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Birth weight in high risk and normal pregnancy: a comparative study

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ABSTRACT

Objective. High-risk pregnancy (HRP) is characterized as a complex pregnancy when one or more factors have a negative impact on the pregnancy outcome. This study aimed to find out the impact of high-risk pregnancy on the birth weight.

Materials and Methods. A comparative case-control study was conducted between 1st September to 1st December 2023 on 250 pregnant women giving birth at Kirkuk city hospitals. A case group of 125 cases (high-risk pregnancies) and a control group of 125 cases (normal pregnancies) were allocated.

Results. The study found that there was a significant association between chronic hypertension ($p = 0.030$), pre-eclampsia ($p = 0.013$), GDM ($p < 0.001$), placenta accreta ($p = 0.028$), and anaemia ($p = 0.033$), and the weight of the newborn. About 8.0% of the women with high-risk pregnancies have had low birth weights, whereas 4.0% reported high birth weights. In contrast, women with normal pregnancies experienced low birth weights in 0.8% of cases and high birth weights in 1.6% of cases. Also, the findings revealed a high association between the weight of neonates born to women who had high-risk pregnancies in comparison to those who were born to women who had normal pregnancies ($p < 0.001$).

Conclusions. The main findings revealed that high-risk pregnancy affects the newborn's weight. Creating and implementing into practice interventional strategies to raise pregnant women's awareness of the importance of regular screenings is highly recommended. Furthermore, complications should be managed effectively to minimize the negative impacts on the weight of newborns.

INTRODUCTION

The weight of a newborn during birth is an essential indicator of maternal and foetal health [1]. Birth weight is significant because newborns with extremely low birth weights have a 100 times higher risk of death than those with normal

birth weights [2]. A newborn birth weight is classified as normal (2.5 to 4.0 kilograms), low weight (less than 2.5 kilograms), and macrosomia (greater than 4.0 kilograms) [3]. Strong evidence from large-scale epidemiological studies suggests that a higher risk of chronic diseases including diabetes, hypertension, and coronary artery disease

is connected with a low-weight newborn at birth [4]. Low birth weight may affect the newborn's health and the health of future generations [4, 5]. High-risk pregnancy (HRP) is characterized as a complex pregnancy when one or more factors have a negative impact on the pregnancy outcome [6]. Each year, over 500,000 women die as a result of complications associated with pregnancy around the world [7]. Most maternal deaths result from direct medical causes [8]. The health of women during pregnancy, childbirth, and the postnatal period is referred to as maternal health [9]. Most complications that occur during pregnancy can be either preventable or treatable; other complications may exist prior to pregnancy but become more serious during pregnancy, especially if not managed as part of the woman's care [10]. Every stage of pregnancy must be a positive experience that allows maternal and their newborns to reach for their full well-being and health [11]. A current systematic review shows that the incidence of iron deficiency during the early stages of pregnancy has been found to be associated with increased mortality among mothers and an elevated likelihood of experiencing unfavourable pregnancy outcomes, such as low birth weight, preterm, or foetal growth restrictions [12]. Additionally, there are other adverse pregnancy consequences, like attention deficit hyperactivity disorder and autism spectrum disorders in offspring [13]. Other conditions, such as gestational diabetes mellitus (GDM), are linked to various risk factors, with body weight being a particularly significant risk factor. A body mass index (BMI) ranging from 25.1 to 29.9 not only increases the likelihood of developing GDM but also increases the risk of suffering from negative effects during pregnancy [14]. Other study has demonstrated a correlation between insufficient levels of vitamin D and adverse outcomes such as low birth weight, gestational hypertension, and premature delivery [15]. In the light of these considerations, the main focus of this study was to determine the influences of high-risk pregnancies such as gestational hypertension-eclampsia-pre-eclampsia, chronic hypertension, gestational diabetes, anaemia, placenta previa and abruptio and placenta accreta, hyperthyroidism/hypothyroidism, and antiphospholipid syndrome to answer how various complications during pregnancy can impacts birth weight. This is because it is widely known that metabolic disease is more common in babies

of mothers who have risk during pregnancy [5]. In Iraq, there is lack of research on the impact of high-risk pregnancies on the birth weight, this knowledge gap impedes the development of effective strategies and interventions to reduce the negative impacts of pregnancy problems and optimize neonatal birth weight outcomes. This study aimed to find out the impact of high-risk pregnancies on birth weight among women living in Kirkuk, Iraq.

MATERIALS AND METHODS

A comparative case-control study was conducted on 250 pregnant women, 125 women were having high-risk pregnancy (case group) while the other 125 were having a normal pregnancy (control group). The data were collected during the period of three months (1st September to 1st December 2023) from Azadi Teaching Hospital, Kirkuk General Teaching Hospital, Maternity Gynecology and Pediatric Hospital. According to the statistical records of the above hospitals, in 2022, each hospital had approximately 750 births per month with annually about 9,000 births. For the purpose of this study, the medical conditions of all pregnant women were diagnosed by gynaecologists and obstetricians, and the gestational age has been determined based on Nägele's rule in identifying the first day of the last normal menstrual cycle LNMP Count and confirmed through ultrasound examination. Monitoring and treatment plans are usually implemented during pre-natal care through primary health care centres taking into account the specific needs of each high-risk pregnancy, in order to achieve the best possible illness management and minimize potential hazards.

Inclusion criteria

Pregnant women with all age, singleton foetus who were live and born with gestational age of 37-41 weeks as well as pregnancy to a high risk with the following definitions were used for pregnancy related high risk:

- Gestational hypertension: it is diagnosed by the gynaecologists when the mother's blood pressure is greater than 140/90 mm Hg in the second half of the pregnancy (after 20 weeks of gestation) and there is no protein urea [16].

- Pre-eclampsia: hypertension of at least 140/90 mmHg measured on at least two separate times at least 4 hours apart and in the presence of at least 300 mg protein in a 24-hour urine collection [17].
- Eclampsia: a severe consequence of pre-eclampsia characterized by new-onset multifocal, focal, or tonic-clonic seizure activity or unexplained coma during pregnancy or postpartum [18].
- Chronic hypertension: the presence of hypertension before pregnancy, before 20 weeks gestational age, or 12 weeks after delivery, characterized by a systolic BP/diastolic BP threshold of 140/90 mmHg [19].
- Gestational diabetes: this type of diabetes occurs between 24 and 28 weeks of gestation, with fasting blood glucose of 5.1 mmol/L, 1 hour of plasma glucose of 10.0 mmol/L, or 2 hours of plasma glucose of 8.5 mmol/L, according to the international diabetes and pregnancy research group criteria [20].
- Anaemia: anaemia in pregnancy as serum haemoglobin levels less than 11 g/Dl [21].
- Placenta previa: placental implantation in the lower uterine segment overlaying the endocervical os, and it is a major cause of foetal and mother morbidity and mortality [22].
- Placenta abruption: characterized by a complete or partial separation of an implanted placenta at any time after 20 weeks of gestation. It occurs in 0.8 to 1% of the total births [23].
- Placenta accreta: occurs when the placenta afterbirth fails to separate from the uterine wall. The abnormal attachment of the placenta to the myometrium develops during the early stages of pregnancy and can be categorized as placenta accreta, placenta increta, and placenta percreta [24].
- Thyroid disorders: the second-most prevalent endocrine disease occurs during pregnancy. During pregnancy, there is a 50% increase in thyroid hormone production, along with an associated increase in the daily requirement for iodine. Thyroid disorders in pregnant women include hypothyroidism and hyperthyroidism [25, 26].
- Antiphospholipid syndrome: autoimmune condition characterized by the presence of at least one type of circulating antiphospholipid antibody and the development of arterial or

venous thrombotic events and/or pregnancy morbidity [27].

Exclusion criteria

The study excluded foetuses with abnormalities, multiple pregnancies, and pre- and post-term deliveries because these conditions may influence and contribute to variations in neonatal weight [28-31].

Statistical analysis

Data was analysed by using statistical package SPSS version 27, a descriptive statistic were including frequency and percentage and mean for average value and SD to show how spread out the data around the mean. Meanwhile, inferential statistics used to find out the association for contingency table include chi square and Fisher-freedom Halton test used when expected frequencies were less than 5, and confidence interval (CI) of 99% were reported. The significance threshold was set at P-value 0.05 or less.

RESULTS

The socio-demographic characteristics of the participants are illustrated in **Table 1**. The majority maternal age in case and control group were between 21-27 years which represent: 92 (36.8%) with mean age 29.06 ± 6.104 , about 77 (30.8%) were primary educated, and 211 (84.4%) of participants were housewife, while 185 (74%) of participant were urban residents.

According to **Table 2**, which displays reproductive parameters, the study indicates that 51 (40.08%) of the pregnant women in the case group had three or more prior pregnancies (gravidity), compared to around 28 (22.40%) in the control group. Furthermore, 64 (51.20%) of the case group's participants had 1-2 prior births (parity), compared to 62 (49.60%) of the control group. In both groups, 69 people (or 27.6%) have had an abortion in the past.

In relation to the delivery mode 61 (48.8%) of the women in the control group and 97 (77.6%) of the women in the case group had birth via C/S. Furthermore, of the participants in the high-risk group, 6 (4.80%) had a history of TORCH infection, 76 (60.8%) had a family history of chronic dis-

Table 1. Distribution of the demographic characteristics of the participants.

Demographic and obstetric characteristics		High risk pregnancy (case group)		Normal pregnancy (control group)		Total	
		Freq.	%	Freq.	%	Freq.	%
Maternal age	≤ 20	5	4.0%	11	8.8%	16	6.4%
	21-27	48	38.4%	44	35.2%	92	36.8%
	28-34	40	32.0%	50	40.0%	90	36.0%
	35-41	26	20.8%	19	15.2%	45	18.0%
	> 41	6	4.8%	1	0.8%	7	2.8%
Mean ± SD		29.82 ± 6.512		28.30 ± 5.588		29.06 ± 6.104	
Level education	Illiterate	9	7.2%	9	7.2%	18	7.2%
	Primary	28	22.4%	49	39.2%	77	30.8%
	Secondary	46	36.8%	27	21.6%	73	29.2%
	Diploma	13	10.4%	15	12.0%	28	11.2%
	Bachelor	29	23.2%	25	20.0%	54	21.6%
Maternal occupation	Housewife	103	82.4%	108	86.4%	211	84.4%
	Student	4	3.2%	7	5.6%	11	4.4%
	Employee	18	14.4%	10	8.0%	28	11.2%
Residence	Rural	24	19.2%	25	20.0%	49	19.6%
	Urban	94	75.2%	91	72.8%	185	74.0%
	Suburban	7	5.6%	9	7.2%	16	6.4%

Table 2. Reproductive parameters of participants.

		High Risk pregnancy (case group)		Normal pregnancy (control group)		Total	
		Freq.	%	Freq.	%	Freq.	%
Gravida	1-2	46	36.80%	75	60.00%	121	48.40%
	3-4	51	40.80%	28	22.40%	79	31.60%
	≥ 5	28	22.40%	22	17.60%	50	20.00%
Mean ± SD		3.49 ± 2.184		2.59 ± 1.656		3.04 ± 1.985	
Para	Nulliparous	30	24.00%	44	35.20%	74	29.60%
	1-2	64	51.20%	62	49.60%	126	50.40%
	3-4	22	17.60%	15	12.00%	37	14.80%
	≥5	9	7.20%	4	3.20%	13	5.20%
Mean ± SD		1.83 ± 1.726		1.32 ± 1.423		1.58 ± 1.600	
Abortion	Yes	47	37.60%	22	17.60%	69	27.60%
	No	78	62.40%	103	82.40%	181	72.40%
Mode of delivery	N+D	28	22.4%	64	51.2%	92	36.8%
	C/S	97	77.6%	61	48.8%	158	63.2%
History of (TORCH) infection	Yes	6	4.80%	0	0.00%	6	2.40%
	No	119	95.20%	125	100.00%	244	97.60%
Family history of chronic disease (HP-DM)	Yes	76	60.8%	69	55.2%	145	58.00%
	No	49	39.2%	56	44.8%	105	42.00%
History of gynaecological disease	PCOS	36	28.8%	17	13.6%	53	21.20%
	Endometriosis	0	0.0%	1	0.8%	1	0.40%
	No	89	71.2%	107	85.6%	196	78.40%
Antenatal care	Yes	74	59.20%	79	63.20%	153	61.20%
	No	51	40.80%	46	36.80%	97	38.80%
BMI	Underweight	1	0.80%	2	1.60%	3	1.20%
	Healthy Weight	41	32.80%	55	44.00%	96	38.40%
	Overweight	39	31.20%	45	36.00%	84	33.60%
	Obese	44	35.20%	23	18.40%	67	26.80%

NVD: normal vaginal delivery; C/S: caesarean section; TORCH: toxoplasmosis, others (syphilis; hepatitis B), rubella, cytomegalovirus (CMV) and herpes simplex; BMI: body mass index; HP: hypertensive; DM: diabetes mellitus; PCOS: poly cystic ovarian syndrome; BMI: body mass index.

ease, such as diabetes and hypertension; whereas in control group, 69 (55.2%) had a family history, and with regard to the history of gynaecological diseases, 36 (28.8%) of the case group's participants had PCOS, compared to 17 (13.6%) of the control group.

Regarding antenatal care, in case group 74 (59.2%) of pregnant women were attending antenatal care compared to 79 (63.2%) in control group. Also, in terms of pre pregnancy BMI, about 44 (35.2%) were obese in case group compared to 23 (18.4%) in control group.

Table 3 shows the association between high-risk pregnancy and its impact on birth weight. As shown, there was a weak association between gestational hypertension, eclampsia, placenta previa, placenta abruption, hypothyroidism, hyperthyroidism, and antiphospholipid syndrome with birth weight at $p > 0.05$. In the meantime, there is a significant association between chronic

hypertension and birth weight at $p = 0.030$ and CI 0.028-0.037; significant association between pre-eclampsia and birth weight at $p = 0.013$ and CI 0.012-0.018; high significant association between gestational diabetes at $p < 0.001$ and CI 0.00-0.001; and significant association between anaemia and newborn weight at $p = 0.033$ and CI 0.03-0.04. Further, there was a significant association between placenta accreta and birth weight at $p = 0.028$ and CI 0.027-0.036.

Table 4 displays the weight distribution of neonates born to women with high-risk pregnancies compared to those born to women with normal pregnancies. The findings indicated that 20 (8.0%) babies who were born to high-risk pregnancy had low birth weight, and 95 (38%) were weighted normal, whereas 10 (4.0%) had excessive birth weight. Meanwhile, among those who were born to normal pregnancies, about 2 (0.8%) had low birth weight and 119 (47.6%) had normal

Table 3. Association between high-risk pregnancies and birth weight.

Items		High risk pregnancy (case group)					
		Low birth weight	Normal birth weight	High birth weight	P-value	Sig.	99%CI
Chronic hypertension	Yes	1	2	2	0.030 [†]	S	0.028-0.037
	No	19	93	8			
Gestational hypertension	Yes	5	24	3	0.946 χ^2	NS	1.00-1.00
	No	15	71	7			
Eclampsia	Yes	0	2	0	1.000 [†]	NS	1.0-1.0
	No	20	93	10			
Preeclampsia	Yes	4	2	0	0.013 [†]	S	0.012-0.01
	No	16	93	10			
Placenta previa	Yes	1	1	0	0.424 [†]	NS	0.414-0.44
	No	19	94	10			
Placenta abruption	Yes	0	1	0	1.000 [†]	NS	1.0-1.0
	No	20	94	10			
Gestational diabetes	Yes	4	7	6	< 0.001 [†]	HS	0.00-0.001
	No	16	88	4			
Hypothyroidism	Yes	1	11	2	0.469 [†]	NS	0.457-0.48
	No	19	84	8			
Hyperthyroidism	Yes	1	5	0	1.000 [†]	NS	1.0-1.0
	No	19	90	10			
Anaemia	Yes	8	60	3	0.033 χ^2	S	0.03-0.04
	No	12	35	7			
Placenta accreta	Yes	2	0	0	0.028	S	0.027-0.036
	No	18	95	10			
APS (antiphospholipid syndrome)	Yes	8	25	5	0.179 χ^2	NS	0.171-0.191
	No	12	70	5			

Low birth: weight < 2.5 kg; normal birth: weight 2.5-3.999 kg; high birth: weight \geq 4 kg;[†]: Fisher Freeman-Halton Exact Test, χ^2 : chi square test; CI: confidence interval 99%.

Table 4. Comparative between weight of neonates born to women who had High risk pregnancies with those who born to women who had normal pregnancies.

Birth Weight	High risk pregnancy (case group)	Normal pregnancy (control group)	Total	P-value (sig.) 99%CI
Low birth weight	20 (8.0%)	2 (0.8%)	22 (8.8%)	< 0.001 (HS) 0.0 to < 0.001
Normal birth weight	95 (38.0%)	119 (47.6%)	214 (85.6%)	
High birth weight	10 (4.0%)	4 (1.6%)	14 (5.6%)	
Total	125 (50.0%)	125 (50.0%)	250 (100.0%)	

Chi Square test = 19.99, d.f. = 2.

weight, and 4 (1.6%) were having macrosomia. As shown, there was a high significant association between weight of neonates born to women who had high-risk pregnancies with those born to women who had normal pregnancies at $p < 0.001$ and CI 0.0 to < 0.001 .

DISCUSSION

Ensuring the safety and well-being of pregnant women and neonates is crucial, and a comprehensive maternal care plays a significant role in achieving this. Consulting healthcare professionals for prevention strategies is an optimal approach for minimizing pregnancy-related risks. Health care-seeking behaviour refers to the steps performed to establish both initial and ongoing care for a person's perceived health condition, to find a suitable solution [32]. The current study aimed to find out the impact of high-risk pregnancy on the birth weight among women living in Kirkuk city. The findings revealed that in both case and control group maternal age were between 21-27 years which represent the 36.8%, that's in line with study by Gomindes *et al.* [33] who found that women aged between 22-25 years, which represent 40% in Vantamuri and 49% in Kinaye, were most at risk during pregnancy. Due to Iraqi culture, most females get married and start having children at very young age [34]. Both advance and younger age pregnancies are at a higher risk of having a negative pregnancy outcome [35]. In terms of antenatal care, the study shows 61.2% of women in both groups were visiting primary healthcare centres to undergo ANC. Regular ANC care has several benefits for maternal health, including a lower risk of premature labour, postpartum haemorrhage, and anaemia. While minimizing the declining neonate death, improving the nutritional status of children, chance of stillbirth and reducing neonatal admission to neonatal intensive care unit (NICU) [36].

The finding showed that 33.60% of women in both groups were overweight. That's in a line with the study conducted by Lutfi *et al.* [37]. Pre-pregnancy BMI is essential factor due to gestational weight gain which is strongly affected by pre-pregnancy BMI, and the prevalence of excessive weight gain during pregnancies increases with pre-pregnancy BMI and women age [37].

The presence of maternal health conditions increases the risk of pregnancy-related complications [38]. Furthermore, the association between high-risk pregnancy and effect on birth weight, according to each condition the current study found that chronic hypertension is significantly associated with newborn birth weight ($p = 0.030$). This is in agreement with a study conducted by Panaitescu *et al.* [39] in the United Kingdom, which found a strong relationship between chronic hypertension and birth weight ($p = 0.0001$). Chronic hypertension during pregnancy has the potential to impact the weight of newborns. Healthcare providers can utilize this knowledge to provide careful monitoring over pregnant women both prior to and during pregnancy, while also promoting the adoption of a health-conscious lifestyle, stress management, and the avoidance of smoking and alcohol intake. In terms of pre-eclampsia previous study by Nakimuli *et al.* [40] and Abdul-Kader and Ghalib [41] revealed a significant association between pre-eclampsia and birth weight; this is consistent with the current study that found low birth weight babies were born to four out of six pregnant mothers with pre-eclampsia, indicating that there was a significant link between pre-eclampsia and birth weight ($p = 0.013$). Quaresima *et al.* [42] revealed that 9.4% of mothers who experienced stillbirth incidents were diagnosed with hypertensive disorder of pregnancy (HDP). The pre-eclampsia has been determined to be caused by a reduction in uteroplacental perfusion, which may result in lower birth weights [43]. To mitigate the adverse impact of preeclampsia on neonatal weight and conditions,

it is essential for clinical practice to emphasize early detection and diagnosis, as well as regular prenatal visits that involve frequent blood pressure checks, regular urine tests, and monitoring of foetal growth [44]. Furthermore, the current study found a highly significant relationship between gestational diabetes mellitus and birth weight at ($p = 0.001$). That agrees with study by Yang *et al.* [45] who found that GDM have a strong correlation with elevated birth weight and a high likelihood of being large for gestational age (LGA) and macrosomia. While, Quaresima *et al.* [42] revealed that 15.09% of mothers who experienced stillbirth incidents were diagnosed with gestational diabetes. Growth of the foetus was mostly affected by the amounts of glucose after a meal, rather than the fasting blood glucose levels. In women with gestational diabetes, change in amino acid metabolism can contribute to abnormalities in foetal growth [46]. It is recommended that women with gestational diabetes who were diagnosed in their first or early second trimester consider the indications for foetal echocardiography [47]. These findings have the potential to be beneficial for healthcare providers in implementing personalized care that meets special circumstances. This offers recommendations for maintaining a lifestyle involving issues such as dietary choices, physical exercise, and weight control. Regarding the finding of the current study, there was association between maternal anaemia and birth weight at $p = 0.033$; that's agree with a study by Villalva Luna and Prado [21] who found that pregnant women of advance ages who have anaemia are six times more likely to give birth to babies with low birth weight: this may due to the insufficient consumption of iron-rich foods throughout pregnancy which may decrease the final outcome of maternal haemoglobin, resulting in abnormalities to foetal growth, such as preterm delivery and low birth weight. Administering iron supplements is a common method of treating iron-deficient anaemia. The finding of this study also showed significant association between placenta accreta and birth weight ($p = 0.028$). This finding is supported by Farquhar *et al.*, [48] who revealed a significant association between placenta accreta and birth weight. It disagrees with the study by Jauniaux *et al.*, [49] who found that the occurrence of negative outcomes in newborns of pregnancies complicated by placenta accreta is associated with early birth rather than poor foetal growth. Clinical practice should be focus on timely

identification and diagnosis of conditions – allowing the implementation of suitable strategies and interventions to enhance birth outcomes –, and primary diagnoses by using prenatal ultrasound, with magnetic resonance imaging (MRI) – typically employed as a supplementary diagnostic method [50]. Regarding the comparison between weight of neonates born to women who had high risk pregnancies with those who born to women who had normal pregnancies, the current study found that in case groups (high-risk pregnancies), 8.0% were having low birth weight, 38.0% were within the normal birth weight, and 4.0% were macrosomia, while in control groups (pregnancies without risk), 0.8% were having low birth weight, 47.6% were having normal birth weight, and 1.6% were born with macrosomia. This revealed that there was a high significant association between the weight of neonates born to women who had high risk pregnancies and those born to women who had normal pregnancies at $\chi^2 = 19.99$, $p = 0.001$. That's agree with previous studies by Wagata *et al.* [51]. Other studies by Majella *et al.* [52] who found that 18.4% of women with high risk pregnancies had a low birth weight, 81.6% had a normal weight; in women with normal pregnancies, 8.6% had a low birth weight, 91.4% normal weight, and this revealed a significant association between birth weight and high risk pregnancies at $p = 0.004$. Weight of newborn is a credible and specific factor that is directly related to maternal nutrition and health during pregnancies [53]. Low birth weight (LBW) is associated with the adequacy and effectiveness of antenatal care (ANC). Furthermore, it is a consequence of either preterm delivery or intrauterine growth restriction. Pregnant women undertake a number of essential services during antenatal care (ANC) appointments, which are vital for the well-being of both the mother and the developing foetus [54]. On the other hand, a lot of healthcare services are provided by private clinics [55]. In developing countries such as Iraq, where challenges with the health of mothers and children continue to arise, there is a pressing need to increase the quality of reproductive health care. The provision of antenatal education alone is not the complete solution, but it can contribute to a partial resolution. Pregnant women would not be able to fully utilize the information they have received if services are not easily accessible and of excellent quality [56]. Medical practitioners can use the strength point discovered from the study of how high-risk pregnancies affect birth

weight to develop focused interventions. These may include focusing on maternal-child health-care programs for low-high and severe risk during pregnancy, raising awareness among the general population to prevent future adverse outcomes, utilizing the screening tool to reduce adverse pregnancy outcomes, and thereby decreasing maternal and neonate morbidity rates, and educating women about benefits of marriage after age 18 as well complications related to teenage pregnancy.

Strengths and limitations

This study is regarded as the first in Iraq to compare the birth weight of major high-risk pregnancies condition. The incorporation of a control group enhanced the study as it enables direct comparisons between pregnancies at high risk and normal pregnancies. Rigorous inclusion criteria were applied to reduce the potential for selection and misclassification bias. The study's limitations arise from the relatively small sample size, which adversely impacts the ability to draw conclusive results for various disorders. A broad range of disorders and the collection of all high-risk pregnancies without taking into account the specific circumstances may obscure significant diversity. The lack of a list of records for high-risk cases in the settings of this study presented further difficulties for the researcher as the data could not be used retrospectively.

CONCLUSIONS

The main findings revealed that high-risk pregnancy affects the newborn's weight. Creating and implementing into practice interventional strategies to raise pregnant women's awareness of the importance of regular screenings is highly recommended. Furthermore, complications should be managed effectively to minimize the negative impacts on the weight of newborns.

COMPLIANCE WITH ETHICAL STANDARDS

Authors' contribution

R.F., S.M.A.: Conceptualization, methodology. R.F.: Data curation, formal analysis, investigation, project administration. S.M.A.: Supervision.

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None.

Study registration

N/A.

Disclosure of interests

The authors declare that they have no conflict of interests.

Ethical approval

Ethical approval was obtained from the Ministry of Health (Ref.: NO.717/2023), Kirkuk Health Directorate as well as Kirkuk University-Nursing college-post graduated ethical committee.

Informed consent

Informed consent was obtained from pregnant women who participated in the study.

Data sharing

Data are available under reasonable request to the corresponding author.

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