1.4 Objectives:

1.4.1 General Objective:

Prevalence of gestational diabetes mellitus and main immediately complication after delivery in River Nile State 2018 .

1.4.2 Specific Objectives :

1- To assess prevalence of gestational diabetes among the mother attending hospital for delivery in River Nile State .

2- To assess main gestational complication on fetal immediately after delivery in River Nile State .

3- To assess main gestational diabetes complication on delivered woman immediately after delivery in River Nile State .

Literature Review

2.1 Definition:

World Health Organization WHO defined gestational diabetes mellitus GDM as onset of glucose intolerance at varying degree or first diagnosed during pregnancy [24].

Kaaja Rj. Greer IA. Manifestations of chronic disease during pregnancy JAMA 2005 had defined gestational diabetes mellitus as glucose tolerance disorder that occurs or is diagnosed for the first time during pregnancy. Similar definition found in WHO [25].

Leticia Nascimento Medeiros Bortolon and et al conduct study 2015-2016 by title which is gestational diabetes mellitus New Diagnostic Criteria. They were defined as any degree of glucose intolerance starting with pregnancy or noticed during pregnancy [26].

Savitri D. kabade and et al. conduct study 2016 by title which is Study of prevalence and outcome of gestational diabetes mellitus at a Tertiary care hospital in North Karnatake. They were defined as a glucose intolerance resulting in hyperglcaemia of variable severity with onset during pregnancy [27].

Sheela P and el al conduct study 2016 by title which is Gestational Diabetes Mellitus Current Perspectives. They were defined as any degree of glucose intolerance causing hyperglycemia with onset or first recognition during pregnancy at any trimester [28].

Hayfaa Wahabi and el al conduct study 2016 by title which is Prevalence and complication of pre gestational and gestational diabetes mellitus in Saudi women Analysis from Riyadh mother and baby Cohort Study (RAHMA). They were defined according to the International Diabetes Federation IDF is diabetes during pregnancy [29].

2.2 Prevalence of GDM:

Prevalence of the GDM according to WHO The prevalence of GDM is high in India and fluctuates according to geographical areas and diagnostic methods used [30]. The prevalence of GDM in India ranges from 3.8% to 21% depending upon the diagnostic method used [31]. According to a random national survey conducted in 2004 the GDM prevalence was 16.55%[32]. In 2008, a hospital based survey showed a combined prevalence of GDM and IGT to be 21.6%[33]. A study conducted during 2005-2007 at Patan hospital in Nepal found the incidence of GDM 0.4%[34].

Sullivan E.P.O and et al conduct study in 17 March 2011.By which title is Atlantic Diabetes in pregnancy; the prevalence and outcome of gestational diabetes mellitus using new diagnostic criteria. At that time that study found that prevalence 12.4% in programme performed screening for GDM in 5,500 women .The prevalence is higher when using newer international association of diabetes and pregnancy study groups, compared with WHO criteria, and these and their experience significant adverse pregnancy outcome [35].

Leticia Nascimento Medeiros Bortolon and et al conduct study 2015-2016 by title which is GDM New Diagnostic Criteria .At that time at that study the Author found that the prevalence of GDM according to the International Diabetes Federation estimates that 16% of the children born alive in 2013 all around the world had complications due to hyperglycemia during pregnancy. It is believed that this prevalence will increase because of the growth of risk factors, mainly obesity and lifestyle [36]. Approximately 90% of the diabetes cases in pregnant women are considered GDM [37]. The prevalence of GDM is higher in Asian, Latin-American and Indian women [1].

Savitri D. Kabade and et al conduct study 2016 by title which is Study of prevalence and outcome of gestational diabetes mellitus at a Tertiary care hospital in North Karnatake. At that time at that study the Authors found that the prevalence of gestational diabetes mellitus was found to be 16.55% assuming this prevalence with relative error of 20% at level of significance of 95%, a sample of at least 500 eligible subjects was required. Prevalence increased with age, maximum being 30.4% among the age group of > 30 years [38].

Sheela P and et al conduct study 2016 by title which is Gestational Diabetes Mellitus Current Perspectives. At that time at that study the Author found that the prevalence of GDM is high in Asian countries compared to other countries [39]. In Scotland prevalence was found to be 1.9% [40] a 9-fold increase in the prevalence of GDM was observed from 1981 to 2012. In Europe GDM is present in about 2-6% [41]. Prevalence varies among racial and ethnic groups depending on different diagnostic criteria used. In India GDM prevalence ranges from around 5% to 18% [42-44] 34.9% in Punjab and 41.9% in Uttar Pradesh [45]. In South India, the prevalence has been increased from 1% in 1998 to 16.55% in 2004 [46].

Preeti Wahi and et al conduct study 2011 by title which is Prevalence of Gestational Diabetes Mellitus GDM and its Outcomes in Jammu Region . At that time at that study the Author found that the prevalence of GDM. The present prospective hospital-based study, which was the first of its kind to be undertaken in this part of the country, showed the prevalence of GDM as 6.94%.prevalence has been reported variably from 1.4 to 14% worldwide and differently among racial and ethnic groups. Prevalence is higher in Blacks, Latino, Native

Americans and Asian women than White women.2 A similar study in Kashmiri women from same state gave a prevalence figure of 3.8% [47].

Robin Varghesel and et al conducted study April 2010 to December 2010. By which title The Prevalence , Maternal and Fetal complication in Gestational Diabetes Mellitus .Retro prospective observational study . The prevalence rate of gestational diabetes mellitus was 2,1% . The prevalence was gradually reduced from 3.0% in 2003 to 1.64% in 2010. Total number of deliveries was gradually increased from 730 in 2003 to 2187 in 2010 [48].

Hayfaa Wahabi and et al conduct study 2016 by title which is Prevalence and complication of pre gestational and GDM in Saudi women : Analysis from Riyadh mother and baby Cohort Study (RAHMA). At that time at that study the Author found that the prevalence of GDM in Saudi Arabia in Riyadh 24.3%. The conclusion in this study the prevalence of GDM and pre-GDM in the Saudi pregnant population is among the highest in the world [49].

Najah and et al conducted among Qatar and other Arab pregnant women period from January 2010 to April 2011 by which title Prevalence of gestational diabetes and associated maternal neonatal complication in a fast-developing community by cohort study. Representative sample of 2056 pregnant women were approached and 1608 women 78.2%expresed their consent to participate in the study. The prevalence of GDM in Qatar was 16.3%. The present study revealed that GDM was higher in women in Qatar and the they were at increased risk of developing pregnancy-induced hypertension, pre-eclampsia, ante-partum hemorrhage premature rupture of membrane, and cesarean delivery. Infant born to women with GDM were significantly more likely to be macrosomia congenital abnormalaties and birth injuries were significantly higher in the offspring of GDM mother. Advanced maternal age, low monthly income, family history of diabetes, and obesity were the main associated risk factors for GDM[50-51].

Akwilina W. Mwanri and et al conduct study 2015 by title which is Gestational diabetes mellitus in sub-Saharan Africa systematic review and meta-regression on prevalence and risk factor. At that time at that study the author found that the prevalence the global prevalence of hyper glycemia in pregnancy in women 20–49 years was estimated to be16.9% and affecting 21.4 million live births, in 2013,and more than 90% of cases are estimated to occur in low- and middle-income countries[52]. A 2011 review on diabetes in Sub-Saharan Africa included the prevalence of gestational diabetes under reported it to range from 0% to 9% based on five studies, the latest one being published in 2007 [53]. A more recent review on the prevalence of GDM in Africa reported data from 14 studies conducted in six African countries and reported the prevalence to range from 0% in Tanzania to 13.9% in high-risk women in Nigeria [54]. The conclusion in this study. There are few studies on prevalence and risk factors for GDM in sub-Saharan Africa. The heterogeneity of the reviewed studies was high and could not easily be explained by selected study characteristics. The prevalence was as high as about 14% when women with at least one risk factor were studied, which indicates that preventive actions should be taken to reduce the short- and long-term complications related to GDM in sub-Saharan Africa.

2.3 Complication of GDM :

2.3.1 Maternal and infant complication :

Women with GDM were more likely to develop pregnancy –induced hypertension, pre-eclampsia, ante partum hemorrhage, preterm labor, and cesarean delivery than those without GDM .Infants born to women with GDM were at increased risk of being born preterm and were also significantly more likely to be macrosomia, birth trauma was significantly higher in offspring of GDM mother were significantly higher in age group, family history of diabetes, and obesity [55].

Sullivan E.P.O and et al conduct study in 17 March 2011. By which title is Atlantic Diabetes in pregnancy; the prevalence and outcome of gestational diabetes mellitus using new diagnostic criteria .At that time that study found maternal complication is gestational hypertension, polyhydrominos and cesarean section .In infant prematurity, large for gestational age, neonatal unit admission, hypoglycemia and respiratory distress [56].

Letica and et al conducted study 29 November 2010 to 11 January 2011 by which title Gestational Diabetes Mellitus New Diagnostic criteria. The complication of maternal are risk of diabetes mellitus recurrence in future pregnancies, future possibility of diabetes mellitus, polyhydramnios, pregnancy toxemia, urinary tract infection candidasis higher incidence of premature childbirth, cesarean delivery. Complication of neonatal include hypoglycemia, hypocalcaemia, polycythaemia, jaundice requiring phototherapy, trauma (shoulder dystocia) and respiratory distress syndrome, macrosomia, spontaneous abortion, congenital malformation and intrauterine death [57].

Savitri D. Kabade and et al study prevalence and complication of gestational diabetes mellitus at terttiory care hospital in North karantaka in January 2016 to December 2016. Conduct maternal complication such as cesarean section delivery and preeclampsia. Infant complication such as excess fetal growth which might increase the risk of birth injury [58].

Robin Varghesel and et al conducted study April 2010 to December 2010. By which title The Prevalence, Maternal and Fetal Complication in Gestational Diabetes Mellitus, Retro Prospective Observation study. The

Maternal weight gain has correlation with birth weight of babies Niswanda et al., 1969 [59], Jensen D et al., 2005 [60]. In our study most of the women 26.12% had a maternal weight gain more than 17 kg and 17.56% of babies had a birth weight more than 3.5kg. PIH, polyhydramnos, oligohydraminos and hypothyroid also has correlation with gestational diabetes mellitus Boriboonhirunsaran et al., 2006 [61]. Inour study 14.41% of women were complicated with PIH, 3.60% of the women were complicated with oligohydraminos and 2.70% were complicated with polyhydraminos. The rate of cesarean delivery was increased significantly with gestational diabetes mellitus Casey MB et al., 1997 the other co-morbidity conditions like PIH also trigger the cesarean delivery in gestational diabetes mellitus Beucher G. et al., 2010 [62,63]. In our study the rate of cesarean delivery was high with 93% of whole delivery, 14.4% of gestational diabetes women found with PIH of which whole was cesarean delivery.

Hayfaa Wahbi and et al conducted study 14 February 2017 .Published 12 March 2017 by which title Prevalence and Complication of Pre-gestational and Gestational Diabetes in Saudi women ,Analysis From Riyadh Mother and baby by cohort study (RAHAMA). From the total cohort 9723 women participated in his study. Pregnancies complication by maternal and neonatal outcome including increased rate of cesarean section delivery, macrosomia, admission to neonatal care unit (NTCU) and prenatal mortality[64-65].

CHAPTER THREE

Methodology

3.1 Study Design :

This analytical cross-sectional study aimed to assess prevalence of gestational diabetes mellitus and main immediately complications of maternal and fetus after delivery in River Nile State (Atbara, Eldamer, Berber, Sulaa) hospitals during period from (March – July) 2018.

3.2 Study Area & Setting :

River Nile state is one of the 18 states of Sudan, located in northern Sudan, it has an area of 122,123 km² (47,152 mi²) and an estimated population of 1,027,534, contain seven localities the select will be randomly four localities, during the period between March to July 2018.

3.3 Study Population :

3.3.1 Inclusion Criteria :

Any pregnant women resident in River Nile State (Atbara, Eldamer, Barber, Sulaa) hospitals.

3.3.2 Exclusion Criteria :

Any pregnant women suffer serious complication on mother and that change mode of delivery management.

3.4 Study Sample Size :-

$$n = \frac{z^2 \times P \times q}{d^2}$$

N = number of subject

Z = 1,96

P = prevalence of diabetes mellitus

Q = 1-P

D = degree/per size =0,05

$$n = \frac{(1.96)^2 \times 0.5 \times (1 - 0.5)}{(0.05)^2} = 384$$

3.5 Sample Technique :

The process selected randomly four localities from River Nile State (Atbara, Eldamer, Barber, Sulaa) within the hospitals the select of subject will be also randomly.

3.6 Data Collection :

3.6.1 Data Collection Tools:

Through prepare questionnaire refiliance.

3.6.2 Data Collection Techniques:

Interview and observation of mother and neonate after delivery.

3.7 Data management :

The data will be manage by excel program and SPSS. The data P value will consider to be significant if p value 0,05, calculate interval will use other Biostatistical test. T test and CH: sample technique. The data will present as tables and graphs.

3.8 Ethical Consideration :

This is proposal will approve by Elshaikh Abdullah Elbadri university faculty health science, nurse department.

- Before data collection we will distribute inform consent , will obtain other discus with subject for consent participation will signed by them.
- The questioners will not contain name of subject.
- All information will be cared confidentially saved.

CHAPTER FOUR

Results

Table No [4.1] : Show that distribution of participant in matter of Personal data [n=384]

Variable	Description	Frequency	Percent
Age	<20	31	28.7 %
	21-30	235	61.3 %
	>31	18	10 %
Educational level	illiterate	23	6 %
	Khalwa	7	1.8 %
	Primary school	103	26.8 %
	Secondary school	165	43 %
	University	80	20.8 %
	Higher education	6	1.6 %
Occupation	Employee	21	5.5 %
	Worker	19	4.9 %
	Housewives	344	89.6 %
Income	High	181	47.1 %
	Medium	184	47.9 %
	Low	19	4.9 %
Total		**384**	**100 %**

The common age group among participant 23-35 year. Level education 43% secondary school, 20.8% university, 1.6 higher education , 26.8% primarily school, 1.8% khalwa and 6% illiterate. Occupation higher level 89.6% house wife, 5.5% employee and 4.9% worker. Income higher 47.9% medium, 47.1% high and 4.9% low level.

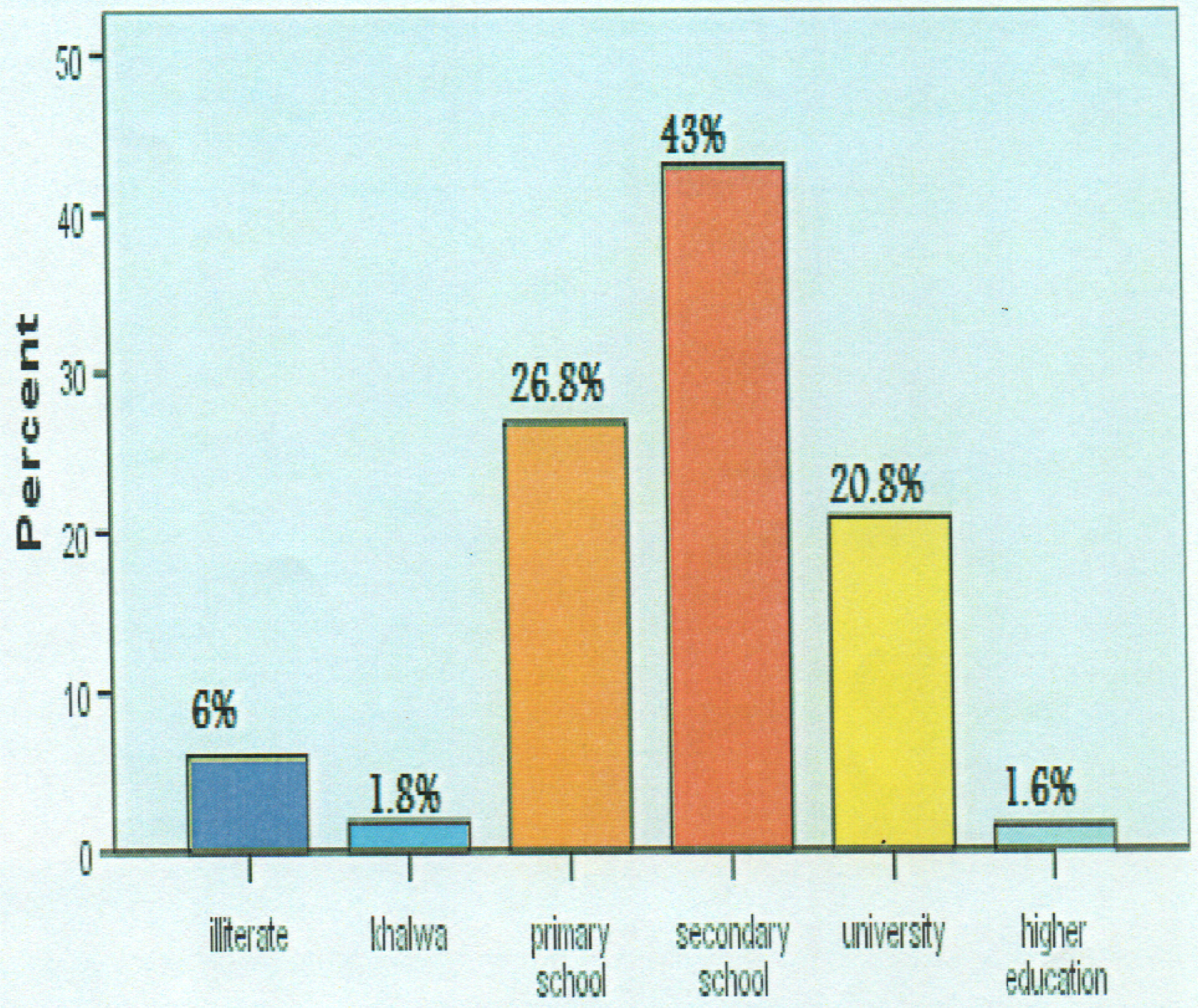

Figure [4.1]:Show that distribution of participant among educational level [n=384]

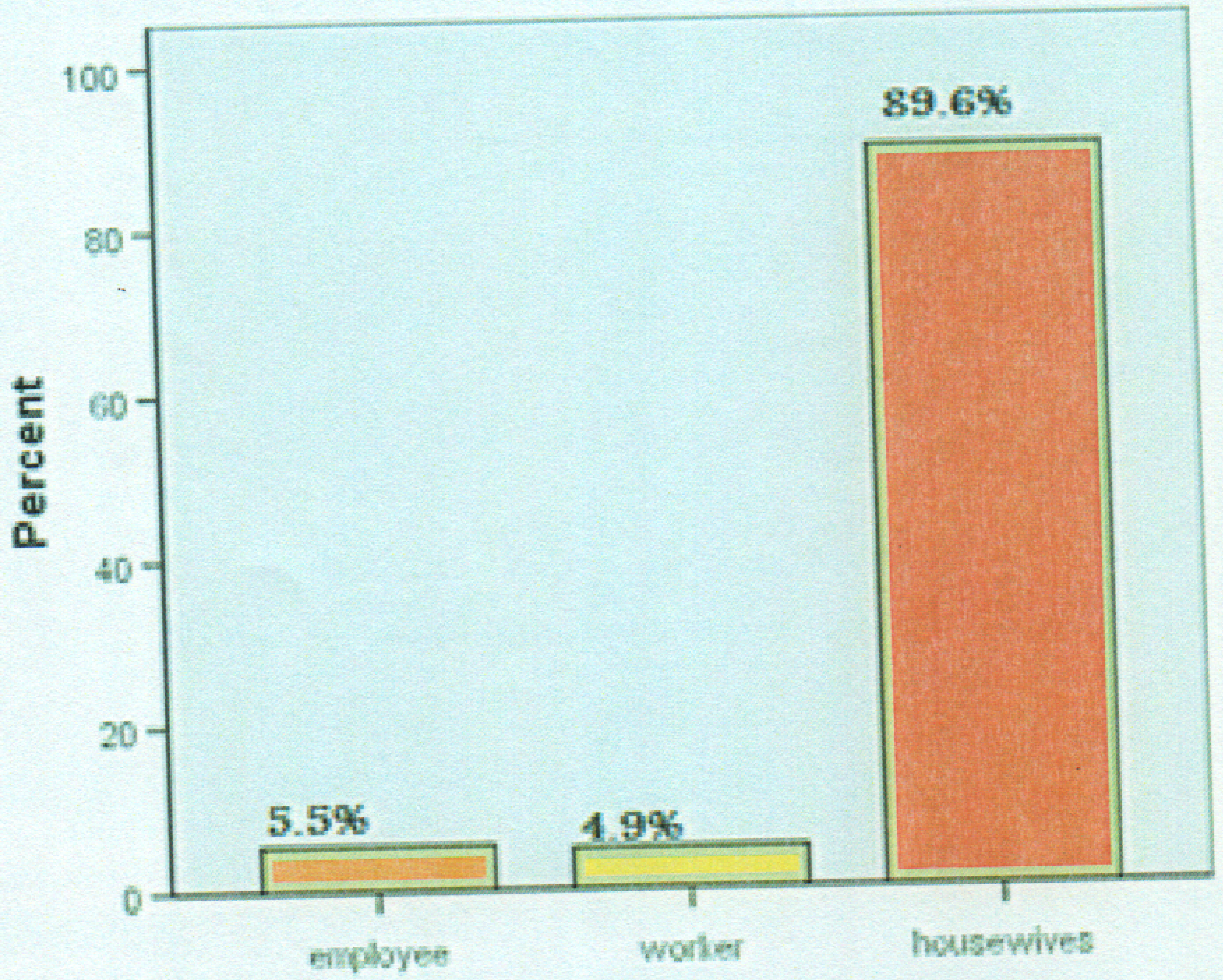

Figure [4.2]:Show that distribution of participant based on occupation [n=384]

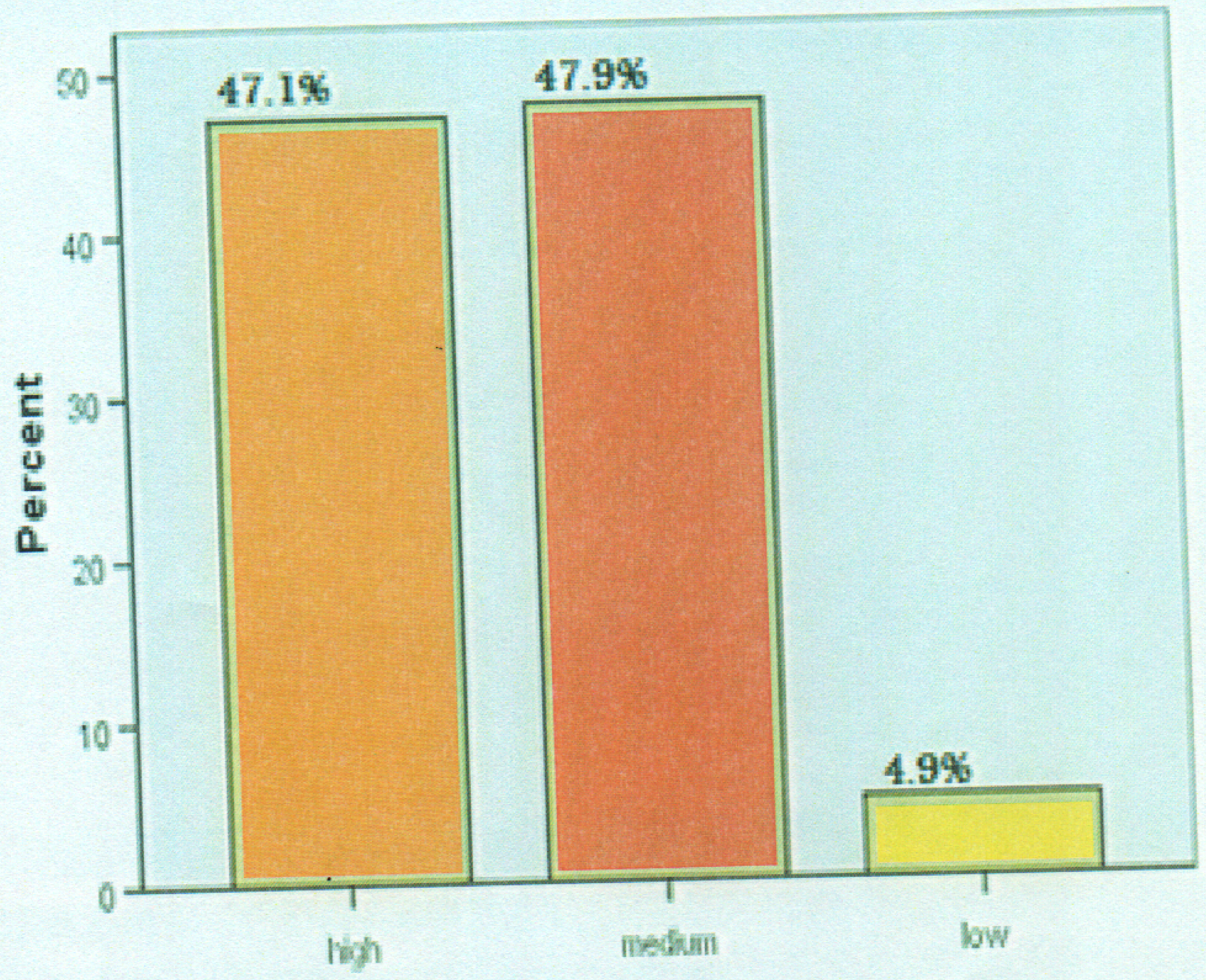

Figure [4.3]:Show that distribution of participant based on income [n=384]

Table No [4.2] : Show that distribution of participant in matter of the mother surfer from diabetes [n=384]

Variables	Description	Frequency	Percent
The mother suffer from diabetes	No exist	353	91.9%
	Diabetes mellitus	12	3.1%
	Gestational diabetes mellitus	19	4.9%
Total		384	100%

The mother no exist of diabetes mellitus and gestational diabetes mellitus is 91.9% , mother of diabetes mellitus is 3.1% and mother of gestational diabetes mellitus is 4.9%.

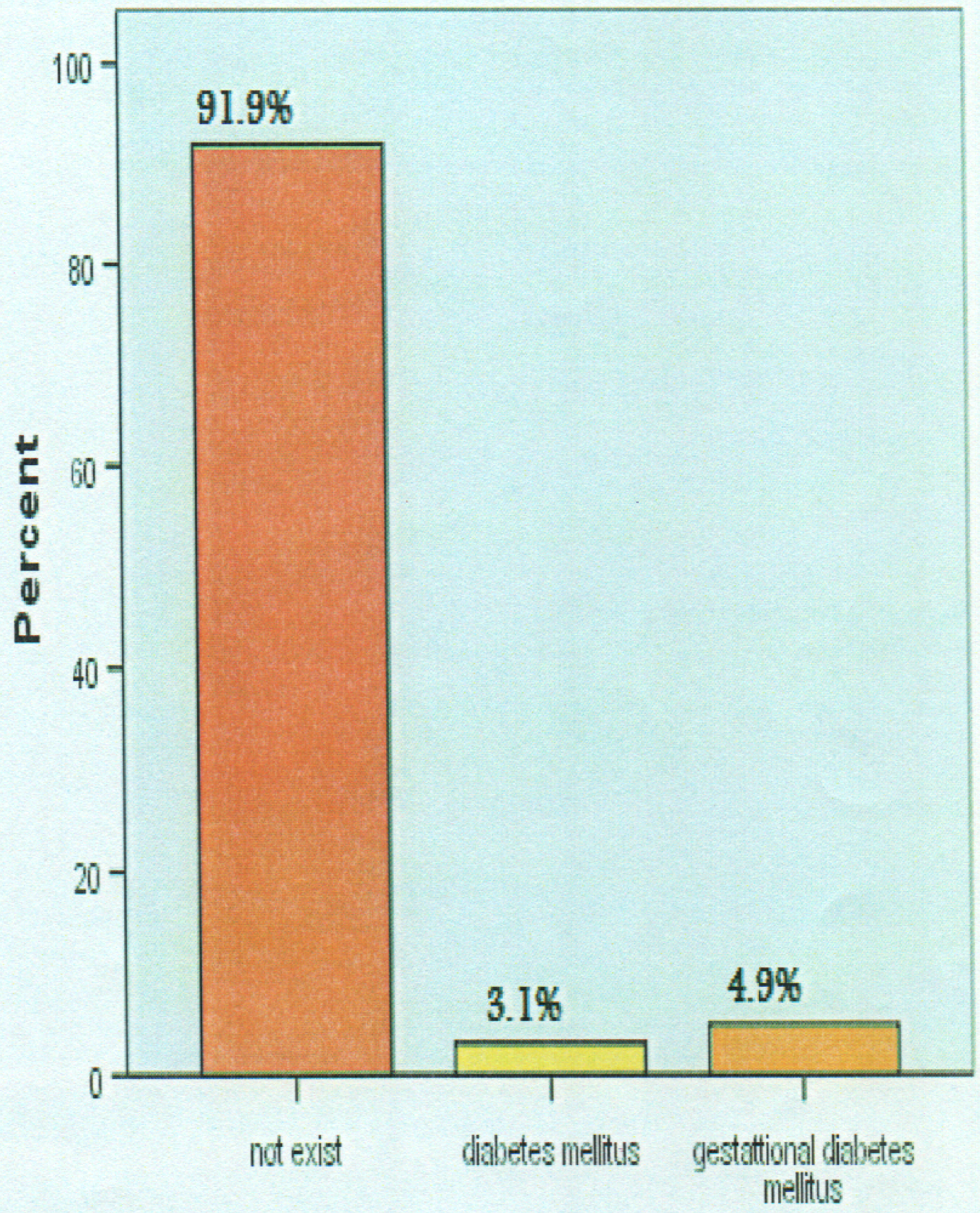

Figure [4.4]: Show that distribution of participant in matter of Gestational Diabetes Mellitus [n=384]

Table No [4.3]: Show that distribution of participant according to the mode of delivery [n=384]

Type of delivery	Description	Frequency	Percent
Normal labor	Spontaneous	133	34.6 %
	Induction labor	21	5.5 %
	Forcipes	9	2.3 %
Caesarian section	Elective	162	84.4 %
	Emergency	73	16.6 %
Total		384	100 %

Mother delivery by normal labor 42.2% , by spontaneous 34.6% , by Induction labor 5.5% , by forcipes 2.3% . Mother delivery by elective caesarian section 84.4% , by emergency caesarian section 16.6% .

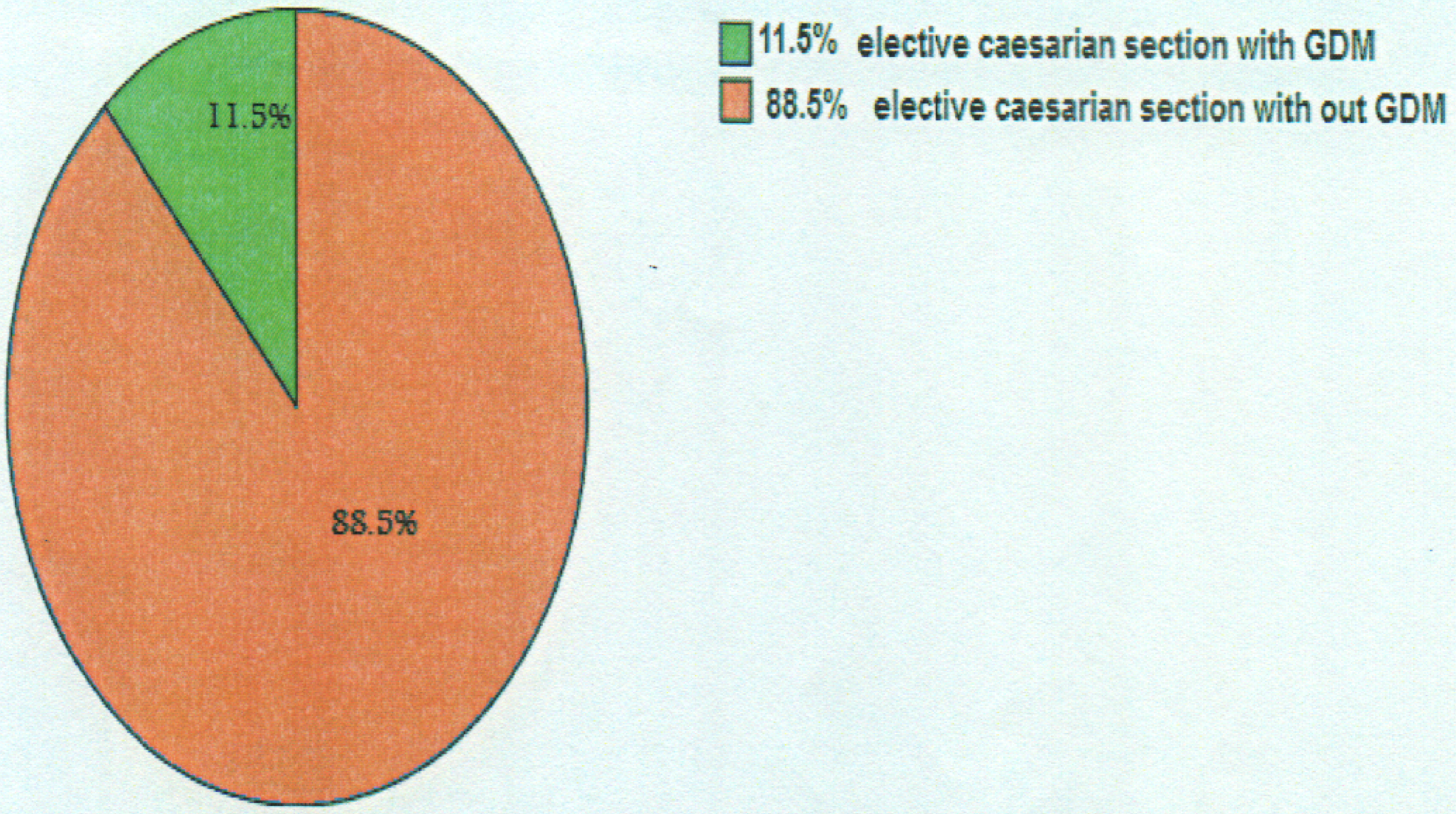

Figure [4.5] :Show that distribution of participant according to the mode of delivery [n=235]

Table No [4.4] : Show that distribution of participant according to Complication of mother after delivery [n=384]

Variables		Description	Frequency	Percent
Complication after delivery		Occurs	334	87 %
		Not occurs	50	13 %
Occurs due to gestational diabetes	Pre rupture of membrane	Yes	21	5.5 %
		No	363	94.5 %
	Preterm labor	Yes	24	6.2 %
		No	360	93.8 %
	Eclampsia	Yes	2	.5 %
		No	382	99.5 %
		Total	384	100 %

Complication of mother occurs after delivery is 87% , not occurs 13% . Complication of mother occurs after delivery due to gestational diabetes Pre rupture of membrane 5.5% , Preterm labor 6.2% , Eclampsia 0.5% .

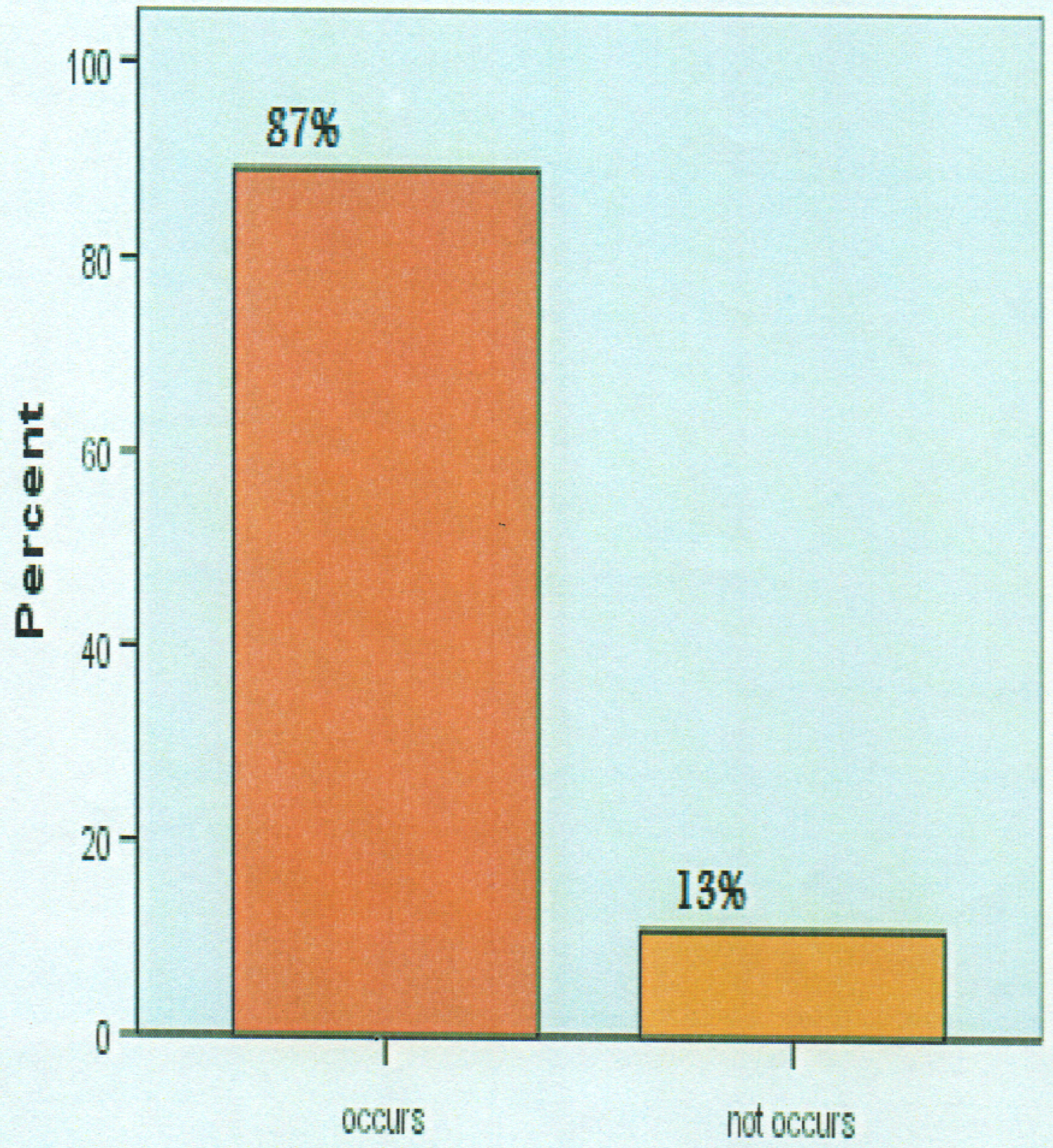

Figure [4.6] : Show that distribution of participant according to Complication after delivery

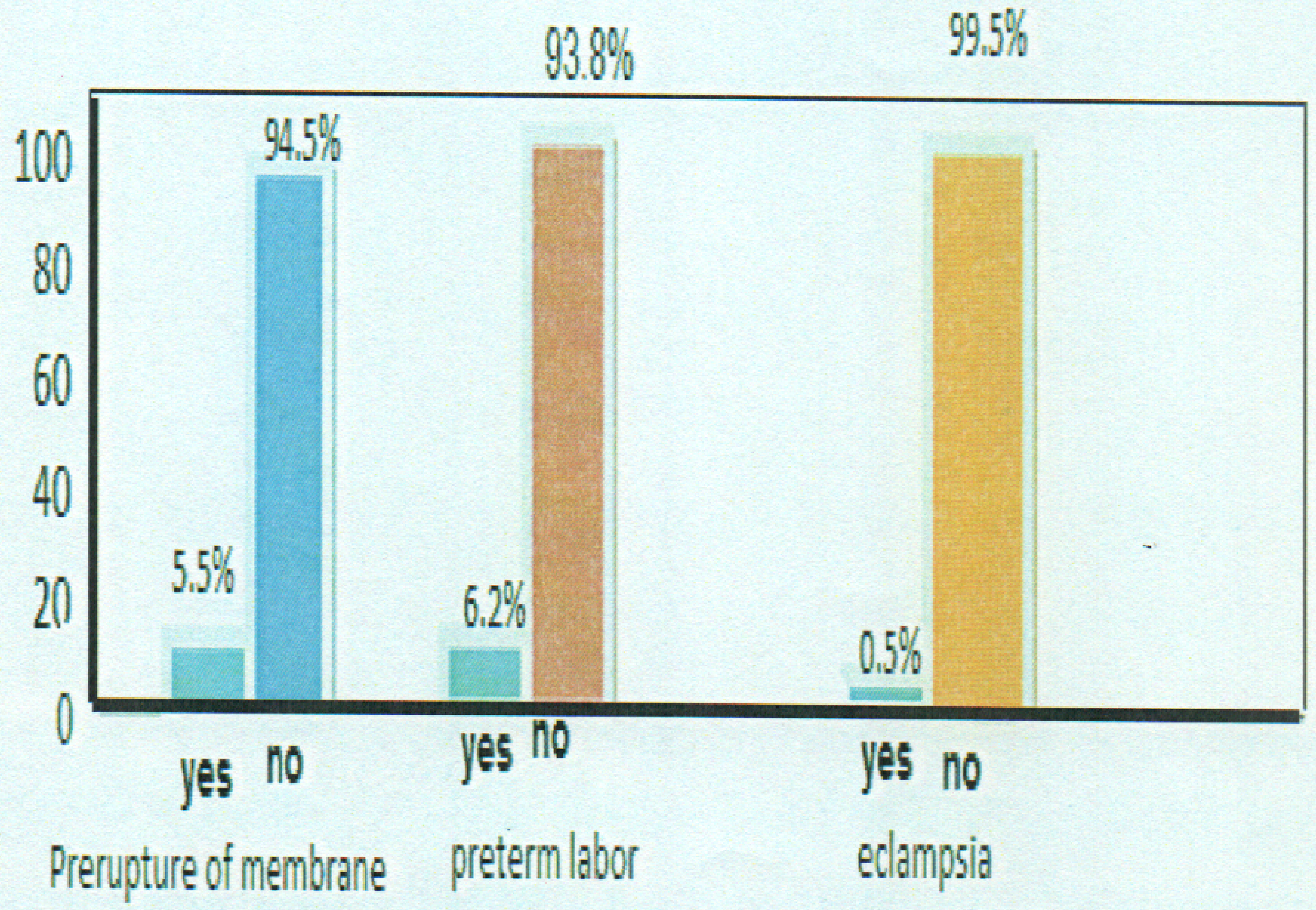

Figure [4.7]:Show that distribution of participant according to complication of mother after delivery

Table No [4.5] : Show that distribution of participant according to Complication of fetal after delivery

Complication of fetus		Description	Frequency	Percent
Period of pregnancy		Termination	323	84.1 %
		Pre termination	61	15.9 %
Weight after delivery		<2.5 Kg	80	20.8 %
		2.5-4 Kg	276	71.9 %
		>4 Kg	28	7.3 %
Complication after delivery		Occurs	73	19 %
		Not occurs	311	81 %
Occurs due to gestational diabetes	Jaundice	Yes	13	3.4 %
		No	371	96.6 %
	Septicemia	Yes	9	2.3 %
		No	375	97.7 %
	Decrease glucose level	Yes	11	2.9 %
		No	373	97.1 %
	Congenital anomalies	Yes	4	1 %
		No	380	99 %
	Respiratory distress	Yes	10	2.6 %
		No	374	97.4 %
Total			384	100 %

Complication of fetus occurs after delivery 19% , not occur 81% . Complication of fetus occurs after delivery due to gestational diabetes Jaundice 3.4% , Septicemia 2.3% , Decrease glucose level 2.9% , Congenital anomalies 1% and Respiratory distress 2.6%.

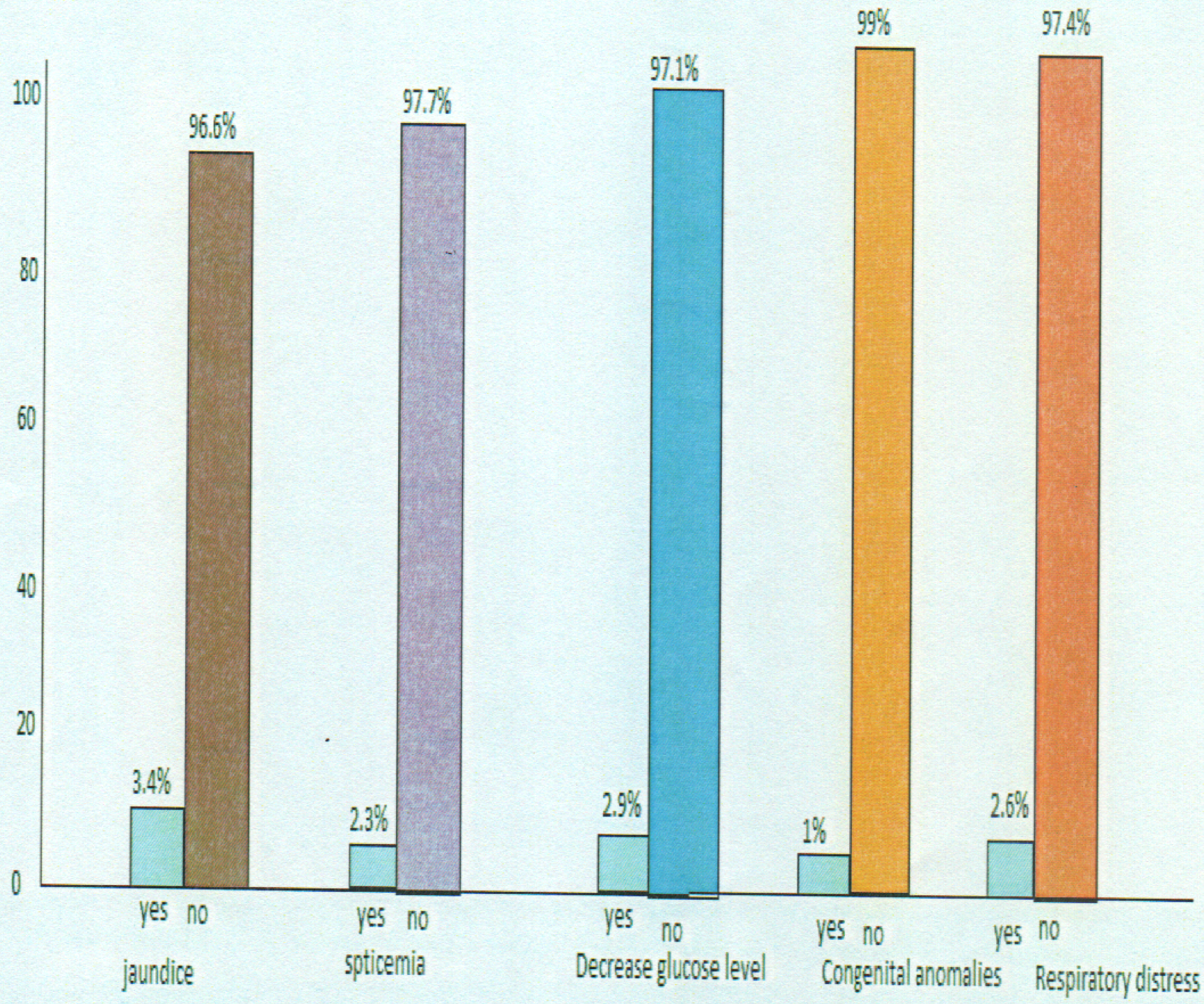

Figure [4.8] :Show that distribution of participant according to complication of fetal after delivery .

CHAPTER FIVE

Discussion

The mother no exist of diabetes mellitus and gestational diabetes mellitus is 91.9% , mother of diabetes mellitus is 3.1% and mother of gestational diabetes mellitus is 4.9%. Complication of mother occurs after delivery is 87% , not occurs 13% . Complication of mother occurs after delivery due to gestational diabetes Pre rupture of membrane 5.5% , Preterm labor 6.2% , Eclampsia 0.5% . Complication of fetus occurs after delivery 19% , not occur 81% . Complication of fetus occurs after delivery due to gestational diabetes Jaundice 3.4% , Septicemia 2.3% , Decrease glucose level 2.9% , Congenital anomalies 1% and Respiratory distress 2.6%.

The result of study compared with other studies we were that prevalence of study 3.8% in India by Who is lower due to increase maternal age, positive history of diabetes, ethnic factor [34].

The result of study compared with other studies we were that prevalence of study 14.4% in atlantics by Sullivan and et-al is higher due to challenge to health care system, all results were adjusted for potential can founder of maternal age, smoking history, hypertensive disorders of pregnancy and insulin use to the statistical mode [35].

The result of study compared with other studies we were that prevalence of study 16% in brazil by letica and et-al is higher due to family history, increase maternal age, pregnant induce hypertension, history of miscarriage, early pregnant [36,37].

The result of study compared with other studies we were that prevalence of study 16.55% in India by savitic and other et-al is higher due to age> 30 years, family history, lower educational level, high BMI, common women with PIH [38].

The result of study compared with other studies we were that prevalence of study 1.9% in Scotland by sheela and et-al is lower due to lifestyle and genetic predisposition, type 2 DM in the family [46].

The result of study compared with other studies we were that prevalence of study 6.9% in India by preeti and et-al is higher due to family history [47].

The result of study compared with other studies we were that prevalence of study 2.1% in India by robin and et-al is lower due to age > 30 years, family history [48].

The result of study compared with other studies we were that prevalence of study 24.3% in Saudi women by hayfae and et-al is higher due to ethnicity, type 2 DM in population [49].

The result of study compared with other studies we were that prevalence of study 16.3% in qater by nagah and et-al is higher due to positive family history of diabetes, treatment of infertility, macrosomic infent, prematurity, preeclampsia, medican history [50,51].

The result of study compared with other studies we were that prevalence of study 14% in subsaharien Africa by akmillia and et-al is higher due to family histoer, age > 30 years [54].

The study conducted in the River Nile State in 2018 for complications of mother who suffer from gestational diabetes was 12.2% higher than the study, which was in Atluntic by Sullivan and et-al, which was 6.3% [56].

The complication of fetal were 14.1% higher in the study conducted in Atluntic by Sullivan and et-al than the study conducted in the River Nile State in 2018, which was 12.2% [56].

The study conducted in the River Nile State in 2018 for complications of mother who suffer from gestational diabetes was 12.2% higher than the study, which was in India by Savitri and et-al, which was 5.3% [58].

The complication of fetal were 89.2% higher in the study conducted in India by Savitri and et-al than the study conducted in the River Nile State in 2018, which was 12.2% [58].

The study conducted in the River Nile State in 2018 for complications of mother who suffer from gestational diabetes was 12.2% lower than the study, which was in India by Robin and et-al, which was 38.8% [62,63].

The complication of fetal were 58.3% higher in the study conducted in India by Robin and et-al than the study conducted in the River Nile State in 2018, which was 12.2% [62,63].

The study conducted in the River Nile State in 2018 for complications of mother who suffer from gestational diabetes was 12.2% higher than the study, which was in Sudi women by Hayfae and et-al, which was 1.5% [64,65].

The complication of fetal were 0% lower in the study conducted in Sudi women by Hayfea and et-al than the study conducted in the River Nile State in 2018, which was 12.2% [64,65].

CHAPTER SIX

Conclusion & Recommendations

6.1 Conclusion:

This study conclude that prevalence of gestational diabetes mellitus in river Nile state , the main immediately complication of mother preterm labor, the second complication pre rupture of membrane, and the last complication Eclampsia, and the maim immediately complication of fetal Jaundice, second complication decrease glucose level, respiratory distress, septicemia, and the last complication congenital anomalies.

6.2 Recommendation:

The study recommended that encourage hospitals to work:

- Management of gestational diabetes millets will improve both maternal and perinatal outcomes.
- Improved screening provides an opportunity to attempt to reduce the associated morbidity for mother and child.
- The woman was give advice on dietary and lifestyle modification and instructed in the self-monitoring of blood glucose.
- Correction for hypertensive disorders of pregnancy and insulin use, the value no longer remained statistically significant, intensive care unit admission.
- It is therefore highly important that these mothers are early diagnosed during pregnancy and that they have a regular postpartum follow-up for identification and treatment of any complications to reduce maternal and fetal morbidity.
- We were asking ourselves for more further permanent complication.

References :

[1] ADA, 2004; Metzger & Coustan , 1998; Casey , Lucas,et al., 1997; Kjos & Buchanan , 1999.

[2] Diabetes Care and Research in Europe (1990). The Saint Vincent declaration. Diabetic Medicine, 7(4): 360.

[3] Kautzky-Willer, A., Pragr, R., Waldhausl, W., Pacini, G., Thermaeth, K. Wagner, O.F. Uim, M. Strels, C. and Ludvik, B. (1997). Pronounced insulin resistance and inadequate B-cell secretion in lean gestational diabetes mellitus during and after pregnancy. Diabetes Care, 20: 1717-1723.

[4] Metzger & Coustan, 1998; Casey et al., 1997; Kjos & Buchanan , 1999 .