Original Article

Determination of the Effect of Obstetric Variables on Stillbirths: A Case Control Study in Turkey

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Abstract

Background: The stillbirth rate may differ between regions; however, most of the stillbirths can be prevented with quality prenatal care. It is important to identify appropriate goals and implement proper intervention programs to cope with this problem. At this point, determining the reasons for recurrent stillbirths would be a strategic move to create the right path to follow.
Objective: The study was conducted to analyze the effects of obstetric variables on stillbirths.
Methods: This is a case-control study. Sample of the study consists of women giving birth in Sanlıurfa Training and Research Hospital in the city of Sanlıurfa, Turkey. The case group includes the women who had stillbirths, and the control group includes the women who had live births. The sample size was calculated as 96 persons for each group taking into consideration the prenatal care rates. The participants in the control group were selected by matching them individually with those in the case group by their ages. The percentage from descriptive statistics, the Mann-Whitney U test and the Chi-square test from univariate analyses were used for the data analysis; logistic regression analysis from multivariable analyses were also used.
Results: The median of women's age is 28. Univariate analysis presents that stillbirth history, short interbirth interval history, early delivery history, placental disorder history is more common in the case group, and the median of living children is lower in the case group. However, according to logistic regression analysis, having a stillbirth history increases the risk of stillbirth by 14.3 times.
Conclusion: In conclusion, it was determined that the rate of stillbirth is higher for women who have a poor obstetric history, and that having had a stillbirth is a high-risk factor for later pregnancies.

Keywords: Case control study, obstetric factors, stillbirth.

Introduction

Stillbirth is defined as the birth of a baby whose birth weight is under 1000 grams or has less than 28 gestational weeks without spontaneous respiration or heartbeat (Frøen et al., 2011).

In 2015, there were 2.6 million stillbirths globally, with more than 7178 deaths a day. Ninety-eight percent occurred in low- and middle-income countries. Three-fourths of the stillbirths occurred in south Asia and sub-Saharan Africa and 60% occurred in rural families from these areas (WHO, 2018).

Stillbirth records are not yet at the desired level in the world. For this reason, the exact data is not known, but it is known that the rate of stillbirth is very close to the rate of early neonatal mortality rate (ENMR) (Blencowe, 2016; Frøen et al., 2011; Lawn, 2010). As a matter of fact, SR and ENMR were calculated as 0.5% and 0.6% respectively, in the Turkey Population Health Research completed in 2013 in Turkey (Turkey Demographic and Health Survey, 2013). Since these two mortalities and their causes are closely related to each other, they are studied together in perinatal periods.

Among the stillbirth causes are child birth complications, post-term pregnancy, maternal infections in pregnancy (malaria, syphilis and HIV), maternal disorders (especially

hypertension, obesity and diabetes), and fetal growth restriction; congenital abnormalities are blamed the most (WHO, 2018). However, 27.0% of the factors relating to stillbirth are not known. In addition to this, it is stated that poor obstetric history increases the stillbirth risk in a remarkable way (Haws, 2009; McPherson, 2013). Various negative obstetric features, including the pregnant women being too young or too old, a short period of time between pregnancies, and a high number of births of one woman are associated with stillbirths (Buitendijk, 2003; Haws, 2009; Fabıo, 2011; Fretts, 2005; Lawn, 2011; McPherson, 2013). Furthermore, it is indicated that ethnic, socio-economic, cultural and geographical features may also affect stillbirths, and it occurs more often in rural communities (Avachat, 2015; Fabıo, 2011; WHO, 2018).

Knowing the causes of complications during pregnancy is as important as preventing complications. Pregnant women in high risk category can be closely monitored by nurse / midwife and risk factors can be determined according to detailed history of pregnant woman. Problems from poor obstetric history, including stillbirths, can be minimized by the effectiveness of prenatal care services and preventive services of health personnel. As a matter of fact, it was stated that the number of stillbirths decreased by 2.0% each year from 2000-2015 (WHO, 2018).

In a prospective study conducted in 29 centers in Turkey in 2003, the stillbirth rate is defined as 38.9 in 1,000 live births in the South-Eastern Anatolia Region where Sanlıurfa is located as well (Erdem G. 2003). The total fertility rate of Sanlıurfa (4.3) and the infant mortality rate of Sanlıurfa (14.4 per mille) are the highest in Turkey. (The total fertility rate of Turkey is 2.07 and the infant mortality rate of Turkey is 9.2 per mille.) (Turkstat Birth Statistics, 2018; Turkstat Mortality Statistics, 2017).

Sanlıurfa is rather a high-risk region in terms of stillbirths. For this reason, it is important to identify appropriate goals and implement proper intervention programs to cope with this problem. At this point, determining the reasons for recurrent stillbirths would be a strategic move to create the right path to follow.

This study was conducted to analyze the effects of socio-demographic and obstetric factors on stillbirths in Sanlıurfa.

Methods

Study Area: Sanlıurfa province, where this study was carried out, is located in the Southeast Anatolia region of Turkey. The State Planning Organization ranked it as 73rd among 81 cities in socio-economic development, which includes education, health and social indicators (UNDP, 2011). The population growth rate in 2017 was 23.0 percent. Sanlıurfa figures are third in population growth rate (Republic of Turkey Ministry of Development Southeastern Anatolia Project Regional Development Administration Presidency Sanliurfa Province Profile, 2018).

Maternal and child health services and family planning services have been prioritized in this region. These services have become important due to the large proportion of women at reproductive age, and the large number of children in the population. These services are also important due to the high infant, child, and maternal mortality rates, the demand for family planning services, and limited prenatal and postnatal care. The mean number of children born to women aged 40-49 years is 4.8 (Turkey Demographic and Health Survey, 2013). The region is among the shortest in terms of the birth interval (Çavlin, 2013; Republic of Turkey Ministry of Health Statistics Yearbook, 2016). Also, the education level is extremely low in the region (47.7% of women and 28.2% of men are illiterate) (Turkey Demographic and Health Survey, 2013).

Setting and Sample: This is a case-control study. It was carried out between September 2016 and February 2017 in the city center of Sanlıurfa. The population of the study consists of women over the age of 18 that gave birth in Sanlıurfa Training and Research Hospital.

The case group includes women who had stillbirths and the control group includes women who had live births. The participants in the control group were selected by matching them individually with those in the case group by their ages.

Sample sizes of each group were calculated in accordance with the rate of prenatal care received by each group. The rate of receiving prenatal care was determined to be 68.3% among the participants that gave birth to living infants, and 48.4% in those that had stillbirths; (Moyer et al., 2016) the number of the individuals that received this care was calculated as 96 for each

group at a confidence level of 95.0% with an 80.0% level of power.

The Ethical Dimension of the Research: The written permission of the Ethics Committee of Harran University and the verbal permission of participants was obtained for the research.

Data Collection Tools: The study data were collected via face-to-face interviews using a structured questionnaire form. This data collection form consists of a total of 41 questions. Fifteen of the questions are about socio-demographic characteristics (age, place of birth, level of education, financial status, working status, level of education of the husband, working status of the husband, social insurance, the language spoken most at home, occurrence of chronic diseases, status of medication usage, status of affinity and blood incompatibility with husband), and 26 are about obstetric features (age at marriage, age at pregnancy, number of pregnancies, number of live births, number of miscarriages, number of stillbirths, number of unintended pregnancies, the number of those being monitored, the reason for not being monitored, number of deliveries with an interval of less than two years, mode of delivery, use of any contraception, premature birth history, gestational diabetes history, having an infection with a previous pregnancy, placental disorder history, preeclampsia history, history of infant with anomalies, low birth weight history, and intrauterine growth retardation history).

Interviews lasted approximately 35 minutes.

None of the individuals refused to participate in the study.

Variables: The dependent variable of the study is the status of having a stillbirth. The independent variables of the study are socio-demographic characteristics and obstetric features.

Data Analysis: The study data were analyzed using the Statistical Package for Social Sciences (SPSS) for Windows 16.0. The study used percentage, median, minimum and maximum from descriptive statistics, and the Mann-Whitney U test and the Chi-square test from univariate analysis. The effect of independent variables on stillbirth was evaluated with the method of Logistic Regression Model Backward Stepwise (Conditional) from multivariate analysis. Findings were interpreted at the confidence level of 95.0%.

Limitations: The study data were collected based on the statements of the women that participated in the research. In the hospital where the study was carried out, Arabian and Kurdish women as well as Syrian refugee women who cannot speak Turkish also get services. The researchers interviewed seven women that spoke only Arabic and Kurdish with the help of an interpreter.

Results

The median age of women participating in this study is 28. In the case study group, 80.2% of the women were either born in the South-Eastern Anatolian Region or reported that it was the place of their longest residence. Of these women, 68.7% said they mostly spoke Kurdish and Arabian at home, and 33.3% did not complete primary education. Also, 88.5% of the participants are unemployed and 15.6% do not have health insurance. In the control group, the South-Eastern Anatolian Region is the birth place and longest residence of 83.3% of the women. Of the participants, 76.0% mostly speak Kurdish and Arabian at home, and 33.3% did not complete primary education. Also, 89.6% of them are unemployed and 14.6% do not have health insurance. There are no differences between case study and control groups regarding these sociodemographic variables ($P<0.05$).

Stillbirth history of previous births is more common in the case group with the rate of 96.9%, than in the control group (4.2%) ($p<0.05$). A history of multiple births in a short period of time is more common in the case group (71.9%) than the control group (53.1%) ($p<0.05$). There are no differences between case and control groups in terms of miscarriage history, abortion history and unintended pregnancy history, using prenatal contraceptive methods, antenatal monitoring status of the last pregnancy, and the last mode of delivery ($p>0.05$) (Table 1).

The median of live born children is lower in the case group (2 children) than the control group (3 children) ($p<0.05$). No differences exist between case and control groups regarding factors of age at first marriage, age at first pregnancy, total number of pregnancies, live-born children, number of unintended pregnancies, number of miscarriages, number of abortions, number of stillborn children, number of premature births, number of short-interval births, history of gestational diabetes and number of antenatal monitoring in the last pregnancy ($p>0.05$) (Table 2).

Table 1. The distribution of certain obstetric features in case study and control groups-1

	Case Study Group		Control Group			
Features	**Number**	**%**	**Number**	**%**	**X^2**	**P**
Miscarriage history						
Yes	16	16.7	25	26.0	1.9	0.15
No	80	83.3	71	74.0		
Abortion history						
Yes	4	4.2	10	10.4	1.9	0.16
No	92	95.8	86	89.6		
Stillbirth history						
Yes	93	96.9	4	4.2	161.3	**<0.001**
No	3	3.1	92	95.8		
Unintended pregnancy history						
Yes	30	31.2	29	30.2	0.0	1.00
No	66	68.8	67	69.8		
Short interbirth interval history						
Yes	69	71.9	51	53.1	6.4	**0.01**
No	27	28.1	45	46.9		
Status of use of prenatal contraceptive method						
Yes	6	6.2	12	12.5	1.5	0.21
No	90	93.8	84	87.5		
Antenatal monitoring status in the last pregnancy						
Yes	85	88.5	86	89.6	0.0	1.00
No	11	11.5	10	10.4		
Latest mode of delivery						
Vaginal birth	65	67.7	60	62.5	0.3	0.54
Cesarean birth	31	32.3	36	37.5		

Table 2. The distribution of certain obstetric features in case study and control groups-2

	Case Group	Control Group		
Obstetric features	**Median (min-max)**	**Median (min-max)**	**M-W U**	**P**
The age of first marriage	19(16-30)	19(16-36)	3894.0	0.06
The age of first pregnancy	20(17-32)	20(17-37)	4140.0	0.21
Total number of pregnancies	3(1-8)	3(1-9)	4151.5	0.22
Number of live births	2(0-6)	3(1-8)	**3665.0**	**0.01**
Total number of unintended pregnancies	1(1-4)	1(1-3)	426.0	0.87
Number of miscarriages	1(1-2)	1(1-2)	170.5	0.12
Number of abortions	1(1-1)	1(1-2)	18.0	0.52
Number of stillbirths	1(1-1)	1(1-2)	18.0	0.52
Number of premature births	1(1-2)	1(1-2)	169.5	0.74
Number of births with short interbirth intervals	1(1-4)	1(1-4)	1599.0	0.32
Number of cases of gestational diabetes	1(1-2)	1(1-1)	21.0	0.23
Number of antenatal monitoring at last pregnancy	8(4-16)	8(2-16)	3584.5	0.82

Table 3. The distribution of complications having occurred in the pregnancies of case and control groups

	Case Group		Control Group			
Complication History	**Number**	**%**	**Number**	**%**	**X^2**	**P**
Premature birth						
Yes	27	28.1	13	13.5	5.3	**0.02**
No	69	71.9	83	86.5		
Gestational diabetes						
Yes	9	9.4	6	6.2	0.2	0.59
No	87	90.6	90	93.8		
Infection						
Yes	9	9.4	11	11.5	0.05	0.81
No	62	64.6	46	47.9		
Preeclampsia						
Yes	20	20.8	13	13.5		
No	76	79.2	83	86.5		
Placental disorder						
Yes	15	15.6	1	1.0	11.5	**<0.001**
No	81	84.4	95	99.0		
Infant with anomalies						
Yes	3	3.1	5	5.2	*	0.72
No	93	96.9	91	94.8		
Developmental delay of intrauterine						
Yes	14	14.6	14	14.6	0.0	1.00
No	82	85.4	82	85.4		
Low birth weight						
Yes	10	10.4	10	10.4	0.0	1.00
No	86	89.6	86	89.6		

* Fisher's Exact Test was performed.

Table 4. The logistic regression model of factors related to stillbirth

Risk Factors*	**B**	**P**	**OR**	**95% CI**
Stillbirth history	2.6	0.02	14.3	1.3-150.6
Constant	**-4.5**	**<0.01**	**0.01**	

* Logistic regression model was done with the method of Backward Stepwise (Conditional).

Table 5. Reasons of stillbirths occurring in previous pregnancies

The cause of stillbirth*	Number	%
Unknown	40	20.8
EMR	4	2.1
Fetal distress	13	6.8
Hydramnios	1	0.5
IUGR	2	1.0
Bleeding	4	2.1
Cord entanglement	5	2.6
Cord prolapse	1	0.5
Coagulopathy	6	3.1
Placental problems	7	3.6
Preeclampsia	1	0.5
Trauma	4	2.1
Prolonged labor	4	2.1
Infant with anomalies	1	0.5
Total	93	100.0

*It was evaluated through 93 women with a stillbirth history in previous pregnancies.

Premature birth history is more common in the case group (28.1%) than the control group (13.5%) ($p<0.05$). Placental disorder history is more common in the case group (15.6%) than the control group (1.0%) ($p<0.05$). There are no differences between case and control groups in terms of histories of gestational diabetes, infection, preeclampsia, intrauterine growth retardation in infants with abnormalities, and low birth weight.

The logistic regression model was created with univariate analysis variables that made a significant difference; these variables were number of live born children (continuous variable), stillbirth history (categorical), short interbirth interval history (categorical), premature birth history (categorical) and placental disorder history (categorical) made a significant difference. However, results of the logistic regression analysis imply that having a previous stillbirth history increases the risk of stillbirth by 14.3 times (Table 4).

As the causes for a history of stillbirth were examined, it was determined that the reasons were mostly unknown (20.8%). After that, fetal distress (6.8%), placental problems (3.6%) and coagulopathy disorder (3.1%) followed (Table 5).

Discussion

Participants of the research are young women that are at the median age of 28 and in the active reproduction period. No socio-economic or obstetric factors other than age variable were controlled to detect independent effects. On the other hand, it can be mentioned that case and control groups are similar in various socio-economic and obstetric factors probably as a result of social structure.

Participants of the research are women who are generally poorly-educated, have a low level of participation in professional life, and have no health insurance. In terms of these features, the group is quite similar to the general status of Sanlıurfa (Turkey Demographic and Health Survey, 2013; Turkstat, Selected Indicators Sanlıurfa, 2013). In this study, the age of the

women when first married is low, use of contraception is also low and the number of births is high. As a matter of fact, it was demonstrated in various studies in societies with a low education level, that when the marriage age is younger, the level of use of a family planning method decreases, and the numbers of births increase (Chen, 2010; Mukhopadhyay, 2010; Mutihir, 2011).

Consistent with the literature, this study also found that the risk of stillbirth is higher in women who have a history of stillbirth (Bapat, 2012; Gordon, 2012; Lamont, 2015). Bapat et al. stated that the rate of stillbirth is the highest for women with previous stillbirth history (Bapat et al., 2012). Lamont et al. also indicated that the risk of a stillbirth in the second pregnancy increases by approximately five times higher for women who previously had a stillbirth (Lamont, 2015). Similarly, in a cohort study performed in Australia, it is observed that the risk of stillbirth in the second pregnancy is higher for women who previously had a stillbirth (Gordon, 2012). These findings imply that the cause of a previous stillbirth affects subsequent pregnancies. Therefore, it is vital to determine the causes of stillbirth that can be monitored and detected. It is also stated that 27.0% of accrual causes of worldwide stillbirths are unknown (Haws, 2009; McPherson, 2013). Furthermore, these women expressed that 20.8% of the causes of their previous stillbirths were unknown.

Stillbirth history, which is referred to as one of the significant risk factors for stillbirth in the literature, was also found as the most significant risk factor for stillbirth. However, there is a possibility of its being associated with various known or unknown reasons. Until these relationships are identified, repetitive stillbirth history was addressed also in this study as singly a factor. The logistic regression analysis approach, which is used to control confounder variables in the study, may provide a road map to explain these possible relationships. Thus, features like short interbirth interval history, premature birth history and placental disorder history making significant differences in univariate analysis which do not take part in logistic regression model may indicate the possibility of significant relations or similarities with stillbirth history.

The period of time between the present and previous pregnancies of women is closely related to the perinatal death rate. Short intervals between births significantly increases the risk of infant mortality. A short interbirth interval results in more frequent births and thereby increases the number of total pregnancies. Women who give birth with an interval of less than two years, and women who give birth to four or more children are in the high-risk group in their pregnancies. Infant mortality is four times higher among the children of these mothers (Blencowe, 2016). Nevertheless, complications generating from preterm labor are prominent reasons for neonatal mortality (Lawn, 2011). In particular, the earlier the week of pregnancy, the higher the mortality rate. A study done in Canada (Khashu, 2009) presents that the probability of stillbirth is higher for 33-36-week preterm labor than 37-40-week preterm labor. In a similar way, it is known that the increase in placenta anomalies causes an increase in the maternal-fetal mortality and morbidity rates (Dafallah, 2004; Korteweg, 2008; Ofir, 2013). The perinatal mortality rate related to abruptio placentae, which is a placental anomaly, fluctuates between 6.5% - 8.7% (Dafallah, 2004). A study done in Sweden (Korteweg, 2008) identifies placental diseases as a prominent reason for stillbirths. Another study (Ofir, 2013) presents that women who previously had a stillbirth commonly experienced placental disorders in their later pregnancies.

For sure, it may be misleading for the conditions discussed above to be considered as reasons for stillbirths without a detailed postmortem and genetic review. However, in compliance with the literature, this study suggests that the number of births and the intervals between births can have an effect on preterm labor and placental anomalies.

Conclusions and suggestions

It was concluded in the study that the rate of stillbirths is higher in women who have a poor obstetric history (short interbirth interval, preterm labor and placental anomaly history). Women who have a history of stillbirth caused by unknown reasons should be included in the category of high-risk pregnancies. Also, a history of stillbirths generates a high risk of stillbirth for later pregnancies. It was recommended in accordance with these results that women's obstetric histories should be evaluated with detailed anamnesis. Risk factors that affect pregnancy and labor should be determined, and the necessary precautions should be taken to

prevent further problems in pregnancy. It was also recommended that family planning education be provided to the women and their husbands to increase interbirth intervals. It was also suggested that proper intervention and monitoring programs be developed for later pregnancies, including identification of the factors affecting stillbirths.

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