A Study To Assess The Maternal Factors Leading To Low Birth Weight Babies In Selected Hospitals Of Pune-India

دراسة لتقييم العوامل التابعة للأم المؤدية إلى انخفاض وزن المواليد في مستشفى مختارة في بيون الهندية

***MRS. Kafia Hashim Karim**;
****Shaila Mathew,**

الخلاصة:
خلفية الموضوع: يعتبر وزن الرضع عند الولادة من أهم المحددات لفرص البقاء على قيد الحياة والنمو والتطور
الاهداف: تقييم العوامل التابعة للأمهات التي تؤدي ولادة الرضع منخفضي الوزن عند الولادة وعلاقته مع بعض المتغيرات الديموغرافية للأطفال الرضع.
المنهجية: أجريت الدراسة المسحية غير التجريبية للفترة من 20 حزيران الى كانون الاول من عام 2011 في الهند. وكانت عينة الدراسة غير احتمالية متالفة من 100 الأمهات اللواتي تم ولادتهن لاطفال منخفضي الوزن الذين ولدوا في مستشفيات بيون. الأداة المستخدمة لجمع البيانات هو استبيان منظم يتألف من قسمين:
1. العوامل التابعة للامهات
2. المتغيرات الديموغرافية

تم التاكد من صحة المحتوى لأدوات التقييم من قبل لجنة من الخبراء. تم تحديد اختبار المصداقية من خلال اختبار التكافؤ للسبي. واستخدمت الإحصاءات الوصفية والاستنتاجي لتحليل البيانات.
النتائج: يتبين من نتائج الدراسة الحالية عن وجود علاقة مهمة بين الأدوية التي تم تناولها بكمية كبيرة خلال فترة الحمل مع تقدم العمر الحامل، جود علاقة وثيقة بين العوامل مثل زيادة وزن الأمهات خلال فترة الحمل مع تقدم العمر الحامل، ووجود علاقة وثيقة بين العوامل التابعة للأمهات مثل الحديد وحمض الفوليك خلال فترة الحمل مع عمر الحامل. لا يوجد أي ارتباط مهم مع العوامل ألاخرى.
الاستنتاج: أن هناك عوامل تابعة للأمهات (والبيولوجية الشخصية والغذائية، وتاريخ المرض، والعوامل النفسية والاجتماعية) يمكن أن تؤثر على وزن الاطفال.
التوصيات: إجراء دراسات مستقبلية على النساء قبل الولادة وبعدها

Abstract
Background: The birth weight of an infant is the single most important determinate of its chances of the survival, health growth and development.
Objectives: Assessment of maternal factors leading to low birth weight babies and Associate it with some demographic variable of the babies.
Methods: Non-experimental exploratory survey research was conducted from Jun 20th to Dec 31st 2011 in India. A Non-probability convenient sample consists of 100 postnatal mothers who delivered low birth weight babies were selected from Pune Hospitals. The tool used for data collection is a structured questionnaire consisted from two sections:
1- Maternal factors and
2- Demographic variables.
Content validity of the tools determined by a panel of experts. Reliability was determined by rational equivalence test. Both descriptive and inferential statistics were used for data analysis.
Results: The results of current study reveals that there were high significant association between medicines taken during pregnancy with gestational age, a significant association between maternal factors like weight gain during pregnancy with gestational age, a significant association between maternal factors like iron and folic acid during pregnancy with gestational age. There is no significant association among other factors.
Conclusion: Researcher concluded that maternal factors (Personal, Biological, Nutritional, History of disease, Psychological and Social factors) can affect the weight of the babies.
Recommendations: Further studies need to be conducted among antenatal and postnatal women.
Keywords: mothers, babies, maternal factors, and low birth weight.

***assistant lecturer, Hawler Medical University, college of Nursing,**
**** Assistant Professor and guide, Bhatari Vidyapeeth Deemed University, college of Nursing, Pune-India**

INTRODUCTION:

Motherhood is a beautiful and joyous experience to a woman. The health of the mother during pregnancy is so important to give birth to a healthy baby. Birth weight is a powerful predictor of infant growth and survival. Infants born with a LBW begin life immediately disadvantaged and face poor survival rates. The birth weight of an infant is the single most important determinate of its chances of the survival health growth and development. The averages weights of newborn vary from 2700 gm to 4000 gm. [1] Weight is considered as one of the finest indicator to measure physical health. It is also considered as an important attribute to the child survival. [2] Low Birth Weights is the single most important factor determining the survival chances of the child. It is also one of the most serious challenges in maternal and child health in both developed and developing countries. Many of them die during their first year. The infant mortality rate is about 20 times greater for all LBW babies. Low birth weight is thus an important guide to the level of care needed by individual babies.[3] The grouped risk factors of low birth weight into the following categories: genetic and constitutional, demographic and psychosocial, obstetric, nutritional, maternal morbidity during pregnancy, toxic exposures, and antenatal care. The incidence of LBW can be reduced if pregnant women “at risk” are identified. For this approach, the women need to be identified early in pregnancy and further reduction in child mortality. Therefore, it requires understanding of the determinants of neonatal mortality such as low birth weight, preterm birth and low Apgar score.[4] The use of tobacco, alcohol and caffeine are three reasons for which evidence of the adverse effects of these substances on pregnancy outcome is increasing.[5]

THIS STUDY AIMS to assess the maternal factors leading to low birth weight babies and to associate them with the selected demographic variables of babies.

CONCEPTUAL FRAMEWORK:

Conceptual framework deals with abstractions that are assembled by virtue of their relevance to a common theme. Conceptual models present an understanding of the phenomenon of interest and reflect the assumptions and philosophic views of the models designer. Conceptual models can serve as springboards for generating research hypothesis.[6] The conceptual framework in this study is based on "General Systems theory" Developed by Ludwig Von Bertalanffy with input, process, output and feedback in 1968.[7]

Conceptual framework based on Ludwing Von Bertalanffy (1968)

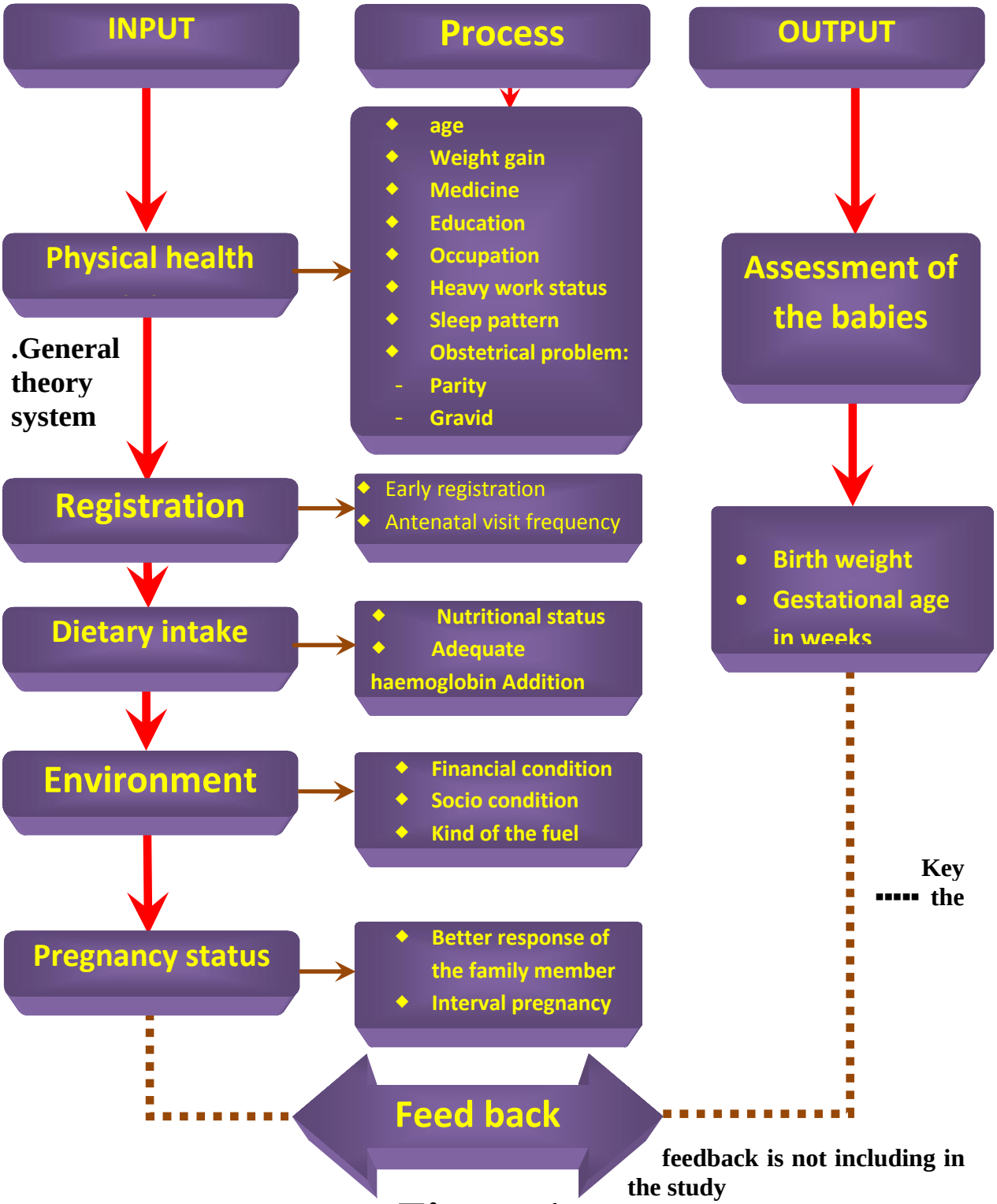

Figure 1

RESEARCH METHODOLOGY

Research design:

The research design selected for the present study was non- experimental exploratory survey research method.

Setting of the study:

The setting refers to the area where the study is conducted. This study was under taken in selected hospitals. Bharati Hospital and Bharati Aurvedic Hospital situated in Pune city.

Population:

The populations of this study consist of all postnatal mothers (who delivered) low birth weight babies**.**

Sampling technique:

In the present study, Non probability convenient method of sampling is used. Samples were selected according to the criteria after obtaining permission from the directors of hospitals**.**

Sample and sample size:

The sample of this study consists of 100 postnatal mothers who delivered low birth weight babies**.**

Sample criteria

The following criteria were set to select samples**:**

Inclusion criteria:

Mothers who are willing to participate in the study**.**

Mothers who are able to read or understand English, Hindi or Marathi.

Mothers having low birth weight baby**.**

Exclusion criteria:

Mothers who are critically ill.

The mothers who are admitted other than the selected hospitals of Pune city**.**

Table: (1) association of the personal factors with the selected demographic variables of babies.

					Birth weight				Gestational age			
#	Personal factors	Category	LBW Frequency	LBW %	Tests		P. V	LS	Tests		P. v	LS
1	Age	<20	4	4%	X^2	0.005	0.94	NS	X^2	1.37	0.24	NS
		20 - 25	45	45%								
		25 - 30	32	32%								
		30 +	19	19%								
2	Education Level	Illiterate	67	67%	X^2	2.74	0.25	NS	X^2	0.09	0.76	NS
		Primary	16	16%								
		Secondary	8	8%								
		High secondary	3	3%								
		Graduate and above	6	6%								
3	Occupation	Business	2	2%	X^2	0.05	0.82	NS	X^2	2.54	0.11	NS
		Service	38	38%								
		Labourer	1	1%								
		Housewife	59	59%								
4	Income	Below 5000 Rs	11	11%	X^2	0.014	0.9	NS	Fisher Exact		0.2	NS
		5,001-10,000 Rs	77	77%								
		10,001-15,000 Rs	9	9%								
		15,001- 20,000 Rs	2	2%								
		above 20,001	1	1%								
5	Gravida	Primi	84	84%	X^2	0.006	0.94	NS	X^2	0.007	0.93	NS
		Multi	16	16%								

LS: level significant ; LBW: low birth weight ; NS:No significant

Table (1): shows that in age Majority of the mothers (45%) were belonging to the age group of 20–25 years. In education Majority 67% were illiterate. In occupation Majority of the mothers (59%) were housewife. In monthly income Majority of the mothers (77%) were within the income between Rs.5, 001-10,000. In Gravida Majority 84% of the mothers were primi. Association of the personal factors Shows that chi-square calculated value is less than chi- square table value for the parameter age, education, occupation, income and gravida with the birth weight and gestational age of babies. It indicates that there is no significant association between the above factors with birth weight and gestational age babies. As the calculated value of Fisher exact is less than table value for income with gestational age, there is no significant association between the incomes with gestational age babies.

Table (2) Association of the biological factors with the selected demographic variables of babies

Sr No	Biological factors	Category	LBW Frequency	LBW %	Birth weight				Gestational age			
					Tests		P value	LS	Tests		P value	LS
6	age at marriage	<20	19	19%	X^2	0.71	0.70	NS	X^2	0.31	0.58	NS
		20 – 25	62	62%								
		25 – 30	18	18%								
		30 +	1	1%								
7	any abortion	Yes	32	32%	X^2	0.055	0.81	NS	X^2	0.042	0.84	NS
		No	68	68%								
8	family history of LBW	Yes	18	18%	X^2	0.44	0.51	NS	X^2	1.03	0.86	NS
		No	82	82%								
9	Antenatal Care registered	Yes	81	81%	X^2	1.09	0.29	NS	X^2	0.031	0.86	NS
		No	19	19%								
10	decision maker	Own self	30	30%	X^2	0.31	0.57	NS	X^2	0.39	0.53	NS
		Family member	70	70%								
11	Admission	Yes	34	34%	X^2	0.05	0.82	NS	X^2	0.23	0.63	NS
		No	66	66%								

Table Number (2): shows that (62%) majority of the mothers' age at marriage belong to the age group of 20-25 years. In previous history of abortion (68%) Majority of the mothers did not have history of abortion. In family history of LBW (82%), Majority of the mothers did not have previous family history of LBW. In ANC Registration (81%), Majority of the mothers were registered. In decision taken for ANC Registration (70%), majority were by their family members. In hospitalization during pregnancy (66%), majority of the mothers had no history of admission. Association of the biological factors shows that since the calculate chi-square values are less than the chi-square table value for the following parameters: age at the time of marriage, any abortion, Previous family history of LBW, registered, decision maker, Admission, No. of babies delivered .It indicates that there is no significant association between the mothers' Biological factors with birth weight and gestational age

Table (3) Association of the nutritional factors with the selected demographic variables of babies

#	Nutritional factors	Category	LBW Frequency	LBW %	Birth weight				Gestational age			
					Tests		P value	LS	Tests		P value	LS
12	Dietary history	Vegetarian	67	67%	X^2	0.15	0.69	NS	X^2	0.81	0.37	NS
		Non-vegetarian	33	33%								
13	number meal pattern	Twice a day	26	26%	X^2	0.57	0.45	NS	X^2	1.1	0.29	NS
		Thrice a day	70	70%								
		Four times a day	4	4%								
		More than four times a day	0	0%								
14	dietary intake increase	Yes	69	69%	X^2	2.3	0.13	NS	X^2	0.0	1.0	NS
		No	31	31%								
15	weight gain	Less than 8 kg	8	8%	X^2	2.06	0.15	NS	Fisher Exact		0.002	S
		9-10 kg	80	80%								
		11-12kg	10	10%								
		13-15 kg	2	2%								
16	supplementation during pregnancy	Yes	36	36%	X^2	0.006	0.93	NS	X^2	5.52	0.018	S
		No	64	64%								
17	Haemoglobin level	Less than 5% gm	0	0%	X^2	0.14	0.71	NS	X^2	2.02	0.15	NS
		6-8% gm	19	19%								
		9-11% gm	74	74%								
		More than 11% gm	7	7%								

S significant

Table Number (3): shows that (67%) majority of the mother's were vegetarian. In number of meals (70%), Majority of the mothers had food thrice a day. In increasing dietary intake majority of the mothers (69%) had increased dietary intake. In Weight gain during pregnancy (80%), majority of the mothers got 9-10 kg increase. In Iron and folic acid supplementation (64%), majority of the mothers did not get Iron and folic acid. In HB (74%), majority of the mothers were between 9-11% gm. Association of the nutritional factors show that since the calculate chi-square values are less than the chi-square table value for the following parameters: Dietary history, normal meal pattern, dietary intake increase, and HB level. It indicates that there is no significant association between the mothers' Nutritional factors with birth weight and gestational age. As the calculated value of fisher exact is more than table value for gestational age, it indicates that there is significant association between the weight gain and gestational age of babies. As the calculated value of chi-square is more than table value for supplementation during pregnancy with gestational age. It indicates that there is significant association between the supplementation and gestational age babies.

Table (4) Association of the history of any major systemic disease factors with the selected demographic variables of babies

					Birth weight				Gestational age			
#	**Disease factors**	**Category**	**LBW Frequency**	**LBW %**	**Tests**		**P.V**	**LS**	**Tests**		**P.V**	**LS**
18	**History of medical illness**	hypertension	1	1%	-	-	-	-	-	-	-	-
		DM	2	2%								
		none	97	97%								
19	**disease during pregnancy**	Yes	5	5%	-	-	-	-	-	-	-	-
		No	95	95%								
20	**obstetrical problem**	Placenta previa	1	1%	-	-	-	-	-	-	-	-
		none	99	99%								
21	**medicine without permission**	Yes	1	1%	-	-	-	-	-	-	-	-
		No	99	99%								
22	**Taken medicines during pregnancy**	Yes	18	18%	X^2	0.22	0.63	NS	X^2	17.6	<0.001	HS
		No	82	82%								

HS height significant

Table Number 4: shows that (97%) majority of the mothers did not have history of medical illness. In medical disorder during pregnancy (95%) majority of the mothers did not have any medical disorder. In obstetrical problem (99%) majority of the mothers did not have any obstetrical problem. In medicine without permission (99%) majority of the mothers have not taken medicine without permission. In taking medicine during pregnancy (82%) majority of the mothers had not taken medicine. Association of the history of any major systemic disease factors show that since the calculate chi-square values are less than the chi-square table value for the following parameters: taken medicines. It indicates that there is no significant association between the mothers' History of any major systemic disease and birth weight. As the calculated value of chi-square is more than table value for taken medicines with gestational age, there is highly significant association between the taken medicines and gestational age of babies.

Table (5) Association of the psychological factors with the selected demographic variables of babies

Sr No	factors	Category	LBW Frequency	LBW %	Birth weight				Gestational age			
					Tests		P value	LS	Tests		P value	LS
23	plan to this pregnancy	Yes	18	18%	X^2	0.44	0.51	NS	X^2	1.64	0.20	NS
		No	82	82%								
24	financial condition	Yes	51	51%	X^2	0.005	0.94	NS	X^2	0.114	0.73	NS
		No	49	49%								
25	sleep pattern	8 hrs sleep at night, and 2 hrs at noon	92	92%	X^2	0.02	0.89	NS	Fisher Exact		0.31	NS
		6 hrs sleep at night, and 2 hrs at noon	8	8%								

Table Number (5): shows that (82%) majority of the mothers did not have plan to the present pregnancy. In Response of the family (97%), majority of the mothers the Response of the family were Supportive. In Emotional status (50%), majority of mothers were Cheerful. In relationship with the husband (98%), majority of the mothers were satisfied. In Relationship with family members (96%), majority of the mothers had Good relationship.In worry about financial condition (51%), majority of the mothers worried. In Sleep pattern during pregnancy (92%) majority of the mothers had 8 hours sleep at night, and 2 hours at noon. Association of the psychological factors show that since the calculate chi-square values are less than the chi-square table value for the following parameters: plan to this pregnancy, relationship with family member, worry about your financial condition and sleep pattern. It indicates that there is no significant association between the mothers' Psychological factors with birth weight and gestational age. As the calculated value of fisher exact is less than table value for sleep pattern with gestational age. It indicates that there is no significant association between the sleep pattern and gestational age of babies.

Table (6) Association of the social factors with the selected demographic variables of babies

					Birth weight				Gestational age			
Sr No	**Social factors**	**Category**	**LBW Frequency**	**LBW %**	**Tests**		**P value**	**LS**	**Tests**		**P value**	**LS**
26	**married closely**	Yes	38	38%	X^2	1.27	0.26	NS	X^2	0.031	0.86	NS
		No	62	62%								
27	**Habits**	Habit present	7	7%	Fisher Exact		0.31	NS	Fisher Exact		0.33	NS
		Habit Absent	93	93%								
24	**house location**	Rural	28	28%	X^2	0.007	0.93	NS	X^2	0.037	0.85	NS
		Urban	72	72%								
25	**Family type**	Nuclear	49	49%	X^2	0.005	94	NS	X^2	0.061	81	NS
		Joint	51	51%								
26	**Houses' type**	Own Flat	52	52%	X^2	0.005	0.94	NS	X^2	0.002	0.96	NS
		Rent	48	48%								
27	**fuel used for cooking**	Wood, Coal	11	11%	X^2	0.32	0.57	NS	Fisher Exact		0.25	NS
		Liquefied petroleum gas	89	89%								

Table Number (6): shows that (62%), majority of the mothers did not married with their relationship. In Personal Habits (93%), majority of the mothers Habits were absent. In location of the house (72%), majority of the mothers were in the urban. In type of the family (51%), majority of the mothers were joint family. In type of the house (52%), majority of the mothers were the owner of the house. In fuel used in cooking (89%), majority of the mothers used Liquefied petroleum gas (LPG). Association of the social factors show that since the calculate chi-square values are less than the chi-square table value for the following parameters: married within close relation, house location, Type of the family, Houses' type and fuel used for cooking. It indicates that there is no significant association between the mothers' Social factors with birth weight and gestational age. As the calculated value of fisher exact is less than table value for maternal habits, there no is significant association between the maternal habits with Birth weight and gestational age of babies. As the calculated value of fisher exact is less than table value for fuel used for cooking with gestational age, there is no significant association between the fuel used for cooking and gestational age of babies.

SECTION II: Frequency distribution of the demographic variables of babies

Table (7) Gestational age

Characteristics (in weeks)	frequency	Percentage (%)
<37	17	15.8878
37	34	31.7757
38	31	28.9719
39	23	21.4953
40+	2	1.8691
Total	107	100

Table Number (7) shows that maximum of babies were (31.7757%) belong to Gestation age group 37 weeks, the babies were (28.9719%) belong to Gestation age group38, the babies were (21.4953%) belong to Gestation age group39, the babies were(15.8878%) belong to Gestation age group <37 and the babies were (1.8691%)belong to Gestation age group 40+.

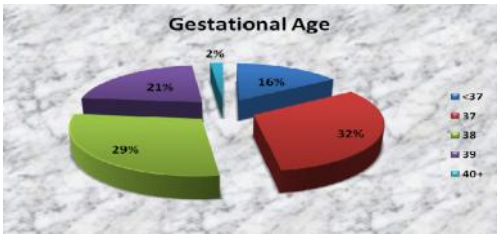

Figure (2) Gestational age

Table (8) Birth weight

Birth weight	frequency	Percentage (%)
<1kg	19	17.757
1 – 1.5	19	17.757
1.5 – 2.0	38	35.514
2.0 – 2.499	31	28.9719
Total	107	100

Table Number (8) shows that maximum of babies were (35.514%) belongs to birth weight group 1.5–2.0 kg, the babies were (28.9719%) belongs to birth weight group 2.0 – 2.499, the babies were(17.757%) belongs to birth weight group 1 – 1.5 and the babies were (17.757%) belongs to birth weight group <1kg.

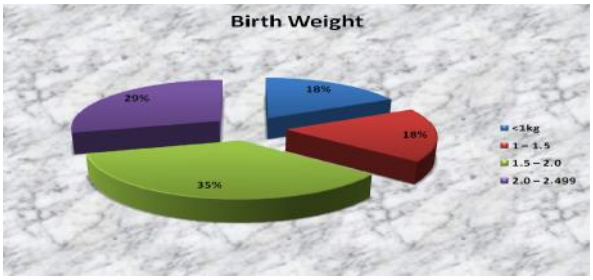

Figure (3) Birth weight

Table (9) distribution of Sex of study sample

Sex	Frequency	Percentage (%)
Males	54	51
Females	53	49
Total	107	100

Table Number (9) shows that maximum of babies were (51%) belongs to male sex and the babies were (49%) belongs to female sex.

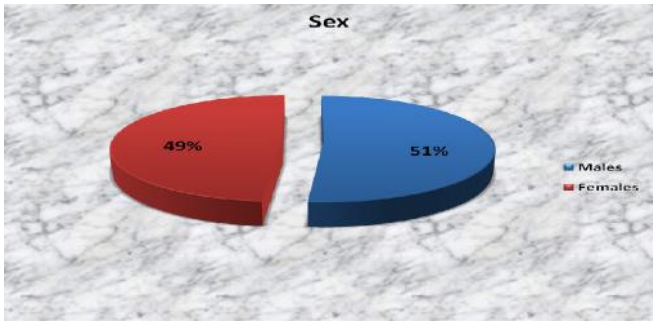

Figure (4) Sex

DISCUSSION

The found another study by (Vidyullatha) on normal primi mothers (n=100)) in Government Maternity Hospital, Hyderabad, about risk factors of LBW reveals that 29% of mothers had low level of knowledge about risk factors of LBW, 39% of mothers had medium level of knowledge. (Makhija K.) who reveals that there is significantly more LBW for males (57.and%) than LBW males (42.0%) but findings in a Thailand study did not find any difference in the incidence of LBW between sexes. Further, the rate of moderate low birth weight newborns and Very Low Birth Weight newborns were more or less same for males and female newborns.[8] Harold, et al. (2003) reported that malnutrition is wide spread in the developing world. 12 or more million low birth weight births occur per year.[9] Anaemia diagnosed early in pregnancy is associated with increased risk of LBW and preterm delivery (Levy et al, 2005). In several studies the association between anaemia and outcome of pregnancy reversed the direction during the third trimester.[10]

CONCLUSION:

Researcher concluded that maternal factors (Personal, Biological, Nutritional, History of disease, Psychological and Social factors) can affect the weight of the babies.

RECOMMENDATIONS:

Keeping in view the findings of the study, the following recommendations were made:

1) A comparative study can be conducted about the risk factors of low birth weight in urban and rural area.
2) An exploratory study can be undertaken to find out the educational needs of the antenatal mothers.
3) A comparative study can be conducted among mothers of low birth weight babies in Gov. Hospital and private Hospital.

4) A similar study can be conducted effectiveness of planned teaching programme on factors effect low birth weight.
5) A similar study can be conducted on mothers of normal weight babies and mothers of low birth weight.
6) A comparative study can be done between pre term and small for gestational age.

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