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## Relationship between early preterm birth (22–33 weeks) and late preterm birth (34–36 weeks) with the characteristics of sociodemography in primiparous and multiparous

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### KEYWORDS

Early preterm birth;  
Late preterm birth;  
Sociodemographic  
characteristic;  
Primiparous and  
multiparous

### Abstract

**Objective:** To determine the relationship between early preterm birth (22–33 weeks) and late preterm birth (34–36 weeks) labor with sociodemographic characteristics in primiparous and multiparous mothers.

**Methods:** Design of observational analysis on 134 mothers after preterm postpartum in East Java using frequency analysis. The case samples were: primiparous and multiparous mothers after preterm postpartum recorded in medical records at 8 hospitals, namely Soewandhi hospital, Universitas Airlangga, Islam Jemur Sari hospital, Sidoarjo hospital, Madiun Sogaten hospital, Jombang hospital, Ibnu Sina Gresik hospital, and Ngawi hospital. The instrument used in this study was a data collection sheet in the form of a questionnaire.

**Results:** Among 29 sociodemographic characteristic variables there were only 3 variables related to early preterm birth and late preterm birth with  $p < 0.05$ , i.e. education was (OR 2.54, CI95%: 1.21–5.34,  $p < 0.020$ ) from 134 mothers including 66 mothers (49.3%) who have higher education and 68 mothers (50.7%) have low education, smoked mother was (OR 0.63, CI95%: 0.55–0.72,  $p < 0.016$ ) including 123 mothers (91.8%) who did not smoke and 11 mothers (8.2%) had smoking habits, and ANC visits during pregnancy (OR 0.37, CI95%: 0.16–0.89,  $p < 0.043$ ) of which there were 107 mothers (79.9%) who visited ANC > 4 times and 27 mothers (20.1%) who visited ANC < 4 times.

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*Conclusions:* There was a relationship between early preterm birth and late preterm birth with maternal sociodemographic characteristics, i.e. education, smoking, and the number of ANC visits during pregnancy. This can be used as the basis for subsequent studies in the prevention of sociodemographic disorders in primiparous and multiparous mothers.

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## Introduction

Preterm birth classification according to gestational age was between 20 and 37 weeks, very early preterm birth between 20 and 23 weeks, early preterm birth between 24 and 33 weeks, and late preterm birth between 34 and 36 weeks.<sup>1,2</sup> Preterm postpartum is still a problem in the world including Indonesia, related to the prevalence, perinatal morbidity and mortality are the main causes of infant mortality and the second cause of death after pneumonia in children under five years old.<sup>3,4</sup> The incidence of preterm postpartum is different in each country; in Europe the figure was 5–11%, while in the USA was 11.5%. In developing countries the number of occurrences is still much higher, for example in Sudan around 31%, India 30%, and South Africa 15%,<sup>5</sup> while Indonesia ranks 5th largest from 184 countries in 2010.<sup>6</sup>

Preterm postpartum is influenced by many risk factors. A study collected several sociodemographic risk factors from several theories, including absence of partner, low socioeconomic, anxiety and stress, depression (life problems such as divorce, separation, death), ever surgery during pregnancy, workplace problems, multiple pregnancy, polyhydramnios, uterine abnormalities, Ketosis-Prone Diabetes, history of second-trimester abortion, history of cervical surgery, short length of the cervix, STI, infectious disease, bacteriuria, periodontal disease, placenta previa, placental abruption, vaginal bleeding, previous history of preterm postpartum, drug abuse, smoking, maternal age, African-American race, low BMI nutrition, inadequate prenatal care, anemia, excessive uterine contractions, low education level, fetal anomalies, impaired fetal growth, environmental factors (e.g. heat and air pollution), fetal death, and positive fibronectin.<sup>7</sup> This study was aimed to determine the relationship between early preterm birth (22–33 weeks) and late preterm birth (34–36 weeks) labor with sociodemographic characteristics in primiparous and multiparous mothers.

## Method

An observational analysis with a cross-sectional study was used in this study along with primary and secondary data. Starting with identifying mothers after preterm postpartum with a retrospective approach. The case samples were: primiparous and multiparous mothers after preterm postpartum recorded in medical records at 8 hospitals, namely Soewandhi hospital, Universitas Airlangga, Islam Jemur Sari hospital, Sidoarjo hospital, Madiun Sogaten hospital, Jombang hospital, Ibnu Sina Gresik hospital, and Ngawi hospital. Inclusion criteria were: spontaneously preterm postpartum

mothers 6 hours-3 days, spontaneous single pregnancy without complications, can communicate well and have a Child and Mother Health record book (CMH). Exclusion criteria were: All deliveries with complications or abnormalities such as hypertension in pregnancy, pregnancy with Diabetes Mellitus, multiple pregnancies, hydramnios, antepartum bleeding, uterine anatomic abnormalities, pregnancy with tumors, and congenital abnormalities of the fetus. The instrument used in this study was a data collection sheet in the form of a questionnaire. The inferential analysis used was frequency analysis and crosstabs of  $2 \times 2$  table categorical data.

## Result

### Analysis of maternal sociodemographic characteristics

The number of respondents was 134 spontaneous preterm postpartum in 8 hospitals namely Jemur Sari Hospital by 25 respondents (18.7%), Soewandhi Hospital by 14 respondents (10.4%), Airlangga Hospital by 25 respondents (18.7%), Gresik, Jombang and Ngawi Hospital by 12 respondents respectively (9.0%), Sidoarjo Hospital by 24 respondents (17.9%), and Madiun Hospital by 10 respondents (7.5%) with sociodemographic characteristics of labor can be seen in [Table 1](#).

### Analysis of differences in sociodemographic characteristics between early preterm and late preterm

The results of the analysis of sociodemographic characteristics between early preterm labor (22–33 weeks) and late preterm (34–36 weeks) in [Table 2](#), it appears from 30 variables there are only 3 significant variables with  $p$  values  $< 0.05$ , namely education (OR 2.54, CI 95%; 1.21–5.34,  $p < 0.020$ ) of 134 mothers there were 66 mothers (49.3%) who had higher education, namely high school, diploma, and undergraduate degrees, while 68 mothers (50.7%) had low education, namely junior high school, elementary school and some not going to school. Smoking was (OR 0.63, CI 95%; 0.55–0.72,  $p < 0.016$ ) there were 123 mothers (91.8%) who did not smoke and 11 mothers (8.2%) had smoking habits, and the number of ANC visits during pregnancy was (OR 0.37, CI 95%; 0.16–0.89,  $p < 0.043$ ) there were 107 mothers (79.9%) who visited ANC  $> 4$  times and 27 mothers (20.1%) who visited ANC  $< 4$  times ([Table 2](#)).

**Table 1** Percentage of sociodemographic characteristics of early preterm and late preterm birth.

| Sociodemographic characteristics                    | Total preterm<br>(n = 134)<br>n (%) | Early preterm 22–33<br>week (n = 45)<br>n (%) | Late preterm 34–36<br>week (n = 89)<br>n (%) |
|---|-------------------------------------|---|--|
| <i>Mother's age</i>                                 |                                     |   |  |
| 20–35 year  | 90 (67.2)                           | 29 (21.6)                                     | 61 (45.5)                                    |
| <20/>35 year  | 44 (32.8)                           | 16 (11.9)                                     | 28 (20.9)                                    |
| <i>Education</i>                                    |                                     |   |  |
| >Senior high school                                 | 66 (49.3)                           | 29 (21.6)                                     | 37 (27.6)                                    |
| <Senior high school                                 | 68 (50.7)                           | 16 (11.9)                                     | 52 (38.8)                                    |
| <i>Occupation</i>                                   |                                     |   |  |
| Housewives  | 83 (61.9)                           | 28 (20.9)                                     | 55 (41.0)                                    |
| Civil servants/entrepreneur/farmer                  | 51 (38.1)                           | 17 (12.7)                                     | 34 (25.4)                                    |
| <i>Number of children</i>                           |                                     |   |  |
| <2 people   | 76 (56.7)                           | 29 (21.6)                                     | 47 (35.1)                                    |
| >2 people   | 58 (43.3)                           | 16 (11.9)                                     | 42 (31.3)                                    |
| <i>Paritas</i>                                      |                                     |   |  |
| Multiparous   | 77 (57.5)                           | 24 (17.9)                                     | 53 (39.6)                                    |
| Primiparous   | 57 (42.5)                           | 21 (15.7)                                     | 36 (26.9)                                    |
| <i>Pregnancy distance</i>                           |                                     |   |  |
| < 2 years   | 77 (57.5)                           | 26 (19.4)                                     | 51 (38.1)                                    |
| > 2 years   | 57 (42.5)                           | 19 (14.2)                                     | 38 (28.4)                                    |
| <i>Weightlifting work</i>                           |                                     |   |  |
| <5 h/day  | 86 (64.2)                           | 25 (18.7)                                     | 61 (45.5)                                    |
| >5 h/day  | 48 (35.8)                           | 20 (14.9)                                     | 28 (20.9)                                    |
| <i>Smoking</i>                                      |                                     |   |  |
| No  | 123 (91.8)                          | 45 (33.6)                                     | 78 (58.2)                                    |
| Yes   | 11 (8.2)                            | 0   | 11 (8.2)                                     |
| Not drinking alcohol                                | 134 (100.0)                         | 45 (100.0)                                    | 89 (100.0)                                   |
| <i>Edinburgh Postnatal Depression Scales (EPDS)</i> |                                     |   |  |
| Mild (score 0–9)                                    | 104 (77.6)                          | 31 (23.1)                                     | 73 (54.5)                                    |
| Medium (score 10–12)                                | 11 (8.2)                            | 4 (3.0)                                       | 7 (5.2)                                      |
| Heavy: score > 13                                   | 19 (14.2)                           | 10 (7.5)                                      | 9 (6.7)                                      |
| <i>The fetus is less mobile</i>                     |                                     |   |  |
| Mobile > 4×/half an hour                            | 95 (70.9)                           | 30 (22.4)                                     | 65 (48.5)                                    |
| Less mobile < 4×/half an hour                       | 39 (29.1)                           | 15 (11.2)                                     | 24 (17.9)                                    |
| <i>Sleeping time</i>                                |                                     |   |  |
| 7–8 h/day   | 56 (41.8)                           | 19 (14.2)                                     | 37 (27.6)                                    |
| <7/>9 h/day   | 78 (58.2)                           | 26 (19.4)                                     | 52 (38.8)                                    |
| <i>Number of visits during pregnancy</i>            |                                     |   |  |
| >4 times  | 107 (79.9)                          | 31 (23.1)                                     | 76 (56.7)                                    |
| <4 times  | 27 (20.1)                           | 14 (10.4)                                     | 13 (9.7)                                     |
| <i>History of preterm birth</i>                     |                                     |   |  |
| Never   | 114 (85.1)                          | 40 (29.9)                                     | 74 (55.2)                                    |
| 1–2/>2 times  | 20 (14.9)                           | 5 (3.7)                                       | 15 (11.2)                                    |
| <i>History of mother's sickness</i>                 |                                     |   |  |
| None  | 263 (93.6)                          | 39 (29.1)                                     | 84 (62.7)                                    |
| Yes   | 18 (6.4)                            | 6 (4.5)                                       | 5 (3.7)                                      |
| <i>History of complication</i>                      |                                     |   |  |
| None  | 134 (100.0)                         | 45 (33.6)                                     | 89 (66.4)                                    |
| Yes   | 0                                   | 0   | 0  |
| <i>Second-trimester abortion history</i>            |                                     |   |  |
| None  | 123 (98.5)                          | 41 (30.6)                                     | 82 (61.2)                                    |

Table 1 (Continued)

| Sociodemographic characteristics           | Total preterm<br>(n = 134)<br>n (%) | Early preterm 22–33<br>week (n = 45)<br>n (%) | Late preterm 34–36<br>week (n = 89)<br>n (%) |
|--|-------------------------------------|---|--|
| 1–2/>2 times                               | 2 (1.5)                             | 4 (3.0)                                       | 7 (5.2)                                      |
| <i>History of cervical surgery</i>         |                                     |   |  |
| None                                       | 278 (98.9)                          | 44 (32.8)                                     | 88 (65.7)                                    |
| Yes  | 3 (1.1)                             | 1 (0.7)                                       | 1 (0.7)                                      |
| <i>Socioeconomic</i>                       |                                     |   |  |
| >Rp.3.045.000                              | 72 (53.7)                           | 23 (17.2)                                     | 49 (36.6)                                    |
| <Rp.3.045.000                              | 62 (46.3)                           | 22 (16.4)                                     | 40 (29.9)                                    |
| <i>Previous child's sex</i>                |                                     |   |  |
| Daughter                                   | 55 (41.0)                           | 15 (11.2)                                     | 40 (36.6)                                    |
| Son  | 79 (59.0)                           | 30 (22.4)                                     | 49 (29.9)                                    |
| <i>Body weight (BW)</i>                    |                                     |   |  |
| >145 cm                                    | 124 (92.5)                          | 43 (32.1)                                     | 81 (60.4)                                    |
| <145 cm                                    | 10 (3.6)                            | 2 (1.5)                                       | 8 (6.0)                                      |
| <i>Blood pressure</i>                      |                                     |   |  |
| 90/60 or 139/89 mmHg                       | 134 (100.0)                         | 45 (100.0)                                    | 89 (100.0)                                   |
| <90/60 mmHg                                | 0                                   | 0   | 0  |
| <i>Body mass index (BMI)</i>               |                                     |   |  |
| 18.5–25 kg/m <sup>2</sup>                  | 92 (68.7)                           | 33 (24.6)                                     | 59 (44.0)                                    |
| <18.5/>35 kg/m <sup>2</sup>                | 42 (31.3)                           | 12 (9.0)                                      | 30 (22.4)                                    |
| <i>Upper arm circumference (UAC)</i>       |                                     |   |  |
| >23.5 cm                                   | 98 (73.1)                           | 30 (22.4)                                     | 68 (50.7)                                    |
| <23.5 cm                                   | 36 (26.9)                           | 15 (11.2)                                     | 21 (15.7)                                    |
| <i>Uterine fundus height (UFH)</i>         |                                     |   |  |
| According to gestational age               | 134 (100.0)                         | 45 (33.6)                                     | 89 (66.4)                                    |
| Not according to gestational age           | 0                                   | 0   | 0  |
| <i>Fetal heart rate (FHR)</i>              |                                     |   |  |
| 120–160 x/ menit                           | 133 (99.3)                          | 45 (33.6)                                     | 88 (65.7)                                    |
| <120/>160 x/ menit                         | 1 (0.7)                             | 0   | 1 (0.7)                                      |
| <i>Periodontal infection</i>               |                                     |   |  |
| None                                       | 110 (82.1)                          | 34 (30.9)                                     | 76 (56.7)                                    |
| Yes  | 24 (17.9)                           | 11 (8.2)                                      | 13 (9.7)                                     |
| <i>Bleeding in young and old pregnancy</i> |                                     |   |  |
| None                                       | 117 (87.3)                          | 39 (29.1)                                     | 78 (58.2)                                    |
| Yes  | 17 (12.7)                           | 6 (4.5)                                       | 11 (8.2)                                     |
| <i>Anemia status</i>                       |                                     |   |  |
| Hb normal: 10.5–11 g/dl                    | 92 (68.7)                           | 33 (24.6)                                     | 59 (44.0)                                    |
| Hb abnormal: <10.5 g/dl                    | 42 (31.3)                           | 12 (9.0)                                      | 30 (22.4)                                    |
| <i>Status of bacterial vaginosis (BV)</i>  |                                     |   |  |
| Not inspected                              | 126 (94.0)                          | 42 (31.3)                                     | 84 (62.7)                                    |
| Positive                                   | 8 (6.0)                             | 3 (2.2)                                       | 5 (3.7)                                      |

## Discussion

The results of the analysis of maternal sociodemographic relationships between early preterm birth (22–33 weeks) and late preterm (34–36 weeks), it appears from 30 variables there are only 3 significant variables with  $p < 0.05$ , namely education (OR 2.54, CI 95%; 1.21–5.34,  $p < 0.020$ ) out

of 134 mothers there are 66 mothers (49.3%) who have higher education (high school, diploma, and undergraduate), while 68 mothers have low education (junior high school, elementary school and some who do not attend school). It appears from 66 mothers (50.7%) who experienced early preterm birth (22–33 weeks) there were 29 mothers (21.6%) who had higher education than high school and 16 mothers (11.9%)

**Table 2** Analysis of differences in sociodemographic characteristics of preterm birth.

| Sociodemographic characteristics  | OR    | 95% confidence interval |       | p-Value* |
|-----------------------------------|-------|-------------------------|-------|----------|
|                                   |       | Lower                   | Upper |          |
| Mother's age                      | 0.83  | 0.39                    | 1.77  | 0.079    |
| Education                         | 2.54  | 1.21                    | 5.34  | 0.020    |
| Occupation                        | 1.01  | 0.48                    | 2.13  | 1.000    |
| Number of child                   | 1.620 | 0.77                    | 3.39  | 0.272    |
| Paritas                           | 0.77  | 0.37                    | 1.59  | 0.615    |
| Pregnancy period                  | 1.02  | 0.49                    | 2.10  | 1.000    |
| Weightlifting work                | 0.57  | 0.27                    | 1.20  | 0.197    |
| Smoking                           | 0.63  | 0.55                    | 0.72  | 0.016    |
| Not drinking alcohol              | –     | –                       | –     | Const-   |
| EPDS                              | 0.39  | 1.47                    | 1.05  | 0.102    |
| Fetal movements                   | 0.73  | 0.34                    | 1.60  | 0.572    |
| The amount of sleep               | 1.02  | 0.49                    | 2.12  | 1.000    |
| Number of visits during pregnancy | 0.37  | 0.16                    | 0.89  | 0.043    |
| History of premature postpartum   | 1.62  | 0.54                    | 4.78  | 0.532    |
| History of mother's sickness      | 0.38  | 0.11                    | 1.34  | 0.350    |
| History of complication           | –     | –                       | –     | Const-   |
| Second-trimester abortion history | 0.87  | 0.24                    | 3.16  | 1.000    |
| History of cervical surgery       | 0.50  | 0.31                    | 8.18  | 1.000    |
| Sociol economic                   | 0.85  | 0.41                    | 1.75  | 0.803    |
| Previous child's sex              | 0.61  | 0.29                    | 1.29  | 0.269    |
| BW                                | 2.12  | 0.43                    | 10.44 | 0.494    |
| BMI                               | 1.39  | 0.63                    | 3.09  | 0.527    |
| UAC                               | 0.61  | 0.28                    | 1.36  | 0.320    |
| UFH                               | –     | –                       | –     | Const-   |
| FHR                               | 0.66  | 0.58                    | 0.74  | 1.000    |
| Periodontal infection             | 0.52  | 0.21                    | 1.29  | 0.244    |
| Bleeding                          | 0.91  | 0.31                    | 2.66  | 1.000    |
| Anemia                            | 1.39  | 0.63                    | 3.09  | 0.527    |
| BV                                | 0.83  | 0.19                    | 3.65  | 1.000    |

141 who had lower education than high school, while moth-  
 142 ers those who experience late preterm birth (34–36 weeks)  
 143 there are 61 mothers (45.5%) who have higher education  
 144 than high school and 28 mothers (20.9%) who have lower  
 145 education than high school, meaning there is a relation-  
 146 ship between the sociodemography of maternal education  
 147 between early preterm birth and late preterm in primiparous  
 148 and multiparous mothers, or based on OR 2.54, mothers  
 149 risk 2 times early preterm birth (22–33 weeks) and late  
 150 preterm (34–36 weeks). A study in tertiary hospitals in three  
 151 urban areas in the Netherlands, showed that education lev-  
 152 els significantly predicted the occurrence of preterm birth  
 153 (educated low OR 1.06, CI 95%; 1.02–1.10) and pregnant  
 154 women with a low level of education also has a risk for  
 155 the occurrence of depressive symptoms (OR 3.57, CI 95%;  
 156 1.99–6.40),<sup>8</sup> as well as a study in Pakistan resulted in a  
 157 significant positive relationship to the husband's higher edu-  
 158 cation level against the risk of birth premature with a value  
 159 of  $p < 0.023$ .<sup>9</sup>

160 Smoking from 134 mothers included 123 mothers (91.8%)  
 161 who did not smoke and 11 mothers (8.2%) had smoking habits  
 162 (OR 0.63, CI95%; 0.55–0.72,  $p < 0.016$ ), it appeared that  
 163 mothers experienced early preterm birth (22–33 weeks) no  
 164 one smoked 45 mothers (33.6%), while mothers who had  
 165 late preterm birth (34–36 weeks) there were 78 mothers

166 (58.2%) also did not smoke, but there were 11 mothers (8.2%)  
 167 who had habits smoking, meaning that there is a relation-  
 168 ship between sociodemography of smoking between early  
 169 preterm labor and late preterm in primiparous and mul-  
 170 tiparous mothers, or based on OR 0.63, mothers risk 0.6  
 171 times having early preterm birth (22–33 weeks) and late  
 172 preterm (34–36 weeks). Mothers who consumed cigarettes  
 173  $\geq 10$  cigarettes per day were associated with preterm post-  
 174 partum (OR 2.44, CI 95%; 1.11–5.37) compared to mothers  
 175 who consumed cigarettes  $\leq 10$  cigarettes per day (OR 1.07,  
 176 CI 95%; 0.57–2.00),<sup>10</sup> whereas in Indonesia from BPS data  
 177 (2015) showed the highest percentage of mothers aged  
 178 15–49 years smoked cigarettes  $< 5$  cigarettes/day by 29.63%,  
 179 sucking 5–9 cigarettes/day at 29.44%, and mothers who  
 180 smoked  $> 25$  cigarettes/day at 1.73% (highest in urban areas  
 181 at 1.86% with high education and economic status).

182 The number of ANC visits during pregnancy (OR 0.37,  
 183 95% CI; 0.16–0.89,  $p < 0.043$ ) out of 134 mothers there were  
 184 107 mothers (79.9%) who made ANC visits  $> 4$  times and 27  
 185 mothers (20.1%) ANC  $< 4$  times, It appears that mothers who  
 186 visited ANC  $> 4$  early preterm deliveries (22–33 weeks) had  
 187 31 mothers (23.1%), while ANC  $< 4$  times there were 14 moth-  
 188 ers (10.4%). Mothers who experience late preterm labor  
 189 (34–36 weeks) have 76 mothers (56.7%) who visit ANC  $> 4$   
 190 times and 13 mothers (9.7%) ANC  $< 4$  times, meaning that

191 there is a relationship between sociodemographic number of  
192 ANC visits between early preterm labor and late preterm in  
193 primiparous and multiparous mothers, or based on OR.0.37,  
194 mothers risk 0.3 times having early preterm labor and late  
195 preterm. According to the Ministry of Health at least 4 visits  
196 during pregnancy, namely first-trimester one visit (before  
197 14 weeks' gestation), second trimester one visit (before  
198 14–28 weeks gestation), third trimester two visits (ges-  
199 tational age between 28–36 weeks and after gestational  
200 age > 36 weeks).<sup>11</sup>

## 201 Conclusion

202 There is a relationship between early preterm birth (22–33  
203 weeks) and late preterm (34–36 weeks) with sociode-  
204 mographic characteristics in primiparous and multiparous  
205 mothers, namely education, smoking, and the number of  
206 ANC visits during pregnancy.

## 207 Conflict of interests

208 The authors declare no conflict of interest.

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