



Appraisalment of preponderance and risk factors of gestational hypertension in a tertiary care hospital in south India

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ABSTRACT

The aim of this prospective observational study was to appraise the preponderance and risk factors of gestational hypertension in a tertiary care referral hospital and also to evaluate the complications associated with Gestational hypertension and to study the delivery and foetal outcomes of such patients. The study was carried out at the in-patient and out -patient setting of a private tertiary level hospital at the Malabar region of Kerala. Based on inclusion criteria, a total of 150 eligible consenting antenatal mothers were enrolled and participated in the study. All the study subjects were screened for GHTN. The prevalence and number of risk factors for GHTN were identified. The percentage of caesarean delivery and low birth weight of infants in GHTN patients were compared to non GHTN patients. The prevalence of GHTN is about 23%. The risk factors for GHTN were age > 35 yrs, overweight, history of hypertension as well as family history of hypertension and diabetes. The prevalence of pre- term birth, IUGR, NICU admission was significantly higher in women in GHTN than those with non GHTN. The percentage of caesarean delivery is higher in GHTN women than that of non GHTN women and the percentage of low birth weight of infants is higher in GHTN patients when compared to non GHTN patients. Nifedipine is commonly used in the management of GHTN. The possible risk factors confirmed in the study may be useful for the development of early diagnosis and appropriate treatment of GHTN.

INTRODUCTION

Gestational hypertension and preeclampsia are hypertensive disorders during pregnancy (HDP). Gestational hypertension is a condition of onset of hypertension without proteinuria after 20 weeks of gestation whereas preeclampsia is refers to the onset of hypertension and proteinuria after 20 weeks of gestation. Gestational hypertension occurs in approximately 6% of pregnancies and evolves into preeclampsia in 10% to 20% of cases [1].

HDP can also trigger severe forms of maternal complications, such as cardiovascular and cerebrovascular disease, liver and kidney failure, placental abruption, disseminated intravascular coagulation (DIC) and Haemolysis, Elevated liver enzymes, low platelet count (HELLP) syndrome. Under these circumstances, the placenta dysfunction can occur leading to foetal growth restriction, foetal distress, preterm birth, intra uterine foetal demise, still birth, and neonatal asphyxia [2]. Pregnancy induced hypertension (PIH) is the second most common medical disorder

during pregnancy. WHO estimates that at least one woman dies every 7 minutes from complications of hypertensive disorders of pregnancy. Most death in PIH occurs due to its complications and not due to hypertension itself.

The death related to hypertensive disorder can be avoided by providing timely and effective care to woman presenting with such complications. Thus, optimization of health care for woman during pregnancy to prevent and treat pregnancy induced hypertension is a necessary step towards achievement of the millennium development goals. Management of women with hypertension aims at minimizing further pregnancy related complications, avoiding unnecessary prematurity and maximizing maternal and infant survival [3]. The primary objectives of treating PIH are to improve the quality of care and outcomes for pregnant women having hypertension. Hypertension in pregnancy can be diagnosed on the basis of absolute blood pressure, mean blood pressure or an elevation in blood pressure during the second trimester from a baseline reading in the first trimester. Hypertension in pregnancy is

defined as a diastolic blood pressure of 90 mm Hg or more, regardless of the degree of rise in systolic or diastolic blood pressure between visit. A systolic blood pressure >140 mm Hg, although not necessarily defining hypertension in pregnancy, provide close monitoring of the patient and foetus [3].

Gestational hypertension is a condition in which systolic blood pressure ≥ 140 mmHg and/or diastolic blood pressure ≥ 90 mmHg in a previously normotensive pregnant woman who is ≥ 20 weeks of gestation and has no proteinuria or new signs of end-organ dysfunction. The blood pressure readings should be documented on at least two occasions at least four hours apart. It is considered severe when sustained elevations in systolic blood pressure ≥ 160 mmHg and/or diastolic blood pressure ≥ 110 mmHg are present for at least four hours. Gestational hypertension is a temporary diagnosis for hypertensive pregnant women who do not meet criteria for preeclampsia or chronic hypertension (hypertension first detected before the 20th week of pregnancy).

Pre-eclampsia

Preeclampsia is diagnosed as hypertension with significant proteinuria, specifically gestational hypertension with new onset proteinuria, or chronic (preexisting) hypertension with new or worsening proteinuria. When preeclampsia develops in women with chronic (preexisting) hypertension, the classification of disease is chronic (preexisting) hypertension plus superimposed preeclampsia. Edema is not considered as specific diagnostic criterion for preeclampsia. Pregnant women with hypertension with other adverse conditions but no proteinuria should have further evaluation for preeclampsia.

Chronic hypertension

Chronic (pre-existing) hypertension is determined as hypertension (systolic blood pressure ≥ 140 mmHg or diastolic blood pressure ≥ 90 mmHg or both) that is present before 20 weeks of gestation or prior to pregnancy. Elevated readings should be documented on more than one occasion during the antenatal care visit. As per the World Health Statistics 2012, of the estimated 57million global deaths in 2008, 36 million (63%) were due to non-communicable diseases (NCDs). The largest proportion of NCD deaths is caused by cardiovascular diseases (48%). In terms of attributable deaths, raised blood pressure is one of the leading behavioral and physiological risk factor to which 13% of global deaths are attributed. Hypertension is reported to be the fourth contributor to premature death in developed countries and the seventh in developing countries [5]. Assessing the epidemiology of pre-eclampsia is difficult due to lack of conformity of the definitions. The incidence of pre-eclampsia for developing countries was estimated to be 3.4%. The incidence of pre-eclampsia was estimated to be 2.8% from the Norwegian Birth Registry for the period 1967-1998. The South East Thames Study estimated that pre-eclampsia incidence to be 0.4% for the period 1997-1998[6]

The prevalence of hypertension in the late nineties and early twentieth Century varied among different studies in India, ranging from 2-15% in Urban India and 2-8% in Rural India. Review of epidemiological studies suggests that the prevalence of hypertension has increased in both urban and rural subjects and presently is 25% in urban adults and 10-15% among rural adults. The prevalence of hypertension in the last six decades has increased from 2% to 25% among urban residents and from 2% to 15% among the rural residents in India. According to Directorate

General of Health Services, Ministry of Health and Family Welfare, Government of India, the overall prevalence of hypertension in India by 2020 will be 159.46/1000 population. The prevalence of high normal blood pressure (also called prehypertension in JNC-VII) has been seen in many recent studies and was found to be around 32% in a recent urban study from Central India. In some studies from South India (Chennai) and from Delhi prevalence of high normal blood pressure has been even higher up to 36% and 44% respectively in these regions. The prevalence of hypertension increases with age in all populations. [7]

Hypertension in pregnancy must be treated in its own right, regardless of the assumed underlying pathology, largely to reduce the risk of maternal intracranial haemorrhage. The level at which antihypertensive treatment is initiated, depending on whether treatment is focused on maternal or foetal wellbeing [8]. Gestational hypertension is a condition that occurs during second trimester of pregnancy. If the blood pressure is not controlled it will cause complications during delivery that will adversely affect the mother and baby. Every mother should take preventive measures against gestational hypertension. The preponderance and risk factors of hypertension during pregnancy is not well documented in Indian literature. The present study was taken to study the preponderance and risk factors of hypertension in pregnancy and its impact on foetal and maternal outcome.

METHODOLOGY

The study was carried out at the in-patient and out -patient setting of a private tertiary level hospital at the Malabar region of Kerala. A prospective observational study was conducted among antenatal mothers with the aim to appraise the preponderance and risk factors of Gestational hypertension in a tertiary care referral hospital over a period of 1 year. The study was approved by the ethics committee of the hospital and an official consent was also provided by the authority for the purpose of conducting the study. The inclusion criteria comprised pregnant women with gestational age of 20 weeks and above and pregnant women who are not having any history of hypertension.

Exclusion criteria included pregnant women with gestational age of less than 20 weeks and pregnant women with history of hypertension. Patients not willing to participate in the study were exempted as well.

All the relevant information regarding the study was collected from the study subjects with the help of a specially design data collection form and questionnaire. Before data collection, all subjects were informed that the study is to explore their personal background and their medical details and the treatment patterns. Confidentiality was addressed. Data were collected anonymously. All the data's were collected by patient interview review of patient's admission details, medication records and discharge summary and by discussion with other health care professionals. . Each and every participant was counselled about the management of the disease, risk and complication, therapeutic lifestyle changes including dietary modifications and exercise. Patients were encouraged to adhere to healthy lifestyle habits and medications to prevent from future risk of hypertension.

Data on prevalence of risk factors and complications were collected from all the study subjects. The data obtained were analyzed and compared among GHTN and non GHTN group for identifying the prevalence of GHTN, age distribution, socio economic status, educational qualification, region wise

distribution, risk factors, complications, delivery outcomes and foetal outcomes. The collected data from 150 subjects were analysed by statistical treatment using statistical package for social sciences (SPSS) software version 20.0 for WINDOWS. For continuous variables mean, standard deviation, minimum and maximum were calculated for summarizing the raw data. For categorical variables frequency and percentages were calculated. In the case of discrete data, median and quartile deviations were calculated for condensing the raw data. Chi square test was used for finding significant difference/association between categorical dependent variables with respect to various groups. Paired t test was used for comparing two groups with respect to each parameter. P value less than 0.05 is considered to be statistically significant.

RESULTS

A total of 150 pregnant subjects > 20 weeks of gestation were enrolled in the study and evaluated for GHTN. Out of 150 subjects, 35 (23 %) were diagnosed as GHTN. The remaining 115(77 %) formed the Non GHTN and the prevalence of GHTN was found to be 23.3%. Compared to non GHTN subjects, most of the GHTN patients were in the age group between 20-25 years with the mean age of 27.94 ± 6.49 , p value < 0.05 and it was found to be statistically significant. Among GHTN group, 25(71.4%) patients were found to be residing at rural area and 10 (28.6%) patients residing at urban area. Whereas in non GHTN group 77(67%) study subjects were from rural areas and 38(33%) patients were residing at urban area.

Patients were classified to various socioeconomic statuses by

Table 1

Socio economic class	GHTN group Frequency (%)	Non GHTN group Frequency (%)	Chi square value	p value
Upper	9 (25.7)	12 (10.4)	8.11	0.088
Upper middle	12 (34.3)	32 (27.8)		
Lower middle	7 (20.0)	33 (28.7)		
Upper lower	3 (8.6)	25 (21.7)		
Lower	4 (11.4)	13 (11.3)		
Total	35	115		

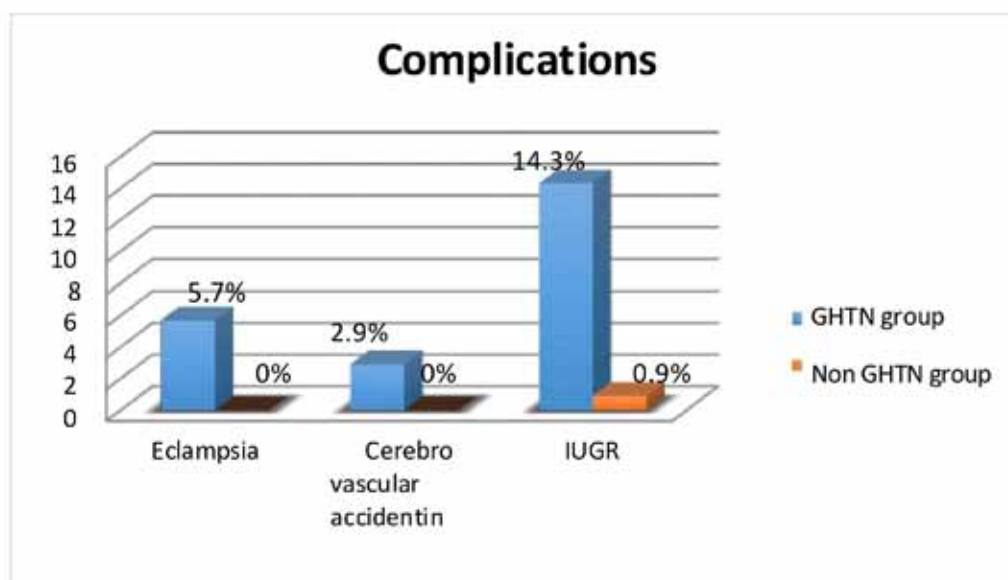


Fig. 1

using the modified Kuppaswamy scale. According to Kuppaswamy scale, 25.7% patients in GHTN group belonged to Upper class followed by 34.3% patients in Upper middle, 20.0% patients in lower middle, 8.6% patients in Upper lower and 11.6% patients in lower. Among non GHTN subjects group 10.4% belonged to Upper class followed by 27.8% patients in Upper middle, 28.7% patients in lower middle, 21.7% patients in Upper lower and 11.3% patients in lower. By comparing both groups, it was found that the prevalence of GHTN was high in upper and upper middle class and it was not statistically significant, p value <0.05 (Table 1)

In GHTN group, 4 (11.4%) patients were post graduate, 10 (28.6%) patients were graduate, 14 (40.0%) were higher secondary and 7 (20%) patients are in high school whereas in non GHTN group, 6 (5.2%) patients were post graduate, 35 (30.4%) patients were graduates, 46 (40%) patients were higher secondary and 28 (24.3%) patients with high school education. By comparing two groups, it has been found that GHTN rate increased in higher secondary and graduates women (28.6% and 40.0% in GHTN patients).

In analysis of risk factor associated with GHTN, the percentage with family history of hypertension was 51.4% which was higher than the 7% non GHTN group. Chi square test showed that there was a statistical significant difference (p value <0.05) between the risk factor of family history of hypertension among GHTN and non GHTN women. Similarly the percentage of GHTN with family history of GHTN (51.4%) was higher than non GHTN women (7.0%). A significant statistical difference (p value <0.05) was observed between the family history of GHTN among GHTN and non GHTN group. Similar result were obtained in women with past history of DM (40.0%) and it was also statistically significant (p value < 0.05). The percentage of women with age >35 years was higher in GHTN group (22.9%) than non GHTN group (0) and percentage of BMI >26 kg/m² were also higher in GHTN group (74.3%). This difference showed a highly significant result (p value < 0.05). No significant

difference was found for other risk factor like history of multiple gestations among GHTN and non GHTN group. (Table 2)

The prevalence of complications associated with GHTN was assessed and compared statistically using chi square test. Among two groups the most prevailing complications associated with GHTN were found to be IUGR (14.3%), it is higher in GHTN group than with non GHTN group (0.9%) and it is statistically significant (p value < 0.05). Similarly the percentage of pregnant women with eclampsia is also higher in GHTN group (5.7%) and it is statistically significant (p value <0.05). The percentage of other complication such as cerebro vascular accident in women is higher in GHTN group (2.9%) and it is not statistically significant. (Fig 1)

In GHTN group, the percentage of women who have undergone caesarean section (82.9%) was higher than women who have undergone assisted vaginal delivery (2.9%) and spontaneous vaginal delivery (14.3%). While the percentage of caesarean delivery in non GHTN group was found to be 32.2% and spontaneous vaginal delivery was 60.0% and assisted vaginal delivery was found to be 8.7%. The prevalence of caesarean delivery was statistically higher in GHTN group than in non GHTN group whereas spontaneous vaginal delivery was higher (60%) in non GHTN group. The observation was statistically significant with p value <0.05.

The percentage of infants with low birth weight was found to be 28.6% and NICU admission 11.4% were higher in GHTN group than with non GHTN group. These values are statistically significant p value < 0.05. The percentage of still born and post natal death are 2.9% each which was higher in GHTN group and no significant correlation were observed between these foetal outcomes. (Fig 2)

The percentage of multi gravida pregnancy (77%) was higher in GHTN patients than with primi gravida pregnancy (23%) group. These are statistically significant with p value <0.05 (Fig 3). In the present study, out of 150 patients 35 were diagnosed as

Table 2

Risk factors	GHTN group (%) (n=35)	Non group	GHTN (%) (n=115)	Chi square	p value
Age >35 years	8 (22.9)	0		27.767	0.0001
BMI >26 kg/m ²	26 (74.3)	44 (38.3)		13.992	0.0001
Family history of HTN	17 (48.6)	15 (13.0)		20.182	0.0001
Family history of GHTN	18 (51.4)	8 (7.0)		37.037	0.0001
Past history of DM	14 (40.0)	11 (9.6)		17.896	0.0001
Past multiple gestation	2 (5.7)	2 (1.7)		1.634	0.201

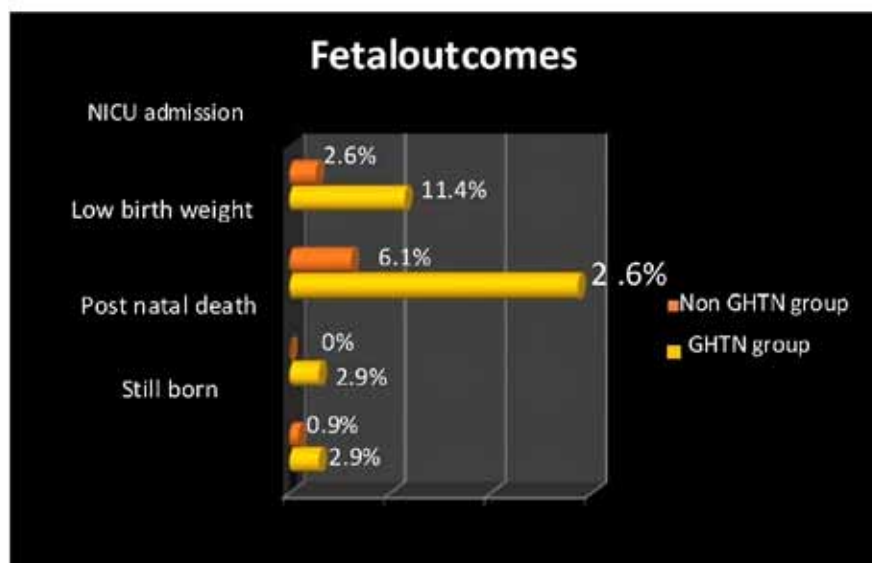


Fig. 2

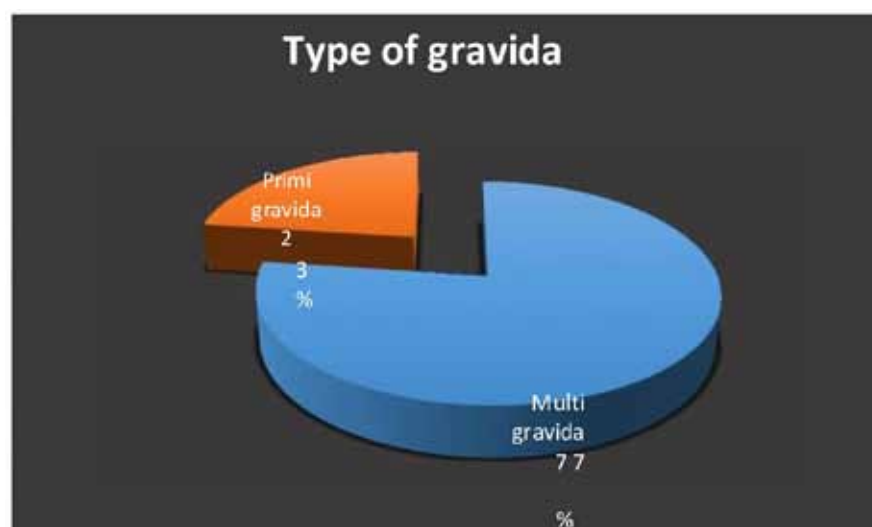


Fig. 3

GHTN and they were managed with nifedipine, methyl dopa, and labetalol. Nifedipine was used at a dose of about 10 mg whereas methyl dopa and labetalol in 250mg and 100mg respectively. Out of 35 subjects 20(57.14%) were managed with nifedipine, 10 (28.5%) subjects were managed with labetalol and 5(14.3%) subjects were managed with methyl dopa.

DISCUSSION

Pregnancy Induced Hypertension is a syndrome of hypertension with or without proteinuria and oedema, with the clinical manifestation usually occurring late in pregnancy and regressing after delivery of the conceptus. PIH is a known cause of premature delivery, Intra uterine growth retardation, placental abruption and foetal death, as well as maternal mortality and morbidity. In this prospective observational study, as per the demographics collected, out of 150 subjects, 35(23%) were diagnosed as GHTN and thus the prevalence of GHTN was found to be 23%, which was quite high compared to the study of Manjusha et al[9] in Pune, they observed a prevalence of 7-8%

whereas Franklin David Kilembe [10] in Malawi found a prevalence rate of 52.1%. In the present study the prevalence of GHTN was found to be associated with increasing age, lower education level, socio economic status, BMI, family history of HTN and past history of GHTN.

The study estimates that most of the GHTN were in the age group between 20-25 years compared with non GHTN group, with the mean age of 27.94 ± 6.49 , p value <0.05 and it was found to be statistically significant. Similar study in china showed age $>35-39$ years are 1.8 times higher risk than 20-24 years women and 2.4 times higher in those aged 40 years and older. A significant association was found between prevalence of GHTN and increasing BMI of participants. Obesity as a significant risk factor for GHTN which is shown in several studies. In Chun Ye et al [2], studies showed that there is a close relationship between HDP and the pre-pregnancy BMI. They suggest that each increase of 5-7 kg/m² in BMI doubles the risk of developing preeclampsia. W.K.B.A. Owiredo et al [6] also found that obesity as a risk factor for developing GHTN. Pratima V et al [11] studies showed that

they could not found any association between educational status of pregnant women with causation of hypertension during pregnancy. The results from the study state that the educational qualification was not statistically significant. The study showed that the most common complications seen in GHTN mothers were IUGR (14.3%) followed by Eclampsia (5.7%) and Cerebro vascular accident in women (2.9%). The findings are statistically significant. On evaluation of delivery outcomes of GHTN and non GHTN women it had been observed a higher rate of cesarean delivery (82.9%) among GHTN group. In non GHTN women the most prevalent outcomes was spontaneous vaginal delivery (60%). The observation was statistically significant with p value < 0.05. This results correlates with the observation of Solange Regina et al^[12].

Out of 35 GHTN patients 20(57.14%) patients were managed with Nifedipine, 5(14.3%) patients with Methyl dopa and 10(28.5%) patients with Labetalol. The drugs included in the other classes, for the treatment of hypertension is not used for the management of GHTN because it produce teratogenic effect and produce adverse effect to mother. Nifedipine was most commonly prescribed antihypertensive drugs in 57.14% of GHTN patients. Similarly in a study by Manjusha et al, Methyl dopa was most commonly prescribed antihypertensive drugs in 17% of patients. The studies from Ray J G et al showed that Nifedipine (47.7%) was prescribed more frequently than Methyl dopa (27.7%). This shows that utilization pattern differs from hospitals, prescribers and among countries also.

Primipara and multi paras should be monitored carefully for hypertension. Health care providers should counsel women at risk on prevention measures such as nutrition, weight and stress management, and early and continual monitoring of gestational hypertension throughout the pregnancy. Community education efforts for women for childbearing age are also needed to reinforce the importance of healthy diets, regular physical activity, and maintaining a healthy weight before and during pregnancy. The knowledge of important risk factors in our population could be useful to help clinician to detect pregnant women who will develop pre-eclampsia. Prevention of hypertensive diseases in pregnancy would mean a huge step forward in prenatal care and assuming that effective prenatal is available, it may have greater potential in the treatment of these diseases.

CONCLUSION

The result obtained from the study reveals the importance of proper screening, diagnosis and management of GHTN in pregnant women by the clinicians to prevent the future burden of pre-eclampsia and hypertension. Strictly controlling of blood pressure definitely gives good outcomes of gestational hypertension pregnancy. It should be given equal importance to primigravida and multigravida women for the screening of gestational hypertension. There is a risk factor for children for developing hypertension from a gestational hypertensive mother. Hence future risk for obesity and hypertension to offspring of gestational hypertension mother should be monitored. Pharmacists can optimize overall care of a gestational hypertensive patient by educating, monitoring, and intervening or assisting the patient in the management of gestational hypertension

REFERENCES

1. I-Kuan Wang et al Hypertensive disorders in pregnancy and

preterm delivery and subsequent stroke in Asian women , stroke.ahajournals (2015);42: 716-721

2. Chun Ye et al The 2011 survey on hypertensive disorders of pregnancy (HDP) in China: prevalence, risk factors, complications, pregnancy and perinatal outcomes, journal PLoS ONE (2014);9(6): 1-10
3. Mehul T et al Study of risk factors of perinatal death in pregnancy induced hypertension (PIH), National journal of community medicine (2012);3(4):703-7
4. J Prakash et al Hypertension in pregnancy: hospital based study, Obstet Gynecol (2006); 78:451-61.
5. Elizabeth Baraban, MPH, PhD, Lucie McCoy, MPH, Paul Simon, MD, MPH. Increasing Prevalence of Gestational Diabetes and Pregnancy-Related Hypertension in Los Angeles County, California, (19912003);5(3):1-9
6. W.K.B.A. Owiredo, L. Ahenkorah, C. A. Turpin, N. Amidu and E. F. Laing Putative risk factors of pregnancy-induced hypertension among Ghanaian pregnant women Journal of Medical and Biomedical Sciences (2012);1(3): 62-76
7. Jun Zhang et al Epidemiology of Pregnancy-induced Hypertension, Epidemiol Rev (1997);19(2): 218-32
8. Elham Kazemian et al Maternal obesity and energy intake as risk factors of pregnancy induced hypertension among Iranian women J health popul nutr (2014);32(3):486-493