Learning about the Incidence of Diarrhea in Toddlers who Visit the Pasar Rebo District Health Center

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Abstract
Diarrhea is a disease with signs of changes in the shape and consistency of the stool, which becomes soft to liquid and an increase in the frequency of defecation at least three or more times a day. The aim of this research is to provide learning about the incidence of diarrhea in toddlers who visit the Pasar Rebo sub-district health center in 2021. This research method is quantitative analytical observational with an analytical cross-sectional study design type where the research population is toddlers who visit the Pasar Rebo sub-district health center by taking the number of samples is 250 samples. The results of the study showed that mothers with low education had a 1.94 times risk (OR: 1.94; CI 95%: 1.10–3.43) of their toddlers suffering from diarrhea when compared with mothers with higher education. The recommendation of this research is that mothers with low education are given education about preventing diarrhea. Therefore, it is recommended to activate existing sanitation clinics or build sanitation clinics that do not yet exist in community health centers so that all diarrhea sufferers can be referred or consulted to obtain information about diarrhea prevention.

Keywords: Diarrhea, maternal education, sanitation

Introduction

Diarrhea is a disease with signs of changes in the shape and consistency of the stool, which becomes soft to liquid and an increase in the frequency of defecation at least three or more times a day. In the world, as many as six million children die every year from diarrhea, most of these deaths occur in developing countries. Until now, diarrhea is still a public health problem in Indonesia, this can be seen by the increasing number of diarrhea illnesses from year to year. The incidence of toddler diarrhea in Indonesia in 2016 and 2019 was 1.3 times per year, and in 2020 the incidence of toddler diarrhea was 900/1000 toddlers. Diarrhea is the number one cause of death in postneonatal babies and children under five.

The prevalence of clinical diarrhea in DKI Jakarta is 80%. Meanwhile, according to surveillance results from DKI Jakarta,
in 2017 there were 66,647 toddlers with diarrhea, 85,136 toddlers in 2018, 80,776 toddlers in 2019 and 74,472 toddlers in 2020. Meanwhile, diarrhea sufferers in toddlers for the East Jakarta area were recorded in 2009 as many as 16,527 toddlers, in 2017 there were 19,862 toddlers, in 2018 there were 17,490 toddlers and in 2019 there were 17,117 toddlers.

Factors that cause diarrhea are environmental factors, for example the type of waste disposal; from maternal factors such as maternal knowledge and maternal education; from toddler factors, for example toddler age and toddler nutritional status; and from behavioral factors such as personal hygiene.

The reason for carrying out this research is because this research has never been carried out before. And in the last three years the incidence of diarrhea among toddlers at the Pasar Rebo District Health Center has remained high.

The general aim of this research is to provide education about the incidence of diarrhea in toddlers who visit the Pasar Rebo District Health Center in 2021. Meanwhile the specific aim of this research is to determine the relationship between the environment (type of waste disposal, type of clean water facilities) and the incidence of diarrhea in toddlers, characteristics mothers (mother's knowledge, mother's education, mother's employment, family expenses) with the incidence of diarrhea in toddlers, characteristics of toddlers (age, nutritional status) with the incidence of diarrhea in toddlers and Behavior (personal hygiene) with the incidence of diarrhea in toddlers at the Pasar Rebo District Health Center in 2021.

This research is quantitative analytical observational with an analytical cross-sectional study design. To achieve this goal, a literature review was carried out regarding factors related to the incidence of diarrhea, then the theoretical framework and conceptual framework were described and then a specific research problem was formulated. On this basis, specific objectives and hypotheses are formulated. Research methods will be determined to answer specific objectives and prove the hypothesis.

Method

This research is quantitative analytical observational with an analytical cross-sectional study design. Data was collected for the independent variable and dependent variable at the same time for toddlers who visited the Pasar Rebo District Health Center.

The population is toddlers who come to visit the Pasar Rebo District Health Center in 2021. This research uses an Analytical Cross-sectional Study design for which ONE Sample is needed; Thus, to determine the minimum sample size, the following information is needed:

- Hypothetical value of the proportion of the population at risk (results of previous research) → Po
- True value of population proportion (desired) → Pa
- Significance level (α)
- Test Strength (100-β)
- Hypothesis: Pa < Po

By using the Table: Sample Size for One Sample Test of Proportion (Level of Significance 5%; Power 90%) Alternative Hypothesis: 1-sided, then for each independent variable, the results of
determining the size or minimum sample size can be seen in the table below.

Table 1. Determination of sample size is based on Sample Size for One Sample Test of Proportion

<table>
<thead>
<tr>
<th>No</th>
<th>Independent Variable</th>
<th>Po</th>
<th>Pa</th>
<th>α</th>
<th>β</th>
<th>Sample Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Type of sewage</td>
<td>0.35</td>
<td>0.25</td>
<td>5%</td>
<td>10%</td>
<td>180</td>
</tr>
<tr>
<td>2</td>
<td>Type of clean water facility</td>
<td>0.32</td>
<td>0.22</td>
<td>5%</td>
<td>10%</td>
<td>161</td>
</tr>
<tr>
<td>3</td>
<td>Mother's knowledge</td>
<td>0.37</td>
<td>0.27</td>
<td>5%</td>
<td>10%</td>
<td>180</td>
</tr>
<tr>
<td>4</td>
<td>Personal hygiene</td>
<td>0.5</td>
<td>0.4</td>
<td>5%</td>
<td>10%</td>
<td>211</td>
</tr>
<tr>
<td>5</td>
<td>Toddler age</td>
<td>0.5</td>
<td>0.4</td>
<td>5%</td>
<td>10%</td>
<td>211</td>
</tr>
<tr>
<td>6</td>
<td>Nutritional status of toddlers</td>
<td>0.44</td>
<td>0.34</td>
<td>5%</td>
<td>10%</td>
<td>205</td>
</tr>
<tr>
<td>7</td>
<td>Mother's education</td>
<td>0.42</td>
<td>0.32</td>
<td>5%</td>
<td>10%</td>
<td>194</td>
</tr>
<tr>
<td>8</td>
<td>Mother's job</td>
<td>0.23</td>
<td>0.13</td>
<td>5%</td>
<td>10%</td>
<td>137</td>
</tr>
<tr>
<td>9</td>
<td>Family expenses</td>
<td>0.32</td>
<td>0.22</td>
<td>5%</td>
<td>10%</td>
<td>161</td>
</tr>
</tbody>
</table>

Based on the table above, it can be seen that the largest sample size is 211 for the independent variables type of clean water facility, age of toddlers, nutritional status of toddlers and family income.

On the basis that for one independent variable 15 samples are needed, then for nine independent variables 9 X 15 = 135 samples are needed. Thus, for this research a sample size of 211 is required, which is rounded to 250.

Sampling was carried out by waiting for toddlers who came to visit the Pasar Rebo District Health Center. Then toddlers with diarrhea who had been recorded were followed up with interviews using a questionnaire.

The type of data collected is primary data, namely data taken about the type of waste disposal, type of clean water facilities, mother's knowledge, age of toddler, nutritional status of toddler, mother’s education, personal hygiene, mother’s occupation, and family expenses. Data was collected using structured interview techniques using closed questionnaires.

Data processing is part of a series of activities carried out after data collection. To facilitate data processing, computer programs are used. Data processing steps include editing, coding, processing, cleaning, and tabulating. Data analysis was carried out in stages including univariate, bivariate, and multivariate analysis.

Hypothesis Statement. The incidence of diarrhea in toddlers is related to the type of waste disposal, type of clean water facilities, mother's knowledge, personal hygiene, age of toddler, nutritional status of toddler, mother's education, mother's occupation, family expenses.

Y = f(X1, X2, X3, X4, X5, X6, X7, X8, X9)
Y = Diarrhea incidence
X1 = Type of waste disposal; X2 = Type of clean water facility; X3 = Mother's knowledge
X4 = Personal hygiene; X5 = Age of toddler; X6 = Nutritional status of toddlers; X7 = Mother’s education
X8 = Mother's occupation; X9 = Family expenses

Results
1. Univariate Analysis
2. Bivariate Analysis

Table 4 below shows that of the 9 (nine) independent variables that are hypothesized to be related to the incidence of toddler diarrhea, there is 1 (one) independent variable that is significantly related, namely the education level of mothers of toddlers, that mothers of toddlers with low education have a risk of 1.94 times that of their toddlers suffered from diarrhea when compared with highly educated mothers (95% CI: OR = 1.10 – 3.43).
### Table-4 Frequency Distribution of Independent Variables Associated with the Incidence of Diarrhea in Toddlers Visiting the Pasar Rebo District Health Center in 2021

<table>
<thead>
<tr>
<th>No</th>
<th>Variable</th>
<th>Diarrhea</th>
<th>Not Diarrhea</th>
<th>Amount</th>
<th>OR (95% CI)</th>
<th>p Value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>f</td>
<td>%</td>
<td>f</td>
<td>%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>14</td>
<td>26.4</td>
<td>39</td>
<td>73.6</td>
<td>53</td>
<td>100,0</td>
</tr>
<tr>
<td></td>
<td>55</td>
<td>27.8</td>
<td>143</td>
<td>72.2</td>
<td>198</td>
<td>100,0</td>
</tr>
<tr>
<td>2</td>
<td>60</td>
<td>29.7</td>
<td>142</td>
<td>70.3</td>
<td>202</td>
<td>100,0</td>
</tr>
<tr>
<td></td>
<td>9</td>
<td>18.4</td>
<td>40</td>
<td>81.6</td>
<td>49</td>
<td>100,0</td>
</tr>
<tr>
<td>3</td>
<td>31</td>
<td>34.1</td>
<td>60</td>
<td>65.9</td>
<td>91</td>
<td>100,0</td>
</tr>
<tr>
<td></td>
<td>38</td>
<td>23.8</td>
<td>122</td>
<td>76.3</td>
<td>160</td>
<td>100,0</td>
</tr>
<tr>
<td>4</td>
<td>22</td>
<td>30.9</td>
<td>49</td>
<td>69.1</td>
<td>71</td>
<td>100,0</td>
</tr>
<tr>
<td></td>
<td>47</td>
<td>26.1</td>
<td>133</td>
<td>73.9</td>
<td>180</td>
<td>100,0</td>
</tr>
<tr>
<td>5</td>
<td>45</td>
<td>31.9</td>
<td>96</td>
<td>68.1</td>
<td>141</td>
<td>100,0</td>
</tr>
<tr>
<td></td>
<td>24</td>
<td>21.8</td>
<td>86</td>
<td>78.2</td>
<td>110</td>
<td>100,0</td>
</tr>
<tr>
<td>6</td>
<td>32</td>
<td>36.4</td>
<td>56</td>
<td>63.6</td>
<td>88</td>
<td>100,0</td>
</tr>
<tr>
<td></td>
<td>37</td>
<td>22.7</td>
<td>126</td>
<td>77.3</td>
<td>163</td>
<td>100,0</td>
</tr>
<tr>
<td>7</td>
<td>15</td>
<td>26.3</td>
<td>42</td>
<td>73.7</td>
<td>57</td>
<td>100,0</td>
</tr>
<tr>
<td></td>
<td>54</td>
<td>27.8</td>
<td>140</td>
<td>72.2</td>
<td>194</td>
<td>100,0</td>
</tr>
<tr>
<td>8</td>
<td>18</td>
<td>21.2</td>
<td>67</td>
<td>78.8</td>
<td>85</td>
<td>100,0</td>
</tr>
<tr>
<td></td>
<td>51</td>
<td>30.7</td>
<td>115</td>
<td>69.3</td>
<td>166</td>
<td>100,0</td>
</tr>
<tr>
<td>9</td>
<td>8</td>
<td>38.1</td>
<td>13</td>
<td>61.9</td>
<td>21</td>
<td>100,0</td>
</tr>
<tr>
<td></td>
<td>61</td>
<td>26.5</td>
<td>169</td>
<td>73.5</td>
<td>230</td>
<td>100,0</td>
</tr>
</tbody>
</table>

### Discussion

1. **Data Quality and Accuracy**

Data quality is determined by the relevance and validity of the data. Data relevance shows the collection, processing and analysis of data in accordance with the specific research objectives, while validity consists of internal validity and external validity. Internal validity is the opposite of errors, which consist of random errors and systematic errors. Random error is determined by the size of the sample used, while systematic error consists of selection bias, information bias and confounding bias. Data accuracy consists of data relevance, data validity and data reliability.

This research uses an analytical cross sectional study design (analytic cross sectional) which is then analyzed with the aim of developing and proving a limited hypothesis based on general objectives and specific objectives that want to know about the relationship between the factors (independent variables) studied and the incidence of diarrhea (variables), dependent) in toddlers who visited the Pasar Rebo District Health Center in 2013. Based on the above, the results of this research have relevance in the data collected and then processed with design and analysis that can prove the hypothesis in...
2. Validity

Validity or validity is the most crucial credibility criterion in epidemiological research because it refers to correct measurement through the correct instrument, meaning the extent to which the instrument can measure what it is supposed to measure. Validity can also be interpreted as the validity of estimating target population parameters based on research sample statistics.

Validity is divided into external validity and internal validity. Internal validity is a prerequisite for external validity, but in epidemiological research external validity is not a prerequisite that must be met, meaning that internal validity does not have to be able to be generalized to a larger population (external validity).

In this study, external validity was not obtained because the sample was taken at the community health center so the research results cannot be generalized to the population of Pasar Rebo District.

Internal validity includes the absence of systematic error (bias) and how large the random error or sampling error is is determined in calculating the size or sample size. This is an important thing in epidemiological research, but there is often a failure to rule out alternative explanations about research results, so that the interpretation made about the relationship between research factors and disease is a wrong interpretation. Errors in interpretation are caused by distortions called biases. Bias can occur due to errors in selecting research subjects, and failure to control external variables other than research factors that influence the incidence of disease.

3. Error

The error consists of α error and β error. Confidence Level is a degree of confidence that shows how many percent of research results can be trusted; the confidence level value is (100% - α error). Test Power is the degree of power expressed as a percentage of a study; Test Strength value is (100% - β error).

The α error and β error are used in calculating the size or sample size. In this study, based on sample size calculations, 211 samples were obtained and rounded up to 250 samples. Systematic error is called bias which consists of selection bias, information bias and confounding bias.

Selection bias. Selection bias can occur when different criteria are used in the subject selection procedure, so it often happens that this bias cannot be controlled, but can only be prevented. (Lapau 2012). In this study, selection bias cannot be avoided because the respondents who came did not represent the population from a particular area.

Information Bias. Information bias or observation bias or measurement bias occurs due to systematic differences in the quality and method of data collection. Information bias consists of misclassification bias, diagnostic bias, instrument bias, recall bias, interviewer bias. Interviewer bias occurs because the interviewer's ability to ask questions in everyday language will give rise to misinformation (the respondent does not
understand) so that the answers given do not match the questions being asked.

The level of accuracy and quality of data is greatly influenced by the honesty of the respondent, so that information bias has quite a big chance in this research. To anticipate this, the interviewer has been given an explanation to explain the purpose of collecting the data for research purposes so that objectivity and honesty of the respondent is required.

Confounding Bias. Confounding Bias can occur if in an analysis there are confounding variables. It is difficult to determine confounding variables because these variables are risk factors (independent variables) that are related to the dependent variable (disease incidence), but are also related to other risk factor variables (independent variables). In this study, confounding bias was not found.

4. Data reliability

Data reliability is the consistency of test equipment results according to time and person. In this study, the reliability of the data cannot be determined because data collection was carried out only once.

5. Independent variables that are causally related to the incidence of diarrhea in toddlers

a. The temporal relationship (+) is because maternal education precedes the incidence of diarrhea in toddlers
b. Plausibility (+), mothers with low education cause a low intellectual level and ability to absorb information. Therefore, it can lead to a lack of insight/knowledge and ways of thinking in caring for toddlers, so that toddlers suffer from diarrhea
c. Dose response relationship (-), in this study cannot be assessed because the data used is categorical data.
d. Strength of association (+), the strength of the relationship between maternal education can be seen from the OR value obtained which was 1.94 times, (CI 95%: 1.10 – 3.43). This means that mothers with low education have a 1.94 times risk of their toddlers suffering from diarrhea when compared to mothers with higher education.
e. Consistency (+) because these results agree with the research results of several other researchers, Madjid (2006), Giyantini (2000), Alamsyah (2002), Kusnodiharjo et al (1994).
f. The type of cross-sectional design is (-) because this type of research design has weak inference, namely suggestive

The discussion of the causal relationship between the independent variable (maternal education) and the incidence of diarrhea in toddlers visiting the Pasar Rebo sub-district health center in 2021 can be summarized in the table below,

<table>
<thead>
<tr>
<th>No</th>
<th>Criteria Items</th>
<th>Mother’s education</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Temporal</td>
<td>+</td>
</tr>
<tr>
<td>2</td>
<td>Plausibility</td>
<td>+</td>
</tr>
<tr>
<td>3</td>
<td>Dose response relation</td>
<td>-</td>
</tr>
<tr>
<td>4</td>
<td>Strength of Association</td>
<td>1.94 (1.10 – 3.43)</td>
</tr>
<tr>
<td>5</td>
<td>Consistency</td>
<td>+</td>
</tr>
<tr>
<td>6</td>
<td>Design Type</td>
<td>-</td>
</tr>
</tbody>
</table>

6. Implications of Research Results
In this study, 1 independent variable was found that was causally related to the incidence of diarrhea in toddlers, namely maternal education. Low education in mothers affects the occurrence of diarrhea in toddlers by 1.94 times when compared to mothers with higher education.

Therefore, it is recommended that mothers with low levels of education be given knowledge about the risk factors for diarrhea so that their toddlers do not suffer from diarrhea. To realize these recommendations, it is recommended to activate existing sanitation clinics or build sanitation clinics that do not yet exist.

7. Independent variables that are not related to the incidence of diarrhea in toddlers

a. Type of sewage. Every residence must have good waste disposal so that the environment remains clean and unpolluted. The questionnaire asked about the type of waste disposal that mothers had in their respective homes. However, the respondents' answers may not understand the meaning of the question, it is possible that mothers do not know about the types of toilets and have limited knowledge about toilets. Therefore, it is recommended that a pretest be carried out before data collection until the respondent understands the questions.

b. Type of clean water facility. In this research, it was seen that many respondents used water that came from non-PAM. There is no significant relationship between the type of clean water facility and the incidence of diarrhea, because the data tends to be homogeneous. It is recommended to conduct research with an ecological study design type, namely comparing the incidence of diarrhea between groups with good and poor clean water facilities.

c. Mother's knowledge. The variable maternal knowledge is not related to the incidence of diarrhea in toddlers because of the possibility of information bias. This occurs due to the respondent's lack of understanding of the question. It is recommended to carry out a pretest whether the respondent understands the substance of the question in question.

d. Personal hygiene. Personal hygiene variables are not related to the incidence of diarrhea, because the data is homogeneous. It is recommended to conduct research with an ecological study design type, namely comparing the incidence of diarrhea between groups with good and poor individual hygiene.

e. Toddler age. The toddler age variable is not related to the incidence of diarrhea in toddlers because toddlers who suffer from diarrhea are not always accompanied by people who know the toddler's age with certainty. It is recommended that a pretest be carried out before data collection to find out to what extent the validity of age can be questioned. And a re-check was carried out with KMS data at the local health center.

f. Nutritional status of toddlers. The variable nutritional status of toddlers is not related to the incidence of diarrhea in toddlers because of the possibility of measurement errors either from instruments that are not calibrated and/or from the staff carrying out the measurements.
further research, correct calibration and training of the officers concerned should be carried out.

g. Mother’s job. The maternal employment variable is not related to the incidence of diarrhea in toddlers because it is possible that working and non-working mothers do not represent the population of the Pasar Rebo area because the data was taken from respondents who came to the health center. It is recommended that you conduct research in the Pasar Rebo area.

h. Family expenses. The family expenditure variable is not related to the incidence of diarrhea in toddlers because the definition of family expenditure is less operational, you have to calculate income first, then calculate expenses. The question is whether the respondent answered income and expenses correctly. For further research, it is better to ask about family expenses carefully.

Summary

The proportion of toddlers suffering from diarrhea who visited the Pasar Rebo sub-district health center was 27.5%. Variables that have a causal relationship with the incidence of diarrhea in toddlers who visit the Pasar Rebo sub-district health center are: Low maternal education influences the incidence of diarrhea in toddlers when compared to highly educated mothers. Independent variables that do not have a statistically significant relationship with the incidence of diarrhea in toddlers are: type of waste disposal, type of clean water facility, mother’s knowledge, personal hygiene, age of toddler, nutritional status of toddler, mother’s occupation, family expenses.

References


