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THE EXPLOITATION STATUS OF WORKING SCHOOL-AGE CHILDREN IN INDONESIA: A MULTILEVEL BINARY LOGISTIC REGRESSION ANALYSIS

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ABSTRACT

Many children in Indonesia are exploited in the workforce. In 2022, 12.22 percent of school-age children worked more than 40 hours per week. Children are considered exploited if they work more than 20 hours a week. Children who work for a long time have serious impacts. This study aims to determine a general picture of the exploitation of working school-age children in Indonesia and its influence factors. This study uses the March 2023 Socioeconomic Survey (SUSENAS) data by utilizing multilevel analysis specifically the two-level binary logistic regression method. The study results showed that 54.22 percent of school-age children are working and exploited in Indonesia. The individual and regional contextual factors that are significantly associated with the exploitation status of working school-age children are age, sex, education level, education of household head, sex of household head, employment status of household head, Smart Indonesia Programme (PIP) ownership status, family size, expected years of schooling (HLS), and poverty level. This study finds that increasing age, male sex, lack of access to the PIP, low household head education, female-headed households, unemployed household heads, and larger household sizes increased the likelihood of child exploitation. Moreover, children residing in districts with lower HLS scores had a higher chance of being exploited. These findings highlight the importance of considering both individual and regional contextual factors when addressing child exploitation. A two-level binary logistic regression model with random effects provides a better fit than the intercept-only model. Therefore, it is recommended to prioritize interventions for children without access to the PIP and those from household heads with low education levels. Furthermore, programs emphasizing the importance of education for children should be strengthened.

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1. INTRODUCTION

School-age children are a nation's future. They have the right to be protected. Indonesia's 1945 Constitution guarantees their rights, and Law No. 13 of 2003 prohibits child labor. However, a gap in this law allows child labor under certain conditions, contributing to a serious issue. Inconsistent regulations may lead to a high prevalence of child labor in Indonesia, with children leaving school prematurely to enter the workforce. Despite a decline in recent years, working children aged 10-17 increased to 7.94% in 2023, indicating a continued challenge [1], [2].

Working at school age increases vulnerability to physical and sexual abuse [3]. A school-aged child involved in exploitative work is a child under 18 who is engaged in work activities for profit and is subjected to abusive or discriminatory treatment by their family or community, disregarding their physical, mental, and social well-being due to lower position in socio and economic hierarchy [1], [4]. There are five forms of exploitation of child labor, including children who work at too young an age; working for more than 20 hours per week; working too long in a certain place without having time to play and recreation; working in situations that inhibit their self-confidence; and children who work as substitutes for adult worker [5]. Children's involvement in the workforce can lead to lower-quality human resources and harm their physical and mental health [6]. It also reduces their playtime, which can hinder creativity. Long working hours pose physical health risks due to their underdeveloped bodies. The most severe risks include accidents, exploitation, and abuse by adult workers [3]. Therefore, protecting children from workplace exploitation is crucial.

Long working hours are an indicator of child exploitation. A study in Indonesia found that almost 50 percent of working children worked 14 hours per week and 12.22 percent of children worked more than 40 hours per week in 2022 [7]. A qualitative study in Pattingaloang, Makassar City, found that children aged 6-18 were unreasonably forced into labor by their parents. The children were forced to sell food at the harbor and dress in skimpy clothes to attract customers [8]. The sheer scale of the problem is alarming. According to a 2018 study, the percentage of child labor reached 51 percent with more than 80 percent of those exploited with an average working hour of 40 hours per week in 2018 in Indonesia [9]. In line with this, a study found that more than 70 percent of child laborers aged 10-17 years in Java Island were neglected in terms of their educational rights as they dropped out of school due to having to work [10].

The labor market participation of children is influenced by child, parental, and regional characteristics. Previous studies have shown that there is a higher propensity for boys [3], [9], [11], older children [12], and children with lower education [12] to enter the labor market. In addition, children from more educated head households [13], male-headed households [11], those with employed heads of household [14], urban residents [10], and those having fewer children [15] are less likely to participate in the labor market. The government's intervention through Conditional Cash Transfer (CCT) has been shown to reduce the number of working children [16]. At the national level, it is necessary to examine the characteristics of available educational facilities [17]. Child labor is influenced by the level of education in a particular area [17]. The phenomenon of child labor is a result of poverty. Children are encouraged to participate in economic activities due to the low socioeconomic conditions of their families [18]. Furthermore, the phenomenon of working children varies by region, reflecting the social contexts in which they live. This regional variation requires a multilevel analysis considering individual and contextual factors [19], [20]. Data from the Ministry of Women Empowerment and Child Protection shows that from 2019 to 2021, the highest percentages of child labor were in the Eastern Indonesia Region (WIT), while Java, particularly DKI Jakarta, consistently had lower rates [2].

Research on the exploitation of working children in Indonesia has been conducted by several researchers [3], [9]–[11]. These previous studies analyzed the exploitation of child labor approached by working hours, education, and wages. The results showed that the education of the Head of Household (KRT) affects exploitation in terms of working hours and access to education [3]. Then another study examined the exploitation of child labor in terms of education in Java Island using multilevel binary logistic regression. The study found that at the regional level, district poverty had a significant effect [10]. To date, no research has specifically examined the exploitation of working school-aged children (10-17 years old) in Indonesia. Therefore, this research aims to examine the exploitation status of working school-age children in Indonesia and the factors that significantly affect it. It is expected that the study results can provide a base for policy recommendations that can reduce the exploitation of working school-age children in Indonesia.

2. RESEARCH METHODS

2.1 Data Source and Scope of the Study

By examining the literature on the exploitation status of working children through, this study proposes the hypothesis that age, sex of the child, education level of the child, the education level of the household head, the sex of the household head, the employment status of the household head, the PIP ownership status, family size, the regional classification of residence, the expected years of schooling (HLS), and the poverty level (percentage of poor people) affect the exploitation status of working school-age children in Indonesia. Then, the March 2023 National Socio-Economic Survey (SUSENAS) data is used to test these hypotheses. SUSENAS is one of the large-scale surveys conducted by BPS-Statistics Indonesia with the aim of capturing the socio-economic characteristics of the Indonesian people accurately and completely. Although this survey is not specifically designed to look at the phenomenon of employment, SUSENAS data is still relevant due to its wide coverage of socio-economic-demographic characteristics [11].

This study is a cross-sectional study covering 34 provinces and 514 districts in Indonesia in 2023. Data on regional contextual factors (HLS and poverty level) were obtained from BPS. The unit of analysis used in this study is working children aged 10-17 (a sample of 7,390 individuals). The lower limit of 10 years of age is used because employment characteristics are only asked of individuals aged 10 and above. The upper limit follows the definition of a child based on Law No. 23/2002. Married children were not included in the analysis. The response variable in this study is the exploitation status of working school-age children. Children aged 10-17 who work are categorized as being exploited when they work more than 4 hours a day, assuming five working days or cumulatively more than 20 hours per week. While children who work less than 20 hours per week are categorized as not being exploited. More details of study variables can be seen in Table 1.

Table 1. Summary of Study Variables

Variables	Notation	Category
Response Variable		
Exploitation status of working school-age children	Exploitation_Status	0 = Not exploited (ref) 1 = Exploited
Explanatory Variable		
Individual Factors		
Age of child	Age	-
Sex of child	Sex	0 = Female (ref) 1 = Male
Education level of child	ChildEdu	0 = High (ref) 1 = Low
Education level of household head	HeadEdu	0 = High (ref) 1 = Low
Sex of household head	HeadSex	0 = Male (ref) 1 = Female
Working status of household head	WorkingStatus	0 = Working (ref) 1 = Not working
Smart Indonesia Programme (PIP) ownership status	PIP	0 = Has access (ref) 1 = No access
Family Size	FamilySize	0 = Less than 4 (ref) 1 = More than 4
Residential area of the household	Residence	0 = Urban (ref) 1 = Rural
Regional Contextual Factors		
Expected Years of Schooling (HLS)	HLS	-
Poverty Level	Poverty	-

Note: ref indicates reference category; "-" indicates ratio-scale data

2.2 Statistical Analysis

The first research objective will be achieved by descriptive analysis. Then the second objective will be achieved by conducting inferential analysis. The inferential analysis is used, namely two-level binary logistic regression with a random intercept to know the difference in the effect of each district through the difference in the intercept. One method of analysis that can be used when the response variable is a binary category is binary logistic regression [21]. The estimation method used in estimating parameters is Maximum Likelihood Estimator (MLE) [22], [23]. Then the analysis that can be used to overcome multilevel structured data is multilevel analysis [24] as shown in **Equation (1)**.

$$\ln\left(\frac{\pi_{ij}}{1-\pi_{ij}}\right) = \gamma_{00} + \sum_{p=1}^{P} \gamma_{p0} x_{pij} + \sum_{q=1}^{Q} \gamma_{0q} x_{qj} + u_{0j} + e_{ij} \quad (1)$$

Where:

$\ln\left(\frac{\pi_{ij}}{1-\pi_{ij}}\right)$: logit linkage function;

i, j : individual order and districts order

γ_{00} : fixed intercept

γ_{p0} : fixed slope of the p-th explanatory variable at level one, p: $1, 2, \ldots, P$

x_{pij} : p-th explanatory variable of the i-th individual in the j-th district at level one

γ_{0q} : fixed slope of the p-th explanatory variable at level two, q: $1, 2, \ldots, Q$

x_{qj} : the q-th explanatory variable from the j-th district at level two

u_{0j} : random effect of the j-th district

e_{ij} : residual of the j-th individual in the j-th district at level one

A two-level binary logistic regression analysis was performed with the following steps:

a. The first stage is to conduct a random effect significance test with Likelihood Ratio Test [24]. The hypothesis used is as follows:

   $H_0: \sigma_{u0}^2 = 0$ (No random effect variations among districts)

   $H_1: \sigma_{u0}^2 > 0$ (Variation exist in random effects among districts)

   with the test statistics as expressed in **Equation (2)**.

$$LR = -2\ln\left(\frac{\text{likelihood model without random effect}}{\text{likelihood model with random effect}}\right) \sim \chi^2_{(1)} \quad (2)$$

   The model without random effects refers to the one-level binary logistic regression model. While the model with random effects refers to the two-level intercept-only binary logistic regression model. The decision is taken by looking at the likelihood ratio test (LR) value, if the test results in an LR value of more than $\chi^2_{(0.05;1)}$ or based on the Chi Square Table LR> 3.84 or p-value <0.05 then Reject H_0. Conclusion Reject H_0 with a significance level of 5 percent, it can be said that there is a significant random effect variation so the two-level binary logistic regression model is better used.

b. The second stage is the calculation of ICC and the formation of a two-level random intercept binary logistic regression model. The greater the ICC value, the greater the variation in response variables that can be explained by differences in characteristics among districts [24], [25], [26]. ICC calculation is done by the formula as expressed in **Equation (3)**.

$$ICC = \frac{\sigma_{uo}^2}{\sigma_{uo}^2 + \sigma_e^2} \quad (3)$$

With σ_{uo}^2 refers to the residual variance at level two and σ_e^2 is the residual variance at level one, which is the same as the variance in the logistic distribution, namely $\hat{\sigma}_e^2 = \frac{\pi^2}{3} = 3.29$ [27].

c. The third stage is the selection of the best model using the AIC criterion. The model with the smallest AIC is better [28]. AIC is calculated as shown in **Equation (4)**.

$$AIC = -2(\ln \text{likelihood}) + 2K, \text{ where K is the number of parameters} \quad (4)$$

d. The fourth stage is to conduct simultaneous and partial parameter testing [22]. The test is carried out with the G statistical to know whether all explanatory variables in the model jointly affect the exploitation status of working school-age children. The hypothesis used is:

$H_0: \gamma_{10} = \gamma_{20} = \cdots = \gamma_{P0} = \gamma_{01} = \gamma_{02} = \ldots = \gamma_{0Q} = 0$ (There is no effect of the explanatory variable on the response variable)

H_1: at least one $\gamma_{p0} \neq 0$ *or* $\gamma_{0q} \neq 0$ (There is at least one explanatory variable that affects the response variable)

With test statistics as shown in **Equation (5)**.

$$G = -2 \ln \left(\frac{\text{likelihood model without explanatory variable}}{\text{likelihood model with explanatory variable}} \right) \quad (5)$$

The model without explanatory variables refers to a two-level binary logistic regression intercept only. While the model with explanatory variables refers to two-level binary logistic regression with random effect. Reject decision H_0 if $G > \chi^2_{(0.05;11)}$ or G > 19.68. Conclusion Reject H_0 indicates that there is at least one explanatory variable that affects the response variable [22]. Then test the significance of the parameters partially with the Wald test. Partial testing is carried out to know the effect of each explanatory variable on the response variable [22]. The hypothesis used is:

Level 1:

$H_0: \gamma_{p0} = 0$ (There is no effect of the p-th explanatory variable on the response variable))

$H_1: \gamma_{p0} \neq 0$ (There is an effect of the p-th explanatory variable on the response variable))

Level 2:

$H_0: \gamma_{0q} = 0$ (There is no effect of the q-th explanatory variable on the response variable)

$H_1: \gamma_{0q} \neq 0$ (There is an effect of the q-th explanatory variable on the response variable)

With test statistics as shown in **Equation (6)**.

$$\text{Level 1 \& 2: } W_{p0} = \frac{\hat{\gamma}_{p0}}{SE(\hat{\gamma}_{p0})} \sim N(0,1) \text{ or } W_{0q} = \frac{\hat{\gamma}_{0q}}{SE(\hat{\gamma}_{0q})} \sim N(0,1) \quad (6)$$

Reject Decision H_0 if $|W_{p0}| > Z_{\frac{0.05}{2}}$ for level 1 and $|W_{0q}| > Z_{\frac{0.05}{2}}$ for level 2 or p-value < 0.05.

e. The fifth stage is calculating the odds ratio. The odds ratio can be used to see the tendency for a successful event to occur compared to failure [22]. We used the formula as shown in **Equation (7)** and **Equation (8)**.

$$\text{Level 1: } OR = \exp(\hat{\gamma}_{p0}); p = 1,2,..,9 \quad (7)$$

$$\text{Level 2: } OR = \exp(\hat{\gamma}_{0q}); q = 1,2 \quad (8)$$

3. RESULTS AND DISCUSSION

3.1. General Overview of Exploitation Status of Working School-Age Children Based on Individual and Regional Contextual Factors

Through the ratification of international conventions related to children's rights, the state has an obligation to guarantee children's civil, political, social, cultural, and economic rights. A negligent attitude

towards children's rights issues, such as child labor, is unacceptable. Working children are evidence that the household economy is weak. This is because children are directed to work as a result of the low-income levels of non-child laborers. Children are expected to be a substitute for adult workers [29]. The distribution of the number of exploited children across Indonesia varies by province. The different shades of color in Figure 1 show the number of exploited children by province. Darker colors represent a higher number of exploited school-aged children in that province. Based on the map, the provinces with the highest number of exploited children are West Java, Central Java, and East Java. This may be linked to factors, such as lower school participation rates among children, as evidenced by statistics such as a Net Participation Rate (APM) below the national average, and a significant number of school dropouts [30]. Meanwhile, the provinces with the lowest number of exploited children are DKI Jakarta and DI Yogyakarta. Schools play an important role in preventing child labor by teaching the value of education, and helping children become productive and capable citizens [31].

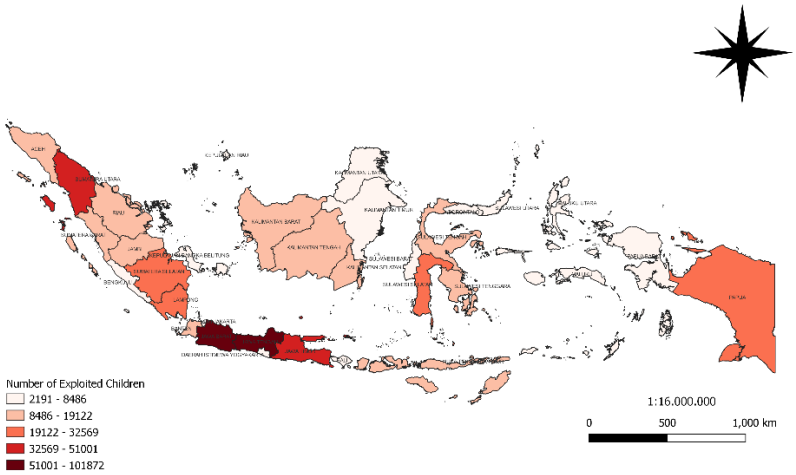


Figure 1. Distribution of The Number of Exploited Children by Province in Indonesia, 2023
***Source**: The March 2023 SUSENAS Data*

Table 2 shows that the majority of Indonesian school-age children (54.22%) are involved in child labor, with an average age of 15. It also indicates that working school-age children are more likely to be exploited if they are boys and have higher education. The high rate of working among school-age children with higher education is due to economic pressure. Children who have completed senior high school are forced to work due to circumstances that do not allow them to continue to college. The achievement of higher education in Indonesia is still low [30]. The School Participation Rate (APS) at the age of 19-23 years, which reflects the enrollment rate in higher education institutions, is only 28.96 percent, indicating a relatively low level of absorption. School-age children are more likely to be exploited in households with low-educated, female, or unemployed heads. Exploitation is also more common in households with fewer than four members, those not benefiting from the PIP program, and in urban areas. In urban areas, poor tend to employ their children to help the household economy [32].

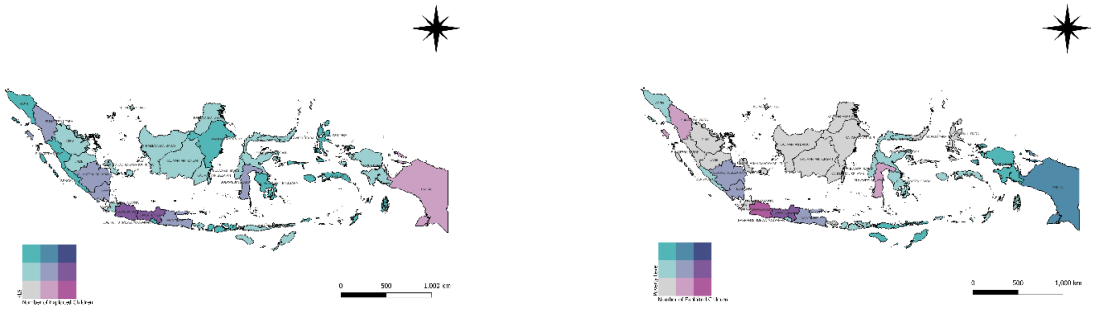
Table 2. Percentage of Working School-Age Children by Individual and Regional Contextual Factors

Variables	Category	Exploitation Status	
		Exploited	Not Exploited
Response Variable			
Exploitation Status of Working School-Age Children		54.22	45.78
Explanatory Variables			
Sex of the child	Female	55.4	44.6
	Male	64.2	35.8
Education level of child	High	83.3	16.7
	Low	60.6	39.4
Education level of household head	High	43.3	56.7
	Low	66.4	33.6
Sex of household head	Male	60.6	39.4
	Female	67.7	32.3

Variables	Category	Exploitation Status	
		Exploited	Not Exploited
Working status of household head	Working	60.8	39.2
	Not working	72.1	27.9
PIP ownership status	Have access	26.5	73.5
	No access	64.8	35.2
Family Size	Less than 4	62.3	37.7
	More than 4	60.6	39.4
Residential area of the household	Urban	64.6	35.4
	Rural	59.5	40.5

***Data source**: The March 2023 SUSENAS*

As can be seen from **Figure 2**, there are different patterns of provinces in Indonesia according to the number of exploited children and HLS. Papua Province has a low HLS value and a high number of exploited children. Based on the poverty level, it is found that Eastern Indonesia has a tendency to have a high percentage of poverty level and a high number of exploited children. Meanwhile, the Western region of Indonesia has a different pattern of the number of exploited children and the poverty level.



(a) **(b)**

Figure 2. Choropleth Map of The Distribution of The Number of Exploited Children Based on HLS and The Poverty Level by Province in Indonesia, 2023, (a) HLS (b) Poverty Level

3.2. Factors that Significantly Affect the Exploitation Status of Working School-Age Children in Indonesia

Modeling was conducted in several steps. First, significance testing of random effects was performed. The Likelihood Ratio (LR) statistic yielded a value of 1137 with a p-value less than 5 percent. This indicates that the random effect variation among districts in Indonesia, or in other words, the multilevel analysis model can be used. The second step involved calculating the Intraclass Correlation Coefficient (ICC), resulting in a value of 0.1853. In other words, approximately 18.53 percent of the variation in the status of school-age children working in Indonesia can be explained by differences among districts. An ICC value exceeding 10 percent is sufficient for using multilevel analysis **[33]**.

The third step is to build a two-level binary logistic regression model as follows:

$$ln\left(\frac{\hat{\pi}_{ij}}{1-\hat{\pi}_{ij}}\right) = -1.6983 + 0.2289\ Age_{ij} + 0.3131\ Sex_{ij} - 0.5754\ ChildEdu_{ij} + 0.5417\ HeadEdu_{ij} + 0.1716\ HeadSex_{ij} + 0.2975\ WorkingStatus_{ij} + 0.9154\ PIP_{ij} + 0.1020\ FamilySize_{ij} - 0.1213\ Residence_{ij} - 0.1598\ HLS_{j} - 0.0152\ Poverty_{j}$$

The best model selection criterion is based on the AIC (Akaike Information Criterion). Based on the analysis, the AIC of the two-level binary logistic regression model with random intercept is smaller than that of the intercept-only model. Subsequently, a simultaneous significance test of parameters using the G-test was conducted. The G-test result was 622.21, leading to the rejection of the null hypothesis. This means that at least one variable in the model influences the status of school-age children working in Indonesia in 2023. Further testing involved partial tests. Based on **Table 3**, it is evident that factors influencing the status of school-age children working in Indonesia are age of child, gender of child, education level of the child,

education level of the household head, gender of household head, working status of household head, PIP ownership status, number of households, HLS, and poverty percentage.

Table 3. Partial Parameter Significance Test Results on Each Explanatory Variable

Variables	Category	Coefficient	Standard Error	p-value	Odds Ratio	1/Odds Ratio
Level 1						
Intercept		-1.6983	0.6685	0.0110*		
Age of child		0.2289	0.0157	0.0000*	1.2573	
Sex of child	Male	0.3131	0.0590	0.0000*	1.3677	
Educational level of child	Low	-0.5754	0.1756	0.0010*	0.5630	1.7762
Educational level of household head	Low	0.5417	0.0691	0.0000*	1.7189	
Sex of household head	Female	0.1716	0.0818	0.0358*	1.1872	
Working status of household head	Not working	0.2975	0.1387	0.0319*	1.3465	
PIP ownership status	No access	0.9154	0.0956	0.0000*	2.4977	
Family Size	More than 4	0.1020	0.0585	0.081**	1.1073	
Residential area of the household	Rural	-0.1213	0.0790	0.1495	0.8858	1.1290
Level 2						
HLS		-0.1598	0.0399	0.0000*	0.8523	1.1733
Poverty Level		-0.0152	0.0072	0.0335*	0.9849	1.0153

***Data source**: The March 2023 SUSENAS*

Notes: *significant at $\alpha = 0.05$, **significant at $\alpha = 0.1$

Despite variations in living environments, a troubling similarity emerges: both rural and urban areas in Indonesia exhibit high rates of child exploitation among working school-aged children. Children living in rural areas experience exploitation mainly in the agricultural sector. This is due to the high demand for child labor while there are few resources available. The possibility of exploitation occurs as a result of the high demand for labor needs [34]. Meanwhile, for children living in urban areas, the high exploitation is because children are more likely to enter the informal sector which is easier to enter because of its flexibility. The informal work sector for children working in urban areas is dominated by the service and industrial sectors [35]. One example of work in the service sector that is often found among children in urban areas is busking. Children become buskers because this job is considered to be able to make money quickly and can be done individually or in groups [36].

Table 3 shows that for a unit change in age, the odds of being exploited in working school-age children were increased by 25.73%. This is because older children are believed to be more responsible so they tend to be included as workers while younger children are prioritized to pursue education [12]. Boys are more likely to be exploited than girls by 1.3624 times. The high number of exploitation cases that occur in males compared to females is due to the different categories of work they do. Women do more domestic work such as washing and cleaning the house [37]. These domestic chores are categorized as a hidden form of child labor. This is because this work is unpaid and rarely reported [12].

This study found that the exploitation of working school-age children was significantly associated with the education level of the child. Low-level education of children was 43.7% less likely to be exploited as compared to children with high levels of education. This contradicts several studies that show that child labor decreases as the level of education increases. This is because there is a tendency for children to contribute to the family by working when the economic level is low [38]. Additionally, children with higher education are more likely to enter the formal sector compared to the informal sector, which is less accessible to children with low education [39]. Meanwhile, for children with low education, the low level of exploitation is because children are still required to go to school through compulsory education.

Children living with low-educated household heads were 71.89% more likely to be exploited. The high labor market participation rate is due to the decision of the child to work being held by the household head. Parents have a tendency to send their children to school to achieve an educational status equal to or higher than their own [17]. Even in urban areas, highly educated mothers can prevent their children from entering the labor market due to prioritizing education [13]. Children living with female household heads were 18.72% more likely to be exploited. In addition, female heads of households, whether due to divorce or the death of their husbands, are usually more vulnerable to economic shocks than those with males. The absence of a man

makes it difficult to provide a decent life for the children. Female household heads will be forced to employ children, especially when poverty is unavoidable [11].

The analysis also shows that children living in households where the head of the household is not working were 34.65% more likely to be exploited than those where the head of the household is working. Children from low-income households may be more likely to work to contribute to the family's income, particularly when the head of household is not working [29]. An increase in poverty will increase child labor [14]. Furthermore, the odds of being exploited in living with more than 4 siblings were 10.73% higher than less than 4 siblings [40]. This is because families tend to distribute resources evenly across siblings. As the family burden increases, the eldest child is more likely to work. Working children will eventually be exploited when parents do not provide sufficient supervision [17]. The tendency of children who do not have access to PIP to be exploited is 2.5242 compared to children who have access to PIP. In families living below the poverty line, the government assistance programs implemented through PIP can reduce children's participation rate in the labor market. The reasons why this program can prevent children from being exploited include its ability to improve household welfare, ensure children remain in school, and protect households from economic shocks [41].

The study revealed that for the unit change in expected years of school, the odds of being exploited decreased by 14.77%. HLS indicates the quality of development in the education system at various levels as indicated by the number of years of education that children in the region are expected to achieve. The negative value indicates that the propensity of working children to be exploited in Indonesia decreases as the HLS in the region increases. When education becomes better, parents will see education as a requirement to become a quality human being [17]. Consequently, with a stronger emphasis on education, parents are less likely to allow their children to enter the workforce [9]. According to Table 3, there is no difference in the tendency of working children to be exploited in areas with low and high poverty rates, likely due to social assistance provided by the government to low-income families, such as PIP. By reducing education costs for low-income families, PIP helps bridge the financial gap that might otherwise push children toward work, especially at certain levels of education [42]**.** To assess the goodness of fit of the model, the likelihood ratio test is used, as the Hosmer-Lemeshow test failed when applied to large samples [43]. Based on the results, the test statistic value is 10 with a p-value of less than 5 percent, indicating that the addition of independent variables to the model has a significant simultaneous effect on the exploitation status.

4. CONCLUSIONS

The percentage of exploitation of working school-age children in Indonesia in 2023 reached 54.22 percent. Exploitation is more prevalent among children who are male, highly educated, 15 years old on average, do not have access to PIP, have low household head education, are female head of household, are non-working head of household, have less than four household members, and live in urban areas. The individual factors that significantly influence the exploitation status of working school age children in Indonesia include age of the child, sex of the child, education level of the child, education level of household head, working status of the household head, PIP ownership status, and family size. While the influential regional contextual factors are HLS and poverty level. Furthermore, the likelihood of working school-age children being exploited is greater among older children, males, those with higher education, and those without access to PIP. Household characteristics that increase the propensity of working children to be exploited are household heads with low education, female, not working, having more than 4 household members, and living in urban areas. Finally, the propensity of working children to be exploited increases when districts have low HLS. Meanwhile, districts with high and low poverty levels have no significant difference in the propensity of working school-age children to be exploited. A two-level binary logistic regression model with random effects provides a better fit than the intercept-only model. Therefore, policy recommendations that can be given include increasing the number of beneficiaries of the PIP program and those from households where the head has a low level of education. In addition, it is necessary to socialize the importance of the role of education for children.

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