timor Leste, consist of:

1. CHC Becora in the Sub district Cristo Rei
2. CHC Comoro in the Sub district Dom Alexio
3. CHC Formosa in the Sub district Nain Feto
4. CHC Metinaro in the Sub District Metinaro and
5. CHC Vera Cruz in the Sub district Vera Cruz.



Figure 2. Map of study sites

3.3 Study Population

All pregnant women who came for Ante Natal Care (ANC) in Five Community Health Centre (CHC) in both in urban and rural area for the first time, second, third and fourth visiting during current pregnancy was taken as a sample. Those CHC were chosen because high attendance rate and people living in Dili Municipality utilize the ANC to the maximum level. Total ANC for the whole year (from **May 2016 to May 2017**) was **49,091**.

3.4 Sampling Technique

The sampling technique of this study was used systematic random sampling. The sampling technique is explained as follows:

3.4.1 All the pregnant women who came to ANC for the first, second, third and fourth pregnancy was taken as a sample.

3.4.2 The researcher selected Five CHC from 6 CHC in Dili Municipality, excluded One CHC. The reasons why researcher excluded this CHC is because:

- The CHC is on the island.
- The transportation is the only boat.
- The schedule of the boat to go to this island is only once in the weekend (Saturday morning) and return in the afternoon.
- The ANC schedule is from Monday to Friday, if researcher goes on Saturday it will be not found pregnant women in the CHC.

3.4.3 The flow chart of the sampling technique as follows:

3.4.3.1 Five CHC was Chosen.

3.4.3.2 The total number of the pregnant women visited from last May 2016 to May 2017 was 49,091.

3.4.3.3 The proportion to size was calculated from the number of pregnant women visited in last May 2017.

3.4.3.4 Finalized the number of mother in each CHC and HP.

3.4.3.5 Systematic random sampling was applied to choose pregnant women in each CHC.

- Every 10th invited to participate in this study. This 10th was taken from the record book in the CHC.
- If 10th will not participate then the next 11th will be invited.

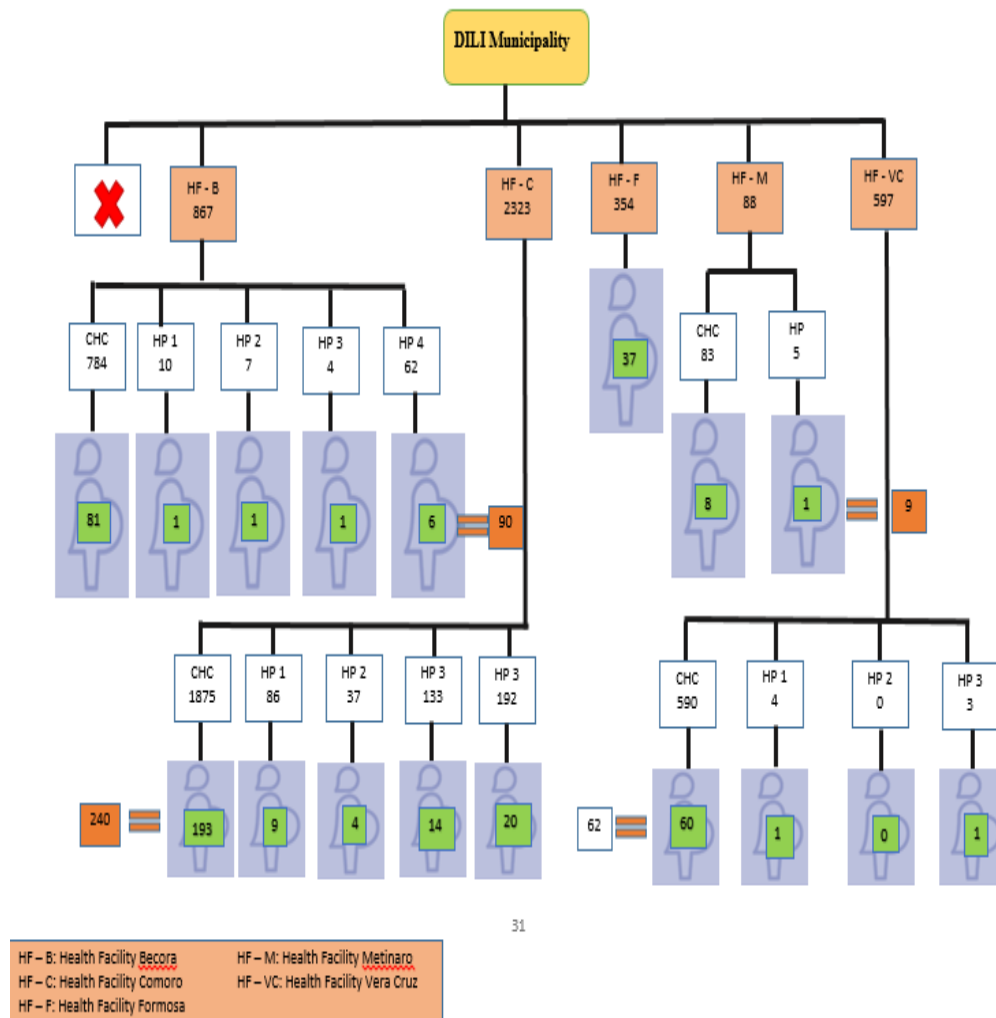


Figure 3. Flow Chart of Sampling Technique

3.5 Inclusion criteria

- 3.5.1 Pregnant women aged 18–40 years old invited to join in this study.
- 3.5.2 Pregnant women who are living in the permanent residential in this municipality.
- 3.5.3 Pregnant women who can speak local language or any others language (Tetum, Indonesia and Portuguese).

3.6 Exclusion criteria

- 3.6.1 Pregnant women with any mental health problem.
- 3.6.2 Pregnant women with related diseases complication such us HIV- AIDS, Diabetes Mellitus, and Cardiovascular.
- 3.6.3 Pregnant women had hypertension before pregnant.
- 3.6.4 Pregnant women which refused to participate.

3.7 Sample & Sample size

The sample size of this study was used *Taro Yamanae's* formula (Yamane 1973) with the assumption of 95% confidence interval. The sampling technique was calculated as follows:

$$n = N / (1 + Ne^2)$$

n = Sample Size

N = Population (Population was the total number of pregnant women visited CHC during May 2016 – May 2017)

e = Error of the sampling (0.05)

$$n = \frac{49,091}{(1 + (49,091)(0.05)^2)}$$

$$= \frac{49,091}{123.73}$$

$$= 396.76$$

$$= 397$$

The data collection was face to face interviewed - complete questionnaire. To prevent incomplete answer, the researcher will grow up the respondents of sample size until 10%. The total sample size may be roughly **438**. The total sampling calculated derived from last ANC in May 2017, from each health facilities.

3.8 Measurement Tools

The data collection used quantitative approach. Under the quantitative approach, prepare structured questionnaire was developed by researcher, translated to local language and piloting. And interviewed with respondent to find the factors that associated with hypertension among pregnant women related to the conceptual framework of this study. The instrument for this study was:

3.8.1 Structured of the Questionnaire will be consisted of 4 parts:

Part I – General characteristic of the mother

Identified personal background of the pregnant women with 9 questions such as: age, marital status, education, religion, occupational, resident, income, weight, and height.

Part II – Reproductive health factors

This part of the questionnaire aimed to find out parity, diseases complication related to reproductive health and week of pregnancy. The respondent was interviewed with Five (5) item of the questionnaire.

Part III – Personal factors

The respondent was interviewed with Seven (7) items of the questionnaire related to the respondent behavior which included:

- Sleep - pregnant women were asked to rate their sleep quality though the past one month. The scaling was classified into very good, fairly good and fairly bad. Sleep duration was reported by average sleeping hours per night during the past month. Also, using sleeping medication during the past month was report as “yes” or “no”.
- Stress was used Depression Anxiety Stress Scales (DASS-21). The DASS is to measured the magnitude of three negative emotional states which is: depression, anxiety, and stress. For this Study, DASS focuses on Stress Scale score to independently diagnose the stress situation that affected pregnant women and rating stress as (normal 0-7/abnormal 8-21). (44)

- Exercise, Genetic, Smoking, Alcohol intake and nutritional status-dietary intake.

Part IV – Environmental factors

The respondent was interviewed with four (4) items of the questionnaire to assess an association between environmental factors and hypertension among respondent included noise disturbance in the resident during daytime and nighttime, the distance from house to the main road, cooking behavior and second hand smoking.

3.8.2 Automatic blood pressure monitor: Omron HEM 7111

Systolic and Diastolic blood pressure were measured in (mmHg) with the pregnant women.

3.8.3 Standardized weight and height scale

For anthropometric were measured in weight (accuracy 0,1 kg) of every pregnant woman used seca digital and height were measured used microtoice (to the next 0,1cm) at the time of the data collection.

3.9 Validity and Reliability

3.9.1 Validity

These questionnaires are validated by three experts. The content validity of the questionnaires is of Item Objective Congruence (IOC) with the score of $IOC > 0.5$ (44). For the general characteristic of the mother the value of IOC was 0.86, reproductive health factor was 0.60 personal factor was 0.62, and residential environments factor was one (1).

3.9.2 Reliability

A standardized and structured questionnaire was developed for the purposed data collection. The pre-tested questionnaire was interviewed with 30 respondents, used Cronbach alpha to test for the four-factor as an associated factor in this study. The perception with Cronbach's Alpha score obtained was 0.76. The pre-tested questionnaire was interviewed to 30 respondents in the same CHC with different respondent. Respondent were interviewed in local language (tetum).

3.10 Data Collection

The data collection was taken on April to May 2018. Data collected by face to face interview. The step for the data collection are:

- 3.10.1 Fill up the application form for HREC review.
- 3.10.2 Researcher presented the research proposal for the HREC.
- 3.10.3 Ethical approval by HREC, Research Department, National Institute of Health, Ministry of Health Timor Leste (MoHTL).
- 3.10.4 Send the letter to District Health Services Office (DHSO) and Five (5) CHC.
- 3.10.5 Data collection completed by one month.
- 3.10.6 Recruit and Conducted training for data collector.
- 3.10.7 For insuring data quality will do piloting for the interview.
- 3.10.8 The data collector will see the recorded book in the CHC and select the Pregnant women based on the sampling technique.
- 3.10.9 The data collector explained the purpose of the study to pregnant women with verbal consent.
- 3.10.10 The data collector invited pregnant women to do physical examination follow WHO protocol, as follows:

- ***Blood Pressure examination***

Blood pressure of the pregnant women are 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 (5) minutes(45). Data collector do measurement to pregnant women two times. If the result of the measurement is different, data collector taken the result from the first measurement is a valid result.(45). The result of the blood pressure measurement were considered as hypertension during pregnancy when the current blood pressure was ≥ 130 mmhg and diastolic ≥ 80 mmhg (AHA, 2017) (7).

▪ ***Measurement procedure for Weight***

- The scale should be placed on a hard-floor surface.
- Pregnant women are asked to remove their heavy outer garments (jacket, coat, trousers, skirts, bagetc.) and shoes.
- The scale is balanced with both sliding weights at zero and the balance bar aligned. The scale is checked using the standardized weights and calibration is corrected if the error is greater than 0.2 kg.
- The weights are moved until the beam balances.
- The result of the checking and the recalibrations are recorded by data collector in kg. (46)

▪ ***Measurement procedure for Height, is done by:***

- Standing in a rear position to the wall where the microtoice is mounted in a relaxed ready position.
- Looked straight ahead.
- Remove shoes, heavy outer garments, and hair ornaments.
- Pull the microtiose down until it fits to the head.
- Height is recorded to the resolution of the height rule (i.e. nearest millimetre/half a centimetre). If the participant is taller than the measurer, the measurer should stand on a platform so that he/she can properly read the height rule.
- Recorded the measurement with centimetre.(46)

- 3.10.10.1 Interview was conducted face to face by trained data collector with pregnant women at CHC and fill the questionnaire.
- 3.10.10.2 The interviewed was conducted in local language (tetum).

3.11 Data Analysis

After completed all questionnaire, researcher rechecked code and entered into the computer. And the data was analyzed by Statistical Package for Social Sciences (SPSS) version 22.0.

3.11.1 Descriptive analysis

For categorical data, frequency and percent were calculated. For continuous data, mean and standard deviation (SD) was presented for normality distribution data. If data is skewed, median and interquartile range were used.

3.11.2 Bivariate analysis

Chi-Square test was used to assess an association between categorical data and categorical data. If Chi-square assumption does not meet, Fisher Exact test was performed.

To compare a difference between continuous data by categorical data, student t-test was used. If data is non-normal distribution, Mann Whitney U test was performed.

3.11.3 Multivariate analysis

Simple linear regression was modeled to access an association between the dependent variable (blood pressure) and independent factors with adjusted some confounding factors.

Confounding factors were selected by using bivariate analysis with the p-value less than 0.2. All statistical significance in this study considered at p-value < 0.05 .

3.12 Ethical Consideration

- The research proposal was submitted to HREC, Research Department, National Institute of Health, for review and approved with the reference number: 271 MS-INS/DE-DEP/CDC-DEP/III/2018 before the study commenced (Appendix)
- The interviewed completely confidential.

- The name of the respondent did not associate with the answer and avoid not ask the private question.
- Verbal consent was taken from each respondent after clearly explained the purposed of the study. The respondent will inform to withdraw from study at any time and/or to refrain from responding to question if they are not interested to participate by any reason.



CHAPTER IV RESULTS

The study was conducted in Five Community Health Centre (CHC) in Dili Municipality Timor Leste, on April 2018. Data was collected by the interviewer and the data collector. The aimed of this study was to estimate Prevalence of hypertension and to assess an association between reproductive health factors, personal factors, and residential environments factors and hypertension among pregnant women who came to Ante Natal Care (ANC) in both urban and rural areas for the first, second, third and fourth time visit during current pregnancy.

Four Hundred Thirty-Eight (438) respondents joined in this study. This chapter will describe the findings of the data analysis. The data analysis reports as divided into Five (5) section:

1. Prevalence of Hypertension
2. The general characteristic of the mother
3. Reproductive health factors
4. Personal factors
5. Residential environments factors

Part I: Descriptive Findings

4.1. Prevalence of hypertension among pregnant woman

Table 2 showed the prevalence of hypertension among pregnant women. Blood pressure is measured in millimeters of mercury (mmHg). Hypertension is a condition of systolic blood pressure equal to or above ≥ 130 mmHg or diastolic blood pressure equal to or above ≥ 80 mmHg. Based on the study that has been done can be concluded that the prevalence of hypertension is 23.5% from 438 sample.

Table 2. Prevalence of Hypertension among pregnant women (n=438)

Variable	Number (n)	Percentage (%)
Hypertension prevalence:		
Yes (Systolic Blood Pressure \geq 130 mmHg Diastolic Blood Pressure \geq 80 mmHg)	103	23.5
No (Systolic Blood Pressure < 130 mmHg Diastolic Blood Pressure < 80 mmHg)	335	76.5

The mean current of systolic blood pressure of the respondents was 109.09 with SD \pm 12.25, and minimum-maximum between 80 to 140 mmHg. While the mean current of diastolic blood pressure was 71.03 with SD \pm 9.52 and minimum-maximum 50 to 110 mmHg.

4.2. The general characteristic of the pregnant women

The description of the general characteristic of respondents showed in table 3 consists of age, caretaker, education, religion, occupational, resident, income, weight, and height. The mean current age of the respondents was 26.82 with SD \pm 4.90, and minimum-maximum age between 18 to 40 years old. Most respondents in this study were in care by the husband (89.0%), followed by in care by mothers (6.8%), and others (4.1%). The majority educational background of the respondents 40.6% were attended High school, 37.0% at the university level, while 12.1% were attended primary school and 10.3% were attended secondary school. Most of the respondents (95.7%) were Catholic by religion and followed by Christian/Muslim 4.3%. The occupational of respondents majority as Housewife/unemployed (77.9%) and 22.1% as an employed. Almost 54.6% respondents lived in an urban resident and 45.4% respondent were lived in rural resident. Monthly income of the respondents was range from \leq 115/month (76.0%) and $>$ 115/month (24.0%). The mean of the weight of the respondents was 53.09 with SD \pm 9.44, and minimum-maximum weight was 33 – 87. While for the height of the respondents the mean was 151.77 with SD \pm 6.30 and minimum-maximum 114 – 179 centimeter.

Table 3. The General Characteristic of pregnant women (n=438)

Variable	Number (n)	Percentage (%)
Age (years):		
Mean (\pm Std. Deviation)	26.82 (\pm 4.90)	
Minimum - Maximum	18 – 40	
Care taker:		
Husband	390	89.0
Mothers	30	6.8
Others	18	4.1
Education:		
Primary school	53	12.1
Secondary school	45	10.3
High school	178	40.6
University	162	37.0
Religion:		
Catholic	419	95.7
Christian Protestant/Muslim	19	4.3
Occupational:		
Housewife/unemployed	341	77.9
Farmer/ employed	97	22.1
Resident:		
Urban	239	54.6
Rural	199	45.4
Income (USD):		
\leq 115/month	333	76.0
>115/month	105	24.0
Weight: (Kilogram)		
Mean (\pm Std. Deviation)	53.09 (\pm 9.44)	
Minimum - Maximum	33 – 87	
Height: (Centimeter)		
Mean (\pm Std. Deviation)	151.77 (\pm 6.30)	
Minimum - Maximum	114 - 179	

4.3. The Reproductive health factors

Table 4 will describe the reproductive health factors and hypertension of respondents. According to the table, the respondent with first pregnancies was 37.7%, second pregnancies were 22.6%, third pregnancies was 17.6%, fourth pregnancies was 11.0% and more than fifth pregnancies was 11.2%. The mean of parity was 2.44 with $SD \pm 1.57$ and minimum-maximum ranges from 1–8 times pregnancy. The age of the pregnancy (week) on this table showed that the ranges of the mean were 25.73 with $SD \pm 9.24$ and minimum-maximum 1-42 weeks. Respondent that reported in the first trimester of pregnancies was 9.8%, second trimester of pregnancies was 46.6%, and the third trimester of pregnancies was 43.6%.

Fifteen (15) respondents who had ever been diagnosed with hypertension during pregnancy or “yes” in this study (3.4%) and “no” diagnosed during pregnancy (96.6%). Of the 15 respondents who were diagnosed with hypertension during pregnancy in the first trimester was 0.9%, second trimester was 1.8% and the third trimester was 0.7%. The range of mean was 20.41 weeks with $SD \pm 7.93$ and minimum-maximum in 9-33 weeks of pregnancy. The most respondents (92.9%) “no” have any diseases complication that related to the reproductive health during pregnancy and 7.1% respondents “yes” have any diseases complication related to reproductive health during pregnancy. Seven point one percent (7.1%) of the respondents have UTI diseases; however, 92.9% “no” have any type of the diseases that related to the reproductive health.

Table 4. Reproductive Health Factor (n=438)

Variable	Number (n)	Percentage (%)
Parity:		
1	165	37.7
2	99	22.6
3	77	17.6
4	48	11.0
>5	49	11.2
Mean (\pm Std. Deviation)	2.44 (\pm 1.57)	
Minimum - Maximum	1 – 8	
Age of pregnancy: (week)		
First trimester	43	9.8
Second trimester	204	46.6
Third trimester	191	43.6
Mean (\pm Std. Deviation)	25.73 (\pm 9.24)	
Minimum - Maximum	1 – 42.2	
Ever been diagnosed hypertension during pregnancy:		
Yes	15	3.4
No	423	96.6
In which week of Pregnancy (n=15):		
First trimester	4	0.9
Second trimester	8	1.8
Third trimester	3	0.7
Mean (\pm Std. Deviation)	20.41 (\pm 7.93)	
Minimum - Maximum	9-33.4	
Diseases complication related to reproductive health		
Yes	31	7.1
No	407	92.9
Type of diseases		
UTI	31	7.1
No	407	92.9

4.5 Personal factor

As showed in the table 5 has (11) variables of personal factors. The majority of the respondents reported during the time of the interviewed, the sleep quality of the respondents 62.8% fairly good, followed by 34.2% was very good and 3.0% was fairly bad. The mean of sleep duration for respondents was 8.37 hours with $SD \pm 1.35$ and minimum-maximum of sleep duration of the respondents was 2-12 hours. All respondents were not used sleeping medication during past month of their pregnancy. Among the stress level, it was found that 99.5% in normal condition and 0.5% abnormal. The mean of the stress level was 3.57 with $SD \pm 2.90$ and minimum-maximum of stress was 0.00-21.00. Fifty-Nine point Eight percent (59.8%) reported “yes” exercise during pregnancy and 40.2% of the respondents reported “no” exercise. The type of exercise that having by the respondents was 98.5% walk, and 1.5% yoga. Similarly, the mean range for the time of exercise was 3.64 with $SD \pm 2.00$, minimum-maximum was 1-7 times of exercise in a week. In this present study found that 90.9% hypertension not as a genetic and 9.1% hypertension yes as a genetic. While for smoking reported 99.5% “no” smoke during pregnancy and 0.5% “yes” smoke during pregnancy. Likewise, 99.5% of respondents were “no” drink any alcohol during pregnancy and 0.5% were drinking any alcohol during pregnancy. For the salty food intake out of 438 respondents, 47.9% do not like salty food, 31.3% like salty food and 20.8% neutral to having salty food. More than half of the respondents were take dietary intake such as bacon or sausages, processed meat, French fries, fried potatoes, tater tots or hash brown potatoes, fast food from a restaurant or store less than one in a month.

Table 5. Personal factor (n=438)

Variable	Number (n)	Percentage (%)
Sleep quality:		
Very good	150	34.2
Fairly good	275	62.8
Fairly bad	13	3.0
Sleep duration:		
Mean (\pm Std. Deviation)	8.37 (\pm 1.35)	
Minimum - Maximum	2 - 12	
Use of sleeping medication:		
Not use during the past month	438	100
Stress:		
Normal	436	99.5
Abnormal	2	0.5
Mean (\pm Std. Deviation)	3.57 (\pm 2.90)	
Minimum - Maximum	0.00 - 21.00	
Exercise:		
Yes	262	59.8
No	176	40.2
Type of exercise:		
Walk	258	98.5
Yoga	4	1.5
Time of exercise (week):		
Mean (\pm Std. Deviation)	3.64 (\pm 2.00)	
Minimum - Maximum	1 - 7	

Genetic:		
Yes	40	9.1
No	398	90.9
Smoking:		
Yes	2	0.5
No	436	99.5
Alcohol Drinking:		
Yes	2	0.5
No	436	99.5
Nutritional status – salty food:		
Like	137	31.3
Neutral	91	20.8
Do not like	210	47.9
Eat bacon or sausages:		
More than one a day	11	2.5
Once a day	11	2.5
2 -3 times in a week	65	14.8
Once a week	61	13.9
1 – 3 times in a month	85	19.4
Less than one in a month	205	46.8
Eat processed meat:		
More than one a day	9	2.1
Once a day	11	2.5
2 -3 times in a week	72	16.4
Once a week	42	9.6
1 – 3 times in a month	65	14.6
Less than one in a month	239	54.6
Eat French fries, fried potatoes, tater tots or hash brown potatoes:		
More than once a day	12	2.7
Once a day	16	3.7
2 -3 times in a week	103	23.5
Once a week	90	20.5
1 – 3 times in a month	85	19.4
Less than one in a month	132	30.1
Eat fast food from a restaurant or store:		
More than once a day	10	2.3
Once a day	5	1.1
2 -3 times in a week	28	6.4
Once a week	18	4.1
1 – 3 times in a month	53	12.1
Less than one in a month	324	74.0

4.6 Residential Environments Factor

According to the table 6, from 438 respondents (47.9%) do not feel the noise during day-time at their resident, 31.1% feel very noise and 21.0% feel quite noise. Similarly, for 58.0% feel do not noise during nighttime at their resident, 25.1% feel very noise and 16.9% feel quite noise. Sixty percent (60%) the source of the noise from the motorbike, 8.0% from drunker and 22.4% from car. Fifty-Eight point Four percent (58.4%) of the respondent reported feel not disturbed by this noise, 25.8% fell disturbed and 15.8% fell very disturbed. 65.5% of the respondent reported these noise does not affect to their health condition while 34.5% respondent reported these noise enough to affect their health condition.

The mean of distance from respondents house to the main road were 118.78 with $SD \pm 170.96$ and minimum-maximum 1.0-1000 meters. The mean ranges of respondent spend their time for cooking every day was 59.29 with $SD \pm 24.38$ and minimum-maximum of cooking times was 30-120 minutes.

In other hand, majority respondents reported both in urban and rural 53.2% used wood as a type of cooking fuel, 42.7% of the respondent used the stove, 4.3% of the respondent used gas, and 78.5% used electricity.

While all of the respondents usually cook inside the house (87.2%) and 40.6% respondent was cook in outside the house.

Regarding to smoke behavior for the passive smoker, majority respondents have anyone smoking in their household (60.0%), 54.3% they do not smoke inside the house and 61.2% of the respondent do not often close to the smoking people in their household.

Table 6. Residential Environments Factor (n=438)

Variable	Number (n)	Percentage (%)
Noise disturbance during day time:		
Very noise	136	31.1
Quite noise	92	21.0
Not noise	210	47.9
Noise disturbance during night time:		
Very noise	110	25.1
Quite noise	74	16.9
Not noise	254	58.0
Source of noise – Motorbike:		
Yes	263	60.0
No	175	40.0
Source of noise – Drunker:		
Yes	35	8.0
No	403	92.0
Source of noise – Car:		
Yes	98	22.4
No	340	77.6
Feel disturbed by these noise:		
Very disturbed	69	15.8
Disturbed	113	25.8
Not disturbed	256	58.4
Noisy conditions, is it enough to affect health:		
Yes	151	34.5
No	287	65.5
Distance to the main road (meter):		
Mean (\pm Std. Deviation)	118.78 (\pm 170.96)	
Minimum - Maximum	1.0 – 1000.0	
Cooking behaviour (minute):		
Mean (\pm Std. Deviation)	59.29 (\pm 24.38)	
Minimum - Maximum	30 – 120	

Type of cooking fuel – Wood:		
Yes	233	53.2
No	205	46.8
Type of cooking fuel – Stove:		
Yes	187	42.7
No	251	57.3
Type of cooking fuel – Gas:		
Yes	19	4.3
No	419	95.7
Type of cooking fuel – Electricity:		
Yes	344	78.5
No	94	21.5
Cook inside:		
Yes	382	87.2
No	56	12.8
Cook outside:		
Yes	178	40.6
No	260	59.4
Anyone smoking in Household:		
Yes	263	60.0
No	175	40.0
Anyone smoke inside house:		
Yes	124	28.3
Sometimes	76	17.4
No	238	54.3
How often do you close to smoking people in a day:		
Very often	52	11.9
Quite often	118	26.9
Not often	268	61.2

Part II: Bivariate Analysis

a. Association between general characteristics of pregnant women and hypertension status

In terms of general characteristic of the mother, it was found that all variables were not statistically significant association between hypertension status in this present study ($p>0.05$). The results are shown in the following table 7. 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, pregnant women who cared by husband is the higher one (75.1%) if comparing to others. While for the education, the higher one is 131 respondents (80.9%) pregnant women with non-hypertension at the university level if compared to high school, secondary school and primary school. In terms of the resident in the table shown, the higher one is 191 (79.9%) pregnant women non-hypertension who are resident in urban. However, all the variables are mention was no association between hypertension status.

Table 7. Association between general characteristic of pregnant women and hypertension status

Variable	Yes (103)	No (335)	P – Value
Age			
Mean (\pm Std. Deviation)	27.05 (\pm 5.21)	26.75(\pm 4.80)	0.279 ^a
Min – Max	18 – 40	18 - 40	
Care taker			
Husband	97 (24.9%)	293 (75.1%)	0.110 ^b
Mothers	5 (16.7%)	25 (83.3%)	
Others	1 (5.6%)	7 (94.4%)	
Education			
Primary School	17 (32.1%)	36 (67.9%)	0.242 ^b
Secondary school	12 (26.7%)	33 (73.3%)	
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			
\leq 115/month	82 (24.6%)	251(75.4%)	0.330 ^b
>115/month	21 (20.0%)	84 (80.0%)	
Weight			
Mean (\pm Std. Deviation)	55.64 (\pm 9.61)	52.31(\pm 9.26)	0.338 ^a
Min – Max	33 – 84	33 - 87	
Height			
Mean (\pm Std. Deviation)	153.33 (\pm 6.16)	151.29(\pm 6.27)	0.641 ^a
Min – Max	114 – 179	114 – 170	

a) Independent T – Test, b). Chi – Square Test, c). Fisher’s Exact Test

b. Association between maternal reproductive health and hypertension

Regarding the reproductive health factor, an association between maternal reproductive health (parity, week of pregnancy, ever been diagnosed hypertension during pregnancy and diseases complication related to reproductive health) and hypertension. The average parity of pregnant women with hypertension is 2.51 (\pm 1.70) which is higher than pregnant women with non-hypertension, and the average week of pregnancy of pregnant women with hypertension is 27.42 (\pm 8.65) weeks. The table revealed the ever been diagnosed hypertension during pregnancy variable became significant association between pregnant women and hypertension status at P-value >0.001 . Lastly, for the reproductive health factor, pregnant women with hypertension and no disease complication is 309 (75.9%).

Table 8. Association between maternal reproductive health and hypertension status

Variable	Yes (103)	No (335)	P – Value
Parity			
Mean (\pm Std. Deviation)	2.51 (\pm 1.70)	2.41(\pm 1.52)	0.332 ^a
Min – Max	1 – 8	1 – 8	
Week of pregnancy			
Mean (\pm Std. Deviation)	27.42 (\pm 8.65)	25.21(\pm 9.36)	0.245 ^a
Min – Max	7 – 42.2	1 – 41.6	
Ever been diagnosed hypertension during pregnancy			
Yes	11 (73.3%)	4(26.7%)	<0.001 ^b
No	331(78.3%)	92 (21.7%)	
Diseases complication related to reproductive health			
Yes	5 (16.1%)	26 (83.9%)	0.314 ^b
No	309 (75.9%)	98(24.1%)	

a) Independent T – Test, b). Fisher’s Exact Test, c). Chi – Square Test

c. Association between personal characteristic and hypertension status

The result showed in the personal characteristic that nutritional status—salty food intake was a strongly significant association with hypertension status ($p < 0.027$) (Table 9) and the other variables was not significantly associated with hypertension status.

Table 9. Association between personal characteristic and hypertension status

Variable	Yes (103)	No (335)	P – Value
Sleep quality			
Very good	43 (28.7%)	107 (71.3%)	0.182 ^a
Fairly good	57 (20.7%)	218 (79.3%)	
Fairly bad	3 (23.1%)	10 (76.9%)	
Sleep duration			
Mean (\pm Std. Deviation)	8.35 (\pm 1.22)	8.37(\pm 1.39)	0.157 ^b
Min – Max	5 -12	2 - 12	
Use of sleeping medication			
Not during past month	103 (23.5%)	335 (76.5%)	-
Stress			
Mean (\pm Std. Deviation)	3.66 (\pm 3.19)	3.55(\pm 2.81)	0.430 ^b
Min – Max	0 -21	0 – 18	
Exercise			
Yes	62 (23.7%)	135 (76.7%)	0.929 ^b
No	41 (23.3%)	200 (76.3%)	
Type of exercise			
Walk	61 (23.6%)	197 (76.4%)	0.576 ^c
Yoga	0 (0.0%)	4 (100.0%)	
Time of exercise (week)			
Mean (\pm Std. Deviation)	3.71 (\pm 2.01)	3.62(\pm 2.00)	0.672 ^a
Min – Max	1 – 6	1 - 7	
Genetic			
Yes	9 (22.5%)	31 (77.5%)	0.874 ^a
No	94 (23.6%)	304 (76.4%)	
Smoking			
Yes	1 (50.0%)	1 (50.0%)	0.415 ^b
No	102 (23.4%)	334 (76.6%)	
Alcohol drinking			
Yes	0 (0.0%)	2 (100.0%)	0.100 ^c
No	03 (23.6%)	333 (76.4%)	
Nutritional status – salty food			
Like	27 (19.7%)	110 (80.3%)	0.027 ^{h**}
Neutral	31 (34.1%)	60 (65.9%)	
Do not like	45 (21.4%)	165 (78.6%)	

a) Chi – Square, b). Independent T – Test, c). Fisher’s Exact Test

d. Association between residential environments and hypertension status

In terms of the residential environments the result showed that the variables were a significant association with hypertension status was noise disturbance during daytime ($p<0.027$), the source of noise from the motorbike ($p<0.027$) and the distance from the house to the main road ($p<0.004$) (table 10).

Table 10. Association between residential environments and hypertension status

Variable	Yes (103)	No (335)	P – Value
Noise disturbance			
Noise disturbance during day time			
Very noise	21 (15.4%)	115 (84.6%)	0.027 ^{a***}
Quite noise	26 (28.3%)	66 (71.7%)	
Not noise	56 (26.7%)	154 (73.3%)	
Noise disturbance during night time			
Very noise	20 (18.2%)	90 (81.8%)	0.312 ^a
Quite noise	19 (25.7%)	55 (74.3%)	
Not noise	64 (25.2%)	190 (74.8%)	
Source of noise – Motorbike			
Yes	31 (17.7%)	144 (82.3%)	0.020 ^{a****}
No	72 (27.4%)	191 (72.6%)	
Source of noise – Drunker			
Yes	9 (25.7%)	26 (74.3%)	0.749 ^a
No	94 (23.3%)	309 (76.7%)	
Source of noise – Car			
Yes	17 (17.3%)	81 (82.7%)	0.102 ^a
No	86 (25.3%)	254 (74.7%)	
Feel disturbed by these noise			
Very disturbed	18 (26.1%)	51 (73.9%)	0.237 ^a
Disturbed	20 (17.7%)	93 (82.3%)	
Not disturbed	65 (25.4%)	191 (74.6%)	
Noisy conditions, is it enough to affect health			
Yes	33 (21.9%)	118 (78.1%)	0.552 ^a
No	70 (24.4%)	217 (75.6%)	
Distance to the main road (meter)			
Mean (\pm Std. Deviation)	141.65(\pm 204.15)	111.75(\pm 159.06)	0.004 ^{b****}
Min – Max	1.5 – 1000	1 – 1000	
Cooking behaviour (minute)			
Mean (\pm Std. Deviation)	63.04(\pm 2.01)	58.14 (\pm 2.01)	0.618 ^b
Min – Max	30 – 120	30 – 120	

⊕			
Type of cooking fuel – Wood			
Yes	59 (25.3%)	174 (74.7%)	0.342 ^a
No	44 (21.5%)	161 (78.5%)	
Type of cooking fuel – Stove			
Yes	42 (22.5%)	145 (77.5%)	0.653 ^a
No	61 (24.3%)	190 (75.7%)	
Type of cooking fuel – Gas			
Yes	5 (26.3%)	14 (73.7%)	0.783 ^a
No	98 (23.4%)	321 (76.6%)	
Type of cooking fuel – Electricity			
Yes	75 (21.8%)	269 (78.2%)	0.106 ^a
No	28 (26.8%)	66 (70.2%)	
Cook inside			
Yes	88 (23.0%)	294 (77.0%)	0.537 ^a
No	15 (26.8%)	41 (73.2%)	
Cook outside			
Yes	43 (24.2%)	135 (73.8%)	0.793 ^a
No	60 (100.0%)	200 (76.9%)	
Anyone smoking in household			
Yes	60 (22.8%)	203 (77.2%)	0.671 ^a
No	43 (24.6%)	132 (75.4%)	
Anyone smoking inside house			
Yes	29 (23.4%)	95 (76.6%)	0.960 ^a
Sometimes	17 (22.4%)	59 (77.6%)	
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%)	0.522 ^a
Quite often	28 (23.7%)	90 (76.3%)	
Not often	66 (24.6%)	202 (75.4%)	

a) Chi – Square, b). Independent T Test, c). Fisher’s Exact Test

Part III: Multivariate Analysis

Table 11 showed that the final model for the association between each independent variables and hypertension status. Four variables in general characteristics whose P-value less than 0.25 were put into the logistic regression analysis to find the association with hypertension. Based on the table below showed that respondent who cared by mothers– OR is less than one (1), even though statistical not achieved. This is possible to reduce the risk 0.657 (AOR=0.657; 95% CI: 0.240, 1.794) while for the respondents who cared by others is possible to reduce hypertension risk 0.197 (AOR=0.197; 95% CI: 0.026, 1.504). For education levels –OR is greater than one (1) even though statistical was not achieved. High school level, is possible to increase 1.700-fold odd of having hypertension during pregnancy (AOR= 1.700; 95% CI: 0.829, 3.485), Secondary school is increasing 1.429-fold odd of having hypertension during pregnancy (AOR= 1.429; 95% CI: 0.657, 3.108) and for Primary School, the education level lower than secondary school, this is possible to increase 1.229-fold odd of having hypertension during pregnancy (AOR= 1.229; 95% CI: 0.723, 2.088) compared to university level.

While for religion, Christian Protestant/Muslim is a possible to increase 2.173-fold odd of having hypertension during pregnancy (AOR= 2.173; 95% CI: 0.832, 5.675). Likewise, living in the rural area is a possibility to increase 1.381-fold odd of having hypertension during pregnancy however statistical was not achieved (AOR = 1.381; 95%CI: 0.877, 2.177).

Table 11. Binary Logistic Regression between General characteristic of pregnant women and hypertension status

	AOR	95% CI		Sig
		Lower	Upper	
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	1.700	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

Table 12-Binary Logistic Regression between Reproductive health and personal characteristic and hypertension. The data indicate that the variable of weeks of pregnancy the OR greater than One (1), is a possibility to increase 1.031 each time the gestation week increase (AOR = 1.031; 95% CI: 1.004, 1.058) the statistically was significant association with hypertension status. Similarly, for sleep duration, OR less than one (1), there was no statistically significant association between dependent variable. Increase time of sleep duration possibility to reduce the risk 0.984 of having hypertension during pregnancy (AOR = 0.984; 95% CI: 0.827, 1.171). Sleep quality variable, all variables OR less than one (1). For fairly good is the possibility to reduce 0.734 of having hypertension during pregnancy (AOR =0.734; 95% CI: 0.438, 1.229) and for fairly bad the possibility to reduce 0.868 of having hypertension during pregnancy (AOR = 0.868; 95% CI: 0.223, 3.375). Nutritional status on this table the OR for neutral less than 1, the possibility to reduce 0.953 of having hypertension during pregnancy (AOR = 0.953; 95% CI: 0.547, 1.658) and for like the OR greater than 1, possibility to increase 1.790-fold odd of having hypertension during pregnancy (AOR= 1.790; 95% CI: 0.987, 3.248)

Table 12. Binary Logistic Regression between Reproductive health and personal characteristic and hypertension status.

	AOR	95% CI		Sig
		Lower	Upper	
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

Table 13-Binary Logistic Regression between residential environments characteristic and hypertension status. Based on the table below showed that the variable of Noise disturbance during the daytime—quite noise OR is less than one (1), possibility to reduce 0.393 times of hypertension (AOR= 0.393; 95% CI: 0.183, 0.841) there statistically was a significant association between hypertension status. For very noise OR is greater than one (1), is the possibility to increase 1.006-fold odd of having hypertension during pregnancy (AOR= 1.006; 95% CI: 0.533, 1.896) there was no statistically significant association between hypertension status. Variable of the feel disturbed by this noise there was no significant association between hypertension status. For disturbed OR is greater than 1, is the possibility to increase 1.905-fold odd of having hypertension during pregnancy (AOR= 1.905; 95% CI: 0.881, 4.119) and for very disturbed is 1.062-fold odd of having hypertension during pregnancy (AOR= 1.062; 95% CI: 0.511, 2.206). And the last one of these variable is cooking behavior, OR is

greater than 1, is the possibility to increase 1.008-fold odd of having hypertension during pregnancy (AOR= 1.008; 95% CI: 0.999, 1.018).

Table 13. Binary Logistic Regression between Residential environments and hypertension status.

	AOR	95% CI		Sig
		Lower	Upper	
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
Fell disturbed of these noise				
Not disturbed	Reference			
Disturbed	1.905	0.881	4.119	0.101
Very disturbed	1.062	0.511	2.206	0.587
Cooking behavior	1.008	0.999	1.018	0.082

CHAPTER V DISCUSSION

This study was conducted in order to estimate the prevalence of hypertension among pregnant women and to assess the association between reproductive health, personal and residential environments factors and hypertension among pregnant women in Dili Municipality, Timor Leste. The target population in this study is among all pregnant women who came for Ante Natal Care (ANC) in Five Community Health Centre (CHC) both in an urban and rural area for the first, second, third or fourth visiting during the current pregnancy.

In this present study we found that the prevalence of hypertension among pregnant women in Timor-Leste was 23.5%. This prevalence was higher compared to the prevalence that reported in several studies such as in India (5.38%) (47), South Africa (20.7%) (48), Ethiopia (18.25%) (48), and in some developing countries which ranging between 1.8% to 16.7% (48). While this prevalence was lower than the prevalence in Indonesia with the rate was 27.1% (49), Zimbabwe (44%) (50), and Thailand (47%) (51).

The finding of our study showed there is no statistically significant association between age and hypertension status among respondents. The older age of pregnant women seem has the effect on the hypertension status. When we look at our average age of pregnant women in this present study, the mean age was 27.05 with SD was 5.21, which is younger compared to a previous study in Thailand. The result of that study revealed the aged of pregnant women ≥ 35 years old was consistently reported to be the concurrent risk of hypertensive disorder in pregnancy (51).

According to general characteristic of respondents, one-fourth of the pregnant women received care from their husband, while in Cameroon showed a higher percentage of pregnant women who were being cared by their husband (52). Although no association between caretaker and hypertension status of pregnant women. In multivariate analysis found that, respondent who cared by mothers and others (mother in law and sisters) is possible to reduce 0.657-fold odd risk of hypertension (AOR= 0.657; 95% CI: 0.240, 1.794) comparing to husband as a caretaker. In relation to the traditional belief in Timor Leste, pregnant women who received cared by mother and

others more likely to reduce the risk of the hypertension or any other risk that related to pregnancy during pregnancy. Since the mothers and others had an experienced in the previous and become a good model for pregnant women in the family.

Even though there was no significant association between the level of education and hypertension status, however, pregnant women in Timor Leste who had less education seem more likely to have hypertension during pregnancy comparing with the women who had the higher education. In our study, we have the most predominant (32.1%) respondents in primary school level. However, nearly 76% of respondents had no pregnancy hypertension. This study is contradict to one of studies conducted in Ghana, pregnant women in Ghana are less educated and this is more likely to get hypertension during pregnancy (53). Furthermore, the previous study was conducted in Cameroon found that illiteracy was associated with hypertension status during pregnancy is about 2-fold risk (54). The low level of the education was associated indirectly with limited access to health information and healthcare.

In multivariate analysis in this study found that, education level has no association with hypertension status. Pregnant women who graduate high school level is possible to increase 1.700-fold odd of having hypertension during pregnancy (AOR= 1.700; 95% CI: 0.829, 3.485) and secondary school is increasing 1.429-fold odd of having hypertension during pregnancy (AOR= 1.429; 95% CI: 0.657, 3.108) comparing to university level. The situation of the education in Timor Leste was in develop. As the data showed the high percentage of the pregnant women who have hypertension were in the primary school, 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. In the guideline to improve maternal and health in Timor Leste, to improve maternal and health will increase access to high quality pre-natal, delivery, post-natal and family planning health services. Pregnant women received ANC at four times during pregnancy (55). However, most of the pregnant women not received ANC four times during pregnancy according to the existing guideline. Based on data available in the health statistics report in 2016, more pregnant women visit the CHC for ANC on the first visit (93%) and the fourth visit (56%) (56). Pregnant women did not do ANC on the second and third visit. This related to the low

level of education that greatly affect the knowledge of pregnant women about the importance of health.

The majority of the pregnant women in Timor Leste were Catholic by religion with no significant association between religion and hypertension status. However, 42.1% of pregnant women who have hypertension were Christian protestant or Muslim. The existence of similarity with the previous study has been conducted in Cameroon, the Muslim religion was more predisposed to hypertension compared to Catholics religion (52). Regarding occupational, the number of respondents who had hypertension with employed status have similar number with those who had unemployed status (24% vs 21.6%). This study was consistent with a previous study in Indonesia, the majority of the pregnant women with hypertension was unemployed (57) and one of the studies in Cameroon, occupation as an unemployed is a determinant of increasing having hypertension during pregnancy(52). This finding maybe related with the income of the respondents, which similar number of income between unemployed and employed (24.6% vs 20%).

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 (37). This study consistent with the previous study was conducted in Ethiopia reported that the proportion hypertensive disorder more develops in rural area (58). However this study conflicting with the study was conducted in Cameroon, 80% of pregnant women living in urban areas with the hypertensive disorders (52). In multivariate analysis, we found that respondent resident in rural areas – OR is greater than one, even though statistical not achieved. This is possible to increase the risk 1.381-fold odd of having hypertension during pregnancy. This study found that access to the study site was easier form urban than rural because of several factors including transportation, economic and cultural.

From the result analyses of the association between maternal reproductive health and hypertension status the mean and SD of the parity of the respondents was

2.5±1.7 times of pregnancy. Even though the statistically no significant association between maternal reproductive health and hypertension status. This study consistent of the previous study were conducted in Cameroon pregnant women with at least two previous delivery represented 15.1% as a risk of having hypertension (52). This study conflicting with one of the studies in Indonesia, 56.2% of pregnant women have hypertension in Primipara or first time of pregnancy (37). Where according to researchers, this is because primipara mothers too much worries since of new pregnancies, whereas in multiparas already had previous pregnancy so that mothers do not feel worried about pregnancy and pregnant women consider that the next pregnancy is the same as current pregnancy.

In multivariate analysis, we found that 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 reasons of increasing the hypertension status might be because of the physical, mental and emotional changes amongst pregnant women. There are three stages of change from gestational age 0-12 weeks, 13-28 weeks and 29-30 weeks with different signs and symptoms. Some changes will increase of having hypertension in pregnancy such as nausea, vomiting, weight gain, difficulty sleeping and others symptoms (37).

In both bivariate and multivariate analysis, our study could not find an association between sleep quality and sleep duration with hypertension status among pregnant women. However, in multivariate we found that OR was less than one (1) (AOR = 0.984; 95% CI: 0.827, 1.171), it showed the possibility to reduce hypertension during pregnancy. The more time needed by pregnant women to sleep most likely reduced the risk of hypertension. Sleep has an important role in immune function, metabolism, memory, learning, and other important functions. A person who sleeps for 7 hours or more is possibility to reduce having high blood pressure. Sleep duration increases the body can rest with the aim of cell regeneration and restore the lost energy after being used for day-to-day activities (59).

In Timor Leste, pregnant women do not use sleeping medication, except only having the vitamin that given by health staff during ANC for 30 days. Some of the respondents did not take vitamin because of beliefs that vitamin will make pregnant

women eat with large portions and make the fetus to grow larger. This will complicate pregnant women during delivery. One of the reasons why pregnant women not to go for the second and third visit because of not finished the vitamin that they have, they might think with access to CHC will get more vitamin.

Moreover, according to the results of research in Indonesia, pregnant women who had experienced stress due to the pressure of work, feeling depressed, moody, anger, resentment, fear, guilt and anxiety (60) tend to have hypertension, even though there was no statistically significant association with hypertension status in our study. Stress is possibility to increase high blood pressure level or can stimulate the kidneys to release the hormone adrenaline and stimulate the heart to beat faster and stronger, so that blood pressure will increase. If stress lasts long, the body will try to make adjustments resulting in organic abnormalities or pathological changes (60).

In bivariate analysis found the exercise variable has no significant association with hypertension status. According to our finding, nearly 24% of pregnant women with hypertension who did walk exercise for three to four times a week. Exercise during pregnancy may be a preventative for hypertension. A previous study suggested to have an aerobic type of exercise in order to reduce the hypertension during pregnancy (61).

Although almost 23% of pregnant women had family history of hypertension during pregnancy which considered as the risk factor for gestational hypertension in this present study, however, there was no significantly association between genetic and hypertension status amongst respondents. A previous epidemiological study indicated that a family history, alcohol intake and smoking are some risk factors for hypertension during pregnancy (62). In bivariate analysis in our study found that a salty food intake was significantly associated with hypertension status. This finding was consistent to one of studies conducted in Indonesia, pregnant women who have the chance of having hypertension was consume salty food, consumption of fat, fried food and instant noodles (63) and in Thailand reported that nearly three-quarters of hypertensive patients attending the hypertension clinic were still on consuming a high salt diet. Although they know the negative effects of consuming salty foods is increasing high blood pressure (64). In multivariate analysis, our study suggested that pregnant women who like to consume salty food was possible to increase 1.790-fold odd of having hypertension during pregnancy (AOR= 1.790; 95% CI: 0.987, 3.248).

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. In some studies, exposure to occupational noise usually occurs during daytime, whereas residential exposure is during night-time. 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 (22).

Our study suggested that, the distance from the house to the main road was significantly associated with hypertension. Some researcher reported that the distance to the main road was associated with a high blood pressure. Pregnant women who lived within 100 meters of a major road had a 22 percent greater risk of high blood pressure, compared to women who lived at least 1,000 meters away. However, researchers admitted that because the study only measured blood pressure for all pregnant women and where they lived at one moment in time, the findings do not prove that living next to a road directly causes high blood pressure (65).

Regarding cooking behavior, the average time that pregnant women spent for cooking was 63 minutes. In multivariate analysis, cooking behavior was not significantly associated with hypertension status, however the OR is greater than one (1), so it is the possibility to increase 1.008-fold odd of having hypertension during pregnancy. Wood users were one-fourth less likely to have hypertension during pregnancy compared with women cooking primary with gas although this difference did not reach statistical significance. Researchers previously thought that more pregnant women are exposed to pollution because wood smoke is likely to get hypertension during pregnancy. However, in this present study, we found some pregnant women who used firewood as the main ingredient for cooking a little getting hypertension during pregnancy compared with pregnant women who cooked using gas. This study consistent with the study was conducted in India, pregnant women used wood as a type of fuel cooking, only one-third compared to pregnant women used gas as a primary fuel cooking (66).

Limitation

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 $\geq 130\text{mmhg}$ and $\geq 80\text{mmhg}$. 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.

Further study

This study provides an important information on various factors that contribute for hypertension among pregnant women. The information that will gather from this study will be inform to the Ministry of Health Timor Leste.

- Further studies should be follow maternal pregnancy since first tri-semester.
- This study is the first study to find any factors that associate with hypertension among pregnant women. This information will be used as a baseline data for the Ministry of Health to develop in health system information regarding hypertension cases and any intervention in the future.
- More time for study will be produce better results.

CHAPTER VI CONCLUSION AND RECOMMENDATION

6.1 Conclusion

The aimed of this study was to estimate the prevalence of hypertension among pregnant women, to assess an association between general characteristic, reproductive health, personal, and residential environments factors among pregnant women in Dili Municipality, Timor Leste.

In 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.

Recommendation

From the above conclusions, the researcher provide recommendation as follows:

6.2.1 For the respondent

Pregnant women with hypertension to pay more attention to factors that can improve the degree of hypertension and better control a good lifestyle and do Ante Natal care at CHC according to existing standards (at least 4 times during pregnancy)

6.2.2 For Government

- Friendly educational program for low educated mother should be provided by local government authority.
- The government should be providing Information Education and Communication (IEC) material such as booklet, pamphlet or brochure in the CHC to take home.
- To record a specific database for hypertension cases in the Community Health Centre.
- Improving environment for controlling noise level might be suggested for enhancing pregnant women health.

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APPENDIX



จุฬาลงกรณ์มหาวิทยาลัย
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APPENDIX B. Research questionnaire (English)

Respondent Number	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>
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RESEARCH QUESTIONNAIRE

FACTORS ASSOCIATED HYPERTENTION AMONG PREGNANT WOMEN IN DILI MUNICIPALITY TIMOR LESTE

Instructions: please put a tick in the box next to the answer of your choice or write in the space provide as the case may be.

District Name	Dili Municipality
Sub District Name	<input type="checkbox"/> Becora <input type="checkbox"/> Comoro <input type="checkbox"/> Formosa <input type="checkbox"/> Metinaro <input type="checkbox"/> Vera Cruz
Village Name	
Living Side	<input type="checkbox"/> Urban <input type="checkbox"/> Rural

PART I - GENERAL CHARACTERISTICS OF MOTHER

1.1 Age of Respondent	<input type="text"/> <input type="text"/> Years Old
1.2 Who is the main care taker during your pregnancy?	<input type="text"/>
1.3 Education	<input type="checkbox"/> Grade _____ <input type="checkbox"/> Others _____ <input type="checkbox"/> University _____
1.4 Religion	<input type="checkbox"/> Catholic <input type="checkbox"/> Christian Protestant <input type="checkbox"/> Muslim <input type="checkbox"/> Others
1.5 Occupational	<input type="checkbox"/> Housewife/Unemployed <input type="checkbox"/> Farmer <input type="checkbox"/> Government Official <input type="checkbox"/> Student <input type="checkbox"/> Company/Seller <input type="checkbox"/> Self-employed
1.6 Income (USD)	<input type="checkbox"/> <115/month <input type="checkbox"/> 116 – 500/month <input type="checkbox"/> >500/month
1.7 What is the weight of the respondent (Measure by researcher)	<input type="text"/> kg
1.8 What is the height of the respondent (Measure by researcher)	<input type="text"/> Cm

PART II - REPRODUCTIVE HEALTH FACTORS

#Pregnant: _____ **#Delivery:** _____ **#Abortion:** _____ **#Death:** _____

<p>2.1 How many weeks of pregnancy <i>(based on record)</i></p> <p><input type="text"/> Weeks</p>
<p>2.2 Have you ever been diagnosed hypertension (during pregnancy) by any health staff in the previous?</p> <p><input type="checkbox"/> No (go to Q2.4) <input type="checkbox"/> Yes</p>
<p>2.3 In which week of pregnancy do you have been diagnosed as hypertension? <i>(based on record)</i></p> <p><input type="text"/> Weeks</p>
<p>2.4 Do you have any complication disease during pregnancy? <i>(based on record)</i></p> <p><input type="checkbox"/> No (go to Q3.1) <input type="checkbox"/> Do not know (go to Q3.1) <input type="checkbox"/> Yes</p> <p>2.4.1 What kind of disease?</p> <p><input type="checkbox"/> <u>Molohidatidosa</u> <input type="checkbox"/> Urinary Tract Infections (UTI) <input type="checkbox"/> Toxoplasmosis</p> <p><input type="checkbox"/> Do not know <input type="checkbox"/> Others</p>



PART III - PERSONAL FACTORS

<p>3.1 Sleep (PSQI standard questionnaire)</p> <p>3.1.1. During the past month, when have you usually gone to bed at night?</p> <p>USUAL BED TIME _____</p>
<p>3.1.2. During the past month, how long (in minutes) has it usually take you to fall asleep each night?</p> <p>NUMBER OF MINUTES _____</p>
<p>3.1.3. During the past month, when have you usually gotten up in the morning?</p> <p>USUAL GETTING UP TIME _____</p>
<p>3.1.4. During the past month, how many hours of actual sleep did you get at night? (This may be different than the number of hours you spend in bed)</p> <p>HOURS OF SLEEP PER NIGHT _____</p>
<p>3.1.5. During the past month, how often have you had trouble sleeping because you.....</p> <p>3.1.5.1. Cannot get to sleep within 30 minutes</p> <p><input type="radio"/> Not during the past month</p> <p><input type="radio"/> Less than once a week</p> <p><input type="radio"/> Once or twice a week</p> <p><input type="radio"/> Three or more times a week</p> <p>3.1.5.2. Wake up in the middle of the night or early morning</p> <p><input type="radio"/> Not during the past month</p> <p><input type="radio"/> Less than once a week</p> <p><input type="radio"/> Once or twice a week</p> <p><input type="radio"/> Three or more times a week</p> <p>3.1.5.3. Have to get up to use the bathroom</p> <p><input type="radio"/> Not during the past month</p> <p><input type="radio"/> Less than once a week</p> <p><input type="radio"/> Once or twice a week</p> <p><input type="radio"/> Three or more times a week</p> <p>3.1.5.4. Cannot breathe comfortably</p> <p><input type="radio"/> Not during the past month</p> <p><input type="radio"/> Less than once a week</p> <p><input type="radio"/> Once or twice a week</p> <p><input type="radio"/> Three or more times a week</p>

- 3.1.5.5. Cough or snore loudly
- Not during the past month
 - Less than once a week
 - Once or twice a week
 - Three or more times a week

- 3.1.5.6. Feel too cold
- Not during the past month
 - Less than once a week
 - Once or twice a week
 - Three or more times a week

- 3.1.5.7. Feel too hot
- Not during the past month
 - Less than once a week
 - Once or twice a week
 - Three or more times a week

- 3.1.5.8. Had bed dreams
- Not during the past month
 - Less than once a week
 - Once or twice a week
 - Three or more times a week

- 3.1.5.9. Have pain
- Not during the past month
 - Less than once a week
 - Once or twice a week
 - Three or more times a week

3.1.5.10. Other reason(s), Please describe _____

How often during the past month have you had trouble sleeping because of this?

- Not during the past month
- Less than once a week
- Once or twice a week
- Three or more times a week

3.1.6. During the past month, how would you rate your sleep quality overall?

- Very Good
- Fairly Good
- Fairly bad
- Very bad

3.1.7. During the past month, how often have you taken medicine (prescribed or "over the counter") to help you sleep?

<input type="radio"/> Not during the past month <input type="radio"/> Less than once a week <input type="radio"/> Once or twice a week <input type="radio"/> Three or more times a week
<p>3.1.8. During the past month, how often have you had trouble staying awake while driving, eating meals, or engaging in social activity?</p> <input type="radio"/> Not during the past month <input type="radio"/> Less than once a week <input type="radio"/> Once or twice a week <input type="radio"/> Three or more times a week
<p>3.1.9. During the past month, how much of a problem has it been for you to keep up enough enthusiasm to get these things done?</p> <input type="radio"/> No problem at all <input type="radio"/> Only a very slight problem <input type="radio"/> Somewhat of a problem <input type="radio"/> A very big problem
<p>3.1.10. Do you have a bed partner or roommate?</p> <input type="radio"/> No bed partner or roommate <input type="radio"/> Partner/roommate in other room <input type="radio"/> Partner in same room, but not same bed <input type="radio"/> Partner in same bed
<p>If you have a roommate or bed partner, ask him/her how often in the past month you have had.....</p> <p>3.1.10.1. Loud snoring</p> <input type="radio"/> Not during the past month <input type="radio"/> Less than once a week <input type="radio"/> Once or twice a week <input type="radio"/> Three or more times a week
<p>3.1.10.2. Long pauses between breaths while asleep</p> <input type="radio"/> Not during the past month <input type="radio"/> Less than once a week <input type="radio"/> Once or twice a week <input type="radio"/> Three or more times a week
<p>3.1.10.3. Legs twitching or jerking while you sleep</p> <input type="radio"/> Not during the past month <input type="radio"/> Less than once a week <input type="radio"/> Once or twice a week <input type="radio"/> Three or more times a week
<p>3.1.10.4. Episodes of disorientation or confusion during sleep</p> <input type="radio"/> Not during the past month <input type="radio"/> Less than once a week

- Once or twice a week
- Three or more times a week

3.1.10.5. Other restlessness while you sleep; please describe _____

- Not during the past month
- Less than once a week
- Once or twice a week
- Three or more times a week

3.2 Stress (DASS-21 standard questionnaire)

3.2.1. I found it hard to wind down

- Did not apply to me at all
- Applied to me to some degree, or some of the time
- Applied to me to a considerable degree or a good part of time
- Applied to me very much or most of the time

3.2.2. I tended to over-react to situations

- Did not apply to me at all
- Applied to me to some degree, or some of the time
- Applied to me to a considerable degree or a good part of time
- Applied to me very much or most of the time

3.2.3. I felt that I was using a lot of nervous energy

- Did not apply to me at all
- Applied to me to some degree, or some of the time
- Applied to me to a considerable degree or a good part of time
- Applied to me very much or most of the time

3.2.4. I found myself getting agitated

- Did not apply to me at all
- Applied to me to some degree, or some of the time
- Applied to me to a considerable degree or a good part of time
- Applied to me very much or most of the time

3.2.5. I found it difficult to relax

- Did not apply to me at all
- Applied to me to some degree, or some of the time
- Applied to me to a considerable degree or a good part of time
- Applied to me very much or most of the time

3.2.6. I was intolerant of anything that kept me from getting on with what I was doing

<p> <input type="radio"/> Did not apply to me at all <input type="radio"/> Applied to me to some degree, or some of the time <input type="radio"/> Applied to me to a considerable degree or a good part of time <input type="radio"/> Applied to me very much or most of the time </p> <p>3.2.7. I felt that I was rather touchy</p> <p> <input type="radio"/> Did not apply to me at all <input type="radio"/> Applied to me to some degree, or some of the time <input type="radio"/> Applied to me to a considerable degree or a good part of time <input type="radio"/> Applied to me very much or most of the time </p>
<p>3.3. Do you have an exercise during pregnancy? (<i>Exercise mean that 30 minutes' regular Continuously physical activity per day</i>)</p> <p><input type="checkbox"/> No (go to Q3.4) <input type="checkbox"/> Yes</p> <p>3.3.1. How often do you do your exercise per week?</p> <p>_____ times / week</p> <p>3.3.2 What kind of exercise that you have (<i>you can apply more than one</i>)</p> <p><input type="checkbox"/> Walk <input type="checkbox"/> Yoga <input type="checkbox"/> Pregnancy gymnastics</p> <p><input type="checkbox"/> Others _____</p>
<p>3.4. Do you have sibling who have hypertension while pregnant?</p> <p><input type="checkbox"/> No <input type="checkbox"/> Do not know <input type="checkbox"/> Yes, if yes who _____</p>
<p>3.5. Do you regularly smoke during pregnant?</p> <p><input type="checkbox"/> No <input type="checkbox"/> Yes, If yes how frequent in a day: _____ times/day</p> <p>3.5.1. How many cigarettes do you smoke in one day?</p> <p><input type="text"/> Cigarette(s)</p>
<p>3.6. Do you regularly drink any alcohol during pregnant?</p> <p><input type="checkbox"/> No <input type="checkbox"/> Yes, If yes how frequent in a day: _____ times/day</p> <p>3.6.1. How many bottle/can do you drink in one day</p> <p><input type="text"/> Bottle(s) <input type="text"/> Can(s)</p>

3.7 Dietary intake

3.7.1. Do you prefer salty food? (*opinion*)

- Like Neutral Do not like

3.7.2. Do you eat bacon or sausages? (Do not include low-fat, light, or turkey varieties.)

- More than once a day
 About once a day
 2 -3 times in a week
 About once a week
 1 - 3 times in a month
 Less than one in a month

3.7.3. Do you eat processed meat (for example, lunch meat, hot dogs made of beef or pork, spam, corned beef)?

- More than once a day
 About once a day
 2 -3 times in a week
 About once a week
 1 - 3 times in a month
 Less than one in a month

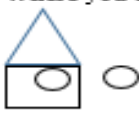
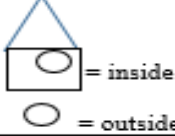
3.7.4. Do you eat French fries, fried potatoes, tater tots or hash brown potatoes?

- More than once a day
 About once a day
 2 -3 times in a week
 About once a week
 1 - 3 times in a month
 Less than one in a month

3.7.5. Do you eat fast food from a restaurant or store (for example, hamburgers, pizza, fried chicken, chimichangas/tacos)?

- More than once a day
 About once a day
 2 -3 times in a week
 About once a week
 1 - 3 times in a month
 Less than one in a month

PART IV - ENVIRONMENTAL FACTORS

<p>4.1. How is noise at your residence during day time? <input type="checkbox"/> Very Noise <input type="checkbox"/> Quite Noise <input type="checkbox"/> Not Noise</p> <p>4.1.1 How is noise at your residence during night time? <input type="checkbox"/> Very Noise <input type="checkbox"/> Quite Noise <input type="checkbox"/> Not Noise</p> <p>4.1.2 Do you know the source of the noise? <input type="checkbox"/> Motorbike <input type="checkbox"/> drunkards <input type="checkbox"/> Car Others _____</p> <p>4.1.3 Do you feel disturbed by these noise? <input type="checkbox"/> Very Disturbed <input type="checkbox"/> Disturbed <input type="checkbox"/> Not Disturbed</p> <p>4.1.4 In your opinion, with these noisy conditions, is it enough to affect your health? <input type="checkbox"/> No <input type="checkbox"/> Yes</p>
<p>4.2 What is the distance from your house to main road? <input type="text"/> meter</p>
<p>4.3 How long do you spend your cooking time every day (Morning, afternoon and Night)? <input type="text"/> Minutes <input type="text"/> hours</p> <p>4.3.1. What type of cooking fuel that you use? (<i>you can apply more than one</i>) <input type="checkbox"/> Wood <input type="checkbox"/> Stove <input type="checkbox"/> Gas <input type="checkbox"/> Electricity Others _____</p> <p>4.3.2. Where you usually cook?  </p>
<p>4.4. Do you have anyone who smoke in your house household? <input type="checkbox"/> No <input type="checkbox"/> Yes, if yes who _____</p> <p>4.4.1. Do they Smoke inside the house? <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> Some times</p>
<p>4.4.2. How often do you close to people who smoke in a day? <input type="checkbox"/> Very often <input type="checkbox"/> Quite often <input type="checkbox"/> Not often</p>
<p>DEPENDENT VARIABLE:</p> <p>Blood Pressure</p> <p>Systolic : <input type="text"/> mmHg</p> <p>Diastolic : <input type="text"/> mmHg</p>

APPENDIX C. Research questionnaire (Tetum)

Numeru Respondente	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
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KUESIONARIU PESKIZA

FATORES NEEBE AFETA HIPERTENSAUN ENTRE INAN ISIN RUA

IHA MUNISIPIU DILI

TIMOR LESTE

Instrusaun: Favor fo vistu iha koluna neebe prepara besik resposta sira ka hakerek opiniaun ruma iha linha neebe mak prepara iha kada perguntas.

Munisipiu	Dili
Posto Administrativu	<input type="checkbox"/> Becora <input type="checkbox"/> Comoro <input type="checkbox"/> Formosa <input type="checkbox"/> Metinaro <input type="checkbox"/> Vera Cruz
Suku	
Hela fatin	<input type="checkbox"/> Urbana <input type="checkbox"/> Rurais

PARTE I – KARAKTERISTIKU JERAL KONA BA INAN

1.1 Idade respondente	Tinan <input type="text"/> <input type="text"/>
1.2 Se mak responsavel maximu (Tau matan) ba ita durante isin rua? _____	
1.3 Nivel Edukasaun (refere ba tinan)	<input type="checkbox"/> Clase _____ <input type="checkbox"/> seluk _____ <input type="checkbox"/> Universidade _____
1.4 Reliziaun	<input type="checkbox"/> Katolika <input type="checkbox"/> Protestante <input type="checkbox"/> Islam <input type="checkbox"/> <input type="checkbox"/> seluk
1.5 Okupasaun /Profisaun	<input type="checkbox"/> Dona de cassa/dezempregu <input type="checkbox"/> Agrikultores <input type="checkbox"/> Funsionariu publiku <input type="checkbox"/> Estudante <input type="checkbox"/> Empresa/vendedor <input type="checkbox"/> Iha servisu rasik
1.6 Rendimentu(USD)	<input type="checkbox"/> <115/fulan <input type="checkbox"/> 116 – 500/fulan <input type="checkbox"/> >500/fulan
1.7 Ita nia todan hira? (Sei sukat direta husi peskizador)	<input type="text"/> kg
1.8 Ita nia Ass hira? (Sei sukat direta husi peskizador)	<input type="text"/> Cm

PARTE II – FATORES SAÚDE REPRODUTIVA

Gravida: _____ Partu: _____ Abortu: _____ Mate: _____

<p>2.1 Ita isin rua semana hira ona? (<i>Bazeia ba livru rezistu</i>)</p> <p>Semana <input type="text"/></p>
<p>2.2 Ita iha diaknosa ruma kona-ba hipertensaun (durante isin rua) husi pesoal saude sira iha tempu liu ba?</p> <p><input type="checkbox"/> Lae (Ba P2.4) <input type="checkbox"/> Sim</p>
<p>2.3 Iha semana hira husi isin rua mak ita iha diaknosa kona ba hipertensaun? (<i>bazeia ba livru rezistu</i>)</p> <p>Semana <input type="text"/></p>
<p>2.4 Ita iha moras komplikasaun ruma durante isin rua? (<i>bazeia ba livru rezistu</i>)</p> <p><input type="checkbox"/> Lae (ba P3.1) <input type="checkbox"/> La hatene (ba P3.1) <input type="checkbox"/> Sim</p> <p>2.4.1 Tipu moras sa ida?</p> <p><input type="checkbox"/> Molahidatidosa <input type="checkbox"/> Urinary Tract Infections (UTI)</p> <p><input type="checkbox"/> Toxoplasmosis</p> <p><input type="checkbox"/> La hatene <input type="checkbox"/> Seluk _____</p>

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PARTE III - FATORES INDIVIDU

<p>3.1 Toba (Perguntas Standar)</p> <p>3.1.1. Fulan ida liu ba, tuku hira mak ita deskansa kalan</p> <p>TEMPU DESKANSAN BAIN-BAIN _____</p>
<p>3.1.2. Fulan ida liu ba, tempu hira (iha minutu) mak ita tenki toba kalan – kalan?</p> <p>MINUTU HIRA _____</p>

<p>3.1.3. Fulan ida liu ba, bain-bain tuku hira mak ita hader iha tempu dader? ORAS BAIN-BAIN HADER _____</p>
<p>3.1.4. Fulan ida liu ba, oras hira mak tuir lolos ita uza deskansa iha tempu kalan? (ida nee la hanesan ho oras hira mak ita uza atu deskansa iha toba fatin) ORAS DESKANSAN KALAN-KALAN _____</p>
<p>3.1.5. Fulan ida liu ba, dala hira mak ita sente iha problema deskansa tanba:</p> <p>3.1.5.1. La bele toba iha minute 30 nia laran</p> <ul style="list-style-type: none"> <input type="radio"/> La iha - durante fulan ida liu ba <input type="radio"/> Menus dala ida kada semana <input type="radio"/> Semana ida dala ida ka dala rua <input type="radio"/> Semana ida dala tolu ka liu <p>3.1.5.2. Hader kalan bot ka madrugada</p> <ul style="list-style-type: none"> <input type="radio"/> La iha - durante fulan ida liu ba <input type="radio"/> Menus dala ida kada semana <input type="radio"/> Semana ida dala ida ka dala rua <input type="radio"/> Semana ida dala tolu ka liu <p>3.1.5.3. Tenki hader atu ba haris fatin</p> <ul style="list-style-type: none"> <input type="radio"/> La iha - durante fulan ida liu ba <input type="radio"/> Menus dala ida kada semana <input type="radio"/> Semana ida dala ida ka dala rua <input type="radio"/> Semana ida dala tolu ka liu <p>3.1.5.4. la bele dada iss ho diak</p> <ul style="list-style-type: none"> <input type="radio"/> La iha - durante fulan ida liu ba <input type="radio"/> Menus dala ida kada semana <input type="radio"/> Semana ida dala ida ka dala rua <input type="radio"/> Semana ida dala tolu ka liu

3.1.5.5. Me'ar ka nakoron maka'as

- La iha - durante fulan ida liu ba
- Menus dala ida kada semana
- Semana ida dala ida ka dala rua
- Semana ida dala tolu ka liu

3.1.5.6. Sente malirin liu

- La iha - durante fulan ida liu ba
- Menus dala ida kada semana
- Semana ida dala ida ka dala rua
- Semana ida dala tolu ka liu

3.1.5.7. Sente manas liu

- La iha - durante fulan ida liu ba
- Menus dala ida kada semana
- Semana ida dala ida ka dala rua
- Semana ida dala tolu ka liu

3.1.5.8. Mehi iha tempu kalan

- La iha - durante fulan ida liu ba
- Menus dala ida kada semana
- Semana ida dala ida ka dala rua
- Semana ida dala tolu ka liu

3.1.5.9. Iha sente moras

- La iha - durante fulan ida liu ba
- Menus dala ida kada semana
- Semana ida dala ida ka dala rua
- Semana ida dala tolu ka liu

3.1.5.10. Razaun seluk: *(se la iha razaun seluk, ba Perguntas numeru 3.1.6)*

Iha fulan ida liu ba, dala hira mak ita sente iha difikuldade toba tanba
 buat hirak nee:

- La iha - durante fulan ida liu ba
- Menus dala ida kada semana
- Semana ida dala ida ka dala rua
- Semana ida dala tolu ka liu

3.1.6. Iha fulan ida liu ba, em jeral - oin sa mak ita fo valor ba ita nia kualidade
 toba?

- Diak los
- Diak ituan
- At ituan
- At liu

3.1.7. Iha fulan ida liu ba, dala hira mak ita hemu aimoruk (ne'ebe mak hetan
 husi receita) atu ajuda ita toba?

- La iha - durante fulan ida liu ba
- Menus - dala ida kada semana
- Semana ida dala ida ka dala rua
- Semana ida dala tolu ka liu

3.1.8. Iha fulan liu ba, dala hira mak ita sente iha difikuldade nafatin bainhira,
 lori kareta han ka involve iha atividade sosias ruma?

- La iha - durante fulan ida liu ba
- Menus - dala ida kada semana
- Semana ida dala ida ka dala rua
- Semana ida dala tolu ka liu

3.1.9. Iha fulan ida liu ba, dala hira mak ita sente iha problema atu nafatin
 hetan antusiasmu neebe naton hodi halo buat hirak nee?

- La iha problema
- Iha problema ituan deit
- Problema ituan

Problema neebe boot

3.10. Ita iha parseiru ka ema ruma neebe mak ho ita iha kuarto ida?

- La iha parseiru ka ema ruma
- Parseiru iha kuarto seluk
- Parseiru iha kuarto ida maibe kama la hanesan
- Parseiru iha kama neebe hanesan

Se ita iha parseiru toba, husu ba nia – iha fulan liu ba dala hira mak nia

iha:

3.10.1. Nakoron maka'as

- La iha - durante fulan ida liu ba
- Menus - dala ida kada semana
- Semana ida dala ida ka dala rua
- Semana ida dala tolu ka liu

3.10.2. Para kleur entre dada iss wainhira toba

- La iha - durante fulan ida liu ba
- Menus - dala ida kada semana
- Semana ida dala ida ka dala rua
- Semana ida dala tolu ka liu

3.10.3. Ain tula sae/sanak wainhira ita toba

- La iha - durante fulan ida liu ba
- Menus - dala ida kada semana
- Semana ida dala ida ka dala rua
- Semana ida dala tolu ka liu

3.10.4. Sente disorientasaun ka oin-halai wainhira toba

- La iha - durante fulan ida liu ba
- Menus - dala ida kada semana

- Semana ida dala ida ka dala rua
- Semana ida dala tolu ka liu

3.10.5. Sente buat seluk la diak wainhira ita toba _____

- La iha - durante fulan ida liu ba
- Menus - dala ida kada semana
- Semana ida dala ida ka dala rua
- Semana ida dala tolu ka liu

3.2 Stress (Perguntas Standar)

3.2.1. Hau sente iha difikuldade atu hamenus

- La aplika liu mai hau
- Aplika mai hau iha nivel ruma ka iha tempu ruma
- Aplika mai hau too nivel ka tempu ruma neebe mak los
- Aplika mai hau barak ka iha tempu neebe barak.

3.2.2. Hau nia reasaun barak liu ba situasaun

- La aplika liu mai hau
- Aplika mai hau iha nivel ruma ka iha tempu ruma
- Aplika mai hau too nivel ka tempu ruma neebe mak los
- Aplika mai hau barak ka iha tempu neebe barak.

3.2.3. Hau sente katak hau uza enerzia nervozu barak

- La aplika liu mai hau
- Aplika mai hau iha nivel ruma ka iha tempu ruma
- Aplika mai hau too nivel ka tempu ruma neebe mak los
- Aplika mai hau barak ka iha tempu neebe barak.

3.2.4. Hau hatene hau nia an anxiozo (gelisah)

- La aplika liu mai hau
- Aplika mai hau iha nivel ruma ka iha tempu ruma
- Aplika mai hau too nivel ka tempu ruma neebe mak los
- Aplika mai hau barak ka iha tempu neebe barak.

3.2.5. Defisil mai hau atu rileks/livre

- La aplika liu mai hau
- Aplika mai hau iha nivel ruma ka iha tempu ruma
- Aplika mai hau too nivel ka tempu ruma neebe mak los
- Aplika mai hau barak ka iha tempu neebe barak.



3.2.6. Hau la tolera ba buat neebe mak halo hau la kontinua ba sa mak hau halo dadauk

- La aplika liu mai hau
- Aplika mai hau iha nivel ruma ka iha tempu ruma
- Aplika mai hau too nivel ka tempu ruma neebe mak los
- Aplika mai hau barak ka iha tempu neebe barak.



3.2.7. Hau sente katak hau sensitive ituan

- La aplika liu mai hau
- Aplika mai hau iha nivel ruma ka iha tempu ruma
- Aplika mai hau too nivel ka tempu ruma neebe mak los
- Aplika mai hau barak ka iha tempu neebe barak.

3.3. Ita halo ezersisu/olahraga ruma durante isin rua? (ezersisiu *siknifika*, *fizikamente halo kontinua durante minute 30 nia laran kada loron*)

- Lae (ba P3.4) Sim

3.3.1. Dala hira mak ita halo ezersisiu iha semana ida nia laran?

Dala _____ / Semana

3.3.2 Tipu ezersisiu sa ida mak ita halo (*bele fo vistu liu husi ida*)

Lao Yoga Jimnastiku isin rua (senam kehamilan)

Seluk _____

3.4. Ita iha familia ruma neebe mak iha hipertensaun durante isin rua?

Lae La hatene Sim, Se Sim - Se

3.5. Ita fuma sigaru ruma durante isin rua?

Lae Sim, Se sim – dala hira iha loron ida : Dala _____/Loron

3.5.1. Ita fuma sigaru lolon hira iha loron ida?

Sigaru lolon

3.6. Ita hemu tua ruma durante isin rua?

Lae Sim, Se sim – dala hira ita hemu iha loron ida: Dala _____/loron

3.6.1. Ita hemu botir ka lata hira iha loron ida?

Botir Lata

3.7 Ingesta de alimentus (asupan makanan) Konsumu Hahan

3.7.1. Ita gusta liu hahan neebe mer (*opiniaun*)

Gosta Neutra La gusta

3.7.2. Ita han na'an fahi ka sosis ruma?

- Liu husi dala ida lora ida
- Dala ida lora ida
- Dala 2 ka 3 semana ida
- Kuaze dala ida semana ida
- Dala 1 ka 2 fulan ida
- Menus husi dala ida iha fulan

3.7.3. Ita han na'an processadas (daging olah) izemplu: han na'an iha tempu meudia, salsisa ne'ebe mak halo hodi na'an karau ka fahi, kornet.

- Liu husi dala ida lora ida
- Dala ida lora ida
- Dala 2 ka 3 semana ida
- Kuaze dala ida semana ida
- Dala 1 ka 2 fulan ida
- Menus husi dala ida iha fulan

3.7.4. Ita han fehuk ropa sona, ka hahan sona neebe mak halo uza fehuk ropa?

- Liu husi dala ida lora ida
- Dala ida lora ida
- Dala 2 ka 3 semana ida
- Kuaze dala ida semana ida
- Dala 1 ka 2 fulan ida
- Menus husi dala ida iha fulan

3.7.5. Ita han hahan neebe mak iha restaurante ka loza sira hanesan hamburger, pizza, manu sona, martabak no seluk tan?

- Liu husi dala ida lora ida
- Dala ida lora ida

- Dala 2 ka 3 semana ida
- Kuaze dala ida semana ida
- Dala 1 ka 2 fulan ida
- Menus husi dala ida iha fulan

PARTE IV – FATORES AMBIENTAL

4.1. Oin sa ho barulhu ka kebisingan iha ita nia hela fatin durante tempu loron?

- Barulhu tebe Barulhu ituar La barulhu

4.1.1 Oin sa ho barulhu ka kebisingan iha ita nia hela fatin durante tempu kalan

- Barulhu tebes barulhu ituan La barulhu

4.1.2 Ita hatene barulhu sira nee mai husi neebe?

- Motorizada Ema lanu Kareta

Seluk _____

4.1.3 Ita sente enkomoda husi barulho sira nee?

- Enkomoda tebes Enkomoda La enkomoda

4.1.4 Tuir ita nia hanoin, ho kondisaun barulhu hanesan nee, iha influensia ita nia kondisaun saude?

Lae Sim

4.2 Distansia hira husi ita nia uma ba estrada boot?

Metru

4.3 Tempu hira mak ita gasta atu tein loron – loron? (dader, meudia no kalan)?

Oras Minutu

4.3.1. Tipu material sa ida mak ita uza hodi tein? (*bele fo vistu liu husi ida*)

Ai Fugaun Gas Eletrisidade

Seluk _____

4.3.2. Bain – bain ita tein iha neebe?



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= Uma laran

= Uma liur

4.4. Iha ema ruma neebe mak fuma iha ita nia uma?

Lae Sim, Se sim - se _____

4.4.1. Sira fuma iha uma laran?

Lae Sim Dala ruma

4.4.2. Dala hira ita besik ho ema neebe mak fuma iha lora ida?

Dala barak liu La dun barak La barak



VARIABEL DEPENDENTE:

Tensaun

Systolic : mmHg

Diastolic : mmHg

APPENDIX D. Approval Letter

	<p>MINISTÉRIO DA SAÚDE</p>		<p>Instituto Nacional de Saúde Gabinete Diretor Ezekutivu</p>
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No. Ref.: 271 MS-INS/DE-DP/CDC-DEP/III/2018
Dili; 28 March 2018

APPROVAL LETTER

Perpetua Ana Mery Estela Laot
National Institute of Health
College of Public Health Sciences, Chulalongkorn University

*Title: Factors associated hypertension among pregnant women in Dili Municipality
Timor-Leste*

Thank you for submitting the above research project for ethical review. This project was considered by the Institute National of Health-Research Technical Committee at its meeting held on 28 March 2018.

I am pleased to advise you that the Quality Control of Health Cabinet MoH (GGKS/EP/2016/XI.07.39) and the Institute National of Health-Research Technical Committee (INS-RTC) have granted **Ethics & Technical approval** of this research project.

Please note that if additional sites are engaged prior to the commencement of, or during the research project, the coordinating Principal Investigator is required to notify the Institute National of Health-Research Technical Committee (INS-RTC). Notification of withdrawn sites should also be provided to the TL-HRTC in timely fashion

The Approved documents include:

1. INS-RTC Application form
2. Interview Guide
3. Research protocol (amendment version)

This approval is for period of six (6) months 28-03-2018 until 30-12-2018. An ANNUAL/FINAL Project progress report is required on or before December 2018.

APPROVAL IS SUBJECT to the following conditions being met:

1. The Coordinating Principal Investigator (PI) will immediately report anything that **might warrant review** of ethical approval of the project.
2. The coordinating Principal Investigator will notify the Institute National of Health-Research Technical Committee (INS-RTC) of any event that requires **a modification to the Protocol or other project document** and submit any required amendments and accordance with the instructions provided by the INS-RTC.

3. The Coordinating Principal Investigator will submit any necessary report related to the **safety of research participant (i.e. Protocol deviation, protocol violations)** in accordance with Institute National of Health-Research Ethics & Technical Committee (INS-RETC) policy and procedures.
4. The coordinating PI will **report** to the INS-RTC, **Annually** in the specified format and notify the HRTC when the project is completed at all sites.
5. The coordinating PI will notify the INS-RTC if the project is **discontinued at participating site before the expected completion date**, with reason provided.
6. The coordinating PI will notify the INS-RTC of any plan **to extend the duration of the project past the approval period listed above** and will submit any associated required documentation.
7. The coordinating PI will notify the INS-RTC of his or her inability to continue as coordinating PI including the name of and contact information for a replacement.
8. The safe and ethical conduct of this project is entirely the responsibility of the investigators and their institution(s).
9. Researcher should report immediately anything which might affect continuing ethical acceptance of the project, including:
 - Adverse effects of the project on subject and steps taken to deal with these;
 - Other unforeseen events;
 - New Information that may invalidate the ethical integrity of the study; and
 - Propose changes in the project.
10. Approval for further Six months will be granted if the INS-RTC is satisfied that the conducted of the project has been consisted with the original protocol.
11. Confidentiality Research participants should be maintained at all times as required by law
12. The patient information sheet and the consent form shall be printed on the relevant site letterhead with full contact details.
13. The Patient Information sheet must provide a brief outline of research activity including, risk and benefits, withdrawal options, contact details of the researcher and must also state that Research Secretary can be contacted (Telephone 78256097 and E-mail elaot2014@gmail.com) for information concerning policies, right of participant, concern or complaints regarding the ethical conduct of study.

This Letter Constitutes Ethical & Technical Approval Only.

Your Sincerely,



Antonio Bonito, M.Kes
Executive Director and President of Directive Council of INS



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APPENDIX E. Photos of data collection



VITA

PERSONAL DETAILS

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EDUCATION AND QUALIFICATION

Public Health degree, 2012

WORK EXPERIENCE

One year Chief of the cabinet for Vice Minister, Ministry of Health, Timor Leste 2015

Research and Training Officer, National Institute for Health, Ministry of Health Timor Leste, 2016 – 2017.



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