The Probability of Socioeconomic Status and Demographics Effect on Birth Weight Babies

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Abstract

Low Birth Weight (LBW) can lead to stunting and the impact of stunting in long term. Socioeconomic status and demographic factors can be a cause of baby's low birth weight. The study aims to analyze the probability of a household giving birth to a baby with low birth weight. The data used in the research uses data from the 2021 National Socio-economic Survey (Susenas). The model used in this study is a logit model with a total of 2,203,472. The result shows poor households, household partners with low education, and household members who smoke have a significantly lower probability of giving birth to normal baby's weight Meanwhile, households who work in the formal sector and live in urban areas have a significantly higher probability of giving birth to normal-weight babies. Households with a good socioeconomic status will provide optimal nutrition. Households in urban areas still have a better level of health than those in rural areas and households that do not smoke will give birth to healthier babies with normal weight.

Keywords: birth weight, demography, LBW, socioeconomic

Abstrak

Berat Badan Lahir Rendah (BBLR) dapat mengakibatkan terjadinya stunting dan dampak dari stunting dalam jangka panjang. Faktor status sosial ekonomi dan demografi dapat menjadi penyebab bayi lahir dengan berat badan rendah. Penelitian ini bertujuan untuk menganalisis probabilitas rumah tangga melahirkan bayi dengan berat badan lahir rendah. Data yang digunakan pada penelitian menggunakan data survei sosial ekonomi nasional (Susenas) tahun 2021. Model penelitian yang digunakan adalah model logit dengan jumlah sebanyak 2.203.472 rumah tangga. Rumah tangga miskin, pasangan rumah tangga berpendidikan rendah, dan anggota rumah tangga merokok memiliki probabilitas lebih rendah dan signifikan untuk melahirkan berat bayi normal memiliki peluang untuk melahirkan berat badan bayi normal. Sementara itu, rumah tangga yang bekerja di sektor formal dan tinggal di wilayah perkotaan memiliki probabilitas lebih tinggi dan signifikan untuk melahirkan berat bayi normal. Rumah tangga dengan status sosial ekonomi yang baik akan memberikan nutrisi yang optimal. Rumah tangga di wilayah perkotaan masih memiliki tingkat kesehatan yang lebih baik dibandingkan dengan wilayah perdesaan dan rumah tangga yang tidak merokok akan melahirkan bayi lebih sehat dengan berat yang normal.

Kata kunci: BBLR, berat bayi, demografi, sosial-ekonomi

Introduction

Health development in Indonesia is still a serious problem. The prevalence of Stunting in Indonesia is slowly decreasing, the percentage of stunting around 24.4% (Indonesian Ministry of Health, 2021). This number is still relatively large because the World Health Organization (WHO) instructs that the prevalence of Stunting is below 20% (Indonesian Ministry of Health, 2023). One that causes the risk of Stunting is low birth weight (LBW). The Stunting Special Handling Index Report states that babies with LBW status have a 2.5 times chance of being stunted ([BPS] Badan Pusat Statistik Indonesia, 2021a). The phenomenon of LBW needs to be suppressed because it has been proven to hamper the growth and development of children, such as being easily infected with non-communicable diseases such as diabetes and heart disease (Wulandari, 2023).

Low birth weight (LBW) is still a world problem, including in Indonesia, one of the determining factors for the nation's successor in terms of baby's birth weight. Based on data from WHO in 2016, the global prevalence rate for LBW is 15.5%, which means that approximately 20.6 million babies in the world experience LBW problems. Around 96.5% of this phenomenon occurs in developing countries (Novita, 2022). Meanwhile, according to data from Kementerian Kesehatan (2021), there are 111,719 babies in the LBW category or around 2.5%. Babies with birth weight < 2500 grams are included in the category of abnormal weight or LBW. According to research conducted by Jornayvaz et al. (2016), this group of babies has a higher risk of death in the first 28 days, and babies who can survive will experience disturbances in their growth and development; their IQ will also tend to be low and have the potential to have chronic diseases and diabetes mellitus. The role of children in a nation is as agents of change, agents of development, and agents of national renewal. Without the optimal role of young people, it will be difficult for the nation to make changes (Handayat, 2019).

Three factors influence LBW, namely maternal factors, fetal conditions, and pregnancy conditions. Another factor that affects LBW, especially in Indonesia, is socioeconomic factor (Angela, 2019). Socioeconomic disparities in Indonesia are still quite substantial. These imbalances usually occur in the economy and education in the demographic sphere. Maternal factors are essential in LBW cases and the economic relationship with LBW can be seen from the mother's employment status and family economic conditions. In line with research by Sharma et al. (2015), mothers who work outside and work hard physically will give birth to babies with low birth weight. Families with low-income levels can potentially experience LBW (Angela, 2019; Demelash et al., 2015; Pramono & Paramita, 2015). Another economic maternal factor is education; mothers who have low education tend to have more opportunities to give birth to babies with abnormal weight or LBW (Angela, 2019).

In the report from BPS (2021b), it was noted that women had a higher percentage rate for continuing junior high school or equivalent education but a lower percentage for continuing to high school or equivalent level, namely 88.92%, and men at 89.36%. In a study conducted by Shapiro et al. (2017) stated that there was a relationship between the education of fathers and mothers with birth weight results. Parents with higher education will have greater access to food consumption and health care and tend to be more obedient to health instructions. As well as with the results of research conducted by Meng and Groth (2018), which stated that fathers with low education would increase

the risk of LBW. Therefore, this study states that it is not only maternal factors that are important in measuring infant weight but also socioeconomic factors at the family level.

Based on the World Inequality Report (2022), economic inequality in Indonesia has increased in the last two decades, as evidenced by the portion of the total wealth of the population in Indonesia being controlled by 30.2% of the top 1% (richest), while the bottom 50% group only controls 4.5%. of the total wealth of Indonesia. This is certainly something that is worrying for Indonesia because the more poor people there will be more babies born with low birth weight. Kayode et al. (2014) stated that households living in rich neighborhoods would protect mothers from giving birth to LBW babies. Conversely, living in an area with a high concentration of poverty will cause pregnant women to experience psychosocial stress, which can affect the baby's weight at birth. In a report published by Badan Pusat Statistik (2021a) on the 2019-2020 Special Index for Handling Stunting, it is hoped that the number of poor people will continue to decrease because poverty problems related to income and economic inequality will become obstacles in efforts to prevent Stunting. Therefore, poverty has a relationship with Stunting, and it can be said that poverty also has a relationship with Low Birth Weight (LBW).

BPS (2023) explains that the Human Development Index (HDI) is used to measure the results of the development of the quality of life of the community through earning income, education, health, and others. The Human Development Index (HDI) in Indonesia is measured using three dimensions: longevity and a healthy life, knowledge, and a decent standard of living. The Human Development Index has a close relationship with human resources. This is said in a book by Handoyo (2018), which states that the Human Development Index is related to the human resource economy; HDI increases along with increased human development.

This research is closely related to the theory of the Human Development Index because this research discusses the quality of human resources, which is related to the baby's weight. In several studies that have been described in the background, it has been explained that the impact that will be caused in the future if the baby is classified as LBW is that the development of his IQ is low, and there is the potential for having chronic and acute diseases. This means that the younger generation will experience setbacks in maintaining economic growth, leading to a declining level of national prosperity.

Based on the description of the conditions above, the authors are interested in and want to examine the relationship between socioeconomic and demographic factors and babies in Indonesia. The main objective of this research is to measure the probability of poor households giving birth to babies of normal weight. The results of this study are expected to contribute to government decision-making so that the LBW rate in Indonesia will decrease, given the importance of the role of children in national development and the achievement of sustainable development goals.

Methods

Participants

This study uses data from the 2021 National Socioeconomic Survey (Susenas). The data is a cross-sectional type conducted by Badan Pusat Statistik (BPS, 2021b). Data collection was carried out in this survey by directly interviewing selected households. So, the participants in this study are households surveyed by Badan Pusat Statistik for the purposes of the National Socioeconomic Survey (Susenas). This research is a household-level study, and the number of observations is 2,203,472.

Measurement

This study uses secondary data, and the instrument or measuring tool for this study is a questionnaire (questionnaire model) made by Badan Pusat Statistik (BPS, 2021b). The questionnaire results from interviews with selected households called the National Socioeconomic Survey (Susenas). In this study, the 2021 Susenas questionnaire was used. Several research variables used in this study were birth weight, poverty, household education, job status, residential area, and smoking status. Table 1 presents a complete list of questions that have been adapted to the research objectives.

Table 1. Questionnaire questions

Variable	Question
Dependent Variable	
Birth weight	How much did the baby weigh when it was born?
Independent Variable	
Poverty line	Calculated based on expenditure per capita based on food and non-food
Household education	What is the highest level of education currently/ever attended by a household member? and the relationship between household members and the head of the household
.	During the past week, what was your
Job-status	status/position in your main job?
Residential area	Urban/Rural Classification
Smoking status	During the past month, have you smoked tobacco?

Source: Susenas (2021)

The poverty line is obtained from questions about expenditure. In accordance with the definition of poverty according to the Badan Pusat Statistik, namely the inability of an individual to meet basic food and non-food needs seen from the expenditure side. The household education variable is a type of interaction variable between a person's relationship with the head of the household and the highest level of education, which produces categorical variables as explained in the description of the variables in Table 2.

Table 2. Variable Description

Variable	Description
Outcomes	
Birth weight	1: Normal
	0: Below normal
Socio-economic Status	
Poverty line	1: Poor
	0: Not poor
Household education	1: The head of household (HH) is highly educated
	2: Highly educated couple
	3: Head of HH/spouse with low education
Job-status	1: Formal
	0: Informal
Demographics	
Residential area	1: Urban
	0: Rural
Smoking status	1: Smoke
	0: No smoke
N = 2,203,472	

Source: Susenas, 2021

Analysis

In this study, STATA software was used to process the data, and the model used in this study was the logit model, which is a statistical analysis method with a binary dependent variable. The logit model is especially suitable for examining relationships and making predictions when the dependent variable is dichotomous, as in this study, which categorizes the baby's weight into the normal or below normal category. Using a logit model, this study seeks to identify indicators of the likelihood of certain events occurring, in this context referring to the weight of the baby, which is influenced by certain factors. The logit regression model used is as follows.

$$Y_i = \beta_0 + \beta_n X_{ni} + u_i$$

The model in this study is:
Birth weight = f (poverty, household education, job status, area of residence status, and smoking status)

The independent variables used in this research are poverty, household education, job status, residential area, and smoking status. The variables of poverty, job status, and residential area are binary variables. The dependent variable used is the birth weight using a dummy variable with details categorized as "1" if the birth weight is normal and categorized as "0" if the birth weight is below normal. The interpretation model used in this study is the marginal effect, which measures the probability of the independent variable with the ceteris paribus assumption.

Findings

Respondent Characteristics

Table 3 shows the results of the characteristics of respondents consisting of the outcome variable, namely baby weight, and the independent variable, namely socioeconomic status, which includes poverty, parental education, and type of work. Apart from that, there is demographic status, which includes residential area and smoking status.

Table 3. Respondent characteristics

Variable	Percentage(%)
Outcomes	
Birth weight	1: 86.30
	0: 13.70
Socio-economic Status	
Poverty line	1: 12.37
	0: 87.63
Household education	1: 2.08
	2: 59.49
	3: 38.43
Job-status	1: 65.83
	0: 34.17
Demographics	
Residential area	1: 44.50
	0: 55.50
Smoking status	1: 0.58
	0: 99.42
N = 2,203,472	

Source: Susenas, 2021

Based on the statistical description table above, it can be seen that the birth weight of babies who are classified as normal in Indonesia is 86.70%, and babies born below normal have a percentage value of 13.70%. Most of the research observations of infants. In the socioeconomic status variable, poor households have a percentage of 12.37%, and the remaining 87.63% are above the poverty line. Based on Susenas 2021 data, 17% of poor households give birth to babies with low birth weight. In the education sector category, approximately 59.49% of households have a high level of education, and 38.43% of households have low education. This indicates that only half of the total Indonesian households have tertiary education. In addition, 65.83% of people work in the formal sector in 2021. Workers in the formal sector will have a more certain income than workers in the informal sector. This is evidenced by Susenas data, which states that 12.5% of workers in the formal sector gave birth to babies with the LBW category and 16% of workers in the informal sector. Judging from the demographic variables, 44.50% of people live in urban areas, and there are around 0.58% of people who smoke in Indonesia. As much as 12% of babies who live in urban areas and 25% of babies who live with people who smoke are included in the Low Birth Weight (LBW) category.

Relationship between Socioeconomic and Demographic Status with Low Birth Weight

Socioeconomic factors associated with low birth weight (LBW) are poverty, education, and employment status. Meanwhile, demographic factors associated with low birth weight (LBW) are the status of the area of residence and smoking status. Table 4

shows the results of the model obtained. Based on the estimation results, the influence of socioeconomic status factors on baby weight has a significant influence. Variables such as education level, employment status, and area of residence have a positive impact on the birth weight of the baby. Other variables such as poverty levels, low-educated spouses, and smoking hurt the birth weight of the baby.

Table 4. Relationship between socioeconomic and demographic status with low birth weight

Variable	Coefficient Birth weight
Based Group (Not poor)	
Poor	-0.0165***
Based Group (Head of HH is highly educated)	
Highly educated couple	0.00243
Head of HH/spouse with low education	-0.0138***
Based Group (Informal)	
Formal	0.0167***
Based Group (Rural)	
Urban	0.0193***
Based Group (No smoking)	
Smoke	-0.0162***
Observation	2,203,472

Note: Significant level (α) ***$p<0.01$, **$p<0.05$, *$p<0.1$

The poverty variable has a significant negative relationship with infant weight. In the case of low-birth-weight babies, it is proven that if a baby is born to a household that is classified as poor, it will affect a lower probability of giving birth to a baby with a normal weight of 1.6% compared to a baby born to a non-poor household. These results can be seen in Table 4. Households with poor economic status tend to be less able to meet their daily needs. In terms of health needs, such as access to routine health checks, health checks for pregnant women and babies, and the like tend not to be met. Regarding food and nutritional needs, households with lower middle or poor economic status tend to be unable to meet good nutritional needs, so the possibility of malnutrition in lower middle-class communities tends to be greater than in upper-middle-class communities.

Household education also influences the baby's weight. The head of the household or household partner who has low education has a significant negative effect on Low Birth Weight (LBW). Couples with low education have a higher chance of giving birth to babies in the LBW category or lower giving birth to babies with normal weight by 1.38% compared to heads of households with higher education. Parents with a good education have better knowledge about health. Parents with good education and knowledge can be more aware of the risks of pregnancy diseases such as low birth weight babies.

Employment status influences the baby's weight. The research results show that households who have formal jobs or can be said to have permanent jobs have a greater chance of giving birth to babies with average weight by 1.67% compared to households who work in the non-formal sector. Parents with formal employment status tend to have better access to knowledge, access to health, and good insurance. This encourages greater guaranteed access to health for individuals or couples with formal worker employment status.

Based on the marginal effects in the table above, the model shows that the variables of residence in rural and urban areas have a significant positive effect on birth weight, where individuals who live in urban areas have a chance of giving birth to babies with a birth weight greater than 1.93% compared to individuals who live in rural areas. This can be attributed to adequate access in urban areas, health and pregnancy information and access to health buildings.

The smoking variable in the study showed a significant negative relationship with the baby's weight. Households with partners who smoke have a lower chance of giving birth to babies with normal weight by 1.62% compared to households with partners who do not smoke. Mothers who smoke or inhale cigarette smoke will certainly expose themselves to toxic gases, which can inhibit the growth and development of the baby in the womb. Thus, the baby's birth weight will be lower than babies born to mothers who avoid exposure to cigarette smoke.

Discussion

The results of this study state that babies born into poor households will have a smaller probability of giving birth to babies of normal weight. Pramono and Paramita (2015) in their research stated that the economic status of the household directly affects low birth weight babies. Households or families with high incomes can meet the nutritional needs of infants. On the contrary, families with low income will experience difficulties in meeting nutritional needs.

In addition, low economic status can lead to a decrease in food purchasing power both in quality and quantity. This has an impact on the probability of low nutritional status of pregnant women. Mothers who experience poor nutritional status will experience impaired growth and function of the placenta, which is reflected in the small size of the placenta. This non-optimal size of the placenta causes a lack of transfer of nutrients from mother to baby, thereby increasing the probability of LBW (Retni et al., 2016).

Other studies that support this finding include research by Aryastami et al. (2017), which explains that poverty is one of the factors related to the stunting phenomenon in Indonesia. In this study, the researchers stated that LBW, gender (male), history of neonatal disease, and poverty are closely related to the phenomenon of Stunting in Indonesia. Research shows that poverty is related to infant growth retardation, which ultimately causes the development and growth of the baby's organs to be slow and stunted. Women with higher social status (individuals who are not poor) may have a higher nutrition awareness than women with lower social status. Awareness of nutrition is also associated with breastfeeding. Women with low social status also have a low prevalence of exclusive breastfeeding. Thus, the nutrition needed by babies comes more from complementary foods than directly from breast milk or exclusive breastfeeding. This can cause a lack of nutrition for the baby, inhibit the growth of the baby, and cause the baby's weight to be classified as Low Birth Weight (LBW).

Talking about education, highly educated couples will have a higher awareness of regular prenatal care. Highly educated couples tend to follow the instructions of medical personnel and carry out health checks with the doctor. Regular health care handled directly by professional workers indirectly helps the baby's development more optimally. This is evidenced by the results of this study, which state that couples with

low education will have a smaller probability of giving birth to babies with normal weight.

Godah et al. (2021) in their research also stated that parental education, especially for mothers, has a strong relationship with baby weight. The higher the mother's education, the lower the chance of giving birth to a baby with the LBW category. Mothers with higher education find it easier to absorb information about the health cycle, so they tend not to ignore their pregnancy.

Household education also affects the baby's birth weight. Babies whose fathers have a basic education have a higher probability of experiencing Stunting. Parents who have higher education will be oriented toward preventive action, understand more about health problems, and learn knowledge about nutrition and health (Wahyuni & Fitrayuna, 2020). Educated parents tend to have more mature knowledge about reproduction and fetal health. This makes parents better able to avoid factors such as smoking and consumption of illegal drugs that can affect or inhibit fetal growth.

Parents have an important role in children's education. Home is often referred to as the first school for children. Ceka & Murati (2016), in their research, explained how important the role of women or mothers as educators for children is an important source for the development of individual or child identities. Every child who is raised and educated directly by his mother is expected to be able to achieve physical, psychological, and social development according to his age. This can be seen in children having a much better appearance, looking happier, and enjoying their childhood according to their age. In addition, children also look more communicative and ready or able to work together.

In a study conducted by Fransiska et al. (2020), it was stated that working mothers have a greater probability of giving birth to babies with the Low Birth Weight (LBW) category. In this study, it was explained that most of the respondents' occupations were farm laborers, and this was related to the purchasing power of a farm worker to meet the nutritional support for the baby's development. In addition, farm labor is a physically demanding job that can cause fatigue for pregnant women and have an impact on the birth of babies.

Households with formal jobs have better access to health services such as hospitals and health insurance than non-formal ones. The International Labor Organization (2010) states that non-formal workers are defined as people who are self-employed or self-employed and workers who help families or family workers. Badan Pusat Statistik (2023b) classifies formal workers, including workers, employees, employees, or self-employed assisted by permanent or paid workers. Some formal jobs are also equipped with health facilities which are borne by the company so that the probability of visits to health services, especially prenatal services, is higher than households working in the non-formal sector.

In line with the results of this study, Demelash et al. (2015) in their research stated that mothers who work as traders have a higher probability of giving birth to babies with low birth weight. Traders are jobs that belong to the non-formal sector and work physically. A study conducted by Sharma et al. (2015) also stated that mothers who work with heavy physical work will have a higher probability of giving birth to babies with abnormal weights.

Residential areas are classified based on rural or urban areas ([BPS] Badan Pusat Statistik Indonesia, 2020). The definition of urban statistically is the status of an administrative area at the village or sub-district level that meets the criteria for urban

village classification. Meanwhile, the definition of rural is the status of an administrative area at the village or district level that meets the criteria for classifying rural villages. The influence of rural and urban areas of residence can be seen in terms of ethnicity, parity, education level, monthly household income, and employment between pregnant women from urban and rural partners.

Research shows that mothers who live in urban areas have a higher probability of giving birth to babies with average weight. This study also shows that pregnant women from urban areas have a higher level of education than pregnant women from rural areas. This higher level of education also reflects higher household income where mothers or women living in urban or urban areas, the majority work or are employed in professional and administrative roles. Meanwhile, more women who live in rural areas tend to work in the non-formal sector. In addition, women who live in urban areas tend to have more physical activity than women who live in rural areas. This is because women who live in urban areas are likely to have broad access to knowledge based on physical activity, so they will be more inclined to do sports that are good for the health of the fetus and baby. In research, pregnant women in rural areas tend to do sports activities such as walking and jogging. However, the average for activities related to physical activity is still low compared to pregnant women who live in urban areas (Kaur et al., 2019).

Women who live in urban areas have better access to health care than women who live in rural areas. This is reflected in the access to hospitals, a professional workforce, and adequate equipment in urban areas than in rural areas. This allows pregnant women living in urban areas to have better prenatal access than women living in rural areas. In addition, living in urban areas gives pregnant women a greater probability of being able to access pregnancy needs such as pregnant vitamins and supplements, sports facilities, and fitness, which can help stimulate fetal growth and have an impact on improving the health of mothers and babies.

Households living in non-urban areas are also often associated with poor sanitary conditions. Anil et al. (2020) stated that the disturbance of weight during pregnancy due to poor health, poor sanitation, and an unbalanced diet will eventually cause delays in the growth and development of the fetus. Women who have at least one health problem during pregnancy have a higher risk of giving birth to a baby with a lower weight compared to women who have no health problems or are in good health.

The World Health Organization (2022) states that an estimated 1.3 billion people worldwide use tobacco products, 80% of whom are in low and middle-income countries. Tobacco use contributes to poverty because household expenses that should be used for basic needs, such as food and shelter, are diverted and allocated to purchase tobacco. Cigarettes can have a negative impact on active and passive smokers. This is in line with this study, which states that mothers who smoke or live with household members who smoke have a lower probability of giving birth to normal-weight babies.

This is in line with the research by Tsuboi et al. (2016), which states that women who smoke or live with partners who smoke have the probability of reducing health during pregnancy and encourage a reduction in birth weight. This is triggered by exposure to addictive biochemical substances from cigarettes, which are dangerous for pregnancy. In addition, research results state that pregnant women who smoke or are exposed to tobacco smoke tend to give birth to babies at an earlier gestational age with lower baby weight compared to women who are not exposed.

In another study, it was also explained that the number of cigarettes smoked and the child's birth weight had a negative correlation. Children of mothers who smoke tobacco during pregnancy have a smaller body weight of 170-377 grams compared to children born to mothers who do not smoke. Tobacco smoking increases the risk of premature bleeding; more than that, smoking during pregnancy also increases the risk of congenital diseases in infants, such as heart defects (Panstw Zakl et al., 2018).

Mothers who smoke during pregnancy correlate with low-birth-weight babies. This allows babies born to mothers who don't smoke to be twice as light. The use of smokeless tobacco during pregnancy can also increase the risk of low-birth-weight babies. Babies born to mothers who are exposed to second-hand smoke have a lower body weight than babies born to mothers who are not exposed to second-hand smoke. Smoking during pregnancy is one of the most important risk factors for negatively affecting the growth and development of the fetus. Mothers who actively smoke during pregnancy also have an impact on the risk of miscarriage, ectopic pregnancy, placental abruption, premature birth, intrauterine growth, congenital anomalies, respiratory disorders, and physical and behavioral disorders. For newborns, smoking can predispose them to infection, delay growth and development, and encourage metabolism that forms chronic diseases (Pereira et al., 2017).

Mothers who smoke during pregnancy can encourage fetal complications and reduce the baby's birth weight. The nicotine contained in cigarettes can penetrate the placenta. These harmful chemicals that penetrate the placenta can disrupt the growth and development of the fetus. In addition, the carbon dioxide present in cigarette smoke also interferes with the oxygen supply of unborn babies through polycyclic aromatic hydrocarbons and tobacco-specific nitrosamines. The carbon monoxide (CO) contained in tobacco increases carboxyhemoglobin in the arteries, which causes inhibition of oxygen to the fetus, causing fetal hypoxia (Banderali et al., 2015).

Smoking during pregnancy can negatively affect the growth and development of the fetus. This is because cigarettes contain chemicals such as nicotine, which cause vasoconstriction. Vasoconstriction causes the pressure of oxygen flow to the fetus to decrease, and the carbon monoxide in it will form carboxyhemoglobin, which will later inhibit the release of oxygen to the fetus (Anil et al., 2020). The limitation of this study is self-reporting because it only uses socioeconomic status and demographic variables in health research. In addition, low-birth-weight babies are not classified based on premature birth because of limited data. So, it is essential for future research to classify the differentiating categories of low birth weight.

Conclusion and Recommendation

Conclusion

Socioeconomic and demographic factors have a significant effect on the probability of infant weight. Some of the socioeconomic factors that can contribute to this problem include families with lower socioeconomic levels who may have limited access to quality medical care. This can affect the quality of maternal care during pregnancy and childbirth, potentially affecting the baby's health and birth weight. Economic factors can affect a household's ability to meet its nutritional needs during pregnancy. Malnourishment of the mother during pregnancy can cause low birth weight babies.

Socioeconomic factors can influence the level of education and knowledge about maternal health. Couples who are not educated about health may not be aware of the importance of nutrition during pregnancy or the ways to care for their baby properly. Low socioeconomic level can also mean limited access to nutritious food, which is essential for the healthy development of the baby in the womb. Low socioeconomic factors can result in unfavorable social conditions, including high-stress levels. Stress on the mother during pregnancy can hurt the health of the baby she contains.

As well as demographic factors, households living in rural areas tend to give birth to babies with abnormal weights. This can happen due to a lack of proper sanitation or incomplete access to information and health care. Mothers who smoke or live with people who smoke will be exposed to harmful substances that will affect the condition of the fetus. Living in an environment that is unhealthy and does not support the health of pregnant women and babies will affect the health of mothers and babies, including nutritional problems and low baby weight.

The impact of the above socioeconomic and demographic factors can be complex and interrelated. In addition, the role of genetic factors, the postnatal environment, and medical factors also need to be considered in the analysis of the probability of underweight babies. Efforts to increase access to quality medical care, support maternal health during pregnancy, provide appropriate health education, and increase access to nutritious food can help reduce the probability of underweight babies due to socioeconomic factors.

Recommendation

Several socioeconomic factors need to be considered in identifying and reducing the probability of underweight babies. The first factor is the family's socioeconomic status, associated with access to adequate health care, nutritious food, and a healthy environment. Families with higher socioeconomic status usually have better access to these resources. Thus, prenatal care and care during pregnancy will receive more attention. These results provide recommendations to the government to help reduce access costs during pregnancy for people who are still classified as poor.

Another factor that affects the baby's weight is the education of household partners, which is linked to knowledge and understanding of health and nutrition during pregnancy. Households with higher levels of education tend to be more aware of the importance of nutritious food and good care during pregnancy, which can help prevent underweight babies. Therefore, researchers suggest to the government that it further improve public access to education to improve the quality of human resources.

Increased access can be achieved through educational support facilities and infrastructure. In terms of employment status, households that work in the formal sector have a higher probability of giving birth to babies of normal weight. This could be because in formal jobs, pregnant women's access to medical care such as BPJS is borne by the company, which reduces the cost of prenatal care. Therefore, for households working in the non-formal sector, there needs to be further attention paid to prenatal care in order to minimize the birth of babies in the low birth weight (LBW) category.

Households living in rural areas have a greater chance of giving birth to babies in the LBW category. This is because the environmental and sanitary conditions in rural areas tend to be poor, which hurts maternal health and infant development. In addition, in rural areas, social support from family, friends, and relatives is given less attention. This support can help mothers deal with stress and challenges during pregnancy, thus

making the baby's development better. Therefore, the government can also work to ensure clean water and sanitation throughout the region and help convey insights regarding environmental and social support to the community. The dangers of smoking certainly hurt health, including the baby's weight. To be able to reduce cigarette consumption in households, the government can re-evaluate smoking policies in Indonesia, especially since Indonesia is also known as a smoker's paradise.

In addition, the government can also provide intensive education for the public regarding the dangers of smoking. Apart from socioeconomic factors, other factors can help reduce LBW rates in Indonesia. These factors include access to nutritious food because maternal nutrition during pregnancy is an essential factor in giving birth to babies. Mothers who are malnourished will be vulnerable to giving birth to LBW.

In addition, the availability of prevention programs and interventions related to LBW is also needed because this program aims to help identify the risks of low baby weight and provide the necessary support and assistance so that access to health information is more accurate and this program can help mothers adopt healthy behaviors during pregnancy. Efforts to reduce the probability of underweight babies require a holistic approach that involves various sectors, including health, education, and socioeconomics. Collaboration between the government, community, and health organizations can improve the welfare of pregnant women and babies to be born.

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