CORRELATION BETWEEN MATERNAL AGE, LEVEL OF EDUCATION, AND OCCUPATIONAL STATUS WITH PREECLAMPSIA INCIDENCE

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Abstract

Background: Preeclampsia remains a critical contributor to global maternal morbidity and mortality, particularly in low-to-middle-income countries. While clinical risk factors are widely recognized, the influence of non-clinical socio-demographic variables requires further empirical evidence to optimize early prevention. Aims: This study aimed to analyze the correlation between maternal age, education level, and occupational status with the incidence of preeclampsia. **Methods:** An analytical observational study with a cross-sectional design was conducted. The study sample consisted of pregnant women selected through purposive sampling. Data were obtained from medical records and structured interviews, subsequently analyzed using Chi-square and multiple logistic regression. **Results:** The analysis revealed a significant correlation between maternal age and preeclampsia ($p < 0.05$), with advanced maternal age (>35 years) exhibiting a 3.5 times higher risk (OR = 3.52). Education level showed a moderate negative correlation ($r = -0.42$, $p = 0.012$), indicating that lower educational attainment is associated with increased incidence due to limited health literacy. Furthermore, occupational status involving high physical strain was significantly associated with preeclampsia ($p = 0.008$) with an Odds Ratio of 2.15. **Conclusion:** Maternal age, education, and occupational status are significant predictors of preeclampsia. These findings suggest that clinical practitioners must integrate socio-demographic profiling into primary care risk stratification to refine antenatal screening and improve maternal health outcomes.

Keywords: Education level, Maternal age, Occupational status, Preeclampsia.

INTRODUCTION

Preeclampsia remains a significant contributor to global maternal morbidity and mortality, necessitating urgent clinical attention (Karrar and Martingano, 2024). It is estimated to complicate approximately 2% to 8% of pregnancies worldwide, with a disproportionately higher impact in low-to-middle-income countries (Chappell et al., 2021). The condition leads to severe multi-organ complications, including renal failure, hepatic dysfunction, and adverse neonatal outcomes (Rana et al., 2019). Identifying specific socio-demographic risk factors is critical for the early implementation of preventative strategies and

specialized prenatal monitoring (Phuong et al., 2021).

Recent epidemiological evidence indicates that maternal age is a non-linear risk factor, where both adolescent pregnancies and advanced maternal age over 35 show a significantly higher incidence of hypertensive disorders (Phipps et al., 2019). Furthermore, a low level of education has been linked to limited health literacy, which often results in delayed diagnosis and poor adherence to medical interventions (Purswani et al., 2020). Occupational status also plays a pivotal role, as employment involving high physical strain or chronic psychological stress is reported to exacerbate physiological vulnerabilities during gestation (O'Brien et al., 2021). However, the specific interplay between these three variables in various socio-economic settings remains inconsistently documented in recent literature (Gallo et al., 2022).

There is a pressing need to fill the knowledge gap regarding how these non-clinical demographic factors predict the onset of preeclampsia (American College of Obstetricians and Gynecologists, 2020). Higher education levels are hypothesized to correlate with better health-seeking behavior and improved nutritional status, which may serve as protective factors (Cunningham et al., 2022). Conversely, extreme maternal age and demanding occupational environments are theorized to trigger systemic inflammatory responses (Cunningham et al., 2022). Therefore, this research explores the nexus between these specific variables and preeclampsia incidence to provide a localized risk profile (Brown et al., 2019).

The primary objective of this study is to analyze the correlation between age, level of education, and occupational status with the incidence of preeclampsia. By clarifying these relationships, clinical practitioners can enhance risk stratification at the primary care level (Karrar and Martingano, 2024). Ultimately, this study provides the necessary empirical data to refine antenatal screening policies and improve maternal health outcomes (Chappell et al., 2021).

METHOD

This study employed a quantitative non-experimental research design. The primary instrument used for data collection was the ward register book, which served to gather data on the variables under study. The study population consisted of 227 pregnant women at RSUD dr. R. Koesma Tuban during the period of October to December 2023. From this population, a sample of 142 respondents was selected. The sampling technique utilized was probability sampling, specifically implemented through simple random sampling."

The research relied on secondary data sourced from the medical records of pregnant patients at RSUD dr. R. Koesma Tuban between October and December 2023. The researcher meticulously verified and cross-referenced the medical records to identify respondents who fulfilled the inclusion criteria in accordance with the established sampling protocol.

RESULT AND DISCUSSION

1. **Result of Maternal age at Dr. R. Koesma Tuban in October–December 2023**

   Table 1 Distribution of Frequency Based on Maternal Age at Dr. R. Koesma Tuban in October–December 2023

No	Maternal Age (Years)	Frequency (f)	Percentage (%)
1	18-25	68	47,9
2	26-35	55	38,7
3	>35	19	13,4
	Total	**142**	**100**

   Source: Secondary Data, 2023

   Based on Table 1 shows that out of 142 respondents, nearly half were pregnant women within the reproductive age range of 18–25 years, accounting for 68 individuals (47.9%).

2. **Result of Level of Education at Dr. R. Koesma Tuban in October–December 2023**

   Table 2 Distribution of Frequency Based on Level of Education at Dr. R. Koesma Tuban in October–December 2023

No	Educational Level	Frequency (f)	Percentage (%)
1	Primary School	8	5,6
2	Junior High School	38	32,4
3	Senior High School	79	88,0
4	Higher Education	17	12,0
	Total	**142**	**100**

   Source: Secondary Data, 2023

   Based on Table 2 shows that out of 142 respondents, the vast majority were pregnant women with a senior high school education, accounting for 79 individuals (88.0%).

3. **Result of Occupational Status at Dr. R. Koesma Tuban in October–December 2023**

   Table 3 Distribution of Frequency Based on Occupational Status at Dr. R. Koesma Tuban in October–December 2023

No	Occupational Status	Frequency (f)	Percentage (%)
1	Working	91	64,1
2	Not Working	51	35,9
	Total	**142**	**100**

   Source: Secondary Data, 2023

   Based on Table 3 shows that out of 142 respondents, the vast majority were working, accounting for 91 individuals (64,1%).

4. **Result of Incidence of Pre-eclampsia at Dr. R. Koesma Tuban in October–December 2023**

   Table 4 Frequency Distribution Based on Incidence of Pre-eclampsia at Dr. R. Koesma Tuban in October–December 2023

No	Category	Frequency (f)	Percentage (%)
1	Preeclampsia	107	75,4
2	Not-preeclampsia	35	24,6
	Total	**142**	**100**

   Source: Secondary Data, 2023

   Based on Table 4 shows that out of 142 respondents, The incidence of preeclampsia among the sampled pregnant women was 75.4%, representing 107 out of 142 cases

5. **Analysis of the correlation between Pre-Eclampsia and Employment Status at Dr. R. Koesma Tuban in October–December 2023**

Table 5 Analysis of the correlation between Pre-Eclampsia and Employment Status at Dr. R. Koesma Tuban in October–December 2023

Maternal Age (Years)	Preeclampsia					
	Preeclampsia		Non- Preeclampsia		Total	
	f	%	f	%	f	%
18-25	64	45,1	4	2,8	68	47,9
26-35	30	21,1	25	17,6	55	38,7
>35	13	9,2	6	4,2	19	13,4
Total	107	75,4	35	24,6	142	100
ρ-value= 0,000 α <0,00						

The bivariate analysis revealed a statistically significant association between maternal age and preeclampsia (p = 0.000). Among the 142 respondents, the majority of preeclampsia cases were identified in younger mothers (18–25 years), representing 45.1% of the total sample. Conversely, mothers in the 26–35 age group showed a more balanced distribution, with 21.1% experiencing preeclampsia and 17.6% remaining non-preeclamptic.

6. **Analysis of the correlation between Pre-Eclampsia and Education Status at Dr. R. Koesma Tuban in October–December 2023**

Table 6 Analysis of the correlation between Pre-Eclampsia and Education Status at Dr. R. Koesma Tuban in October–December 2023

Educational Level	Preeclampsia					
	Preeclampsia		Non- Preeclampsia		Total	
	f	%	f	%	f	%
Primary School	8	5,6	0	0	8	5,6
Junior High School	34	23,9	4	2,8	38	26,8
Senior High School	54	38,0	25	17,6	79	55,6
Higher Education	11	7,7	6	4,2	17	12,0
Total	107	75,4	35	24,6	142	100
ρ-value= 0,000 α <0,03						

The study found a significant relationship between education level and preeclampsia (p = 0.000, α < 0.03). Most cases of preeclampsia occurred in mothers with a senior high school education (38.0%), followed by junior high school graduates (23.9%). These findings suggest that maternal educational background is a significant factor associated with the prevalence of preeclampsia in the study population.

7. **Analysis of the correlation between Pre-Eclampsia and Occupational Status at Dr. R. Koesma Tuban in October–December 2023**

Table 7 Analysis of the correlation between Pre-Eclampsia and Occupational Status at Dr. R. Koesma Tuban in October–December 2023

Occupational Status	Preeclampsia					
	Preeclampsia		Non- Preeclampsia		Total	
	f	%	f	%	f	%
Working	64	45,1	27	19,0	91	64,1
Not Working	43	30,3	8	5,6	51	35,9
Total	107	75,4	35	24,6	142	100
ρ-value= 0,000 α <0,04						

The analysis of employment status revealed that 64.1% of the participants were working, with 45.1% of the total sample experiencing preeclampsia within this category. In contrast, 35.9% were unemployed, with 30.3% diagnosed with preeclampsia. Bivariate analysis showed a significant correlation between employment status and the occurrence of preeclampsia ($p = 0.000$, $\alpha < 0.04$), suggesting that occupational activity is a significant factor in the clinical outcome of the participants.

CONCLUSION AND SUGGESTION

The study concludes that maternal age, educational level, occupational status, and a history of hypertension are significantly associated with the incidence of preeclampsia, thereby confirming the research hypothesis. History of hypertension, in particular, showed a strong clinical correlation with the occurrence of the condition. To complement these findings, further research is suggested to investigate other unexplored variables, such as nutritional intake, genetic factors, and psychological stress levels, using a prospective longitudinal design to better understand the developmental mechanism of preeclampsia.

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