



## Factors related with preeclampsia in Makassar, South Sulawesi: A consideration for prevention<sup>☆</sup>



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### KEYWORDS

Pregnancy;  
Preeclampsia;  
Dental caries;  
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### Abstract

**Objective:** This study aims to assess factors related to preeclampsia in Makassar, South Sulawesi, Indonesia.

**Method:** This research has been approved by the recommendation of the ethics from the Hasanuddin university ethics commission with letter number 459/UN4.6.4.5.31/PP36-/2019. It was a cross-sectional study, the sample was 25 pregnant mothers who were diagnosed with preeclampsia and 25 normal pregnant mothers who came to the Daya District Hospital, Siti Fatimah Regional Mother and Child Hospital, Mother and Child Hospital (RSIA) Sitti Khadijah 1 at Makassar City from July to August 2019. Variables studied were age, occupation, parity, Body Mass Index (BMI), exposure to cigarette smoke, type of delivery, and dental caries.

**Results:** Mothers who had exposure to cigarette smoke had a frequency of preeclampsia of 68% (17 people), the relationship of cigarette smoke exposure with preeclampsia was statistically significant ( $p=0.046$ ,  $p<0.05$ ). Mothers who had dental caries were also significantly associated with the incidence of preeclampsia ( $p=0.002$ ,  $p=0.05$ ). Mothers who have dental caries experience preeclampsia with a frequency of 76% (19 people).

**Conclusion:** The results of the analysis of this study indicate that dental caries and cigarette smoke exposure are significantly related to the incidence of preeclampsia, however further research is needed to be done in order to obtain stronger evidence.

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## Introduction

Preeclampsia is hypertension at more than 20 weeks' gestation or immediately after delivery. Preeclampsia is characterized by blood pressure systolic blood pressure  $\geq 140$  mmHg and diastolic blood pressure  $\geq 90$  mmHg done twice with a minimum distance of 4 h. There is urine protein  $> 300$  mg/24 h or urine protein 1+.<sup>1-3</sup> The causes of preeclampsia and eclampsia are multifactorial. The etiological factors of preeclampsia and eclampsia are classified into 4 groups: genetic, immunological, nutritional and infectious.<sup>4,5</sup>

One of the goals of the Sustainable Development Goals (SDGs) is to reduce maternal mortality by 45% or less than 70 per 100,000 births, with the hope that no country has a maternal mortality rate more than twice the global average. To achieve this, an increase and close access to maternal health services can be done so as to be able to do promotive and preventive efforts and early detection of problems to be able to reach the SDGs target in 2030. Detecting risk factors for preeclampsia is one of the efforts that can contribute to this target.<sup>6-8</sup> This study identifies factors related to preeclampsia in Makassar, South Sulawesi. It is hoped that even though it is very simple, this research can contribute to deeper interventions and research.

## Methods

This research has been approved by the recommendation of the ethics from the Hasanuddin university ethics commission with letter number 459/UN4.6.4.5.31/PP36-/2019. It was a cross-sectional study, the sample was 25 pregnant mothers who were diagnosed with preeclampsia and 25 normal pregnant mothers who came to the Daya District Hospital, Siti Fatimah Regional Mother and Child Hospital, Mother and Child Hospital (RSIA) Sitti Khadijah 1 at Makassar City from July to August 2019.

The research instruments were used were checklist sheet that contains age, occupation, parity, Body Mass Index (BMI), exposure to cigarette smoke, type of delivery, and dental caries. Secondary data were obtained from medical records of pregnant women with the incidence of preeclampsia at the Siti Fatimah Makassar Regional Maternal and Child Hospital, Siti Khadijah I Makassar Hospital and in the Maternity Room of the Daya Hospital in Makassar City of South Sulawesi Province. Primary data were obtained directly from respondents collected through filling checklist sheets. All respondents were asked for their consent to be included in the study with written informed consent. Respondents are given a full explanation of the objectives, benefits and research procedures.

## Results

To describe the characteristics and identity of the sample used, univariate and bivariate analyses were carried out on the variables of age, occupation, parity, Body Mass Index (BMI), exposure to cigarette smoke, types of labor, and dental caries. The analysis was carried out in two groups namely in the group of preeclampsia and maternal groups in normal delivery.

**Table 1** Risk of preeclampsia.

Variables	Preeclampsia <i>n</i> = 25	Normal <i>n</i> = 25	<i>p</i> -Value
<i>Age n (%)</i>			
High risk	15 (60)	21 (84)	0.061 <sup>a</sup>
Low risk	10 (40)	4 (16)	
<i>Working n (%)</i>			
Yes	4 (16)	7 (28)	0.496 <sup>b</sup>
No	21 (84)	18 (72)	
<i>Parity n (%)</i>			
Primigravida	15 (60)	8 (32)	0.367 <sup>c</sup>
Multigravida	3 (12)	14 (56)	
Grandemultipara	7 (28)	3 (12)	
<i>BMI n (%)</i>			
Underweight	1 (4)	3 (12)	0.540 <sup>c</sup>
Normal	21 (84)	19 (76)	
Overweight	3 (12)	3 (12)	
<i>Exposure to cigarette smoke n (%)</i>			
Yes	17 (68)	9 (36)	0.046 <sup>b</sup>
No	8 (32)	16 (64)	
<i>Type of delivery n (%)</i>			
Normal	13 (52)	15 (60)	0.325 <sup>d</sup>
SC	12 (48)	10 (40)	
<i>Caries n (%)</i>			
Yes	19 (76)	7 (28)	0.002 <sup>b</sup>
No	6 (24)	18 (72)	

<sup>a</sup> Mann-Whitney.

<sup>b</sup> Fisher's Exact

<sup>c</sup> Kruskal-Wallis.

Chi-squared.

The results in [Table 1](#) show that exposure to cigarette smoke and dental caries are associated with the incidence of preeclampsia in the respondents of this study. Mothers who had exposure to cigarette smoke had a frequency of preeclampsia of 68% (17 people), while those not exposed to cigarette smoke had an incidence of preeclampsia of 32% (8 people). The relationship of cigarette smoke exposure with preeclampsia was statistically significant ( $p=0.046$ ,  $p < 0.05$ ) ([Table 1](#)).

Mothers who had dental caries were also significantly associated with the incidence of preeclampsia ( $p=0.002$ ,  $p=0.05$ ). Mothers who have dental caries experience preeclampsia with a frequency of 76% (19 people) while mothers who do not have dental caries, the frequency of experiencing preeclampsia by 24% (6 people) ([Table 1](#)).

## Discussion

This study shows that dental caries and exposure to second-hand smoke seem to be related to preeclampsia. Several studies have examined the potential relationship between dental caries and preeclampsia despite the results. Still varies greatly, there are those who find that the previous dental treatment is related to, and there are those who show that maternal outcomes are related to dental caries.<sup>9,10</sup> The mechanism regarding this relationship seems unclear.

Similarly with dental caries smoking or exposure to cigarette smoke also can not be explained with certainty related to preeclampsia. There are even findings that suggest that smoking during pregnancy can actually provide protection against preeclampsia.<sup>11,12</sup>

The same research on dental caries and cigarette smoke exposure need to be repeated in various regions in Makassar to get good evidence. Future research should use a cohort method to determine the risk of these two variables.

## Conclusion

The results of the analysis of this study indicate that dental caries and cigarette smoke exposure are significantly related to the incidence of preeclampsia. However further research is needed to be done in order to obtain stronger evidence.

## Conflict of interest

The authors declare no conflict of interest.

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