

**ESTIMATION OF FETAL WEIGHT USING THE RISANTO FORMULA AND THE JOHNSON-THAUSACK
FORMULA COMPARED TO BIRTH WEIGHT**

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**ABSTRAK : PERBEDAAN AKURASI TAKSIRAN BERAT BADAN JANIN MENGGUNAKAN RUMUS RISANTO
DAN RUMUS JHONSON THAUSACK DENGAN BERAT BADAN BAYI**

Latar Belakang: bagian penting dari asuhan kebidanan adalah mengukur tinggi fundus uteri untuk memastikan perkiraan berat badan bayi. Pengetahuan mengenai perkiraan berat badan janin memungkinkan bidan, untuk mengantisipasi potensi masalah dan menyusun strategi untuk mengatasinya

Tujuan: mengetahui perbedaan akurasi antara Rumus Risanto dan Rumus Jhonson Thausack dalam menentukan taksiran berat janin di RS Ibu dan Anak Al Islam Bandung

Metode: Desain Penelitian ini adalah Cross Sectional Design, Populasi adalah ibu inpartu kala 1 fase laten yang melahirkan di RS Ibu dan Anak Al Islam periode Mei – Juni 2024 sebanyak 61 orang. Teknik pengambilan sampel menggunakan Total Sampling.

Hasil: Terdapat perbedaan yang signifikan antara berat bayi lahir dengan TBJ Risanto ($p=0,001$) dan berat bayi lahir dengan TBJ Johnson Tohsack ($p=0,001$). Dari uji yang membandingkan akurasi antara rumus Risanto dan rumus Johnson Thausack didapatkan hasil rata-rata untuk TBJ Risanto sebesar 2824,92 gram dan TBJ Johnson Tohsack sebesar 2614,67 gram, dan sementara berat bayi yang dilahirkan adalah 3084,02 gram.

Kesimpulan: Terdapat perbedaan yang signifikan secara statistik antara rumus Risanto dan Johnson Thausack dengan berat bayi lahir yang sebenarnya, rumus Risanto lebih mendekati dengan berat bayi lahir.

Saran: Bidan lebih meningkatkan ketelitian dalam pengukuran TFU dan menggunakan rumus Risanto untuk mengukur TBJ sehingga hasil pengukuran dapat digunakan dalam pelayanan kebidanan.

Kata Kunci : Taksiran berat Janin, Rumus Risanto, Rumus Johnson Thausack

ABSTRACT

Background: A crucial aspect of midwifery practice involves assessing the height of the uterine fundus to determine the estimated fetal weight. Understanding this estimated weight enables the midwife to foresee possible complications and develop appropriate strategies to address them.

Objective: to evaluate the accuracy disparity between the Risanto Formula and the Johnson Thausack Formula in estimating fetal weight at Al Islam Mother and Child Hospital in Bandung.

Methods: This study employs a Cross-Sectional Design, focusing on a population of 61 mothers in the latent phase of the first stage of labor who delivered at Al Islam Mother and Child Hospital between May and June 2024. The sampling method utilized was total sampling.

Results: A notable difference was observed between the birth weight of babies estimated using the Risanto formula ($p=0.001$) and those estimated using the Johnson Tohsack formula ($p=0.001$). When comparing the accuracy of these two formulas, the average estimated fetal weight (EFW) using the Risanto formula was 2824.92 grams, while the Johnson Tohsack formula yielded an average EFW of 2614.67 grams. In contrast, the actual average birth weight of the newborns was 3084.02 grams.

Conclusion: A statistically significant difference exists between the Risanto and Johnson Thausack formulas when compared to the actual birth weight, with the Risanto formula providing an estimate that is more closely aligned with the actual birth weight.

Suggestion: Midwives should enhance the precision of fundal height measurements and apply the Risanto formula to estimate fetal weight, ensuring that the results are reliable for use in midwifery care.

Keywords: Estimated Fetal Weight, Risanto Formula, Johnson Thausack Formula

INTRODUCTION

Maintaining the quality of midwifery services for patients is a crucial aspect of providing care. Issues related to infant health, stemming from birth weights that are either too high or too low, can significantly affect the baby's life and future development (Febrianty, 2019). Abnormal birth weight is linked to the occurrence of birth defects and complications requiring care in the neonatal intensive care unit (Cunningham FG, 2012).

A critical component of prenatal care during labor management involves measuring the height of the uterine fundus to estimate the baby's weight (Lombogia., 2017). Knowledge of estimated fetal weight allows healthcare providers, particularly midwives, to anticipate potential problems and devise strategies to address them (Cunningham FG, 2012).

Estimation of intrauterine fetal body weight (TBJ) is important in labor management because fetal weight indicates fetal growth. Accurate assessment of birth weight will improve delivery management (Widatiningsih, Hastuti and Wibowo, 2015). For birth attendants, TBJ has a very important meaning (Rusdy, R. S., Yasmin, F. A., Putri, L. A., Oktrian, O., LF, B., & Pusponegoro, 2014). By knowing the estimated fetal weight during pregnancy, especially in the third trimester, you can detect the possibility of a small fetus or a large fetus and immediately take appropriate management measures during pregnancy and childbirth (Anggraini, D., Abdollahian, M., & Marion, 2016; Pietersz, E., Rachman, I. T., & Siswosudarmo, 2018).

Infants born with abnormally low birth weight or height are more likely to experience difficulties during labor and the postpartum period, so accurate estimation of fetal weight is important (Prawirohardjo, 2016). As the manager of labor, midwives must be able to interpret fetal weight (Gayatri and Afyanti, 2014). To avoid potential problems, it is important to know whether the baby will be born with a large or small weight, and an accurate way of interpreting fetal weight can inform the midwife of this (Ambarwati, 2015). Reducing the impact of the above problems can be done with a better approach in evaluating fetal weight (Kusumaningtyas, 2021). In addition, all medical professionals are able to take fundus uteri measurements because the procedure is practical, easy, and accurate (Ujiningtyas, 2018; Khatun *et al.*, 2023).

Determining the approximate weight of the fetus, one can use an ultrasound examination or measure the height of the fundus uteri (Herawati *et al.*, 2022). Although there is some evidence that

ultrasound can provide a more accurate picture of fetal development, access to this technology is currently limited (Hermawati, E., Tajmiati, A., & Rohmatin, 2018). A simple alternative to ultrasonography for estimating fetal weight is to measure the height of the fundus uteri and incorporate the results into the calculation (Gayatri and Afyanti, 2012; Gayatri and Afyanti, 2014).

Estimates of fetal weight using the Johnson-Thaushack method have shown considerable differences (overestimation) in many previous studies conducted in Indonesia (Mardeyanti, Djulaeha and Fatimah, 2019). Because of this potential population-specific variation, it is necessary to use a fundus uteri height growth curve that is tailored to specific groups (Gayatri and Afyanti, 2014).

Determining the approximate weight of the fetus, the Johnson Thaushack formula is traditionally used. It involves measuring the distance from the symphysis pubis to the fundus uteri and the bottom of the fetus (Siswosudarmo and Titisari, 2014). The Risanto formula created at the Department of Obstetrics and Gynecology of Dr. Sardjito Hospital, Yogyakarta, only requires data on the height of the fundus uteri to estimate fetal weight, in addition to the Johnson-Thaushack formula. A common method to estimate fetal weight is to measure the height of the fundus uteri (Gayatri and Afyanti, 2014; E B Hutagaol *et al.*, 2022).

The results of estimating fetal weight using the Johnson-Toshack formula and the Risanto formula did not show significant differences, according to research conducted by Puspita regarding the comparison of the two formulas in 2019. (Herawati *et al.*, 2022). The Risanto formula is more accurate in predicting the baby's birth weight than the Johnson-Tohsack fetal weight estimate, although both methods are able to estimate the baby's weight during pregnancy (Hidayah, Pertiwi and Rohmatin, 2019). This is because both data sets are smaller for the Risanto formula (Puspita *et al.*, 2019).

By conducting a preliminary survey of 10 mothers in labor in the first stage of the latent phase at Al Islam Mother and Child Hospital Bandung, there was an average difference of 293 grams between the estimated baby weight and estimated fetal weight according to Johnson Tausack and 182 grams according to Risanto. Johnson Thausack states that there is always a larger difference between the average TBJ and the baby's birth weight.

From the background description above, the researcher is interested in knowing which formula can determine TBJ closer to the baby's birth weight

measured in mothers inpartu kala 1 latent phase. The two formulas to be compared are the Johnson-Toshack formula and the Risanto formula. This study was conducted at Al Islam Mother and Child Hospital Bandung. This hospital was chosen because it has been certified as a hospital that has quality and standardized obstetric services. In addition, the number of patients handled is quite large so it is easier to get research subjects.

RESEARCH METHODS

This research utilized a cross-sectional design, collecting primary data from May to June 2024 at Al Islam Mother and Child Hospital in Bandung. The study focused on all mothers in the latent phase of the first stage of labor as the research subjects. A total sampling method was employed, with participants selected based on specific inclusion criteria: a head engagement of 1/5-3/5, a single pregnancy with cephalic presentation, a live fetus, and gestational age between 37-42 weeks. The research period used is May - June 2024. Exclusion criteria included cases of intrauterine fetal demise (IUID), polyhydramnios, multiple pregnancies,

abnormal fetal positions, placenta previa, and uterine fibroids. Based on these criteria, 61 subjects were selected for the study. To measure the height of the fundus uteri (TFU), the mother was positioned supine, with her bladder emptied. Using a measuring tape, the height of the fundus was recorded in centimeters from the upper edge of the pubic symphysis to the top of the uterine fundus. This measurement was performed by the researcher. The estimated fetal weight using the Johnson-Toshack formula was calculated as $(TBJ_J) = (TFU - n) \times 155$, where n represents the degree of fetal descent: $n = 11$ if the fetal head has passed the ischial spines (Hodge III), $n = 12$ if the head has entered the pelvic inlet, and $n = 13$ if the head has not engaged. The Risanto formula estimated fetal weight as $(TBJ_R) = (125 \times TFU) - 880$, expressed in grams. The newborn's weight was measured within one hour of birth using a calibrated scale. Before hypothesis testing, data normality was assessed using the Kolmogorov-Smirnov test. Since the data did not follow a normal distribution, the Wilcoxon test was used for further analysis.

RESEARCH RESULTS

Table 1
Overview of LBW with TBJ using the Risanto Formula

Variables	Mean	average difference	Min-Max	SE	SD
Birth weight	3084,02		2150-3915	40	318
TBJ Risanto	2824,92	259.1 grams	2245- 3870	39	305

Table 2
Overview of LBW with TBJ using the Jhonson Thausack Formula

Variables	Mean	average difference	Min-Max	St Error	SD
Birth weight	3084,02		2150-3915	40	318
TBJ Thausack	2614,67	469.35 grams	1860- 3870	47	372

Table 3
Difference between Birth Weight and Estimated Birth Weight according to Risanto formula and Jhonson Thausack Formula

Variables	Mean	Zhitung	Sig
Risanto BBL Formula	33,32-1732,5	-5,65	0,001
Thausack BBL Formula	31,89- 1849,95	-6,49	0,001

The results of the statistical analysis between the estimated fetal weight using Risanto's formula and the weight of the baby born in May - June in 2024, there was a significant difference of 259.1 grams between the weight of the baby estimated

using Risanto's formula and the actual weight of the baby at birth, because the analysis revealed that the average weight of babies born was 3,084.02 grams, while the weight calculated using Risanto's formula was 2,824.92 grams. Therefore, Risanto's formula

does not always give the same result as the actual birth weight of the baby. Even in the data, Risanto's formula produces a lower estimated fetal weight than the actual birth weight.

However, in line with research conducted by Mariyana which states that there is a difference in the average estimated fetal weight based on the TFU of the Risanto formula with the weight of the newborn with a significant value of 0.001 and the calculation of the estimated fetal weight using the Risanto formula is closer to the weight of the newborn. According to research by Dongol (2020), researchers in developing countries can utilize their clinical experience to estimate fetal weight with ultrasound devices. (Noviana, Siswosudarmo and Hadiati, 2016).. Risanto's method is easier for midwives and medical students to learn because it only focuses on measurement (Curti *et al.*, 2014). Abdominal palpation and Risanto's formula are also more accurate in predicting fetal weight (Waikheh, Palimbo and Hestiyana, 2023). This study showed that the clinical method is a reliable way to estimate the approximate fetal weight in single baby pregnant women and the baby is ready for birth. (Arnesia *et al.*, 2024). Moreover, this method is easy, fast, cheap, and effective, making it a good choice for those who do not have much clinical experience. (Lamdayani and Olivia Varadita, 2019).

The advantage of the Risanto formula is that there are several research results with a population of Indonesian mothers who say that the formula gives TBJ results closer to birth weight than other methods. (Rianti and Aminah, 2017). In addition, the Risanto formula is simpler because it only requires TFU measurement to be able to calculate TBJ. (Simanjuntak, 2020;Kusumaningtyas, 2021).The disadvantage of the Risanto formula is that it is still not recognized and used by health workers (Rianti and Aminah, 2017;Malik, R., Thakur, P., & Agarwal, 2016). In addition, it still needs more scientific evidence to prove its accuracy in various conditions (Puspita, Arifiandi and Wardani, 2019).

This study revealed a substantial discrepancy between the actual birth weight of newborns and the estimated weight calculated using the Johnson Thausack formula in May and June 2024. The analysis indicated that the average birth weight was 3084.02 grams, whereas the average weight estimated using the Johnson Thausack formula was 2614.67 grams, resulting in an average difference of 469.35 grams. This suggests that the Johnson Thausack method tends to underestimate the actual birth weight. Similar findings were observed in Anggraini's (2018) study, where the Johnson Thausack formula produced lower average estimates

compared to the Risanto formula and the actual birth weights (Anggraini, 2018; Ugwa, E. A., Gaya, S., & Ashimi, 2015).

The results of a research study in Thailand also showed that the use of Johnson's formula to estimate fetal weight gave an average of 227 grams higher than the actual birth weight of the baby. (Anggraini, Abdollahian and Marion, 2018).

The findings indicated that the Risanto formula more accurately predicted the actual birth weight of the baby, with a statistically significant difference of 0.001 compared to the Johnson-Thausack formula. The analysis highlighted discrepancies in the estimated birth weight between these two formulas. This result aligns with previous research by Puspita, which found that the Risanto formula's average deviation from the actual birth weight was smaller, with a difference of 103 grams, compared to the 121 grams difference observed with the Johnson-Thausack formula. Therefore, it can be concluded that the Risanto formula offers a more precise estimate of a baby's birth weight than the Johnson-Thausack method.

Upon analyzing the study data, it becomes evident that the Risanto formula more accurately reflects the actual birth weight of the baby compared to the Johnson-Thausack formula, which tends to yield lower estimates than other methods. In situations where ultrasonography or advanced medical tools are unavailable, the Risanto formula serves as a viable alternative for estimating fetal weight (TBJ). Unlike the Johnson-Thausack formula, which necessitates an internal examination to assess the fetal head's descent, the Risanto formula simply relies on measuring the fundal height (TFU), making it a more practical and easier method to teach and apply.

CONCLUSION

The average difference between the fetal weight estimated by the Risanto formula and the actual birth weight indicates that there is a discrepancy between these two measures. Similarly, the average difference between the fetal weight estimated using the Johnson-Thausack formula and the actual birth weight also suggests a lack of agreement between the estimated and actual weights. However, with a P value of 0.001, the Risanto formula provides an estimate that is closer to the actual birth weight compared to the Johnson-Thausack formula.

SUGGESTION

It is recommended that midwives can improve skills and accuracy in measuring fundus uteri height

and using the Risanto formula to measure estimated fetal weight in performing midwifery services and for educational institutions can make guidelines in providing teaching to students in determining estimated fetal weight using the Risanto formula and making comparisons with different formulas and different measurement techniques.

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