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COMPATIBILITY OF THE SYMPHYSIS FUNDAL HEIGHT AT GESTATIONAL AGE > 20 WEEKS ASSOCIATED WITH INFANT STUNTING INCIDENCE

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ABSTRACT

The high rate of stunting in Indonesia is the government's major concern to acquire the national target of 14% in 2024. Symphysis Fundal Height (SFH) measurement during pregnancy can be an effort to detect stunting. However, there is still no data to examine the correlation between the suitability of SFH and the stunting incidence. The research design was correlative analytic using a case-control approach, with a population of 237 stunted and normal babies, using total sampling for the case group and proportionate random sampling for the control group to obtain 34 stunted babies and 34 normal babies. The instruments were the infantometer and the MCH book. The significant value is 0.02 ($<\alpha$ 0.05) and a correlation coefficient of -0.281 indicating a significant relationship between the compatibility of SFH at Gestational Age (GA) > 20 weeks and the stunting incidence in infants. The odds ratio value of 3.59 means that a baby with a history of SFH that does not fit GA will be 3.5 times at risk of experiencing stunting. Early detection of fetal growth through SFH examination during pregnancy should be considered by health workers and the public so that one with growth disorders can get appropriate prevention management.

Keywords:

Stunting, Symphysis Fundal Height, Gestational Age

INTRODUCTION

The stunting rate in Indonesia remained high in 2019 (27.7%) is one of the Indonesian government's concern to achieve the target of 14% in 2024 (Liza Munira, 2023). Stunting is a form of malnutrition that can have short-term and long-term adverse effects, such as increased morbidity and mortality, impaired child development, and learning capacity, increased risk of infection and non-communicable diseases, reduced work capacity, and poor reproductive outcomes as adults (Soliman *et al.*, 2021). Quality care during the critical window (intrauterine life and early postnatal life) is prominent because this phase is where phenotype development of organisms that are responsive to intrinsic or extrinsic factors occurs, so it has an influence on the quality of health in the future. (Soliman *et al.*, 2021).

Some of the factors associated with the occurrence of stunting at birth include short maternal height, chronic malnutrition in the mother, low birth weight (LBW), premature birth, short birth length, low maternal education level, and poor socioeconomic status (Gonete *et al.*, 2021)(Kemenkes RI, 2022a). The prevalence of stunting at birth shows the condition of the mother's nutritional adequacy that is lacking during pregnancy. A study in Ethiopia showed that 22.67% of stunted babies were born to malnourished pregnant women, which was higher than the counterpart, namely 7.87% of stunted babies (Gonete *et al.*, 2021). Malnutrition in the mother during pregnancy will affect the growth of the intrauterine fetus which can be monitored through SFH. Data shows that 55.6% of babies born with low birth weight are pregnant women with abnormal SFH, which is higher than normal SFH, which is 44.4% (Aghadiati, Hanim and Dewi, 2019). In addition, short body length at birth (< 48 cm) also increases the risk of stunting, which is 15 times greater than those with a birth length of \geq 48 cm (Lukman *et al.*, 2021). The results of a meta-analysis study stated that LBW babies increase the incidence of stunting by 3.64 times greater than babies with normal birth weight (Putri, Salsabilla and Saputra, 2022).

The problem of stunting in Indonesia became the basis for the government to develop National Guidelines for Health Services for the prevention, early detection, and immediate management of stunting, such as anamnesis, physical examination, and anthropometric measurements (Kemenkes RI, 2022a). However, this service guideline is for early detection of stunting after the baby is born, whereas detection since pregnancy is also an important thing to do as a basis for further intervention. A study by Oktaviana *et al.*, (2020) developed an application to examine the influence of risk factors on pregnant women as early detection of stunting risk using a "forward chaining" algorithm. Meanwhile stunting interventions that can be done during pregnancy according to the Indonesian Nutritional Status Survey are antenatal care (ANC), consumption of iron supplementary tablets, and provision of additional food for pregnant women with Chronic Energy Deficiency (CED) (Liza Munira, 2023). One of the physical examinations during ANC to monitor fetal growth is the measurement of SFH. SFH is the same as GA (1 cm TFU = 1-week increase in GA) when it enters 20 weeks of gestation (Lee *et al.*, 2020).

The preliminary study conducted by researchers based on the results of the Weigh Operation in April 2018 showed that the number of stunted toddlers in Malang Regency reached 161,332 toddlers. One of the areas with the highest number of stunted toddlers was the Poncokusumo Health Center, with 1,159 toddlers in the short category and 782 toddlers in the very short category. There are three villages in the Poncokusumo area with

the highest percentage of stunting, namely Gubugklakah Village, Belung Village and Karangnongko Village. It shows that efforts to prevent stunting from an early age, especially during pregnancy, are urgently needed. The most simple, safe, and practically accurate method is through SFH measurements. However, the data and results of previous studies related to early detection of stunting have not specifically examined the importance of measuring SFH and its relationship to stunting. Therefore, this study was done to find the relationship between the suitability of SFH at GA > 20 weeks and the incidence of stunting in infants in Poncokusumo District, Malang Regency.

METHOD

The research design used is correlative analytic with a case control approach. The data was collected in time with Posyandu activities in April - June 2019 in Belung Village, Gubugklakah Village, Karangnongko Village, Poncokusumo District, Malang Regency. The population in this study were 237 stunted and normal babies, using total sampling for the case group and proportionate random sampling for the control group to obtain 34 stunted babies and 34 normal babies.

The data collection process was carried out simultaneously with the Posyandu activity schedule, namely by measuring body length, then analyzing it to age (BL/A) category, and carrying out a retrospective study through documentation (Maternal and Child Health book) related to the suitability of SFH when GA > 20 weeks. The researcher will conduct a home visit if the mother and baby do not present but are registered at the Posyandu. The instruments used were the infantometer and the Maternal and Child Health (MCH) book.

The hypothesis test in this study used the Spearman Rank test with an α value of 0.05 and calculated the risk factor value (odds ratio).

RESULTS

Table 1. Frequency Distribution of Symphysis Fundal Height Compatibility at Gestational Age > 20 weeks

SFH Compatibility	Case f (%)	Control f (%)
SFH incompatible with GA (SFH < GA)	29 (85,3)	21 (61,8)
SFH compatible with GA (SFH=GA)	5 (14,7)	13 (38,2)
Total	34 (100)	34 (100)

Data of the compatibility of SFH at GA > 20 weeks based on Table 1. shows that most of the case group (85.3%) had a history of SFH that was not suitable with GA, higher than the control group (61.8%).

Table 2. Frequency Distribution of BL/A Category in Infant

Group	BL/A Category	f	%
Control	Normal (z-score \geq -2SD)	34	50
	Short (z-score \geq -3SD up to < -2SD)	21	30,9
Case	Very Short (z-score < -3SD)	13	19,1
Total		34	100

Data on the BL/A category in infants based on Table 2 shows that most of the case group (30.9%) is in the short category while the entire control group (50%) is in the normal category.

Table 3. Cross Tabulation between Compatibility of SFH during Pregnancy at GA > 20 Weeks and Stunting Incidence in Infant

SFH Compatibility	Stunting Incidence in Infant			Total f (%)
	Very Short f (%)	Short f (%)	Normal f (%)	
Incompatible	12 (24)	17 (34)	21 (42)	50 (100)
Compatible	1 (5,6)	4 (22,2)	13 (72,2)	18 (100)
Total	13 (19,1)	21 (30,9)	34 (50)	68 (100)

Based on Table 3, data on the compatibility of SFH during pregnancy at GA > 20 weeks shows that a small proportion of SFH that are not compatible have very short stunting (24%),

and most of the SFH that are compatible are not stunted or normal (72.2%)

The analysis test results using the Spearman Rank test showed that the significant value between the suitability of SFH for GA > 20 weeks and the stunting incidence in infants was 0.020. This significant value is more than α means there is a significant correlation between the suitability of the SFH for GA > 20 weeks and the stunting incidence in infants. The correlation coefficient value is -0.281 indicating a weak correlation between the two variables. A negative value (-) indicates whether the correlation between the two variables is negative or not unidirectional. So it means that a compatible SFH at GA > 20 weeks will reduce the incidence of stunting, or an incompatible SFH at GA > 20 weeks (SFH < GA) will increase the incidence of stunting.

The value of Odds Ratio (OR) > 1 means it increases the risk. If the OR value is > 1 and the confidence interval (CI) value is > 1, it can be said that the stronger the suspicion that exposure is a risk factor for the outcome. The OR value in this study was 3.59, and the 95% CI value was 1.109-11.619 so that the OR increases the risk means that infants with a history of incompatible SFH for GA > 20 weeks will have a 3.5 times higher risk of experiencing stunting compared to compatible SFH for GA > 20 weeks.

DISCUSSION

The measurement of SFH during ANC visits can be used to find out GA and the basis for further intervention to improve maternal and fetal health. The basis for determining SFH measurements above 20 weeks is that 1 cm SFH has the same value as an increase of 1 week when GA has reached 20 weeks (Lee *et al.*, 2020). Knowledge of GA in pregnancy is essential for proper obstetric management and as a cornerstone of antenatal care (Fung *et al.*, 2020). So when SFH is compatible with GA, the interventions that can be given adjust to the health conditions of the mother and fetus in the hope of creating a good outcome. Meanwhile, when SFH is incompatible with GA, this can be an indication that certain health conditions in the mother or fetus need to be intervened immediately to prevent unwanted risks from occurring.

Research data shows that most of the 85.3% of the stunting babies from the case group had a history of incompatible SFH with GA. Several things that can be a factor causing this are pregnant women who are malnourished which causes inadequate transfer of nutrients to the fetus. It causes fetal growth retardation and can increase the risk of low birth weight babies, in line with research in Sudan which states that malnourished mothers will increase the risk of giving birth to LBW babies (Bilal *et al.*, 2022). However, the incompatibility of

SFH with GA can also occur due to other factors, such as measurement time, measurement accuracy standards, skills in measuring using a measuring tape, or pathological factors from the fetus. The SFH measurement can be inaccurate in determining GA because it is also influenced by the amount of maternal body fat, Intrauterine Growth Restriction (IUGR), uterine fibroma, or malpresentation (AMANHI, 2020). A study in Bangladesh stated that SFH < 26 cm was classified as GA < 28 weeks with 85% sensitivity and 81% specificity, and SFH < 29 cm was classified as GA < 34 weeks with 83% sensitivity and 71% specificity (Lee *et al.*, 2020). Although SFH measurement has low sensitivity as a screening and diagnostic tool, SFH measurement is quite useful for use in rural areas with minimal access to technology and as an initial test in determining further obstetric management. Therefore it is necessary to measure SFH periodically to minimize errors in measurement and misdiagnosis.

Fetal growth and development are highly dependent on environmental/extrinsic factors. Influence factors from the mother during pregnancy are health conditions, health behavior, mother's readiness, nutritional fulfillment, or other maternal factors such as age, parity, and genetics. A total of 21 babies from the case group had short body length and 13 of them had very short body length. A study in Indonesia showed that several factors associated with stunting incidence were premature birth, height of mother and father, age of both parents < 20 years or > 35 years, and babies from first pregnancies (Sari and Sartika, 2021).

Premature babies are included in a vulnerable group that requires specific interventions so it does not trigger risks that can affect their growth and development. So when babies are born prematurely with low weight and do not get enough care, it can increase the incidence of stunting. In line with research by Putri dkk. (2022), LBW can increase the stunting incidence in children aged 0-60 months up to 3.64 times compared to non-LBW babies. Maternal height can be considered a good indicator of malnutrition across generations. Mothers with poor nutrition are more at risk of having stunted children because of the significant impact, especially in the first 500 days of life (Mulyaningsih *et al.*, 2021). It can happen because it is very likely that the mother's knowledge and behavior influence the fulfillment of nutrition, such as habits and awareness to consume balanced nutritious food. However, the incidence of stunting does not only occur due to intergenerational effects but is also influenced by the intrauterine effects of the mother herself (Wu *et al.*, 2021). Parental age affects the readiness to become parents and its contribution to healthy behavior. Babies born to both parents aged < 20 years or > 35 years are 2.37 times more likely to experience stunting (Sari and Sartika, 2021). The condition of the reproductive organs of mothers in these two age ranges is not in prime condition for pregnancy because it will be at risk for experiencing IUGR, premature

birth, hypertension, or preeclampsia. In addition, factors that influence stunting incidence in pregnant women aged < 20 years are related to financial readiness and exclusive breastfeeding (Astuti, Azka and Rokhmayanti, 2022).

The data from the results of this study indicate that 34% of incompatible SFH at GA > 20 weeks are in the short category, while 24% are in the very short category. Meanwhile, 72.2% of compatible SFH did not experience stunting. Infants with a history of incompatible SFH at GA > 20 weeks have a risk of 3.5 times higher experiencing stunting (95% CI 1.109-11.619) compared to infants with a history of compatible SFH at GA > 20 weeks. It shows that there is a correlation between the compatibility of SFH at GA > 20 weeks and the incidence of stunting in infants. Each increase in the SFH value during measurement indicates growth in the fetus and used as a basis for assessment and reference for further interventions. When the SFH is incompatible with GA, it can be assumed that fetal growth is obstructed and may increase the risk of stunted babies. According to the Indonesian Nutritional Status Survey, specific interventions for stunting during the prenatal period that can be done are ANC visits, consumption of iron supplements, and provision of supplementary food for CED pregnant women (Liza Munira, 2023). Routine ANC visits are carried out to identify risks, prevent and manage diseases during pregnancy, educate and promote health, and guide parenting (Dahl, Heinonen and Bondas, 2020). Consumption of iron supplements is necessary to prevent and overcome iron deficiency in pregnancy which risks causing stillbirth, premature birth, infant death, and LBW (Caniglia *et al.*, 2022). Supplementary feeding is given to improve the nutritional status of pregnant women with a risk or have CED accompanied by balanced nutrition counseling (Kemenkes RI, 2022b).

CONCLUSION

The results of this study indicate that there is a significant relationship between the compatibility of SFH at GA > 20 weeks and the incidence of stunting in infants. Infants with a history of incompatible SFH at GA > 20 have a risk of 3.5 times experiencing stunting compared to infants with a history of compatible SFH. A suggestion from researchers to health workers is to pay more attention to the growth and development of the fetus through SFH measurement so that if inappropriate SFH is detected, intervention can be carried out immediately. A suggestion for the community is to be more aware of the importance of prenatal checks, not only for the health of the mother and fetus but also to prepare for better growth for their child later. Researchers recommend conducting further research using cross-sectional methods to minimize the confounding factors.

ABBREVIATIONS

ANC : Antenatal Care; BL : Body Length; CED : Chronic Energy Deficiency; GA : Gestational Age; IUGR : Intrauterine Growth Restriction; LBW : Low Birth Weight; MCH : Maternal and Child Health; SFH : Symphysis Fundal Height.

COMPETING INTEREST

The authors report no conflict of interest.

AUTHORS' CONTRIBUTION

The first author was the collector of the research data, the second and third author performed in correcting the result of this research.

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