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THE BIRTH WEIGHT CHARACTERISTICS IN RURAL AND URBAN AREAS IN THE PROVINCE OF NORTH SUMATERA, INDONESIA

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ABSTRACT

The infant mortality rate remains public health problem. Low birth weight prevalence has been estimated around 60%-80% of all neonatal deaths. Birth weight problems can be associated by infant factors, demographic factors, and maternal factors. Likewise, the difference in area of residence that can affect birth weight. This study aims to investigate the differences birth weight both rural and urban areas in North Sumatera. This study used secondary data which is originated from the Indonesia Demographic Health Survey (IDHS) in 2017. The sample of this study was 991 children. The existence of a process of data elimination due to missing data, thus obtaining 499 children who were used as research samples. Data analysis used the Mann Whitney test to see if there was a difference in the average birth weight between variables. Most of the baby's weight was born within normal limits as much as 85.6%. The results of the Mann Whitney test show that there is a relationship between birth weight and area of residence and birth weight in rural areas is higher than in urban areas.

Kata kunci:
berat badan lahir,
perkotaan,
pedesaan,
faktor risiko

ABSTRAK

Angka kematian bayi masih menjadi masalah kesehatan masyarakat. Prevalensi berat badan lahir rendah diestimasikan sekitar 60-80% penyebab kematian pada neonatal. Permasalahan berat badan lahir dapat dipengaruhi oleh faktor bayi, faktor demografis, dan faktor ibu. Begitu juga dengan perbedaan wilayah tempat tinggal yang dapat berpengaruh terhadap berat badan lahir. Penelitian ini bertujuan untuk menginvestigasi perbedaan berat badan lahir bayi pedesaan dan perkotaan di Sumatera Utara. Penelitian ini menggunakan data sekunder yang berasal dari Survei Demografi Kesehatan Indonesia (SDKI) tahun 2017. Jumlah sampel pada penelitian ini sebesar 991 anak. Proses manajemen data dilakukan dengan pembersihan data yang tidak tercatat dan keliru sehingga jumlah sampel sebanyak 499 sampel. Analisis data dilakukan dengan pendekatan statistic non parametrik uji Mann Whitney untuk melihat apakah perbedaan rata-rata berat badan lahir antar variabel. Mayoritas berat badan bayi lahir dalam batas normal, yakni sebanyak 85.6%. Hasil uji Mann Whitney menunjukkan bahwa ada hubungan berat badan lahir dengan wilayah tempat tinggal dengan berat badan lahir di pedesaan lebih tinggi dibandingkan di perkotaan.

INTRODUCTION

The infant mortality rate remains a public health problem that needs efforts undertaken by the government, including the health leading sectors. According to the World Health Organization (WHO), 75% of all under-five deaths occur in the first year of life, with the highest cases in the African Region, namely 52 per 1000 live births (1). The incidence of Low Birth Weight (LBW) estimates around 60% - 80% as a causes of neonatal deaths (1). Globally, prevalence of LBW is reported in 15.5%, which means that around 20 million LBW babies are born every year and are mostly (95.5%) living in the developing countries (2).

Meanwhile, over the previous 2-3 decades, the report of overweight prevalence has increased among developing countries, which was estimated around 0.5% to 15% (3). Babies born with low birth weight have a greater risk of stunting and contracting non-communicable diseases such as heart disease and diabetes as adults (4). Whereas in infants with overweight the impact found was being overweight or obese at the age of 7 years (5).

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Study in Vietnam found that there was a difference in average birth weight between rural and urban areas where urban areas had a higher birth weight (6). Another study has concluded that birth weight is associated with socioeconomic conditions, maternal nutrition, weight gain during pregnancy and antenatal care (7). Furthermore, study in Turkey in 2018 found that working status of both parents and gender of baby were associated with birth weight (8). Study in Pakistan reported that wealth index also related with birth weight (9). A study in Indonesia also highlighted the gap between accessibility to healthcare among rural and urban communities, where rural communities tend to visit healthcare services less than urban communities due to lack of health facilities and differences in knowledge of pregnant women (10).

Indonesia Demographic and Health Survey (IDHS) 2017 collected demography survey among women, men, family and children;s health in Indonesia, including North Sumatra Province. The use of IDHS 2017 data for analysis is expected to provide an overview of the current condition of health so that it can be used as a source and material for evaluation of optimal prevention and health development, especially related to maternal and child health problems.

Limited information is available in investigating risk factor of birth weight in the Province of North Sumatera particularly recent condition of birth weight in rural and urban area. Negative outcome could develop children in the future when low birth weight remains emerging problem in urban and rural areas. This study aims to investigate the differences of birth weight in rural and urban infants in the Province of North Sumatra.

METHODS

Study Setting

This study was located in the Province of North Sumatera and analyzed secondary data that originated from large scale survey in Indonesia. To investigate the LBW in the study sites, this study utilized existing data obtained from certain agencies (11). Utilization of this data provides an option for researchers who have limited time and resources and were suitable for research by following a systematic research process.

Indonesia Demographic and Health Survey (IDHS)

The Indonesia Government conducted a survey for demographic and health under joint-agency/multi-sector. Indonesia Demographic and Health Survey (IDHS), a community-based survey that ran from 1987 to 2017. The IDHS 2017 was jointly carried out by the Central Bureau of Statistics (Badan Pusat Statistik/BPS) as the leading sector, the National Population and Family Planning Board (Badan Kependudukan dan Keluarga Berencana Nasional/BKKBN), and the Ministry of Health (Kementerian Kesehatan/Kemenkes). The aim of the IDHS 2017 is to provide the latest estimates in basic demographic and health indicators and to provide a comprehensive picture of the population, especially maternal and child health in Indonesia. The IDHS 2017 sample includes 1,970 census blocks for urban and rural areas throughout Indonesia.

The household selection uses the household list results from updating of household data from the 2010 population census block. The implicit process of stratification by rural and urban areas is by sorting census blocks based on the Wealth Index category and then selecting 25 household samples in each block. This survey focuses on four themes, that is households, women of childbearing age (Wanita Usia Subur/WUS), married men (Pria Kawin/PK), and male adolescents (Remaja Pria/RP).

The questionnaire for households and women aged 15-49 years refers to the 2015 DHS (Demographic Health Surveys) Phase 7 questionnaire which has accommodated some of the latest issue questions. The questionnaire for women aged 15-49 years was used to collect individual information such as background (including age, education and media exposure), birth history, contraception, pregnancy and postnatal examinations, child immunizations (last birth and birth before last child), health and child nutrition, marriage and sexual activity, fertility preferences, husband/partner background and occupation of the respondent, HIV and AIDS, other health issues.

Population and Samples

The population that is eligible for the IDHS 2017 consists of 50,730 women aged 15-49 years, of whom 49,627 were successfully interviewed (97.8%). North Sumatra Province interviewed 4.8% (2,459 women) of the total sample. A total of 991 respondents who had children were selected as the population, then 369 respondents were excluded from the analysis because they had missing data and the answers did not know. This study describes in detail the elimination of this data, that is five cases in the variable birth weight, 174 cases in the variable of antenatal visits, and 190 cases in the variable birth spacing. The results of this process left 499 respondents who met the requirements for analysis.

Instruments and Variables

Gender was assessed using questions such as “is (name) male or female?” The type of pregnancy variablewas assessed using questions such as "Are there twins among the children of the mother/sister?" with a “single” or “twin” answer. Maternal age was assessed using questions such as "in what month and year was the mother/sister born?" This study classified age into two groups, a risk group (<19 years and >35 years) and no risk (20-34 years). The distance between the previous birth and the last child was assessed using questions, such as "in what month and year was (name) was born?" with the final results categorized into two groups <24 months and ≥24 months.

Pregnancy examinations or antenatal visits were assessed using questions, such as "as long as the mother/sister was pregnant with (name), how many times did the mother/sister check the pregnancy?" and then the respondents' answers were categorized into two groups: <4 times and ≥4 times. The area where the respondent lives is assessed using questions, such as "before the mother/sister lived in (the regency/city where she currently lives), did she live in a big city, small town or rural area?" Work status was assessed using questions such as, in the last 12 months, “did you work?”

The wealth quintile was assessed using many questions such as the main source of drinking water, the location of the water source, the type of latrine used, the distance between the well and the feces/feces collection, the type of fuel used for cooking, kitchen ownership, livestock ownership, number of animals owned, ownership of agricultural land, ownership of household appliances, ownership of vehicles, and the main building materials for the floor of the house. The level of education is the last level of education taken by mothers who are categorized into two groups, low (graduated from junior high school and below) and high (graduated from high school and above).

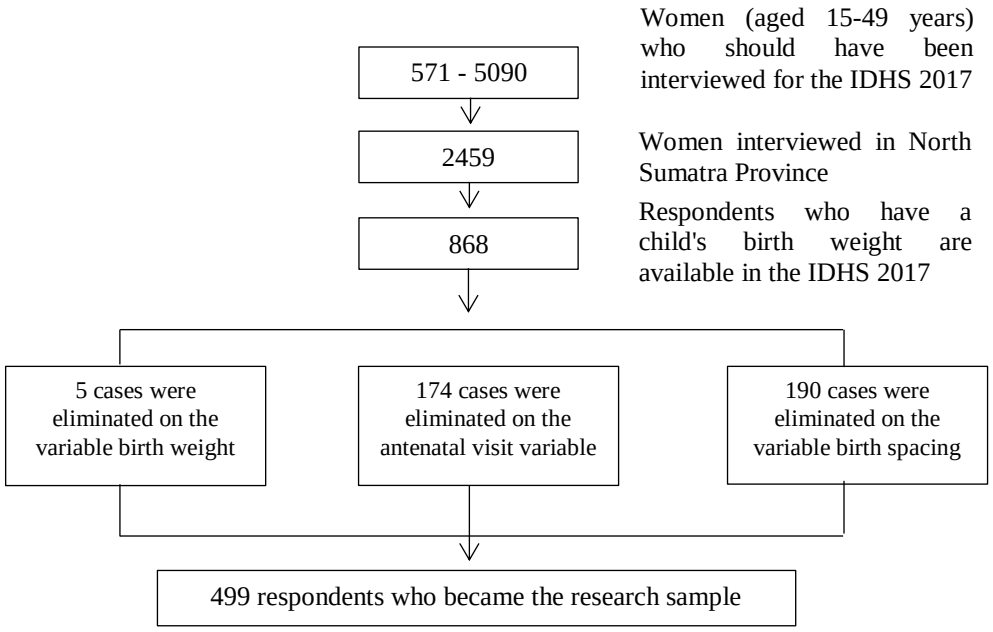

Figure 1. Sample Determination Flow

Statistic Analysis

This study used univariate and bivariate analysis, where univariate analysis was used to see the frequency distribution of the tested variables. Whereas in the bivariate analysis of the study using the Independent T-test for numerical variables. Independent T-test was used to see the difference in mean birth weight between the two sample groups. the statistical analysis also used whether there is a relationship between birth weight and variables measured using the *Mann Whitney test* because the data in this study were not normally distributed. If there is a p value <0.05, then there is a difference in the mean birth weight statistically; this will answer whether or not there is a relationship between birth weight and the variables tested.

RESULT

This study involved 499 babies consisting of 256 (52.3%) boys and 234 (48.7%) female babies, the majority came from urban areas as much as 54.4%, with the economic status of the rich category of 55.1%. About 84.4% of respondents had a low level of education, 84.2% of antenatal visits were ≥4 times and 99.2% had single pregnancies. Then, the majority of respondents were at the age without risk as much as 59.3% and parity with 2-3 children was 70.1% (Table 1).

Table 1. Characteristics Demography of Respondents

Variable	N	%
Type of pregnancy		
Single birth	495	99.2
Twin birth	4	0.8
Gender of baby		
Male	256	51.3
Female	243	48.7
Birth interval		
<24 months	78	15.6
≥ 24 months	421	84.4
Age		
Risky	203	40.7
Not risky	296	59.3
Parity		
≥ 4 children	149	29.9
< 4 children	350	70.1
Visit ANC		
≥4 times	411	82.4
<4 times	88	17.6
Working status		
Yes	268	46.3
No	231	53.7
Wealth quintile		
Poor	224	44.9
Rich	275	55.1
Education		
Low education	421	84.4
Higher education	78	15.6
Type of residence area		
Urban	272	54.5
Rural	227	45.5
Birth weight		
< 2500 gram	25	5.0
2500 – 4000 gram	427	85.6
>4000 gram	47	9.4

Infant Characteristic in Urban and Rural Areas

The pattern of birth weight in urban infants has a different pattern with overall infant weight, especially in the age group (Table 3). Mothers who had risk based on age group had a higher birth weight than mothers who were not at risk and had a statistically significant difference (3351 gram vs 3226 gram).

A different pattern was shown for birth weight in rural areas. According to Table 4, it is known that the mother's employment status has no statistical relationship with birth weight. Gender is the single factor that has differences in the average birth weight in rural areas. Boys tend to have a greater birth weight than female babies in rural areas. The statistic result of the Mann Whitney test showed that the baby's weight in rural areas was higher than that in urban areas (3424 gram vs 3275 gram).

Table 2. Relationship of Risk Factors with Birth Weight in Urban Areas

Variable		n	Mean (gram)	SD (gram)	*p value*
Type of pregnancy	Single birth	269	3282	603.27	0.061
	Twin birth	3	2566	602.77	
Gender of baby	Male	128	3306	623.39	0.217
	Female	144	3247	592.46	
Birth interval	<24 months	47	3365	592.16	0.304
	≥ 24 months	225	3256	609.41	
Age	Risky	106	3351	570.08	0.043*
	Not risky	166	3226	625.88	
Parity	≥ 4 children	68	3338	701.17	0.272
	< 4 children	204	3254	572.27	
Visit ANC	≥4 times	225	3295	605.17	0.159
	<4 times	47	3178	611.81	
Working status	Yes	141	3163	552.23	0.006*
	No	131	3395	641.17	
Type of residence area	Urban	86	3334	602.88	0.598
	Rural	186	3247	608.22	
Wealth quintile	Poor	225	3278	614.77	0.554
	Rich	269	3282	603.27	
Education	Low education	3	2566	602.77	
	Higher education	128	3306	623.39	0.217

Table 3. Relationship of Risk Factors of Birth Weight in Rural Areas

Variable		n	Mean	SD	*p value*
Type of pregnancy	Single birth	226	3432	636.72	0.089
	Twin birth	1	1600	0.0	
Gender of baby	Male	128	3559	641.53	0.000*
	Female	99	3250	614.182	
Birth interval	<24 months	31	3470	558.68	0.567
	≥ 24 months	196	3417	660.69	
Age	Risky	97	3422	641.53	0.785
	Not risky	130	3426	653.26	
Parity	≥ 4 children	81	3508	688.69	0.141
	< 4 children	146	3378	619.95	
Visit ANC	≥ 4 times	186	3425	629.35	0.995
	< 4 times	41	3419	729.45	

Variable		n	Mean	SD	*p value*
Working status	Yes	90	3387	638.26	0.582
	No	137	3448	653.62	
Wealth quintile	Poor	138	3453	654.926	0.45
	Rich	89	3379	635.177	
Education	Low education	196	3416	650.94	0.642
	Higher education	31	3477	628.42	

DISCUSSION

Antenatal care visits were not related to the baby's birth weight in this secondary data analysis, which is in line with study that found insignificant association between antenatal care visits and birth weight (12). The results of this study are in contrast with other study which state that antenatal care visits are related to birth weight (13), mothers who make antenatal care visits have a three times higher chance of giving birth to babies with normal weight compared to mothers who do not make antenatal care visits (14).

This study shows that the average birth weight of babies in mothers who do not work is greater than mothers who do work in urban areas. Research evidence has found that infant birth weight is related to the nature of the mother's work during pregnancy; if pregnant women work physically, the birth weight will be lower than mothers who do not work (6). Occupational factors that play a role in the final outcome of birth weight are such as standing and heavy physical work, lifting objects, long working hours, and working shifts (15). Women who work during pregnancy increase the risk of miscarriage, premature delivery, and hypertensive disorders of pregnancy (16) .

The results in this study showed that the mother's working status was related to the baby's birth weight, which was in line with research in Indonesia in 2019 which showed that there was a relationship between the mother's working status and birth weight. Working mothers are five times more likely to give birth to babies with low weight compared to mothers who do not work. This is because working mothers tend to have little time to rest resulting in pregnancy complications, such as detachment of the placenta, which is directly related to low birth weight (17). Meanwhile, mothers who do not work have more time to make antenatal care visits compared to working mothers, so that health workers monitor the development of the health of the mother and fetus (18). In addition, mothers who do not work do not need a lot of energy output compared to working mothers, so that good nutrition intake will increase the weight of pregnant women related to the baby's birth weight.

The results showed that the average birth weight in rural areas was greater than in urban areas; the results contradicted the study in Malaysia that rural women gave birth to more babies with low birth weight compared to urban women (19). Life in rural areas is no longer traditional with technological advances, especially in the field of mass media, which causes changes in household life in rural areas that imitate urban household life (20). Diet and nutrition are the areas most frequently affected by the urban lifestyle (21). Rural people are switching from traditional foods to animal foods, oils, and vegetables and fruits (20). In addition, pregnant women in rural areas have more opportunities to access gardens at home so as to provide a variety of foods consumed (22).

This study also showed that the average birth weight of male infants was higher than that of rural female infants, whereas in urban areas it was not. The gender variable was found to be less important when other variables such as education and household assets were taken into account (6). Previous studies have concluded that birth weight is related to socioeconomic conditions, education, weight gain during pregnancy, and gestational spacing (23–26).

Low family economic status will affect the quality and quantity of food consumed by pregnant women; food will usually be less varied thereby increasing the risk of malnutrition (27). The better the socioeconomic condition of the mother, the lower the possibility of giving birth to a baby with low weight. The average birth weight increases along with increasing family income; economic status also affects the fulfillment of

maternal nutrition during pregnancy (28). Pregnant women who have normal nutritional status tend to give birth to babies with normal weight; this is due to normal blood volume so that the size of the placenta is also normal and the flow of food from the mother to the fetus can run well and the nutritional needs of the fetus are met.

CONCLUSIONS AND SUGGESTIONS

Conclusion

Results showed that there was a relationship between birth weight and type of pregnancy, sex of the baby, parity, work status, and area of residence. Among urban areas, age and work status are related to birth weight, while in rural areas only the sex of the baby are related to birth weight.

Suggestion

Baby's birth weight is very important for future health development and growth. The government can use information about risk factors for birth weight and the differences in urban and rural areas in this paper as a basis for balancing health policies. Pregnancy at that age tends to tend to birth weight and the risk of maternal death, so it is necessary to intervene related to these problems through planning programs that must have a high existence.

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