

A COMMUNITY BASED SURVEY OF HIGH-RISK PREGNANCIES
AND DETERMINANTS OF PRE-ECLAMPSIA AND
GESTATIONAL HYPERTENSION IN
ADA-A DISTRICT ETHIOPIA

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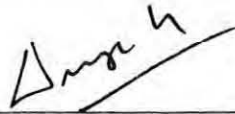
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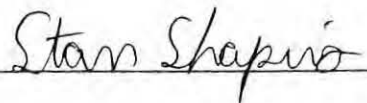
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ABSTRACT

A population-based cross sectional survey was conducted from April 1990 to March 1991, to measure the magnitude of high risk pregnancies, and to examine the determinant factors for pre-eclampsia and gestational hypertension, in Ada-a district. 13 urban kebeles and 13 rural villages were randomly chosen and a house to house survey was conducted based on a pre tested questionnaire and relevant measurements. Information was collected on demographic, socioeconomic, the exposure status for risk factors prior and during the current pregnancy, the usual dietary intake and the usual physical activities during the early months of the current pregnancy, and measurement findings for height, blood pressure and proteinuria. A total of 567 pregnant women were included in the study.

Of the 567 pregnant women 28.6% were younger than 20 or older than 34 years. Early marriage below the age of 20 were reported by 85%. 21.7% and 22.2% were Nulliparous and multiparous women respectively. 39.2% were illiterate and 42.9% with a very low income. 14.6% gave a history of abortion, 13.1% of infant deaths, 6.3% of postpartum hemorrhage and 1.1% of antepartum hemorrhage. Abnormal height was recorded in 18.5%, Albuminuria in 11.5% and abnormal diastolic blood pressure in 12.2%, where 2.9% and 9.2% were classified as pre-eclamptic and gestational hypertensive women. 52.3% were not receiving antenatal care services in the district.

It was found that pregnant women in the very low category of income had a reduced risk of Pre-eclampsia (RR =0.3, 95% CI 0.06, 1.07). And Nulliparous women had a higher risk (RR =5.6, 95% CI 1.83, 15.92). High energy expenditure was observed to be a risk factor for gestational hypertension (RR =5.3, 95% CI 1.35, 45.77). Among the studied pregnant women, those who had at least one of the risk factors were very high (85%). Antenatal care services were not received by the majority of the pregnant women, especially in the rural area. Relatively young women, with a better education, a better income, in their first pregnancy were at high risk of pre-eclampsia and gestational hypertension. Strenuous physical exertion and low dietary protein intake during the early months of pregnancy also increased the risk of both pre-eclampsia and gestational hypertension. A high dietary calcium intake during the early months of pregnancy increased the risk of pre-eclampsia but not gestational hypertension.

The results from this study indicate to increase Family Planning services and appropriate training, and use of community health workers in Ada-a district.

SECTION I

1. INTRODUCTION

Maternal and child health is now recongnized to be an important area of public health. Besides other health problems, pregnancy and child birth are the important risks many women encounter during their child bearing age. These problems eventually result in a high maternal and infant mortality rate, psychosocial problem to the surviving family members, and a burden on the health services.

Globally, each minute a woman dies as a result of pregnancy: an estimated 500,000 deaths every year. Nearly all of these deaths occur in developing countries where women's health is poor and maternal health care is scarce (1). There is now a global consensus that a woman's health throughout her life influences her risk in child bearing. This calls for a stronger attention in every community to take off the pregnant woman at risk from entering the maternity death road, as pregnancy and child birth are inevitable natural events. The estimates for maternal mortality in Ethiopia, 5.66 per 1000 live births (2), and 9.6 per

1000 patients (3), depicts that a larger proportion of women in child bearing age suffer from serious, sometimes permanent but potentially preventible hazards.

High risk pregnancies are problems in both developed and developing countries. The difference is in developed countries high risk mothers are few, suffer from only unpredictable causes, and get way out of the problem soon. Where as in developing countries high risk mothers are many, the problems start from childhood, stay with the problem longer and can not get their way out of the problem soon.

In Ethiopia, the incidence of complications of pregnancy, labor, and puerperium are also reported to be high (3). Together with the inadequate maternal and child health service in Ethiopia, the contribution of high risk pregnancy to the high morbidity and mortality rates is significant.

Pre-eclampsia or eclampsia has long been recognized as one of the major complications of pregnancy. However, there is still no agreed cause, definition and classification of the syndrome.

In Ethiopia very few hospital based studies, have been done on the magnitude of high risk pregnancy. Population-based studies on the determinant factors for pre-eclampsia and gestational hypertension have not been reported from Ethiopia.

This report presents the results of a population-based study on the magnitude of high-risk pregnancies and risk factor for pre-eclampsia and gestational hypertension among women in Ada-a district, Eastern Shoa Administrative Region, Ethiopia, which was conducted from April 1990 to March 1991.

Where vital statistics is lacking, there is a need for population based studies for the information to be used as a spring board or to determine the trend when appropriate planning to development of health care is under consideration.

The purpose of this study was to measure the magnitude of social risk factors (e.g. lower socio-economic status, less education), and medical risk factors (e.g. maternal age, age at marriage, parity, past and current obstetric and medical histories) in Ada-a district. Another objective was to determine the magnitude and determinant factors (dietary protein and

dietary calcium intakes and physical activity) of pre-eclampsia and gestational hypertension in the same district.

The anticipated applications of the results from this study are: Develop an instrument for screening, preventing, treating and referring mothers who are at risk in the district, strengthen maternal and child health care in both static and out reach sites, increase the awareness of health professionals, including community health workers about the magnitude of the problem, increase the knowledge, attitude and practice of the community in general and of women in particular to increase the rate of utilization of antenatal care services, provide specific health, nutrition and family life education in schools, working places and the community.

2. LITERATURE REVIEW

Safe child bearing requires a healthy woman. There is still much to be learnt about the possible ways that child bearing could be made safer, including the care that girls and women need when they are not pregnant. Over 60% of all women and girls in the world live in poor countries. In these countries females often get less education than boys, less food, less health care, marry young and bear children while very young (1). This is a result of the poor status of the community in general and females in particular, eventually increasing a woman's chance of complications during child bearing.

The out come of pregnancy is determined by the age of the mother during her pregnancy. The safest period of woman's life for child bearing is between 20-30 years, but studies show that, in developing countries between 10% and 20% of babies are born to women in their teens (5). Other studies have shown that a girl may have 2% and 9% of the optimal pelvic growth and 1% of height still to achieve even two years after menarche (5). In a society where under- nourishment is common, stunted growth and a small or deformed birth canal will have the additive effect and put young

mothers at high risk of all the complications of obstructed labor.

Early marriage and child bearing are considered to be the norm in many countries. Early marriage is most common in Indian subcontinent, and in Africa, it is less common in East Asia and Latin America (1). It is also reported that on average, women who marry between 15 and 19 years of age bear six or seven children (1). In a study in Nigeria, women aged 15 had a maternal mortality rate seven times to that of women 20-24 years. Older women also run a higher risk of dying during child bearing. In Jamaica for women 30-34 years the risk of death was doubled and increased five fold for women over 40 years when compared to women aged 20-24 (5). Early marriage is also common in Ethiopia, particularly among the rural inhabitants. Total fertility rate for Ethiopia is 6.7 (31) indicating that early marriage is common, and that the complication resulting from early child bearing and high parity could also be very high.

Obstructed labor and pre-eclampsia are common among women during their first pregnancy. The safest births are the 2nd and the 3rd, while the risk of hemorrhage, ruptured uterus and infection increases

from the third birth onwards (5). Most of the living circumstances in agrarian society predisposes a family to have too many children putting mothers at high risk.

Hypertension is the commonest disorder of pregnancy. 5% of all obstetric patients and 51% of hypertensive patients were given a clinical diagnosis of chronic hypertensive vascular disease at the Chicago Lying-in hospital. Of these 20% had major obstetric problems, and 90% had a recurrence of chronic hypertensive vascular disease in later pregnancies (6). Other studies show a frequent association of chronic hypertension with super imposed pre-eclampsia in these situations the perinatal mortality rate approached 25% (7).

Diabetes mellitus during pregnancy is reported to be associated with an increased risk of abortion, maternal and perinatal loss, and a greater chance of anomalies or birth injuries (7). Larger babies of a diabetic mother can result in obstructed labor, and after delivery infants from diabetic mothers may go into hypoglycemia.

Hemorrhage during the first 24 hours of the post partum period is the commonest cause of maternal deaths

related to pregnancy and child birth. The causes for post partum hemorrhage are failure of uterine retraction, laceration of the birth canal, atony of the uterine muscle, and diseases of the blood and blood vessels. About 5-8% of obstetric patients suffer from serious post partum blood loss (7). One study reported anemia in 20% of mothers following delivery (6). Under estimation of the magnitude of this problem is likely since most studies were based on institutional cases. Moreover, in a society where health services are very minimal, mothers who die before a simple blood test for the detection of anemia are many.

Uterine bleeding during the last trimester and during labor is also a common disorder in pregnancy. The cause is attributed to pre-eclampsia or eclampsia, to a mechanical origin and to unknown factors (6). A study done on 19,760 deliveries at the Chicago Lying-in hospital found abruptio placenta in 0.73% of deliveries. However, at the Boston Lying-in hospital the prevalence was 1.2%. Case fatality rate of abruptio placenta is within the range of 2-5%. Perinatal mortality rate was reported to be 15-20% among mothers with placenta previa and abruptio placenta. However, higher values of perinatal loss (50-100%) has also been reported (6). In Ethiopia, the incidence of

complications of pregnancy, labor and puerperium are suspected to be high, although actual figures have not been reported (3).

An estimated 20% prevalence rate of at risk expectant mothers and their offsprings is reported (7). The prevalence of pre-eclampsia was observed in 7% of pregnancies in urban and rural areas in the Ukraine between 1962 and 1964 (33).

Pre-eclampsia used to be considered as a syndrome consisting of at least three findings:- Hypertension, Proteinuria and Edema during pregnancy. However, some of the findings might usually be absent or appear lately. This made the definition and the value of the findings controversial. It is reported that edema occurs in 80% of all pregnancies and has no prognostic significance even when associated with hypertension and proteinuria (8). Because edema is assessed subjectively the measurement variability will be high, and therefore emphasis should be given to hypertension and proteinuria.

The high variability of the systolic blood pressure made it less useful in the diagnosis or prognostic significance of pre-eclampsia and/or

gestational hypertension (8). Therefore several epidemiologic studies use diastolic blood pressure as a criteria for defining pre-eclampsia and/or gestational hypertension.

There are two suggested methods of definition of pre-eclampsia: increments from baseline in the first half of pregnancy and absolute levels. Redman and Jefferies had compared their definition of a first diastolic blood pressure below 90 mm Hg, a subsequent increase of at least 25 mm Hg, and a maximum reading at least 90 mm Hg, to that of a "modified" Nelson's definition (a onetime diastolic blood pressure measurement of ≥ 90 mm Hg). The analysis, which was made on 16,211 singleton pregnancies reported that the former definition identified fewer member of pre-eclamptics than the modified Nelson's definition. A diagnosis of mild chronic hypertension rather than pre-eclampsia was considered on those women excluded by their definition (9). A fall of 15 mm Hg in the 2nd trimester with a subsequent increase in the third trimester to reach pregnancy levels at term is a normal observation in both normotensive and chronic hypertensive women (8). Thus a rise in 30 or 40 mmHg may fall with in the normal statistical range (8). The use of blood pressure increments from baseline as a

criteria for diagnosis is not practical in population based studies.

Various blood pressure cutoff points have been proposed for the diagnosis of pre-eclampsia and/or gestational hypertension, but a diastolic blood pressure ≥ 90 mmHg corresponds approximately to 3 SD above the mean in early and mid pregnancy, 2 SD above the mean between 34 and 38 weeks' gestation, and to 1.5 SD above the mean at term. It is also the point where above this point perinatal mortality is significantly increased (8). Such a definition might introduce misclassification by categorizing gestational hypertensive cases as pre-eclamptics. This problem can be averted by adding another defining criterion, e.g. proteinuria (8).

The methods used for the detection of proteinuria determines its definition. The Committee of Terminology of the American College of Obstetricians and Gynecologists recommended that of ≥ 300 mg protein in a 24 hour urine collection or ≥ 1 gm/l in a random urine sample to be taken as abnormal (8). However, reagent strips are commonly used in daily practice for the detection of proteinuria. Besides the inconvenience to subjects of the former method it is also not practical

for use in population based studies. The incidence of false positive rates in random urine specimens using reagent strips for urinalysis is also reported to be 25% in trace reactions and 6% with 1⁺ reactions, and negligible for 2⁺ reactions (8). Taking into consideration the option given by the American Committee on Terminology of setting a high limit for the diagnosis of significant proteinuria, reagent strips can validly and feasibly used in population based studies.

It has been reported that persistent proteinuria is associated with a mild or moderately severe form of glomerulonephritis. If renal function is not adequate to compensate the existing renal disease, the pregnancy outcome might be hazardous both for the mother and child (6).

Developing countries have high infant mortality rate. For Ethiopia infant mortality rate is estimated to be 151 per 1000 live births (31). Low birth weight is a major determinant of infant mortality rate, especially in the neonatal period (0 to 27 days of life) where the majority of deaths occur. The contribution of pre-eclampsia in causing low birth weight babies is high. 52% of babies from pre-eclamptic

mothers are small for gestational age (10). Of 6,766 deliveries 4.8% pre-eclamptics, and a significantly high frequency of low birth weight babies of pre-eclamptic mothers was observed in a hospital based study in Ethiopia. Still births and neonatal deaths were 13.1% in pre-eclamptic mothers (11). Deaths attributed to eclampsia was also reported to be 5.5% (3). All of the above studies were hospital based studies and the criteria used for diagnosis was not stated.

Dietary factors are now suspected of being associated with the development of pre-eclampsia (6). Low protein content in the diet has been correlated to pre-eclampsia (16). Pregnant women normally have lower total serum proteins, reduced albumin-globulin ratio and reduced oncotic pressure of the plasma. These are decreased further in pre-eclampsia or eclampsia (6). Animal experiments show that the lower albumin concentration is accentuated when the maternal diet is low in protein (16). This is the basis for the assumption that the low protein content of the poor African woman's diet may put her at risk of pre-eclampsia or eclampsia.

Another observation was the inverse relation between calcium and the incidence of pre-eclampsia and gestational hypertension. Calcium has been also implicated in the pathogenesis of essential hypertension (17). An increased leukocyte cytosolic calcium levels has been reported in some hypertensives and calcium entry blockers are known to be effective anti-hypertensive drugs.

In pregnancy calcium demand increase because of fetal demand. The transport of ionized calcium from the mother to the fetus increases from about 50 mg/24 hours at 20 weeks of gestation to a maximum of about 350 mg/24 hours at 35 weeks. Randomized placebo-controlled clinical trials have shown a dose-response relationship between calcium supplementation and blood pressure levels during pregnancy. At term groups with calcium supplementation of 1.0, 1.5 and 2.0 gm/day had a blood pressure of 2.9, 3.7 and 8.5 mm Hg, respectively, lower than those of the corresponding placebo groups (17). Studies conducted among poor population group in Ethiopia have shown an association between high calcium intake (derived from the basic diet of grains) and a low incidence of pre-eclampsia or eclampsia (17).

The increased curiosity in studying the relationship between diet and disease, in the past three decades have led to the use of various dietary assessment methods (12). Several methodologies have been used including 24 hours recall, 24 hours record, 7 days recall and 7 days record. Besides the question of reliability and validity, the feasibility of these methods is the major constraint for population based studies. Feasible method is thus required to obtain information from large number of subjects on their dietary intake.

Food frequency questionnaires have often been used by investigators in addressing the relation between nutrition and disease in population based studies. In evaluating this relation, usual dietary intake is of more interest than what is eaten on any particular day or week (13). Food frequency questionnaires are used to rank individuals according to food and nutrient intake, often into different categories, for example, low, moderate and high. In this way, food frequency questionnaires are sufficient to evaluate dietary hypothesis (12).

One of the criteria to evaluate a measurement is to determine its reliability which is the ability of a

measurement to be reproduced in repeated trials. Correlations between 0.5 and 0.8 are considered reasonable in diet methodology studies (12). Food frequency questionnaires have produced greater than 60% exact agreement for individual food items with out the influence of respondents or time factor (12).

Whether an instrument measures what is intended to be measured, therefore to determine its validity is difficult for food frequency questionnaires, because the true dietary intake is unknown (13), as it need unobserved monitoring of the usual dietary intake (12). Although food frequency questionnaires have not been used previously in Ethiopia, different comparability studies done elsewhere show that food frequency questionnaires produce a highly correlated results with that of other methodologies. Moreover, the feasibility of using food frequency questionnaires in population-based studies make them more attractive than other methodologies.

Since intakes of all nutrients are positively correlated with total caloric intake (14), two analytic approaches have been used to measure the effect of nutrient intakes independent of total caloric intakes. One approach is to use "caloric adjusted" nutrient

intakes computed as the residuals from a regression model with total caloric intake as the independent variable and absolute nutrient intake as the dependent variable. The other approach uses the nutrient fractions computed by dividing nutrient values by total caloric intake (14). However, there exists a strong correlation between the results of the two approaches, for total protein, fat, and carbohydrate 0.96, 0.99, and 1.00 respectively and 1.00 for calcium and 0.92 for iron and niacin (15). Because of this high correlation and ease of calculation the latter method is used commonly.

Physical activity has now been implicated in the development of pre-eclampsia and/or gestational hypertension (20), and has also been shown to affect fetal growth (21).

Although bed rest is still recommended in the treatment of pregnancy induced hypertension, working in pregnancy does not seem to increase the risk of developing pregnancy induced hypertension (20). Leisure time physical activity during the first half of pregnancy was reported to reduce the risk of pre-eclampsia and gestational hypertension. Occupational activities are also reported to reduce the risk of pre-

eclampsia, but not that of gestational hypertension (20). On the other hand, a recent study from the USA has reported a similar occurrence of pre-eclampsia between women residents (who are in long hours stressful occupation) and their controls (resident's wives) (22). The above studies were conducted in an affluent society where the usual physical activity of women is much different from that of women in developing countries. Socio-economic factors might also have influenced their results.

Since World War II, surveys of energy expenditure for the diverse physical activity have been conducted and used as a basis for food rationing (17).

Activity questionnaires are now increasingly being used as instruments for assessment of physical activity and its relation to diseases. Activity questionnaires can categorize subject's into three or four groups based on habitual physical activity to test hypothesis regarding physical activity - disease relationship. Physical activity questionnaires have shown 51% agreement on two different occasions. However, sufficient validation studies are not available due to lack of agreed criterion measurement (19).

3. OBJECTIVES

General Objective.

To generate baseline data on high risk pregnancy, pre-eclampsia and gestational hypertension which can be used in the planning of future health services in Ada-a district.

Specific Objectives.

1. To measure the magnitude of high risk pregnancies in Ada-a district.

2. To examine whether low dietary protein intake in early pregnancy is a risk factor for pre-eclampsia and gestational hypertension.

3. To evaluate whether low dietary calcium intake in early pregnancy is a risk factor for pre-eclampsia and gestational hypertension.

4. To examine whether physical activity is a protective factor for pre-eclampsia and gestational hypertension.

4. METHODOLOGY

This is a population-based cross sectional study conducted in urban and rural communities in Ada-a district from April 1990 to March 1991.

4.1 DEFINITIONS

1. A pregnant woman was considered to be at risk if one or more of the following factors were present (4). Age ≤ 19 years or > 34 years of age, Primigravida mother, multipara > 5 pregnancies, early marriage ≤ 19 years, previous history of hypertension, diabetes, abortion, still births, infant deaths, urinary tract infection, postpartum hemorrhage or antepartum hemorrhage, present history of hypertension, diabetes, urinary tract infection or antepartum hemorrhage, family history of hypertension, height of 150 cm or less, diastolic blood pressure ≥ 90 mm Hg, albuminuria $\geq 2^+$ using reagent strips for urinalysis.
2. Gestational hypertension = Diastolic blood pressure ≥ 90 mm Hg during the 2nd or 3rd trimester.
3. Pre-eclampsia = Diastolic blood pressure ≥ 90 mm Hg with albuminuria $\geq 2^+$.
4. Daily dietary protein intake as expressed in

terms of percent of caloric intake (total protein intake divided by total caloric intake x 100), and based on the group mean ± 1 SD, therefore:-

Low daily dietary protein intake = the lower one third group

Moderate daily dietary protein intake = the middle one third group

High daily dietary protein intake = the upper one third group.

5. Daily dietary calcium intake as expressed in terms of percent of caloric intake (total calcium intake divided by total caloric intake x 100), and based on the group mean ± 1 SD, therefore:-

Low daily dietary calcium intake = the lower one third group

Moderate daily dietary intake calcium intake = the middle one third group

High daily dietary calcium intake = the upper one third group.

6. Physical activity as expressed in terms of total energy expenditure, based on the group mean ± 1 SD, therefore:-

Light physical activity = the lower one third group

Moderate physical activity = the middle one third group

Heavy physical activity = the upper one third group.

4.2 The Study Area

The study area is found 45 km from Addis Ababa along the main road to the Assab port. The elevation of the district varies from 1600 to 2400 meters above sea level. Average temperature varies between 17⁰C and 20⁰C. The climate is suitable for the production of "teff" and other grains. It has a population of 294,171 (from the district administrative office in 1989).

Ada-a district is administratively and geographically divided into 15 urban kebeles and 293 rural peasant associations.

4.3 Sample Design and Sample Size Calculation

The sample design was based on the administrative and geographical divisions of the district and uses the urban and rural areas as a stratum, and urban kebeles and rural villages as a sampling unit. All the 15 kebeles in the urban and 57 accessible villages in the rural were included as our sampling frame.

Sample size calculations were made using the following assumptions: Prevalence of pregnancy (10%), pre-eclampsia (7%), gestational hypertension 20%, the chance of failing to reject the null hypothesis that is infact false (B)=.20, the risk of rejecting the null hypothesis that is really true ()=0.05, the magnitude of the difference expected (L)=15% and the ratio of controls to cases (r)=6.

Actual rates were however lower (4-7%), because women in their initial weeks of pregnancy might not be aware that they are pregnant, unmarried women might be reluctant to report their pregnancy, the respondents during the completion of the registration list, therefore the time for the detection of the pregnant women were about 50% people other than the pregnant women themselves.

The lower actual rates for pre-eclampsia (2.9%) and for gestational hypertension (9.2%) may be due to the different definitions used in different studies, the inherent variability of blood pressure and our one time measurement.

Using the following formula

$$n = \left(Z_{\alpha/2} + Z_{\beta} \right)^2 \bar{p} (1 - \bar{p}) (r + 1) / L^2 (r).$$

$$(P=.20, \beta=.20, \alpha=.05, L=.15, r=6)$$

$$n = (7.85)(.2)(.8)(7) / (.02)(6)$$

$$= 73$$

Then the total sample size required:

$$73 + (73 \times 6) = 511$$

$$+ 10\% \text{ (non-response)} = 562$$

Therefore, considering a 10% pregnancy rate around 6000, 15-49 years old females are necessary.

Taking one urban kebele to consist a total population of 3000, total female population 1500, and total females aged 15-49 years 750, 6 kebeles were initially planned to be surveyed. And taking one rural village to consist a total population of 2000 total female population of 1000 and total females aged 15-49 years 500, 6 rural villages were also planned to be surveyed. However, the total observed in the sample raised to 13 in both sampling units, because the number of pregnant women identified were less than the 10% originally expected.

SOURCE POPULATION - Females aged 15-49 years in Ada-a district, who were pregnant at the time of the registration.

STUDY POPULATION - Sample from the source population.

SAMPLING TECHNIQUE

Simple random selection was originally adopted for both urban and rural villages to obtain 6 urban and 6 rural villages. All pregnant women were latter included in the study. The totals observed in the sample were raised to 13 in both urban and rural sampling units, because during the survey the number of pregnant women identified were very much less from the prior estimate.

4.4 The Survey Content

The data collection instruments, a registration list and a questionnaire were developed according to the objectives of the study (Annex A and B).

4.4.1 Registration List

The registration list was developed to obtain the following data.

-Dejure number of females who usually live in each house, and are 15-49 years of age.

-Registration of women identified to be pregnant at the time of the survey.

-Registration of de jure number of people living in each surveyed house.

-Registration of the person interviewed for the identification of the pregnant women.

The objectives for collecting the above data was to identify and enroll pregnant women in the community, to determine the proportion of 15-49 years of age females from the total de jure number of people covered in the study, and to determine the proportion of pregnant women which could be possible to be identified based on the method used in this study.

4.4.2 Questionnaire

During the completion of the registration list, an interview was conducted if a given dwelling housed a pregnant woman after an informed consent. If the pregnant woman was unavailable a maximum of two visits to the household was made to conduct the interview.

The questionnaire comprised the following sections:-

-Demographic, socio-economic and other characteristics

of the pregnant woman. The total monthly family income were categorized into 0-99 Birr, 100-249 Birr, 250-449 Birr and above 500 Birr to be designated as very low, low, medium, and high respectively for use in the text.

-Past and current obstetric and medical history

-A semi-quantitative food frequency questionnaire which consisted a list of 57 food items with portion sizes and a set of frequency response options to indicate how often each food is consumed during the first 20 weeks of pregnancy. The nutrient content of the food items were calculated using an Ethiopian Food Composition Table (23). Daily dietary intakes as expressed in terms of percent of caloric intake ($\text{crude nutrient score} \div \text{total caloric intake score} \times 100$) were used for grouping the pregnant women into three categories of relative nutrient intake levels: low, moderate and high intake.

-Physical activity questionnaire:- The assessment of physical activity by the questionnaire used in this study consisted of leisure time, occupational and household activities and required a recall of specific physical activity during the first 20 weeks of the current pregnancy. It is composed of 20 physical activity lists and a set of frequency response options

to indicate how often a specific physical activity was carried out.

Daily activity scores were developed by classifying tasks into one of the three (light, moderate, heavy) based on values for total energy expenditure reported from other studies (20,24). Thus light work requires ≤ 3.5 KCal/min, while moderate work involves an expenditure between 3.5-5.5 KCal/min and heavy ≥ 6 KCal/min. Examples of physical activity in each class are:- Light - walking and sweeping floor, moderate - washing cloths and carrying water from a distance and heavy - grinding grain and farm activities. The maximal intensity of physical activity performed by a subject was determined by the intensity level of the activity with the highest intensity code. Daily energy expenditure was obtained by multiplying the intensity code of each activity by its corresponding duration, and by summing up the values of all activities reported. Daily energy expenditure was then categorized into low, medium and high to divide subjects into groups based on the habitual activity to measure the relationship between physical activity and pre-eclampsia and/or gestational hypertension.

The last section of the questionnaire consisted of

a measurement recording list for height, blood pressure and the presence of albumin in the urine.

A two meters long plastic measuring tape graduated in centimeters was distributed for each enumerator. The height of the pregnant woman was then measured while standing upright against the wall without raising the heels from the ground. The straight heel to crown measure was then recorded as 150 cm or less and above 150 cm on the space provided.

The enumerators and the supervisors were provided with a sthetoscope and sphygmomanometre. Blood pressure was then measured, the mother sitting comfortably, the sphygmomanometer cuff tied on the right arm at the same level as the heart. Diastolic blood pressure was taken at the point of muffling (Phase IV) of the korotkoff sound. This measure corresponds closely to the true values in pregnancy (8). Two blood pressure measurements were taken at the mid and end of the interview by the enumerator and the supervisor respectively. Measurements done by supervisors (health assistants) were used in the analysis. Diastolic blood pressure ≥ 90 mm Hg were considered abnormal.

Enough amount of plastic caps and one bottle of

Ames Reagent Strips for urinalysis were also provided to each of the enumerators and supervisors. Random midstream urine was then collected at the end of the interview. Reading was made visually by comparing the reagent areas to the corresponding color chart on the bottle in 60 seconds. The results were recorded as negative, trace, +, ++, and +++ on the space provided. Because of the possibility of false positive results a high cutoff point, therefore, 2⁺ or more was considered as significant proteinuria.

The data obtained from the questionnaire were needed to determine the magnitude of pregnant mothers who are at risk, the magnitude of pre-eclampsia and gestational hypertension and to relate these to demographic and socio-economic characteristics of the women, and to evaluate the relationship of physical activity and dietary factors with the outcome of interest pre-eclampsia and gestational hypertension.

In order to facilitate the data collected to be processed on a computer, a coding manual was produced containing both continuous and discrete variables.

4.5 Pre-test

The pre-test was carried out in Dukem clinic with eight antenatal care attendants. This clinic was chosen because this was the only clinic which exercise integrated health service in the district, where antenatal care was given on daily basis, and because of its geographical location it was possible to get both urban and rural women for the pre-test. Completion of the registration list and questionnaire together with height, blood pressure and albuminuria measurements were carried out. Women with any clinical finding were treated accordingly. The pre-test was done to determine how best questionnaire items be phrased to maximize the likelihood of response, and to determine the time required to complete the procedure.

Based on the results of the pre-test it was possible to identify food items which are not available or not consumed in the area. And the time required for the completion of the procedure, including blood pressure and other measurements range from 45 to 60 minutes. This allowed for modification of the questionnaire by eliminating food items which are not consumed in the area and for the estimation of the time required for the survey.

4.6 Data Collection and Management

Data collection was conducted twice, the first survey took 6 weeks, 4 weeks for urban and 2 weeks for rural, from June 1, 1990 to July 15, 1990. After a period of 2 months the second reassessment of those pregnant women who were on their first 20 weeks of gestation and were negative during the first survey was conducted and took 4 weeks from September 16, 1990 to October 14, 1990.

In order to facilitate the survey a letter from Ministry of Health and Addis Ababa University was given to the district Workers Party of Ethiopia, where the message was then distributed by telephone to the district Administrative Office, Youth association, Women's association office and the City Council which was helpful in getting the necessary cooperation.

Recruitment of enumerators among 12 grade female students was conducted. It was thought that it would be advantageous to recruit this category of enumerators, to get a positive attitude from the community while they go from house to house, to create a comfortable atmosphere during the interview because of their gender similarity, and as they are not health professionals it

was easy to make them blind about the study which possibly avoids the interviewers bias.

Enumerators and supervisors signed a contract to be paid according to the number of working days. There was a different payment for enumerators and supervisors. The training time was considered to be a working day. End of the training day, end of the survey for the urban kebeles, and end of the survey for rural villages were the pay days.

4.6.1 Training

A six day training was given for enumerators and supervisors from May 21-26, 1990. An instruction manual was prepared together with the registration list and the questionnaire. The training was given by the investigator and a laboratory technician in the health center for urine albumin detection.

The training manual comprised of five sections: Introduction, the task of enumerators, how to conduct the interview, how to take measurements, instructions for completing questionnaires.

4.6.2 Interviewing Procedure

Based on the time table for the selected kebeles/villages, using the zones which were divided for vaccination program, the enumerators went to each kebele/village and a house to house survey was conducted to fill the registration list and complete the questionnaire as the pregnant woman was identified on the spot and in a maximum of two revisits. The questionnaire was read to the pregnant woman and the response was recorded on the space provided for each variable.

4.6.3 Supervision

Supervision was done for controlling daily attendance of enumerators, for allocation of daily work, and for collection of completed data.

4.6.4 Quality Control

The questionnaire was given to two general practitioners where translation to Amharic and back translation to English was done with no major difference from the original one and was taken as it was.

The blood pressure apparatus was cross-checked by two interviewers always before the start of work and a reserve apparatus was given to the supervisors.

The two supervisors conduct together a 10% repeatability check of the pregnant women in each kebele/village on daily basis to monitor the reliability of the data collected by the enumerators where no major difference was observed throughout the study.

4.7 Data Processing and Analysis

This was performed using a microcomputer of the Department of the Community Health, Medical Faculty, Addis Ababa University. Data entry was carried out via a visible screen terminal into a disc file, using a program written for this purpose.

After computer input was complete, a 2% check of all the questionnaires in the completed computer information was carried out by the investigator. On 28 November 1990, data processing was completed.

The analysis was done using SPSS (PC) program (34), which is capable of producing frequency

distributions, cross tabulations and tests of associations. EPI-INFO program (35) was additionally used to assess the strength of the associations. This program is capable of producing rate ratios, 95% confidence intervals and chi square statistic for linear trend.

Univariate statistics were computed to assess demographic, socio-economic, the dichotomous responses for past and current exposures for the risk factors, height, blood pressure and urine albumin measurement findings of the target population. Tables were also prepared for cross tabulations between variables considered to be risk factors for pre-eclampsia and gestational hypertension to determine whether an association existed. A chi-square statistic was then used to determine whether the association was significant. Finally relative risks, 95% CI and their linear trend were calculated to assess the strength of the association.

SECTION II

5. RESULTS

A total of 48,546 people were surveyed. This was 90% of the estimated total population for the study area. The percentage distribution of females within the age group of 15-49 years were found to be 26.8% in the urban, 22.4% in the rural and 25.8% for the total. 567 pregnant women were enrolled from this population. The observed percentage of pregnant women identified was 4.5% for the total. 7.0% and 3.9% for the rural and urban from the total 15-49 years females population respectively.

5.1 Socio-Demographic Characteristics. Out of 567 pregnant women studied, 60% were urban, and 40% rural inhabitants. 14.3% were with in the age group of 15-19, 71.4% with in 20-34 and the rest 14.3% were with in 35-49 years of age during the survey. Age at first marriage below 20 years was reported by 85% of the group, and only 15% were in the age group 20 and above (Table 1).

Table 1. Demographic, Socioeconomic, and Other Characteristics of Pregnant Women in Ada-a District, 1990.

CHARACTERISTICS		TOTAL	URBAN	RURAL	CHI-SQUARE
		No. (%)	No. (%)	No. (%)	
Maternal age in years	15-19	81(14.3)	61(15.3)	20(12.0)	7.5**
	20-34	403(71.4)	291(72.9)	112(67.5)	
	35-49	81(14.3)	47(11.8)	34(20.5)	
Age at first marriage in years	5-19	467(85.0)	323(80.7)	144(86.2)	3.2
	≥ 20	100(15.0)	77(19.3)	23(13.8)	
Parity	0	123(21.7)	101(25.3)	21(12.8)	17.5***
	1-4	318(56.1)	225(56.4)	93(55.5)	
	5-10	126(22.2)	73(18.3)	53(31.7)	
Period of Gestation in months	1st Trimester	42(7.4)	28(7.0)	14(8.4)	2.3
	2nd "	173(30.5)	117(29.4)	56(35.5)	
	3rd "	340(60.0)	247(62.1)	93(55.7)	
	Unknown	12(2.2)	6(1.5)	4(2.4)	
Occupation	Home maker	513(91.8)	340(88.8)	165(98.8)	14.3***
	Non-Home maker	46(8.2)	44(12.2)	2(1.2)	
Education	Illiterate	222(39.2)	88(22.1)	134(80.2)	177.6***
	Elementary	258(45.6)	228(57.1)	30(18.0)	
	≥ Secondary	86(15.2)	83(20.8)	3(1.8)	
Total Family monthly income in Birr*	0-99	243(42.9)	118(33.3)	125(94.7)	145.4***
	100-249	152(26.8)	145(41.0)	7(5.3)	
	250-499	63(11.1)	63(17.8)	- - -	
	500+	28(4.9)	28(7.9)	- - -	

* 1 Birr = 0.48 USD

** P<0.05

*** P<0.01

21.7% were Nulliparous women and those who had 1-4 live births were 56.1%. 22.2% had 5-10 live births. 60.2% were in their 3rd trimester, 30.6% in their 2nd trimester and 7.4% were in their first trimester.

92% of the total pregnant women were homemakers. 98.8% among the rural and 88.8% among the urban pregnant women. Rural pregnant women were much more illiterate than the urban pregnant women, 80.2% and 22.1% respectively. A higher proportion (57.1%) of the urban pregnant women attended elementary school compared to (18%) for the rural. Very few (1.8%) of the rural pregnant women were having the opportunity to go beyond elementary school, when compared to urban pregnant women (20.8%).

42.9% of the pregnant women had a total family monthly income of 0-99 Birr, 26.8% had 100-249 Birr, 11.1% had 250-499 Birr, and 4.9% earned 500 Birr and above. The total monthly family income of the rural pregnant women as a whole were in the very low and low categories (Table 1).

5.2 High Risk Pregnancies. The percentage distribution of pregnant mothers who had a past history of hypertension was 3.2%. The urban-rural difference were statistically significant, $P < 0.05$. 1.2% all urban reported a history of diabetes mellitus (Table 2).

The percentage distribution of pregnant women who had a history of abortion was 14.6% which was similar among the urban and rural inhabitants. The proportion of pregnant mothers reporting past histories of still births were 1.4%. Urban-rural differences were not statistically significant. The proportion of pregnant women reporting past histories of infant deaths were significantly higher 19.2% among the rural pregnant women, than that of the urban 10.5% ($P < .01$).

The percentage distribution of pregnant women who had a past history of urinary tract infection were 3.9%. Urban-rural differences 5.3% and 0.6% respectively were statistically significant ($P < .05$). Postpartum hemorrhage comprises 6.3% of the total study group. 8.0% among the urban and 2.4% among the rural pregnant women. The difference was statistically significant ($P < .05$).

TABLE 2. Percentage Distribution of Pregnant Women According to the Status of Exposure for Risk Factors Prior to the Present Pregnancy in Ada-a District, 1990.

RESPONSE CATEGORIES		TOTAL	URBAN	RURAL	CHI-SQUARE
		No. (%)	No. (%)	No. (%)	
History of hypertension	No	549(96.8)	382(95.7)	166(99.4)	4.04**
	Yes	18(3.2)	17(4.3)	1(0.6)	
History of diabetes	No	560(98.8)	392(98.2)	167(100)	0.85*
	Yes	17(1.2)	7(1.8)	- -	
History of abortion	No	484(85.4)	338(84.7)	145(86.8)	0.29
	Yes	83(14.6)	61(15.3)	22(13.2)	
History of still births	No	559(98.6)	393(98.5)	165(98.8)	0.56*
	Yes	8(1.4)	6(1.5)	2(1.2)	
History of infant deaths	No	493(86.9)	357(89.5)	135(88.8)	6.8***
	Yes	74(13.1)	42(10.5)	32(19.2)	
History of urinary tract infection	No	545(96.1)	378(94.7)	166(99.4)	5.7**
	Yes	22(3.9)	21(5.3)	1(.06)	
History of post partum hemorrhage	No	531(93.7)	367(92.0)	163(97.6)	5.4**
	Yes	36(6.3)	32(8.0)	4(2.4)	
History of ante partum hemorrhage	No	561(98.9)	395(99.0)	165(98.8)	0.57*
	Yes	6(1.1)	4(1.0)	2(1.2)	
History of convulsion	No	564(99.5)	396(99.2)	167(100)	0.35*
	Yes	3(0.5)	3(0.8)	- -	
History of hypertension in the family	No	554(97.7)	391(98.0)	162(97.0)	0.33*
	Yes	13(2.3)	8(2.0)	5(3.0)	

* P-Value for Fischer's exact test

** P<0.05

*** P<0.01

Past histories of ante partum hemorrhage were 1.1% among the group in general. Urban-rural differences were not statistically significant. The percentage distribution of mothers reporting a past history of convulsion was 0.5% all among the urban pregnant women. the difference was not statistically significant. Family history of hypertension was reported in 2.3% of the total. Urban-rural differences were not statistically significant.

The percentage distribution of pregnant mothers who gave a present history of hypertension was 2.3% of the total. All among the urban pregnant women. The difference was statistically significant ($P < .05$). (Table 3). 1.1% of the total and all among the urban pregnant women were reporting to have diabetes at present. Urban-rural difference was statistically significant. The proportion of pregnant women reporting a present history of urinary tract infection were 2.1%. Urban-rural difference was not statistically significant.

Table 3. Percentage Distribution of Pregnant Women According to Their Exposure Status for the Risk Factors in the Current Pregnancy, in Ada-a District, 1990.

RESPONSE AND FINDINGS		TOTAL	URBAN	RURAL	CHI-SQUARE
		No. (%)	No. (%)	No. (%)	
Hypertension	No	554(97.7)	386(96.7)	167(100)	0.01*
	Yes	13(2.3)	13(3.3)	- -	
Diabetes	No	561(98.9)	393(98.5)	167(100)	0.12*
	Yes	6(1.1)	6(1.5)	- -	
Urinary Tract Infection	No	551(97.9)	388(97.2)	166(99.4)	0.09*
	Yes	12(2.1)	11(2.8)	1(0.6)	
Ante partum hemorrhage	No	559(98.6)	392(98.2)	166(99.4)	0.26*
	Yes	8(1.4)	7(1.8)	1(0.6)	
Antenatal care attendance	No	299(52.3)	250(63.0)	152(92.1)	139.9***
	Yes	268(47.7)	147(37.0)	13(7.9)	
Height	≤150cm	105(18.5)	79(19.8)	26(15.6)	1.2
	>150cm	462(81.5)	320(80.2)	141(84.4)	
Albuminuria	<2+	502(88.5)	340(85.0)	161(96.4)	15.8***
	≥2+	65(11.5)	59(15.0)	6(2.6)	
Diastolic blood pressure in mm Hg	<90	497(87.8)	345(85.2)	152(91.1)	4.7
	≥90	69(12.2)	54(14.8)	15(8.9)	
Pre-eclampsia		17(2.9)	17(5.3)	- -	6.6**
Gestational hypertension		52(9.2)	37(9.3)	15(9.0)	0.01

* P-Value for Fischer's exact test

** P<0.05

*** P<0.01

Antepartum hemorrhage during the current pregnancy were reported by 1.4% of the total pregnant women. Urban-rural difference was not statistically significant. The percentage distribution of antenatal care non-attendants for the group as a whole was 52.3%. The proportion for the rural pregnant women was 92.1%. The difference was statistically significant ($P < .01$). 20% of the urban and 16% of the rural pregnant women had heights measuring 150 cm or less. The difference was not statistically significant.

Albuminuria constituted 11.5% of the total. Of these 2.6% were rural. The difference was statistically significant ($P < .01$). The percentage distribution of pregnant women who had a diastolic blood pressure ≥ 90 mm Hg was 12.2%, higher among the urban than that of the rural mothers 13.5% and 9% respectively. However, the difference was not statistically significant. 2.9% had pre-eclampsia, all among the urban pregnant women. The difference was statistically significant ($P < .01$). Gestational hypertension comprises 9.2% of the total. However, urban-rural differences were not statistically significant.

5.3 Risk Factors for Hypertensive Disorders

5.3.1 Pre-eclampsia. The relative risk of pre-eclampsia decreased with increasing age of mothers although this trend was not statistically significant, $P > 0.05$ (Table 4). Pre-eclampsia was also associated with education. The lowest relative risk was among the pregnant women attended elementary school. The observed differences was however not statistically significant. Pre-eclampsia was associated with income. The relative risk decreased with a decrease in the monthly family income. The trend was statistically significant ($P < .05$).

Nulliparous women had a 6 times higher risk of developing pre-eclampsia than the rest in the study group. The difference was statistically significant ($P < .01$). Cases of pre-eclampsia tended to be engaged with physical activities which require high energy expenditure during their first 20 weeks of gestation. The group of pregnant women who had a high level of energy expenditure were at risk 3 times higher than those with low level of energy expenditure. However the difference was not statistically significant.

High dietary protein intake during the first 20 weeks of gestation is observed to have a protective

TABLE 4. Distribution of Cases of Pre-eclampsia Among Pregnant Women in Ada-a Dostroct by Different Maternal Characteristics.

CHARACTERISTICS	CASES	CONTROL	RR(95% CI)	CHI-SQUARE for trend
	No.(%)	No.(%)		
Maternal age in years				
15-19	4(23.5)	77(14.1)	1.0 ^a	1.9
20-34	12(70.6)	391(71.3)	0.59(0.17,2.6)	
35-49	1(5.9)	80(14.6)	0.24(0.01,2.72)	
Education				
Illiterate	5(29.4)	217(39.5)	0.5(0.14,1.65)	1.7
Elementary	1(5.9)	85(15.5)	0.26(0.01,1.87)	
≥ Secondary	11(64.7)	247(45.0)	1.0 ^a	
Total family monthly income in Birr ^a				
0-99	5(29.4)	270(49.2)	0.3(0.06,1.07)	12.78 (4.7)**
100-249	6(35.3)	194(35.3)	0.4(0.11,1.7)	
250 ^a	6(35.3)	85(15.5)	1.0 ^a	
Parity				
Primi	10(58.8)	112(20.4)	5.6(1.83,15.92)	0.0008***
Others	7(41.2)	437(79.6)	1.0 ^a	
Total energy expenditure				
Low	1(5.9)	89(16.2)	1.0 ^a	0.22***
High	16(94.1)	460(83.8)	3.0(0.47,131)	
Daily protein intake				
Low	1(5.9)	14(2.5)	5.1(0.06,403.5)	1.2
Moderate	15(88.2)	464(84.5)	2.3(0.34,97.9)	
High	1(5.9)	71(13.0)	1.0 ^a	
Daily calcium intake				
Low	1(5.9)	47(8.6)	0.42(0.01,5.44)	0.48
Moderate	13(76.5)	443(80.7)	0.58(0.15,3.25)	
High	3(17.6)	59(10.7)	1.0 ^a	

^a Referent category

^a 1 Birr=0.48 USD

** P<0.05 (trend test)

*** P-Value for Fischer's exact test

effect against the development of pre-eclampsia. The relative risk decreased with an increase in a daily dietary protein intake. However, the trend was not statistically significant.

In this study, low dietary calcium intake during the first 20 weeks of gestation was found to have a protective effect for pre-eclampsia. The relative risk decreased with a reduced daily dietary calcium intake. The observed trend, however, was not statistically significant.

5.3.2 Gestational Hypertension. Pregnant women in the age group of 15-19 had a 2 times higher risk than those in the age group of 35-49. However, the difference was not statistically significant (Table 5). Distribution of cases of gestational hypertension has no or little variation in the three categories of educational status. The relative risks were similar.

Gestational hypertension was associated with income. The relative risk decreased with a decrease in the monthly family income. However, the trend was not statistically significant.

Parity was also associated with gestational hypertension. The relative risk for primiparous women was two times higher than the others. The observed difference was however not statistically significant.

Physical activities which require high energy expenditure during their first 20 weeks of gestation were associated with gestational hypertension. The group of pregnant women who had a high level of energy expenditure had five fold higher risk than those with low level of energy expenditure. The observed difference was statistically significant ($P < .05$).

Distribution of cases of gestational hypertension have little or no variation in the three categories of protein intake. The relative risk was lower in the group with moderate daily dietary protein intake. However, the difference was not statistically significant.

Low dietary calcium intake during the first 20 weeks of gestation was associated with gestational hypertension. The relative risk increased with the reduced dietary calcium intake. The observed trend was however not statistically significant.

TABLE 5. Distribution of Cases of Gestational Hypertension Among Pregnant Women in Ada-a District by Different Maternal Characteristics.

CHARACTERISTICS	CASES	CONTROL	RR(95% CI)	CHI-SQUARE for trend
	No.(%)	No.(%)		
Maternal age in years				
15-19	11(21.2)	66(13.3)	1.5(0.51,4.57)	0.79
0-34	33(63.5)	358(72.2)	0.83(0.36,2.17)	
35-49	8(15.3)	72(14.5)	1.0 ^a	
Education				
Illiterate	24(46.2)	193(48.6)	1.0 ^a	1.66
Elementary	19(36.5)	131(33.0)	1.2(0.58,2.32)	
≥ Secondary	9(17.3)	73(18.4)	0.99(0.39,2.34)	
Total family monthly income in Birr ^a				
0-99	19(44.2)	221(51.6)	1.0 ^a	1.6
100-249	13(30.2)	133(31.1)	1.14(0.5,2.52)	
250 ⁺	11(25.6)	74(17.3)	1.7(0.71,4.03)	
Parity				
Primi	17(32.7)	95(19.1)	2.1(1.03,3.95)	5.4
Others	35(67.3)	402(80.9)	1.0 ^a	
Total energy expenditure				
Low	2(3.8)	87(17.5)	1.0 ^a	7.3 ^{**}
High	50(96.2)	410(82.5)	5.3(1.35,45.77)	
Daily protein intake				
Low	11(21.2)	60(12.1)	1.1(0.20,11.46)	1.9
Moderate	39(75.0)	425(85.5)	0.55(0.12,5.25)	
High	2(3.8)	12(2.4)	1.0 ^a	
Daily calcium intake				
Low	5(9.6)	42(8.5)	1.6(0.33,8.74)	0.5
Moderate	43(82.7)	400(80.5)	1.5(0.51,5.88)	
High	4(7.7)	55(11.0)	1.0 ^a	

^a Referent category^{*} 1 Birr = 0.48 USD^{**} P<0.05

SECTION III

6. DISCUSSION

6.1 Socio-demographic Characteristics. Pregnant women of age groups 15-19 and 35-49 are considered as high risk, as they run an excess risk of death related to pregnancy (5). In this study 28.6% of mothers were in these age groups. This is similar to the previous estimate of Addis Ababa 25.6% (26). The estimate for Addis Ababa was based on those women who have been pregnant during a period of two years and were exclusively urban.

Illiteracy is considerably high among the group particularly among the rural pregnant women. Women with some formal education had a maternal mortality rate one-fourth that of women with no formal education (5). The figure for illiteracy of 39.2% in this study is higher than the 3% estimate for developed countries. However, our finding was smaller than the estimates for developing countries 68%, and for East Africa 76% (5). This might be the result of the on going literacy campaign in the Country. The effect of education in making child bearing safer is not mutually exclusive to that of the socio-economic status of the majority. In a

country like Ethiopia where poverty is common and access to better health care is minimal, the potential contribution of illiteracy to the high mortality and morbidity will be high.

Total family monthly income for the group is below a subsistence level. Outcomes of pregnancy and child bearing are highly influenced by the level of the socio-economic status of a society, where income is the pace maker. However, its improvement is hardly achievable in a short time.

Teenage marriage was observed to be very high (85%). 25% in their 5-14 years and 60% in their 15-19 years of age. The highest incidence among the age group 15-19 was reported in Bangladesh 72%, for South Asia 54% and 44% for Africa. Though we have no other reports for comparison for the age group 5-14, the observed figure is very high. Because teenagers are anatomically and psychologically not prepared to bear a child, mortality and morbidity rates in these group is very high (5).

Nulliparous and multiparous women in the study group comprises a higher proportion 45.1%. Other study in Addis Ababa reported 63.6% (26). However, they

included both live and dead cases and their sample size was larger. Most of the circumstances in agrarian society predisposes a family to have too many children.

6.2 High Risk Pregnancies. Past histories of hypertension was as low as 3.2%. In a suburban white population a prevalence of up to 20% was reported (27). Other reports showed that 5% of all obstetric patients as having hypertension. However, this figure is based on a study in a well equipped hospital in an affluent society. Major obstetric problems were encountered in 20% of those pregnant women from other reports who had hypertension, and in 90% of them a recurrence in later pregnancies (6). The observed significant difference between urban and rural pregnant women might be due to the availability of the service in the town which facilitate the diagnosis and the attitude towards the utilization of modern health care. Furthermore, our study relied on a recall questionnaire, and health care facilities are minimal in the district underestimation is likely to occur.

Past histories of diabetes was reported by 1.2% of the study group. The overall prevalence of diabetes in western societies was reported to be 1% (28). Various hormonal changes in pregnancy tend to unmask diabetes.

Prior to the use of Insulin, maternal mortality rate attributed to diabetes ranged from 27 to 49% (6). Difficulties in management and an increased tendency to ketosis and acidosis are major problems a diabetic mother encounters during pregnancy (6). Large fetus from a diabetic mother can result in obstructed labor. Because of the limited availability of modern health care service in the district pregnant women may not recognize whether they are diabetic or not.

The loss of fetal life in early pregnancy and that of the suffering of women from abortion is a major problem both in the urban and rural areas in the district. In the United States 28% of pregnant women choose to terminate their pregnancy by abortion (29). A report from Addis Ababa (26) show 5.5% of pregnancies resulted in abortion, this might be due to the reluctance of women to report that they had an abortion which can also be the case in our study. Other study reported a 22.2% maternal death attributed to abortion. However, as it relied on a hospital based study cases might be those who had access to the health unit and might be in a sever form of complication which forced them to search for help.

1.4% of the total pregnant women reported a history of still birth which is lower than that of previously reported a still birth rate of 25 per 1000 live births from Ethiopia (26).

Past histories of infant deaths were very high, 13.1%. In the United States in 1978 infant mortality rate was reported to be 13.6 per 1000 live birth (30). Egypt had 85 per 1000 live births, and for Ethiopia 151 per 1000 live births (31). Higher infant mortality rates entail a lower socio-economic status and a lower maternal and child health care. Hence, the significant urban rural difference observed in this study might be attributed to these factors.

Past histories of urinary tract infection was reported in 3.9% of pregnant women. Specific figures for comparison are not available. Women with underlying urinary tract infection, like glomerulonephritis can end up in renal failure during pregnancy where the management might be difficult than the non-pregnant women (6).

The findings of 6.3% prevalence for post partum hemorrhage compares well with other reports. Other studies reported a prevalence of 5.8% of their

obstetric patients (6). High rate of maternal mortality due to post partum hemorrhage in rural areas might be the reason to the significant difference observed between the urban and rural pregnant women in our study. Other studies reported an incidence of 5-8% of their obstetric patients (6). Anemia is common among pregnant women with post partum hemorrhage. In Ethiopia deaths attributed to post partum hemorrhage was reported to be 6.5% of all cases (3). Since this study is hospital based, those who had access to health care were possibly reported.

Bleeding in late pregnancy is relatively not common. Other hospital based studies from developed countries reported a prevalence of 0.73%-1.2% of all deliveries (6). Maternal mortality rate of 2.5% and a perinatal loss of 15-100% due to bleeding in late pregnancy were also reported (6). However, the findings are from a higher socio-economic group with a better health care. In developing countries the magnitude may be higher. Very few pregnant women reported past history of convulsion.

Family history of hypertension is reported in a very few proportion. Considering the prevalence of hypertension in the community to be as high as 20%,

people might not be aware of the condition because of the limited availability of health care in the district.

Pregnant mothers who reported having hypertension currently were very small. Considering the 12.2% of women with diastolic blood pressure of ≥ 90 mmHg in our study, the reason for the lower report may be due to the low antenatal care attendance rate. Gestational diabetes, urinary tract infection and antepartum hemorrhage were also reported by a few members of the study group.

A higher proportion, 52.3% of the study population did not utilize antenatal care services in the current pregnancy. For SriLanka non attendants were 3%, for Brazil 14% in urban and 49% in the rural areas (1). A study done in Addis Ababa showed 32% non attendance (26). These reports were based on reports of use of antenatal care were in the preceding 2-5 years. Besides that Addis Ababa is a capital city where hospitals, health centers and clinics are available to the population.

Short stature is observed to be prevalent among the study group. Obstructed labor can be detected by a

simple height measurement. In Sierra Leone 85% of cases of obstructed labor were identified among pregnant women with less than 152 cm height who were urged to give birth in hospital or health center (1). Even though this is a sensitive measure where the cut off point is not certainly defined, in a country like Ethiopia where only 14% of the deliveries are attended by a trained personnel (31), the observed percentage might have contributed to much of the sufferings and of the deaths resulted from obstructed labor.

Albuminuria is observed to be common among the group, 11.5%. Highly alkaline urine or urine contaminated with vaginal discharge or very concentrated urine may be registered as positive using dipstick reagents. Additional use of PH and specific gravity results may help to exclude very alkaline and very concentrated specimens. Persistent proteinuria is reported to be associated with mild or moderately severe form of glomerulonephritis (6). Although 24 hour collected urine protein measurement is recommended for confirmation, which is hardly possible in population based studies our finding probably does reflect the truth since false positivity at 2⁺ level is minimal.

The observed percentage for pre-eclampsia, 2.9% is lower than other reports of 4.8% from Addis Ababa (11). Since the report from Addis Ababa was based on hospital cases, there a possibility women at risk to be referred to them, and taking several blood pressure measurement by itself increase the likelihood of detecting hypertension. Considering the higher maternal and infant mortality rate and the higher occurrence of low birth weight babies among pre-eclamptic women, our finding show the importance of this problem.

Gestational hypertension was also found to be low 9.2% compared to figures from other reports 21.5% in Cuba, 28.8% in the UK in 1958 and 27.2% in 1970 (33). Cheslly and Sibai suggested that the significance of high 2nd trimester mean arterial blood pressure is to predict transient hypertension rather than pre-eclampsia. Due to the smaller sample size used and the inherent variability of blood pressure the result from this study may have underestimated the true proportion of gestational hypertension.

6.3 Risk Factors for Hypertensive Disorders

6.3.1 Pre-eclampsia. Pre-eclampsia tended to occur among the younger age group. A "J shaped" curve have

been reported for the relationship between maternal age and the incidence of pre-eclampsia, a slight increase among the young and a marked increase among the older age group (32). However, this was seen in Nulliparous mothers only. Although the relative risk did not achieve statistical significance this is probably due to the smaller number of cases. Since all pregnant women identified were included in the study, selection bias is unlikely.

Cases of pre-eclampsia tended to be among the group who attended secondary school or more. In other study it was reported that pre-eclampsia to be more common among the highly educated group in a healthy population of high socio-economic status (22).

Pre-eclampsia was significantly more common among the group with a relatively higher income. Most studies on risk factors for pre-eclampsia were conducted in developed countries within homogeneous income groups and were unable to measure the relationship between income and pre-eclampsia.

A significant association was observed between pre-eclampsia and parity. Nulliparous had a higher risk of pre-eclampsia. This finding is in agreement with

those of some other studies, where pre-eclampsia was considered predominantly a disease of Nulliparous women (8,9).

The result from this study suggests that women who had physical activities which require high energy expenditure during the first 20 weeks of their pregnancy are at a higher risk of pre-eclampsia. Other report suggested a protective effect of leisure time physical activity on pre-eclampsia (20). However, their report focused mainly on leisure time activities in affluent communities. The non significant results observed might be the reflection of the smaller sample size. Since the data on physical activity behaviour was collected before determination of the outcome measures recall were comparable among cases and controls, and as all identified women were enrolled a problem of selection is also unlikely.

Low dietary protein intake in the first 20 weeks of gestation was observed to be a risk factor for the development of pre-eclampsia. This was in agreement with another study (6). However, studies in developing countries are not repeated for comparison. The non significant difference observed might be the reflection of the smaller number of cases. Again recall and

selection bias are unlikely alternative explanations for the results.

Low dietary calcium intake was negatively associated with pre-eclampsia. This is in contrast to other findings where calcium has been shown to be protective (17). It is likely that this is a chance finding as the association was not statistically significant.

6.3.2 Gestational Hypertension. Gestational hypertensive women were also observed to be younger than the controls. This however is in contrast to other reports where a "J" shaped curve for the relationship between maternal age and gestational hypertension which was probably attributed to the unmasking of latent hypertension in these older women (33).

Education was observed to have no significant effect on the development of gestational hypertension. However, the effect of education on the development of gestational hypertension can not be differentiated from that of the socio-economic status. Gestational hypertension was significantly more common among the group with a relative higher income. Most studies on risk factors for gestational hypertension were done in

developed countries with homogenous income groups and did not measure the relationship between gestational hypertension and income. Nulliparity was also observed to be a risk factor for gestational hypertension. The finding is also in agreement with those of some other studies where gestational hypertension was accepted as essentially a disease of Nulliparous women (8,9,34).

The result of this study suggests that women who had physical activity which require high energy expenditure during the first 20 weeks of gestation are at a higher risk of developing gestational hypertension. However, other reports suggest a protective effect of leisure time physical activity on gestational hypertension (20). However, this study was based on a high socio-economic group where the extent of physical activity is different from ours. Thus similar studies on a similar population base are required for comparison.

In this study it was observed that dietary protein intake has no influence on the development of gestational hypertension. this goes in agreement with suggestion from other reports where protein diet was considered not to influence the occurrence of gestational hypertension (33). Again recall and

selection biases are unlikely alternative explanation for the result.

High dietary calcium intake in early pregnancy is observed to be protective against the development of gestational hypertension. This finding is in agreement with those of other findings where a negative dose-response relationship was observed between calcium supplementation and blood pressure levels (17). The observed non-significant difference might be due to the smaller sample size used in the study.

The results from this study are unlikely to be biased. To achieve a valid results the following schemes were employed:

1. Exposure data that was collected (diet, physical activity, etc.) was on the first 20 weeks of gestation prior to the occurrence of outcome measures. This assumed an appropriate temporal sequence between the exposure and the disease.
2. The information collected were prior to the classification of cases and controls.
3. The enumerators being non-health professionals making them unaware of the objective of the study was possible.
4. The place and circumstance of interview and

measurements were similar.

5. Because of the gender similarity of enumerators, the cooperation from the study group was very high.

Since there is no agreed definition for hypertensive disorders in pregnancy, the problem of differentiating secondary hypertension from that of gestational as it require post partum evaluaton, the inherent variability of blood pressure and our one time measurement where there is a possiblility to miss a raised blood pressure value and the use of questionnaires for the assessment of diet and physical activity as they relie on a recall of past events misclassification is likely to occur in our results, however, the misclassification will be non directional thus giving more strength to the observed relative risks.

Communication gap which is possible to exist particularly in the rural setup, because of the diversified perception for some of the variables like diabetes, urinary tract infections underestimation is also likely to occur in our results.

Because of the small number of cases the confounding effect of several variables were also not controlled.

SECTION IV

7. CONCLUSIONS AND RECOMMENDATIONS

7.1 CONCLUSIONS

This population based study assessed the risk profile of 567 pregnant women in Ada-a district, using socio demographic characteristics, past and current obstetric and medical histories, and height, proteinuria and blood pressure measurements.

Out of the 567 pregnant women 162 (28.6%) were younger than 20 or older than 34 years of age. Early marriage before the age of 20 were reported by 467 (85%). 123 (21.7%) and 126 (22.2%) were classified as primipara and multiparous women respectively. 222 (39.2%) were illiterate and 243 (42.9%) with a very low monthly income. Abnormal past and current obstetric history was obtained in as much as 83 (14.6%). Abnormal height was recorded in 105 (18.5%), albuminuria in 65 (11.5%) and abnormal blood pressure was recorded in 69 (12.2%), where 17 (2.9%) and 52 (9.2%) were classified as pre-eclamptic and gestational hypertensive women. A higher proportion 299 (52.3%) were not attending the existing antenatal care service in the district.

Pre-eclamptic women tended to be younger, attended secondary school or higher and earn a relatively high monthly income, and reside in the town. Nulliparity was observed to be a risk factor for the development of pre-eclampsia. Strenuous physical activity during the early periods of gestation is observed to be a risk factor for pre-eclampsia. A protective effect of high dietary protein intake in early pregnancy was also observed. No conclusive role of dietary calcium intake in early pregnancy was found.

Gestational hypertensive women were also tended to be younger, earn relatively higher monthly income. Education and residential area showed no influence in the occurrence of gestational hypertension. Nulliparity was observed to be a risk factor for gestational hypertension. Physical activity which require high energy expenditure during the first 20 weeks of gestation was observed to be a risk factor for gestational hypertension. Differences in dietary protein intake showed no influence on the occurrence of gestational hypertension. High dietary calcium intake was observed to have a protective effect against the development of gestational hypertension.

Taking the total population sample into

consideration generalizability of the results to population in Ethiopia and other least developed countries is also possible since the socio-economic status is not too apart.

Poor status of women compromises maternal health in many ways: girls often get less education, less food, less health care, married young, bearing children too soon (1). Reports from SriLanka showed that through universal education, raised the average at marriage and increased the use of family planning, eventually reducing the number of high risk pregnancies in adolescence and in older women with many children (1). Thus improvement of social factors in the community are important areas to establish opportunities for safe child bearing.

Hypertensive disorders of pregnancy are taken to be essentially diseases of primigravidae. Even if hypertensive disorders recur in a subsequent pregnancy it tends to be less severe. And also the combination of an age 35 or more and primigravidity leads to a particularly high risk of severe pre-eclampsia (33). Other study considered relative proportion of primigravidae of 1.3 or more as a test for a valid definition of pre-eclampsia (9). In our case the

relative proportion is 1.4.

Pregnant women normally have lower total serum proteins, reduced albumin-globulin ratio and reduced oncotic pressure of the plasma. These are further decreased in pre-eclampsia or eclampsia. Animal experiments show that the lower albumin concentration is accentuated if the maternal diet is low in protein (6,16). Thus a low dietary protein intake in early pregnancy will likely increase the risk of pre-eclampsia.

A higher dietary calcium reduces the level of parathyroid hormone which in turn reduce the cytosolic calcium ion resulting in reduced muscular reactivity and eventually in reduced blood pressure. A low dietary calcium has the opposite effect (17). Thus a low dietary calcium intake in early pregnancy will likely increase the risk of developing hypertension.

7.2 RECOMMENDATIONS

1. Since education is more of a government function, government commitment and encouragement of the on going literacy classes and formal education are the needed resources for the country.

2. Health education in the community concerning age at first marriage.

3. Health education on the importance of child spacing methods and making some of them available at the primary health care level.

4. Community based health care should gain emphasis to screen the women at risk, to monitor the pregnancy, to treat some complaints, to attend deliveries and refer to the nearest higher level as indicated.

5. Adequate training, regular supervision and support for traditional birth attendants which is the shortest way to improve prenatal care in the community especially in the rural areas. Initiate community involvement as much as possible.

6. Increase the maternity services at all levels in the health service delivery system. This include,
 - a) Increase the awareness of health professionals including, community health workers about the magnitude of the problem
 - b) Strengthen maternity services by extending the service to the community as an out reach in integrated basis with other programs.

c) Increase the quality of the service by increasing obstetric beds in the hospital, organizing adequate transfusion service and the facilities for emergency operations.

d) Increase the knowledge, attitude and practice of the community in general and of women in particular to increase the rate of utilization of antenatal care services.

7. To keep on going advising bed rest while taking care of pre-eclamptic and gestational hypertensive women.

8. Specific nutrition education for a high dietary protein and calcium rich intake during pregnancy should be part of the strategies in the health care services for pregnant women.

9. Further research on the magnitude and determinants of high risk pregnancies should be encouraged.

Adequate training of traditional birth attendants and use them together with making child spacing methods available at the primary health care level should gain a priority concern. These will avoid much of the suffering and deaths of women related to pregnancy.

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ANNEX A

REGISTRATION FORM

Form No. _____
 Enumerator's Name _____
 Signature _____
 Date _____

We are conducting a study of mothers health problem during pregnancy. In the following questions, I will be asking you the general identification points, to identify those pregnant mothers in your household, so that they will be included in the study after their permission. This study has the approval of Addis Ababa University.

Town Kef. _____ kebele _____
 Village Name _____ Number _____

House Number	Household Number	Name of Females Aged 15-49 years	Name of Women Who is Pregnant	Status of Person Interviewed	Total Number of Persons in the household
		1 _____ 2 _____ 3 _____ 4 _____ 5 _____			
		1 _____ 2 _____ 3 _____ 4 _____ 5 _____			
		1 _____ 2 _____ 3 _____ 4 _____ 5 _____			
		1 _____ 2 _____ 3 _____ 4 _____ 5 _____			

Supervisor's Name _____ Signature _____ Date _____

ANNEX B

Form No. _____

Enumerator's Name _____

Signature _____

Date _____

We are conducting a study of mothers health problem during pregnancy. It has been necessary to understand more about the socio-demographic, economic, nutrition, work intensity and medical history as to their contribution to ill health during pregnancy. Therefore I would like to ask some questions in this respect.

Town Kef _____ Kebele _____ House No. _____

Village Name _____ House No. _____

A. SOCIO-DEMOGRAPHIC STATUS

- _____
1. Present maternal age in years
 2. Age at first marriage in years

Code in Number	
_____	_____
_____	_____

6. Mothers Occupation

- | | |
|--|---|
| ___ Housewife | 1 |
| ___ Student | 2 |
| ___ Maid servant | 3 |
| ___ Cleaners | 4 |
| ___ Factory workers | 5 |
| ___ Government employees
(nurse, teacher, etc...) | 6 |
| ___ Farmer | 7 |
| ___ Others (specify) _____ | 8 |

7. Marital status

- | | |
|----------------------------|---|
| ___ Married | 1 |
| ___ Single (never married) | 2 |
| ___ Divorced/Separated | 3 |
| ___ Widowed | 4 |

8. Total family monthly income in Birr

_____.

Code in Number

—

—

— — — —

B. NUTRITION

9. In the following question about nutrition we are interested in knowing about your usual diet during the first 2 months of the present pregnancy.

No.	Types of Food	Day	Week	Month	Two Months	None
1	Barley "injera" (1 Pc)					
2	Corn "injera" (1 Pc)					
3	Sorghum "injera" (1 Pc)					
4	Teff "injera" (1 Pc)					
5	Corn bread ("kita") (1 Pc)					
6	Wheat bread ("ambasha") (1 Pc)					
7	Wheat bread ("dabo") (1 Pc)					
8	Enset (kotcho) (1 Pc)					
9	Wheat Porridge (1 ldl)					
10	Enset ("bula") (1 ldl)					
11	Potato (1)					
12	Sweet Potato (1)					
13	Corn Porridge (1 ldl)					
14	Corn "nifro" (1 ldl)					
15	Chick peas (kolo) (1 ldl)					
16	Barley kolo (1 ldl)					
17	Corn Kolo (1 ldl)					

No.	Types of Food	Day	Week	Month	Two Months	None
18	Emmerwheat gruel (1 ldl)					
19	Wheat Kolo (1 ldl)					
20	Sorghum kolo (1 ldl)					
21	Fenugreek gruel (1 ldl)					
22	Butter (1 tsp)					
23	Cheese (1 tsp)					
24	Cow milk (1 cup)					
25	Sour milk ("ergo") (1 cup)					

No.	Types of Food	Day	Week	Month	Two Months	None
26	Butter milk ("arera") (1 cup)					
27	Dried skim milk (1 tsp)					
28	Egg (yolk part) (1)					
29	Egg (white part) (1)					
30	Broad beans wat (1 ldl)					
31	Peas red wat (1 ldl)					
32	Kale wat (1 ldl)					
33	Lentils red wat (1 ldl)					
34	Pea "shiro" wat (1 ldl)					

No.	Types of Food	Day	Week	Month	Two Months	None
35	Meat wat (1 dl)					
36	Lentils "alicha" wat (1 dl)					
37	Pea "alicha wat"(1 dl)					
38	Pea "alicha shiro wat (1 dl)					
39	Birds eye (1 tsp)					
40	Dried meat (1 Pc)					
41	Raw meat (1 Pc)					
42	Chicken stew (1 dl)					
43	Fish (1)					
44	Wine (1 kilo)					
45	Lemon (1)					
46	Orange (1)					
47	Sugar cane (1 Pc)					
48	Banana (1)					
49	Tomato (1)					
50	Carrot (1)					
51	Green pepper (1)					
52	Garlic (1 tsp)					
53	Onion (1)					
54	Pumpkin (1 Pc)					
55	Linseed gruel (1 cup)					
56	Linseed soup (1 cup)					
57	Safflower seed (1 cup)					

C. WORK INTENSITY

In the following questions about your work intensity we are interested in knowing about your usual activity during the first 5 months of pregnancy.

I As part of exercise

No.	Types of Activities	Day	Week	Month	Three months	None
1	Walking for (1 hr)					
2	Swimming for (1 hr)					
3	Bicycling for (1 hr)					
4	Running/Jogging (1 hr)					
5	Tennis (1 hr)					
6	Others (specify)					

II As part of work at home

No.	Types of Activities	Day	Week	Month	Three months	None
7	Walking for (1 hr)					
8	Carrying water for (1 hr)					
9	Grinding/crunching grain (1 hr)					
10	Sweeping floor (1 hr)					
11	Washing clothes (1 hr)					
12	Carrying load from market (1 hr)					
13	Others (specify)					

III As part of work out of home

No.	Types of Activities	Day	Week	Month	Three months	None
14	Professional & technical (8 hrs)					
15	Administrative & managerial (8 hrs)					
16	Clerical (8 hrs)					
17	Farm (8 hrs)					
18	Service (8 hrs)					
19	Industrial work (8 hrs)					
20	Others (specify)					

D. HEALTH INFORMATION

In the following questions about your health, we are interested in knowing about your past and present medical and obstetric history, and we are also interested in knowing some relevant health problems in your family.

PAST MEDICAL HISTORY

11. Did you have high blood pressure
(hypertension)?

- ___ No 0
 ___ Yes 1
 ___ Don't know 2 if yes,

12. Was the diagnosis made by health
professional?

- ___ No 0
 ___ Yes 1
 ___ Don't know 2

13. Did you have raised blood/urine sugar
(diabetes)?

- ___ No 0
 ___ Yes 1
 ___ Don't know 2 if yes,

14. Was the diagnosis made by health professional?

- ___ No 0
 ___ Yes 1
 ___ Don't Know 2

Code in Number

—

—

—

—

Code in Number

15. Did you have bloody urine/swollen legs or face (Renal Disease)?

No 0

Yes 1

Don't know 2 if yes,

16. Was the diagnosis made by health professional?

No 0

Yes 1

Don't know 2

17. Did you have excessive vaginal bleeding after delivery (postpartum hemorrhage)?

No 0

Yes 1

Don't know 2 if yes,

18. Was the diagnosis made by a health professional?

No 0

Yes 1

Don't know 2

19. Did you have vaginal bleeding after the 28th weeks of gestational (ante partum hemorrhage)?

No 0

Yes 1

Don't know 2 if yes,

20. Was the diagnosis made by a health professional?

- No 0
- Yes 1
- Don't know 2

21. Did you have "fits" during the past pregnancies?

- No 0
- Yes 1
- Don't know 2 if yes,

22. Was the diagnosis made by health professional?

- No 0
- Yes 1
- Don't know 2

23. Other past medical history (specify)___

PRESENT MEDICAL HISTORY

24. Do you have high blood pressure (hypertension)?

- No 0
- Yes 1
- Don't know 2 if yes,

Code in Number
—
—
—
—

Code in Number

25. Was the diagnosis made by health professional?

 No 0 Yes 1 Don't know 226. Do you have raised blood/urine sugar
(diabetes)? No 0 Yes 1 Don't know 2 if yes,

27. Was the diagnosis made by health professional?

 No 0 Yes 1 Don't Know 228. Do you have bloody urine/swollen legs or
face (Renal Disease)? No 0 Yes 1 Don't know 2 if yes,

29. Was the diagnosis made by health professional?

 No 0 Yes 1 Don't know 2

30. Other medical history at present (specify) _____

OBSTETRIC HISTORY

		Code in Number	
31. Present number of pregnancies	_____	—	—
32. Present number of deliveries	_____	—	—
33. Number of live births	_____	—	—
34. Number of abortions			
___ None	0		
___ One	1		—
___ Two or more	2		
35. Do you have vaginal bleeding at present (abortion/ antepartum hemorrhage)?			
___ No	0		
___ Yes	1		—
___ Don't know	2 if yes,		
36. Was the diagnosis made by health professional?			
___ No	0		
___ Yes	1		—
___ Don't know	2		
37. Number of still births			
___ None	0		
___ One	1		—
___ Two or more	2		

38. Number of infant deaths (≤ 1 year) None 0 One 1 Two or more 2

39. Period of gestation in months

 ≤ 3 months 1 $> 3-6$ months 2 > 6 months 3 Unknown 4

40. Other obstetric history (specify) _____

41. Family history of health problems

 Hypertension 1 Diabetes 2 Others (specify) _____ 8

42. Antenatal care attendance

 No 0 Yes 1

Code in Number

—

—

—

—

E. MEASUREMENTS

As part of our study we are also interested in taking measurements, which help us to understand more about your health status. Therefore, I am going to measure your blood pressure, height and urine protein.

- 43. Mothers height in (cm)
 - ___ 150 cm or less 1
 - ___ >150 cm 2
- 44. Blood pressure in (mmHg)
 - A. Systolic _____
 - Diastolic _____
 - B. Systolic _____
 - Diastolic -----
- 45. Albuminuria
 - ___ Negative
 - ___ Trace
 - ___ +
 - ___ ++
 - ___ +++

Code in Number

Supervisor's Name _____

Signature _____

Date _____

የትሎ ቁጥር _____
 የትሎ የምሳጭ ስም ስም _____
 የትሎ የጥላባት ቀን _____
 ፊርማ _____

በአሁኑ ጊዜ እና ተቸ በእርገዝና ወቅት የሚያገጥሙትን ችግር በተመለከተ ጥናት በጣም ረገ ላይ እንገኛለን። ስለሆነም የእና ተቸ አጠቃላይ የሄሮ ደረጃ የአጠቃላይ ልዩነቶቹ፣ የሥራ ልዩነቶቹና እንዲሁም በጤና ያርመራያቸው የሚገኙት ልዩነቶች በእርገዝና ወቅት በእናት የጥናት በጽንሱ ላይ ስለሚደገፉት ችግሮች ጭንቀት አስፈላጊ ሆኖ በጠገን ብዙም አኳያ ለጥቅርብ ጥያቄያቸው እንዲተባበሩ በተሾሙትና እጠይቃለሁ።

ሀ. በመጀመሪያ የጥቅርብ ጥያቄ አጠቃላይ መረጃያቸውን የሚመለከት ይሁናል።

ስተጻፍ : ከፍተኛ _____ ተባብሮ _____ የቤት ቁጥር _____
 ገጠር : የጠገን ደረጃ ስም _____ የቤት ቁጥር _____

	ከዚህ በታች
1 በአሁኑ ጊዜ በእርገዝና ላይ ያሉት ሴት ፀጩ / በዓመት /	
2 መጀመሪያ ተጻር ሲጠራ ተ የነበሩት ፀጩ / በዓመት /	
3 በእርገዝና ላይ ያሉት ሴት የተቃራኒ ደረጃ	
<input type="checkbox"/> ጣንባብና ጠገን የጣይቸሉ 1	
<input type="checkbox"/> ጣንባብና ጠገን የሚቸሉ 2	
<input type="checkbox"/> የአገደኛ ደረጃ ተቃራኒ የተከታተሉ 3	
<input type="checkbox"/> የሁለተኛ ደረጃ ተቃራኒ የተከታተሉ 4	
<input type="checkbox"/> ከፍተኛ ተቃራኒ የተከታተሉ 5	
ሌላ ባለ / ይገለጻል / _____ 8	

7 የእናተ የግ የቤተሰብ ይዘት

- ያገባቸ 1
- ያሏገባቸ 2
- የተፋታቸ 3
- ባለቤቷ ባጥተ የተለያተ 4

8 የቤተሰብ ጠቅላላ የፀር ገቢ ስጦር _____

ስድስት ስጦር

ለ. የዲቶሎጂ ጥያቄያቸውን የዲያቲብራት በመጀመሪያ ያያዙ ሁለት ወራት ለዘፀትረፍ ስለተሰጠው የምገብ ዓይነቶች ይህናል፡፡

ተ. ቁ.	የምገብ ዓይነት	በቀን	በሰዓት	በጾር	በሁለት ወራት	ምንም ለስጠላሁም
1	የገብስ ለገጀራ / ለገጃ/					
2	የበቀሉ ለገጀራ / ለገጃ/					
3	የጣቦላ ለገጀራ / ለገጃ/					
4	የጤፍ ለገጀራ / ለገጃ/					
5	የበቀሉ ጫማ / ለገጃ ቅሬጥ/					
6	የሰገዳ ለምግብ / ለገጃ ቅሬጥ/					
7	የሰገዳ ጎብ / ለገጃ ቅሬጥ/					
8	የቀጠ ወይም የሰገዳ ጫማ / ለገጃ ቅሬጥ/					
9	የሰገዳ ገገፍ / ለገጃ ጥሰታ/					
10	የቀጠ ገገፍ ወይም ጫማ / ለገጃ ጥሰታ/					

ተ. ቁ.	የምገባ ዓይነት	በቀጥ	በሰጥጥ	በወር	በሁለት ወራት	ምገም ስልጠና
11	ዱገፍ / አገዳ					
12	የሰከር ዱገፍ/አገዳ/					
13	የበቆሎ ገገፍ /አገዳ ጭልፋ/					
14	የበቆሎ ገፍር /አገዳ ጭልፋ/					
15	የጠምብራ ቆሎ /አገዳ ጭልፋ/					
16	የገብብ ቆሎ /አገዳ ጭልፋ/					
17	የበቆሎ ቆሎ /አገዳ ጭልፋ/					
18	የአጃ ጫቀ /አገዳ ብርጭቅ/					
19	የሰገጃ ቆሎ /አገዳ ጭልፋ/					
20	የጣጣሳ ቆሎ /አገዳ ጭልፋ/					
21	አበገ የተቀቀለ /አገዳ ብርጭቅ/					
22	ቀቤ /አገዳ የገይ ጣገኪያ/					
23	አይብ /አገዳ የገይ ጣገኪያ/					

ተ. ቁ.	የምገባ ዓይነት	በቀጥ	በሰጥጥ	በወር	በሁለት ወራት	ምገም ስልጠና
24	የሳም ወተት /አገዳ ብርጭቅ/					
25	አርጌ/አገዳ ብርጭቅ/					
26	አራራ/አገዳ ብርጭቅ/					
27	የፋቶ ወተት /አገዳ ብርጭቅ/					
28	አገቆላሳ አሰከሳ /አገዳ/					
29	የአገቆላሳ ነጭ ብቻ /አገዳ/					
30	የባቆላ ከከ ወጥ /አገዳ ጭልፋ/					
31	የአተር ከከ ቀይ ወጥ /አገዳ ጭልፋ/					
32	የገጫገ ወጥ /አገዳ ጭልፋ/					
33	የምሥር ከከ ቀይ ወጥ /አገዳ ጭልፋ/					

ተ. ቁ.	የምገባ ዓይነት	ቦታ	በሰነድ	ብድር	በሌላው ወረት	ምገባ አሰጣጥ
34	የአተር ገር ቀይ ወጥ /አገዳ ጭፋ/					
35	የሰጋ ወጥ/አገዳ ጭፋ/					
36	የምሥር ከከ አሰጣ /አገዳ ጭፋ/					
37	የአተር ከከ አሰጣ /አገዳ ጭፋ/					
38	የአተር ገር አሰጣ /አገዳ ጭፋ/					
39	ጭጥጫ /አገዳ የገይ ጭገያ/					
40	ጭገያ /አገዳ ዘሰዘሰ/					
41	ጥሪ ሥጋ /አገዳ ጭጥ/					
42	የደር ወጥ /አገዳ ብሰት/					
43	አሃ /አገዳ/					
44	ወይን/አገዳ ዘለላ/					
45	ሌጃ /አገዳ/					
46	ብር ተከገ /አገዳ/					
47	ሸገገራ /አገዳ/					
48	ጫዘ /አገዳ/					
49	ቴግቴግ /አገዳ/					
50	ካርት /አገዳ/					
51	ጋሪ ጋ /አገዳ/					
52	ነጭ ገንጠርት/አገዳ/					
53	ቀይ ገንጠርት/አገዳ/					
54	ጭገ /አገዳ ጭጥ/					
55	የተፈጠ ተሰጣ /አገዳ ብርጭጭ/					
56	ጥሪ ተሰጣ የተቀቀለ /አገዳ ብርጭጭ/					
57	ጭፍ /አገዳ ብርጭጭ/					

10. ስ. የጌታዎች ጥያቄዎችን የሚያተኩሩት በመጀመሪያዎቹ ሰባት የስርገዘና ወራት አብዛኛውን ጊዜ በሚሰሩ የጥቅም ሥራዎች ላይ ያተኮሩ ይሆናሉ።

1. በአካል ማሳበሪያ መሰከ

ተ. ቁ.	የሥራው ዓይነት	በቀን	በሰዓት	በወር	በሠዓት ወራት	ምንም አልሠራም
1	የመጠነኛ አርቃጃ አገባብ/1 ሰዓት/					
2	መዋኝት /1 ሰዓት/					
3	በሰከለት መገገጥ /1 ሰዓት/					
4	መርጥ /1 ሰዓት/					
5	ቴኒስ መጫወት /1 ሰዓት/					
6	ሌላ ካለ ይጻፉ					

2. በቤት አካባቢ የሚሰሩ ሥራዎች

ተ. ቁ.	የሥራው ዓይነት	በቀን	በሰዓት	በወር	በሠዓት ወራት	ምንም አልሠራም
7	መጠነኛ አርቃጃ አገባብ/1 ሰዓት/					
8	ጭን ተሸከቦ ማዎጣት /1 ሰዓት/					
9	አሀል መፍጨት/መጭቀጥ/ /1 ሰዓት/					
10	ቤት ማጽጻት /1 ሰዓት/					
11	ልብስ ማጠብ /1 ሰዓት/					
12	ከገበያ ዕቃ ተሸከቦ ማዎጣት /1 ሰዓት/					
13	ሌላ ካለ ይጻፉ					

3. ከጠተ አካባቢ ውጪ የጻገሩ ሥራ ምድቶች

ተ. ቁ.	የሥራው ዓይነት	ቦታ	በሰዎች	ቦታ	በሠራተኛው ወራት	ምንም አሰራርም
14	ፕሮግራም ተከናኦ / ነርቲካንት/ግራ ወዘተ/8 ሰዓት/					
15	የባህሪ ሥራ/8 ሰዓት/					
16	የጽሕፈት ሥራ ምድቶች /8 ሰዓት/					
17	እርግ /8 ሰዓት/					
18	የጠተ ሥራ ተኛ /8 ሰዓት/					
19	የፋብሪካ ውስጥ ሥራ /8 ሰዓት/					
20	ሌላ ካለ ይጥቀሱ					

ጠ. ጤና በተለከተ

የሚቀጥሉት ጥያቄዎች የሚያተኩሩት ከዚህ ቀደም በነበረባቸው የጤና ፕገርና በአሁኑ ወቅት ለኖር ይቻላል ይህንን ጥያቄ የጤና ፕገር ላይ ያተኮረ ይሆናል። በተጨማሪም በቤተሰብዎ ውስጥ ለኖሩ የሚቀጥሉትን የጤና ፕገሮች በመገገር ለገዳተባቸውን ለገጠይቃለን።

ከዚህ በቀጥታ

11. ከዚህ ቀደም የደም ገፊት ያ ከጤና በላይ ጤናዎ ምን ይሆናል?

- ለ ያ ጭቀም 0
- ያ ጭቃል 1
- ለ ልተከታተልኩት 2

12. የደም ገፊት ያ ከጤና በላይ ጤናዎ ምን ይሆናል የተነገረዎት በጤና ባለሙያ ነጭ?

- ለ ይደለም 0
- ነጭ 1
- ምን ነጭ ተኮር ለላ ጭቀም 2

13. የባህር በሽታ ኖርብ ያት ያ ጭቃል?

- ለ ያ ጭቀም 0
- ያ ጭቃል 1
- ለ ልተከታተልኩት 2

14. የባህር በሽታ ለገዳለብዎት የተነገረዎት በሕክምና ባለሙያ ነጭ?

- ለ ይደለም 0
- ነጭ 1
- ምን ነጭ ተኮር ለላ ጭቀም 2

<p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p>

15. በገንዘብ በደም የተቀየሙ/አገር ያወደሙ ፊት ያ/ አብጦ ያጭቃሉ? / የኩላሊት በሽታ/

- አ ያጭቀም 0
- ያጭቃል 1
- አልተከታተሉትም 2

16. የኩላሊት በሽታ እንዳለብዎ የተነገረዎ በጤና ባለሙያ ነጩ?

- አይደለም 0
- ነጩ 1
- ምን ነታቸውን አሳጭቀም 2

17. ከወላጅ በኋላ ከመጠን በላይ የደም ጭፍሰት ችግር አጋጥሞ ያታሉ?

- አ ያጭቀም 0
- ያጭቃል 1
- አልተከታተሉትም 2

18. ከመጠን በላይ ደም ጭፍሰት የተነገረዎ በጤና ባለሙያ ነጩ?

- አይደለም 0
- ነጩ 1
- ምን ነታቸውን አሳጭቀም 2

19. በእርገዝና ወቅት ሰባት ወር ከሞላ በኋላ በጣላጭ ደም የጭፍሰት ችግር አጋጥሞ ያታሉ?

- አ ያጭቀም 0
- ያጭቃል 1
- አልተከታተሉትም 2

ዘድ በቅጥር

20. ሰባት የስርገዛና ወራት ካሳለፉ በኋላ የነበረው ደም የሎኖሰስ ፑገር የተነገረዎት በጤና ባለሙያ ነው?

- አይደለም 0
- ነው 1
- ምን ነታቸውን አሳውቅም 2

21. የሚጥሰው በሽታ ኖርብ ያድጋል?

- አያውቅም 0
- ያውቃል 1
- አልተከታተሉትም 2

22. የሚጥሰው በሽታ እንዳለብዎት የተነገረዎት በጤና ባለሙያ ነው?

- አይደለም 0
- ነው 1
- ምን ነታቸውን አሳውቅም 2

23. ሌላ ከዚህ ቀደም የነበረ የጤና ፑገር ካለ ይገለጻል: _____

24. በአሁኑ ወቅት የደም ገፊት ያ ከጠጠን በላይ ጩዳላ?

- አያውቅም 0
- ያውቃል 1
- አልተከታተሉትም 2

25. የደም ገፊት ያ ጠጠር የተነገረዎት በሕክምና ባለሙያ ነው?

- አይደለም 0
- ነው 1
- ምን ነታቸውን አሳውቅም 2

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	<hr style="width: 50%; margin: 0 auto;"/>
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26. በአሁኑ ወቅት የሰከር በሽታ አለብዎት?

- አያውቅም 0
- ያውቃል 1
- አልተከታተልኩትም 2

27. የሰከር በሽታ አገዳለብዎት የተነገረዎት በሕክምና ባለሙያ ነጭ?

- አይደለም 0
- ነጭ 1
- ዎን ነታገጃን አላውቅም 2

28. ሽንትዎ በደም የተቀየመ/አገርዎ ወይም ፊትዎ/ ያበጣላችሁ? / የኩላሊት በሽታ/

- አያውቅም 0
- ያውቃል 1
- አልተከታተልኩትም 2

29. የኩላሊት በሽታ አገዳለብዎት የተነገረዎት በጤና ባለሙያ ነጭ?

- አያውቅም 0
- ያውቃል 1
- ዎን ነታገጃን አላውቅም 2

30. ሌላ በአሁኑ ወቅት ያለ የጤና ችግር ይጠቀስ

38. አገዳሚዎች ለሥራ ለማድረግ የሚችሉትን ዘዴዎች ይጠቅሙ

- የሥራ ለማድረግ 0
- አገዳሚዎች 1
- ሌሎችም ለሥራ ለማድረግ 2

39. የሥራ ለማድረግ ወቅት /በወራት/

- 3 ወራት 1
- ከ3 - 6 ወራት 2
- ከ6 ወራት በላይ 3
- አልተከተተም 4

40. ለሥራ ለማድረግ በሚያስፈልጉት ደንብ ላይ ስለሚገኙት ደንቦች

41. በሥራ ለማድረግ ወቅት ከሚከተሉት የሥራ ለማድረግ የሚያስፈልጉትን ደንቦች ይጠቅሙ፡፡

- የሥራ ለማድረግ 1
- የሥራ ለማድረግ 2
- ሌሎችም ለሥራ ለማድረግ 8

42. በሥራ ለማድረግ የሚያስፈልጉትን ደንቦች ይጠቅሙ

- አልተከተተም 0
- ተከተላለሁ 1

ሠ. የጤና ዎርመራ

በአሁኑ ዓይነት ስለሚከናወነው ጤናዎች ለመረጃ ለማግኘት ያስቸል ዘንድ የደዎ ገፈት ያቸገሩ ጤናዎችን አገልግሎት፣ የገንጠል ዎርመራዎችን ለደር ገልጽታለን፡፡

43. የላይኛ የዋ ጤና / በሴንቲ ሜትር /

150 ሴ.ሜትርና ከዚያ በታች

ከ150 ሴ.ሜትር በላይ

44. የደዎ ገፈት / ቁጥር በሌላ / በሜ.ሜ. ሜትር

ሀ. ሲባታል _____

የሲባታል _____

ለ. ሲባታል _____

የሲባታል _____

45. የገንጠል ዎርመራ / አሰጣጥ /

Negative

Trace

+

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+++

ከዚያ በታች

Vertical box containing horizontal lines for recording answers to questions 43, 44, and 45.

የተቀጣጠሉት ቦታ _____

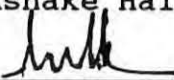
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DECLARATION

THIS THESIS IS MY ORIGINAL WORK, AND HAS NOT
BEEN PRESENTED FOR A DEGREE IN ANY OTHER
UNIVERSITY AND ALL SOURCES OF MATERIAL USED
FOR THIS THESIS ARE GRATEFULLY ACKNOWLEDGED.

Name: Asnake Hailu, MD

Signature 

Place. Addis Ababa University, Ethiopia

Date of Submission: MARCH 11/1991

THIS THESIS HAS BEEN SUBMITTED FOR EXAMINATION
WITH MY/OUR APPROVAL AS UNIVERSITY ADVISOR(S)

Dr. Derege Kebede 