Do Pregnant Women Know about Danger Signs of Pregnancy and Childbirth? – A Study of the Level of Knowledge and its Associated Factors from a Tertiary Care Hospital in Southern India

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Abstract

Introduction: Awareness about danger signs during pregnancy is essential for a woman to seek prompt care. This can avert long-term morbidity and mortality. This study was aimed to find the level of knowledge and its related factors about danger signs of pregnancy and childbirth among pregnant women attending a tertiary care hospital in southern India. Patients and Methods: We conducted a cross-sectional survey of pregnant women attending a tertiary care hospital in South India. Systematic random sampling of every 10th woman exiting the antenatal clinic was done. Results: We studied 382 pregnant women. Of them, 188 (49.2% [95% confidence interval (CI): 44%–54%]), 104 (27.2% [95% CI: 23%–32%]), and 81 (21.2% [95% CI: 17%–26%]) women had sufficient knowledge about danger signs during pregnancy, labor, and childbirth, respectively. On multivariable analysis, lack of exposure to formal awareness raising health counseling classes was the only factor found to be significantly associated with a lack of knowledge about danger signs of pregnancy (adjusted prevalence ratio, 95% CI: 1.8 [1.2–2.7]) and after childbirth (1.4 [1.1–1.7]). Lower education level was significantly associated with a lack of knowledge about danger signs of labor (1.2 [1.1–1.4]). Conclusion: We found that lack of exposure to formal awareness raising health counseling classes is a modifiable risk factor to improve knowledge about danger signs. We recommend structured mandatory health awareness sessions addressing the danger signs of pregnancy and child health to all pregnant women.

Keywords: Childbirth, danger signs, knowledge, pregnancy

INTRODUCTION

Complications during pregnancy, childbirth, and the postnatal period are the leading causes of death and disability among women of reproductive age worldwide. India and Nigeria account for about 31% of all maternal deaths worldwide. Direct causes such as hypertensive disorders, hemorrhage, and obstructive labor continue to be the leading causes of maternal mortality. It is a national emergency to reduce the maternal deaths. Improving awareness among pregnant women about the danger signs would be an important strategy to reduce morbidity and avert mortality as the women would recognize the problem and seek prompt care resulting in early detection and prompt institution of treatment. Various studies have shown that the knowledge about danger signs of pregnancy among the pregnant women varied from 26% to 39%. It is important to know why the knowledge of the danger signs during pregnancy, labor, and after childbirth is low among the pregnant women. Therefore, this study was planned to determine the level of knowledge and the factors affecting the knowledge of danger signs during pregnancy and childbirth among pregnant women attending tertiary care institution.

PATIENTS AND METHODS

This study was conducted at the Women and Children’s Hospital, Jawaharlal Institute of Postgraduate Medical Education and Research, Puducherry, India.

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Education and Research, Puducherry, India. The study was carried out on pregnant women above 18 years of age attending the antenatal clinic of our hospital during May and June 2015, after obtaining approval from the Institute Ethics Committee (human studies). We obtained written informed consent from all participants. This study had a cross-sectional design. Ours is a large tertiary care hospital with over 1200 deliveries a month and a large attendance in the antenatal clinics. A systematic random sampling was done, and every 10th pregnant woman exiting the antenatal clinic was approached for the study. It was carried out with the help of a pretested language-validated structured questionnaire by open interview method. The components included demography such as age, parity, education etc, and other data about the number of visits and whether exposed to formal education classes. The tool used for testing the knowledge about the danger signs of pregnancy, labor, and childbirth was as enumerated by the World Health Organization in the Safe Motherhood Needs Assessment document. The same is enclosed in Annexure 1. Pregnant women who mentioned at least three danger signs during pregnancy, at least two problems of labor, and at least two danger signs after delivery were considered knowledgeable. At the end of the interview, we briefed the participants about the danger signs through a handout in the local language enumerating the danger signs during pregnancy and childbirth.

Sample size estimation
Presuming the level of knowledge to be 50%, with absolute precision of ±5%, the sample size was calculated as 384.

Statistical analysis
Data were processed using SPSS version 19.0, (IBM SPSS statistics for Windows, IBM corp., Armonk, NY). We expressed the proportion of women for various items analyzed as percentages. We calculated mean for quantitative data. We compared the different factors among the knowledgeable and nonknowledgeable women with Chi-square test. We applied independent t-test for comparing continuous variables between the two groups. Multivariable analysis was done to assess independent association of sociodemographic and clinical factors with poor knowledge about danger signals. Those variables with \( P < 0.1 \) in univariate analyses were included in multivariable analysis. Log binomial regression was done, and adjusted prevalence ratios were calculated with 95% confidence intervals (CIs). \( P < 0.05 \) was considered statistically significant.

Results
Three hundred and eighty-two pregnant women consented and completed the study. The response rate was 98%.

The mean age was 24.7 years with a standard deviation of 3 years. There were 19 (5%) teenage pregnancies. Among the women studied, 236 (61.7%) were in their third trimester, 132 (34.5%) were in their second trimester, and 3.7% were in the first trimester. The mean period of gestation was 30.82 weeks with a standard deviation of 7.91 weeks.

Table 1 shows the sociodemographic and obstetric characteristics of the population studied. One hundred and sixty (41.9%) of the 384 women surveyed had also attended a primary health center, and 59 (15.4%) women had also visited a private practitioner apart from this tertiary care hospital for antenatal checkup during this pregnancy.

Only 61 (16%) of the pregnant women interviewed were exposed to any formal awareness raising classes. The doctors could spend more than 5 min in 50% of cases only. Only 103 (27%) of the study population had been informed about the danger signs during their antenatal visit by the doctors and health personnel.

Knowledge about danger signs
We found the level of knowledge about danger signs during pregnancy, during labor, and after childbirth to be 49.2% (95% CI: 44%–54%), 27.2% (95% CI: 23%–32%), and 21.2% (95% CI: 17%–26%), respectively. Severe abdominal pain \( n = 232; 60.7% \) was the most common danger signal of pregnancy enumerated by them followed by heavy bleeding \( n = 216; 56.5% \). Heavy bleeding was also the most common danger sign of labor \( n = 96, 56.1% \) and postdelivery \( n = 125, 32.7% \) reported by the study participants. High fever followed this in the postnatal period \( n = 112, 29.3% \).

Factors affecting knowledge
Knowledge about danger signs during pregnancy
On univariate analysis, we found that the lower education \( P = 0.0305 \), multiparity \( P = 0.053 \), lack of exposure to any formal awareness raising class \( P = 0.0003 \), and the lower education of husband \( P = 0.0342 \) were associated with the risk of being nonknowledgeable about danger signs during pregnancy.

Table 1: Sociodemographic and obstetric characteristics of pregnant women attending a tertiary care center, Puducherry

| Category         | Criteria                  | Frequency (%) |
|------------------|----------------------------|---------------|
| Residence        | Urban                      | 115 (30.1)    |
|                  | Rural                      | 267 (69.9)    |
| Type of family   | Joint                      | 243 (63.6)    |
|                  | Nuclear                    | 139 (36.4)    |
| Number of antenatal visits | <4 | 85 (22.3) |
|                  | 4 or more                  | 297 (77.7)    |
| Education of women | Less than primary school | 83 (21.7) |
|                  | Above primary school       | 299 (78.3)    |
| Education of husband | Less than primary school | 93 (24.3) |
|                  | Above primary school       | 289 (75.6)    |
| Occupation of women | Homemaker               | 313 (81.9)    |
|                  | Unskilled worker           | 31 (7.9)      |
|                  | Skilled worker             | 38 (10.2)     |
| Gravida          | Primi                      | 152 (39.8)    |
|                  | Second                     | 152 (39.8)    |
|                  | Third and above            | 78 (20.4)     |
**Knowledge about danger signs during labor**

Lower education of the women \((P=0.0049)\) and lack of exposure to awareness raising classes \((P=0.0204)\) were strongly associated with a lack of knowledge about danger signs during labor.

**Knowledge about danger signs after childbirth**

Lower education of the women \((P=0.0331)\) and lack of exposure to awareness raising classes \((P=0.0001)\) were significant predictors of a lack of knowledge about danger signs after childbirth.

However, on multivariable regression analysis [Tables 2-4], lack of exposure to formal awareness raising health counseling classes was the only factor found to independently predict a lack of knowledge about the danger signs of pregnancy. Lower education level independently predicted a lack of knowledge about danger signs of labor. Lack of exposure to health counseling classes was related to higher risk of being not knowledgeable about danger signs after childbirth.

**DISCUSSION**

Our study found the level of knowledge about danger signs during pregnancy, during labor, and after delivery to be 49.2%, 27.2%, and 21.2%, respectively. Table 5 shows the comparison of our study with the study results by other authors.

Low levels of knowledge in the study by Pembe et al.\(^8\) could probably be due to a lower education of the rural Tanzanian women. The study by Acharya et al.\(^9\) was conducted in New Delhi, India. The common danger signs enumerated by their study population were severe bleeding (20.1%), pain abdomen (8.6%), swelling of face and hands (6.7%), and reduced fetal movement (5.8%). The various sources from where this knowledge regarding danger signs was acquired were elders/mother-in-law in 45.8%, doctor in 26.6%, friends in 10.0%, and other sources in 16.6%. In our study, we found that abdominal pain was the most common danger signal of pregnancy, and heavy bleeding was the most common danger sign of labor and childbirth enumerated by the study participants. Various authors have observed that heavy bleeding was the most common danger signal known to women.\(^{3,9,10}\)

While in their study conducted in Chhattisgarh, Mutreja and Kumar\(^11\) found that paleness of hands and face was most commonly reported. These authors had interviewed 146 women in the 20 villages of Sukma district in Chhattisgarh and found the level of knowledge about problems of pregnancy, labor, and

### Table 2: Multivariable analysis of factors associated with poor knowledge about danger signs during pregnancy among pregnant women attending a tertiary care center, Puducherry

| Variable                        | Knowledge about danger signs during pregnancy | Unadjusted PR (95% CI) | Adjusted PR (95% CI) |
|---------------------------------|---------------------------------------------|------------------------|----------------------|
| Residence                       | Poor, n (%)                                 | Good, n (%)            |                      |
| Rural                           | 148 (55)                                    | 119 (46)               | 1.4 (1.1-1.8)        | 1.3 (1.0-1.7)          |
| Urban                           | 46 (40)                                     | 69 (60)                | Reference            | Reference              |
| Type of family                  |                                             |                        |                      |
| Nuclear                         | 70 (50)                                     | 69 (50)                | Reference            | -                     |
| Joint                           | 124 (51)                                    | 119 (49)               | 1.0 (0.8-1.2)        | -                     |
| Number of antenatal visits      |                                             |                        |                      |
| <4                              | 48 (57)                                     | 37 (43)                | 1.2 (0.9-1.4)        | -                     |
| 4 or more                       | 146 (49)                                    | 151 (51)               | Reference            | -                     |
| Education (women)               |                                             |                        |                      |
| <8th standard                   | 50 (60)                                     | 33 (40)                | 1.5 (1.1-1.9)        | 1.2 (0.9-1.7)          |
| 8-12th standard                 | 98 (52)                                     | 90 (48)                | 1.3 (1.0-1.6)        | 1.2 (0.9-1.6)          |
| >12th standard                  | 46 (41)                                     | 65 (59)                | Reference            | Reference              |
| Education (husband)             |                                             |                        |                      |
| <8th standard                   | 58 (62)                                     | 35 (38)                | 1.4 (1.1-1.8)        | 1.1 (0.8-1.5)          |
| 8-12th standard                 | 91 (48)                                     | 99 (52)                | 1.1 (0.8-1.4)        | 0.9 (0.7-1.2)          |
| >12th standard                  | 45 (46)                                     | 54 (54)                | Reference            | -                     |
| Occupation (women)              |                                             |                        |                      |
| Homemaker                       | 156 (50)                                    | 157 (50)               | Reference            | -                     |
| Employed                        | 38 (55)                                     | 31 (45)                | 1.1 (0.9-1.4)        | -                     |
| Gravida                         |                                             |                        |                      |
| Primi                           | 68 (45)                                     | 84 (55)                | Reference            | Reference              |
| Second                          | 78 (51)                                     | 74 (49)                | 1.1 (0.9-1.5)        | 1.2 (1.0-1.5)          |
| Third and above                 | 48 (62)                                     | 30 (38)                | 1.4 (1.1-1.8)        | 1.3 (1.0-1.7)          |
| Exposure to health education    |                                             |                        |                      |
| Yes                             | 18 (30)                                     | 43 (70)                | Reference            | Reference              |
| No                              | 176 (55)                                    | 145 (45)               | 1.9 (1.2-2.8)        | 1.8 (1.2-2.7)          |

\(P<0.05\) highlighted in bold. CI=Confidence interval, PR=Prevalence ratio
childbirth to be 31%, 9%, and 4%, respectively, however only 21.9% were able to tell at least three danger signs.

In our study, education of the women, their husband’s education, low parity, and exposure to any formal health counseling awareness raising classes were found to be predictors of awareness about danger signs during pregnancy. Okour et al. also observed that education of the husband affected the knowledge level of women.

Further, higher education of women and exposure to formal awareness raising health counseling classes were the factors predicting knowledge about danger signs of labor and of risk symptoms after childbirth in our study. Hailu et al. observed that higher education of the mother, place of birth, and having a radio were independently associated with knowledge about the danger signs of pregnancy and childbirth. In another study, Hailu et al. found that urban residence, being in a current marital union, and higher education were independently associated with mentioning of at least two danger signs of pregnancy while factors affecting knowledge of danger signs of labor were urban living, being currently married, and multiparity. Only urban residence was independently associated with mentioning of at least two danger signs after childbirth. In our study, we observed that women with lower parity had better knowledge of danger signal of pregnancy. This finding may be because primigravida with higher education are probably more anxious about problems of pregnancy and are more likely to know about it.

In our hospital, the doctors could spend more than 5 min in only 50% pregnant women. We recommend studies comparing

| Variable                        | Knowledge about danger signs during labor | Unadjusted PR (95% CI) | Adjusted PR (95% CI) |
|---------------------------------|-----------------------------------------|------------------------|----------------------|
| Poor, n (%)                    | Good, n (%)                             |                        |                      |
| Residence                      |                                        |                        |                      |
| Rural                          | 206 (77)                                | 61 (23)                | 1.2 (1.1-1.4)        | 1.2 (1.0-1.4)        |
| Urban                          | 72 (63)                                 | 43 (37)                | Reference            | Reference            |
| Type of family                  |                                        |                        |                      |
| Nuclear                        | 91 (66)                                 | 48 (34)                | Reference            | Reference            |
| Joint                          | 187 (77)                                | 56 (23)                | 1.2 (1.0-1.4)        | 1.1 (1.0-1.3)        |
| Number of antenatal visits     |                                        |                        |                      |
| <4                             | 67 (79)                                 | 18 (21)                | 1.1 (1.0-1.3)        | -                    |
| 4 or more                      | 211 (71)                                | 86 (29)                | Reference            | -                    |
| Education (women)              |                                        |                        |                      |
| <8th standard                  | 63 (76)                                 | 20 (24)                | 1.2 (1.0-1.5)        | 1.2 (1.0-1.4)        |
| 8-12th standard                | 147 (78)                                | 41 (22)                | 1.3 (1.1-1.5)        | 1.2 (1.1-1.4)        |
| >12th standard                 | 68 (61)                                 | 43 (39)                | Reference            | Reference            |
| Education (husband)            |                                        |                        |                      |
| <8th standard                  | 68 (73)                                 | 25 (27)                | 1.0 (0.8-1.2)        | -                    |
| 8-12th standard                | 137 (72)                                | 53 (28)                | 1.0 (0.8-1.1)        | -                    |
| >12th standard                 | 73 (74)                                 | 26 (26)                | Reference            | -                    |
| Occupation (women)             |                                        |                        |                      |
| Homemaker                      | 230 (74)                                | 83 (26)                | Reference            | -                    |
| Employed                       | 48 (70)                                 | 21 (30)                | 1.0 (0.8-1.1)        | -                    |
| Gravida                        |                                        |                        |                      |
| Primi                          | 109 (72)                                | 43 (28)                | Reference            | -                    |
| Second                         | 111 (73)                                | 41 (27)                | 1.0 (0.9-1.2)        | -                    |
| Third and above                | 58 (74)                                 | 20 (26)                | 1.0 (0.8-1.2)        | -                    |
| Exposure to health education   |                                        |                        |                      |
| Yes                            | 37 (61)                                 | 24 (39)                | Reference            | -                    |
| No                             | 241 (75)                                | 80 (25)                | 1.2 (1.0-1.5)        | 1.2 (1.0-1.5)        |

P<0.05 highlighted in bold. CI=Confidence interval, PR=Prevalence ratio
structured audio-video educational materials with the existing means such as health talks or individual verbal counseling as means of health awareness raising on the knowledge levels of pregnant women. We also recommend future research to study the impact of audio-visuals on danger signs, transmitted in the waiting hall of large hospitals, on knowledge levels of danger signs of pregnancy, labor, and childbirth among pregnant women.

**Conclusion**

Our study has shown that the significant modifiable factor to improve the knowledge about danger signs is exposure to formal awareness raising health counseling classes. We recommend structured mandatory health awareness sessions addressing the danger signs of pregnancy and child health to all pregnant women.

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**Table 4: Multivariable analysis of factors associated with poor knowledge about danger signs after delivery among pregnant women attending a tertiary care center, Puducherry**

| Variable                        | Knowledge about danger signs after delivery | Unadjusted PR (95% CI) | Adjusted PR (95% CI) |
|---------------------------------|------------------------------------------|------------------------|----------------------|
|                                 | Poor, n (%)                              | Good, n (%)            |                      |
| Residence                       |                                          |                        |                      |
| Rural                           | 218 (82)                                 | 49 (18)                | 1.1 (1.0-1.3)        |
| Urban                           | 83 (72)                                  | 32 (28)                |                      |
| Type of family                  |                                          |                        |                      |
| Nuclear                         | 108 (78)                                 | 31 (22)                | Reference            |
| Joint                           | 193 (79)                                 | 50 (21)                | 1.0 (0.9-1.1)        |
| Number of antenatal visits      |                                          |                        |                      |
| <4                              | 69 (81)                                  | 16 (19)                | 1.0 (0.9-1.2)        |
| 4 or more                       | 232 (78)                                 | 65 (22)                |                      |
| Education (women)               |                                          |                        |                      |
| <8th standard                   | 68 (82)                                  | 15 (18)                | 1.2 (1.0-1.4)        |
| 8-12th standard                 | 155 (82)                                 | 13 (18)                | 1.2 (1.0-1.3)        |
| >12th standard                  | 78 (70)                                  | 33 (30)                | Reference            |
| Education (husband)             |                                          |                        |                      |
| <8th standard                   | 77 (83)                                  | 16 (17)                | 1.0 (0.9-1.2)        |
| 8-12th standard                 | 145 (76)                                 | 45 (24)                | 1.0 (0.8-1.1)        |
| >12th standard                  | 79 (80)                                  | 20 (20)                | Reference            |
| Occupation (women)              |                                          |                        |                      |
| Homemaker                       | 249 (80)                                 | 64 (20)                | Reference            |
| Employed                        | 52 (75)                                  | 17 (25)                | 0.9 (0.8-1.1)        |
| Gravida                         |                                          |                        |                      |
| Primi                           | 122 (80)                                 | 30 (20)                | Reference            |
| Second                          | 118 (78)                                 | 34 (22)                | 1.0 (0.9-1.1)        |
| Third and above                 | 61 (78)                                  | 17 (22)                | 1.0 (0.8-1.1)        |
| Exposure to health education    |                                          |                        |                      |
| Yes                             | 36 (59)                                  | 25 (41)                | Reference            |
| No                              | 265 (83)                                 | 56 (17)                | 1.4 (1.1-1.7)        |

P<0.05 highlighted in bold. CI=Confidence interval, PR=Prevalence ratio

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**Table 5: Comparison of level of knowledge with other studies**

| Year | Authors                  | Study design | Eligibility criteria                   | Number of women studied | Level of knowledge % |
|------|--------------------------|--------------|----------------------------------------|-------------------------|----------------------|
| 2009 | Pembe et al.[4]          | Community    | At least previous one pregnancy        | 1118                    | P*: 26, L*: 23, PN*: 40 |
| 2010 | Hailu et al.[3]          | Pregnancy    | up to 3 months                         | 812                     | P*: 30.4, L*: 41.3, PN*: 37.7 |
| 2015 | Mutreja et al.[11]       | Community    | Pregnant and recently delivered        | 146                     | P*: 31, L*: 9, PN*: 4   |
| 2015 | Anita et al.[9]          | Hospital     | Postnatal women                        | 417                     | P*: 27.8, L*: 6.7, PN*: 0.7 |
| 2015 | Our study                | Hospital     | Pregnant women                         | 382                     | P*: 49.2, L*: 27.2, PN*: 21.2 |

*Knowledge about danger signals of pregnancy, †Knowledge about danger signals of labor, ‡Knowledge about danger signals after delivery
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Conflicts of interest
There are no conflicts of interest.

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### Annexure 1: Danger signals of pregnancy and childbirth

| Danger signs during pregnancy                        | Danger signs of labor                        | Danger signs postpartum                         |
|------------------------------------------------------|---------------------------------------------|------------------------------------------------|
| Severe fatigue                                       | Heavy bleeding                             | Heavy bleeding                                 |
| Severe abdominal pain                                 | Prolonged (>12 h) labor                     | Bad-smelling vaginal discharge                 |
| Bleeding from the vagina                             | Vaginal tearing                             | High fever                                     |
| Fever                                                | Convulsions                                | Painful urination                              |
| Unusual swelling of face/fingers/legs                 | Fever                                      | Hot, swollen, painful breasts                  |
| Severe and continued headache                         | Green or brown water coming from the vagina |                                                |
| Rapid or difficult breathing                          | Water breaks and labor not induced within 6 h|                                                |
| Foul-smelling vaginal discharge                       | Placenta not expelled within 1 h of birth   |                                                |
| Convulsions/fits                                      |                                            |                                                |
| Loss of consciousness                                |                                            |                                                |
| Blurred vision                                       |                                            |                                                |