



ISSN (P): 2522-6614
ISSN (E): 2522-6622
© Gynaecology Journal
www.gynaecologyjournal.com
2023; 7(3): 280-283
Received: 05-01-2023
Accepted: 10-02-2023

Priscilla AD
Tutor, School of Nursing CHWC,
New Delhi, India

A descriptive study to assess the difference between estimated fetal weight using Johnsons formula and the actual birth weight of newborn babies born to women availing maternity services in a tertiary care hospital, Haryana

Priscilla AD

DOI: <https://doi.org/10.33545/gynae.2023.v7.i3b.1314>

Abstract

Introduction: Knowledge about weight of the fetus in-utero is important for the health care professionals to decide upon the antepartum as well as intrapartum initiatives and thereby reducing fetal complications. Johnson's formula is one of the important and easiest methods of clinical estimation of fetal weight. The aim of the study was to assess the difference between estimated fetal weight calculated by Johnson's formula and actual birth weight of newborns, to associate and correlate selected maternal and fetal variables with the estimated fetal weight and actual birth weight.

Methods: The study sample was 110 term pregnant women in labour and their just born babies. Research approach - quantitative non-experimental descriptive. Tool - data sheet. Data analyzed using descriptive and inferential statistics.

Result: The difference between estimated fetal weight and Actual birth weight had a mean of 774.9 and SD \pm 403.21. Study revealed that the estimated fetal weight using Johnson's formula had a difference in comparison with the actual birth weight of babies (371.69 to 1178.1).

Discussion: Obstetric Score (OS) Mean 1.59 SD \pm 0.76, Period of Gestation (POG) Mean 39 SD \pm 1.2. Pre-delivery Weight Mean 64.5 SD \pm 9.839. Post-delivery Weight Mean 61.4 SD \pm 9.28. Estimated fetal weights (EFW) range 2945 to 4340gms. (Mean 3800.7 SD \pm 295.9), Actual birth weight (ABW) range 2120gms to 4145gms (Mean 3025.8 SD \pm 388.5). Placental Weight Mean 516 SD \pm 112.7. Chi square test revealed that there was no association between obstetric score, period of gestation and estimated fetal weight. Similarly Fisher's exact test revealed that there was no association between obstetric score, period of gestation and actual birth weight.

Keywords: Estimated fetal weight, Johnson's formula, actual birth weight, difference between estimated and actual weight

Introduction

Need for the study and literature review

The aim of modern obstetrics is to achieve the best quality of life for both mother and new born. It is the responsibility of the health care system to take adequate care and to ensure the provision of desired antenatal services to all pregnant ladies.

Proper estimation of fetal weight and appropriate timely intervention can help to decrease the perinatal morbidity and mortality. In our clinical experience we found that the estimated weight using Johnson's formula had a major difference in comparison with the actual birth weight of individual babies. To determine the significance of a western formula in Indian scenario.

Birth weight of the newborn baby is the important and single most factors that determine the survival of the newborn as well as the neonatal morbidity. It is mandatory for the midwives and obstetricians to assess the birth weight of the fetus before birth in order to take care of the unexpected problems in intrapartum and postpartum period ^[1].

Prediction of birth weight is usually done by clinical method, gestational age derived birth weight centiles and ultrasound fetal biometry. Each of these methods has varying degree of accuracy and limitations. SFH measurement is one of the methods which has now become popular for estimation of fetal weight using Johnson's formula ^[2].

Corresponding Author:
Priscilla AD
Tutor, School of Nursing CHWC,
New Delhi, India

Nutrition is perhaps the most influential non genetic factor. Maternal body consumption, nutritional stores, diet, and ability to deliver nutrients through the placenta determine nutrient availability for the fetus. Nutrition and weight management before and during pregnancy has a profound effect on the development of fetus. This is a rather critical time for healthy fetal development as the fetus rely heavily on maternal stores and nutrient for optimal growth and health outcome later in life [3].

Prenatal nutrition addresses nutrient recommendations before and during pregnancy. Prenatal nutrition has a strong influence on the birth weight and further development of the fetus [4].

A comparative study of various methods of fetal weight estimation at term pregnancy by WHO stated that there is no much difference between estimated fetal weight calculated by Johnson's formula and actual birth weight of the baby [2].

A study on Johnsons formula, fundal height measurement for estimation of birth weight by faculty of nursing science, Assumption University, Bangkok Thailand stated that the difference between estimated fetal weight and actual birth weight ranges between -750 to +530gms [3].

Methodology

The approach used for the present study is quantitative, non-experimental and descriptive in nature. The study was conducted at the maternity unit, command hospital (WC) Chandimandir. 110 pregnant women and healthy term new born baby pairs without any maternal and neonatal complication who has under gone normal vaginal delivery in CH (WC). The sampling technique used was convenient sampling technique.

Inclusion criteria

Normal Pregnant women (Between 37-41 completed weeks of Period of Gestation).

Exclusion criteria

Instrumental/LSCS deliveries, Malpresentation /IUGR cases, and Preterm/large for date babies/ postterm babies.

Description of Tool

A well-structured data sheet. The body of the data sheet was divided into 12 columns in which various items like obstetric score, period of gestation, pre-delivery weight, symphysis fundal height, per vaginal findings, estimated fetal weight, actual fetal weight, placental weight, post-delivery weight, negative difference between estimated fetal weight and actual birth weight and positive weight difference were recorded.

Validity

Tool was given to the experts in the field of obstetrics and gynecology. Final tool was prepared after a few modifications as suggested by the experts.

Method of data collection

1. In this study pre delivery weight of all the samples were recorded as they entered inside lab our room with the complains of lab our pains.
2. Abdominal examination done to assess the fetal lie, position and presentation; those who were found to have longitudinal lie, cephalic presentations were included in the study.
3. Symphysis fundal height measured for all the study subjects after abdominal examination.
4. Per vaginal examination performed to assess the level of fetal head in relation to ischial spines.
5. After the delivery, baby weight was recorded without any clothes.
6. Placenta along with its entire membranes and cord was weighed and recorded.
7. Post-delivery weight recorded as the subjects were wheeled out of delivery suite.
8. The maternal weight was recorded using zero calibrated bath room weighing scale. New born babies weight was recorded using zero calibrated electronic baby weighing scale. To prevent discrepancies in weight same weighing scales were used for all the women and the babies.

Findings

Table 1: Obstetric Score and Period of Gestation N=110

S. No	Characteristics	Frequency	Percentage	Mean SD
1	Gravida			1.59 ± 0.76
	Primi	46	42	
	G2A1	16	14	
	Multi	48	44	
2	Period of Gestation (Weeks)			39 SD ± 1.2
	37-38+6	41	37	
	39-40+6	68	62	
	>40	1	1	

Inference

Maximum were multigravida that is 44% and 14% were gravid a 2 with one abortion. Maximum were in 39-40weeks +6days period of gestation.

Table 2: Pre and Post-delivery weight category N=110

S. No	Weight Category (Kgs)	Pre-delivery		Post Delivery	
		Frequency	Percentage (%)	Frequency	Percentage (%)
1	46-55	11	10	29	26
2	56-65	49	45	51	46
3	66-75	31	28	19	18
4	76-85	16	14	10	9
5	86-95	2	2	1	1
6	96-105	1	1	0	0
Mean and SD		64.5 ± 9.839		61.4 ± 9.28	

Inference

In pre-delivery 45% were in 56-65kg weight category whereas

only 1% from 96-105kg. In post-delivery 51% were in same 56-65 kg weight category.

Table 3: Estimated fetal weight and actual birth weight category N=110

S. No	Newborn Weight category (Kgs)	Estimated fetal weight		Actual Birth Weight	
		Frequency	Percentage (%)	Frequency	Percentage (%)
1	2.001-2.500	0	0	11	10
2	2.501-3.000	3	2.7	44	40
3	3.001-3.500	10	9	42	39
4	3.501-4.000	69	62.7	12	10
5	4.001-4.500	28	25.4	1	1
6	>4.500	0	0	0	0
Mean and SD		3.800 ± 0.295		3.025 ± 0.388	

Inference

Maximum of 62.7% were in 3.501-4.000kg estimated fetal weight category. Whereas a total of 79% were in 2.501-3.500kg in the actual birth weight category.

Table 4: Placental weight category N=110

S. No	Placental Weight (Gms)	Frequency	Percentage (%)
1	<350	5	4
2	351-450	26	24
3	451-550	31	28
4	551-650	30	27
5	651-750	15	14
6	>750	3	3
Mean and SD		516 ± 112.7	

Inference

A total of 79% were in 351-650 range of placental weight

Table 6: Mean & Standard Deviation of selected variables N=110

Parameter	Mean	SD	Range	
			Lowest Value	Highest Value
Pre-delivery Weight (Kgs)	65.3	10.23	55.07	75.53
Post-delivery (Kgs)	61.7	9.49	52.21	71.19
Difference in Maternal Weight (Kgs)	3.6	0.74	2.86	4.34
Placental weight (Gms)	516.2	112.7	403.7	628.9
Estimated Fetal Weight (Gms)	3800.7	295.91	3504.8	4096.6
Actual Birth Weight (Gms)	3025.8	388.5	2637.3	3414.3
Difference (Gms)	775	403.2	371.8	1178.2
Visible loss (Gms)	3542	501.2	3041	4043
Difference from visible loss & Estimated Fetal Weight (Gms)	258.7	205.3	53.4	464

Inference

The difference between estimated fetal weight calculated by Johnson's formula and Actual birth weight had a mean of 775 and SD ± 403.21. Johnson's formulae can be relied upon with a mean of 258.7 and SD ± 205^[3].

Association and correlation of selected maternal and fetal variables

Chi square test revealed that there was no association between obstetric score, period of gestation and estimated fetal weight. Similarly Fisher's exact test revealed that there was no association between obstetric score, period of gestation and actual birth weight. Negative correlation was found among OS Vs EFW; POG Vs EFW and OS Vs ABW. Positive correlation found among POG Vs ABW and EFW Vs ABW.

Very few literatures available in this regard and have EFW mainly using USG & other formulas. This study only concentrated on the use of Johnson's formula as it is easy for the nurses in their day to day clinical practice.

Discussion

Birth weight is an important parameter to predict the neonatal

category.

Table 5: Difference in Estimated fetal weight and Actual Birth Weight N=110

S. No	Difference	Frequency	Percentage
1	(-)400 – 0	5	5
2	0-400	12	11
3	401-800	33	30
4	801-1200	45	41
5	1201-1600	14	12
6	1601-2000	1	1
Mean and SD		774.9 ± 403.2	

Inference

A total of 71% were in the 401-1200 weight difference category of estimated fetal weight and the actual birth weight. Five percent (5%) were in -400 to 0 difference category.

outcome and its prenatal estimation places significant role in the management of normal pregnancies as well as high risk pregnancies^[5].

Selected Maternal variables

Current study consisted of 110 samples of pregnant women at term whose estimated fetal weight calculated using Johnson's formula compared with actual birth weight, a similar study conducted on the fetal weight estimation consisted of 126 pregnant women^[6].

In the present study, among all the samples 42% were primigravida, 14% were G₂A₁ and 44% were multigravida; whereas a comparative study of fetal weight estimation at term by clinical method and ultrasound method and after delivery consisted of 50% of primi gravid a, 30% of second gravid a and 20% were multigravida^[5].

This current study included pregnant women with POG range of 37- 42 weeks a study on clinical versus sonographic estimation of fetal weight also had the similar weeks of period of gestation.⁷

Selected Fetal Variables

Our study estimated fetal weight by using Johnson's formula

whereas a comparative study of fetal weight estimation at term by clinical method and ultrasound method and after delivery the study used Johnson's formula as well as Hadlock's formula [5].

A similar study conducted to study of various methods of estimation in term pregnancy used Dawn's formula [Fetal weight in gms = Longitudinal diameter of the uterus X (transverse diameter of the uterus) 2 X 1.44/2], Dare's formula [Fetal weight in gms = SFH X AG] and Johnson's formula for estimation of fetal weight [8].

In this study, the sample group was 110 newborns with Actual birth weight between 2120gms to 4145gms giving a mean of 3025.8gms and standard deviation of 388.5gms while the estimated weights ranged from 2945 to 4340gms with a mean of 3800.7gms and standard deviation of 295.9gms. Similar findings was present except for some deviation in the estimated fetal weight in a comparative study between clinical estimation and ultrasonographic determination of fetal weight with a sample group of 126 newborns with Actual birth weight between 2150 to 4230gms giving a mean of 3093.57gms and a standard deviation of 391.03gms and the estimated weights ranged from 2325 to 4495gms with a mean of 3477.66gms and standard deviation of 454.55gms [6].

Conclusion

It is important for midwives to know how to estimate fetal weight and understand the difference in estimated and actual birth weight. As birth weight is an important parameter to predict the neonatal outcome, and its prenatal estimation places significant role in the management of normal as well as high risk pregnancies.

Conflict of Interest

Not available

Financial Support

Not available

References

1. Yadav R, Sharma BK, Deokota RN, Rahman H. Assessment of clinical methods and ultrasound in predicting fetal birth weight in term pregnant women. *Ijrcog* 2018 Aug;5:8. <https://doi.org/10.18203/2320-1770.ijrcog20162664>
2. Numprasert W. A study in Johnson's formula: Fundal height measurement for estimation of birth weight. *AU JT*. 2004 Jul;8(1):15-20.
3. Impact of maternal nutrition on fetal development. *Health odyssey-*
4. Prenatal Nutrition ; cDec 2010. <https://www.mednet.ca/en/report/impact-of-maternal-nutrition-on-fetal-developmen.html>
5. Nahum GG. Estimation of fetal weight. Practice essentials, importance of estimation of fetal weight. URL: <https://emedicine.medscape.com/article/262865-overview>
6. Annapurna K, Rama DR, Ramamani C. A comparative study of fetal weight estimation at term by clinical method and ultrasound method and after delivery. *IJAR*. 2015 June;5(6):118-123. URL: worldwidejournalism/ojs/index.php/ijar/article/view/8462
7. Nareelux S, Jintana T, Khuanchanok N. The results of the fetal weight estimation of the infants delivered in the delivery room at Dan Khunthot Hospital by Johnson's method. *International science index, medical and health*

8. Shittu, *et al*. Clinical versus sonographic estimation of foetal weight. *Health Popular Nutr*. Mar 2007;25(1):14-23. URL: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3013260/pdf/jhpn0025-0014.pdf>
9. Kumara A, Goswami S, Mukharjee P. Comparative study of various methods of estimation in term pregnancy. *Journal of south Asian Federation of obstetrics and Gynecology*. Jan-April 2013;5(1):22-25. URL: www.jsafog.com/doi/10.5005/jp-journals-10006-1213.

How to Cite This Article

Priscilla AD. A descriptive study to assess the difference between estimated fetal weight using Johnson's formula and the actual birth weight of newborn babies born to women availing maternity services in a tertiary care hospital, Haryana. *International Journal of Clinical Obstetrics and Gynaecology*. 2023;7(3):280-283.

Creative Commons (CC) License

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-Non Commercial-Share Alike 4.0 International (CC BY-NC-SA 4.0) License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.