



## The relationship between spontaneous abortion among nurses and its related factors

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### Original Article

#### Abstract

**BACKGROUND:** Abortion is the most common complication of pregnancy which occurs in 15% of pregnancies. The aim of this study was to determine the incidence of spontaneous abortion and its related factors among nurses working in the hospitals.

**METHODS:** This cross-sectional study was conducted on 431 nurses working in hospitals in Sanandaj City, Iran, in 2014. A researcher-made questionnaire was used to collect the data. Data were analyzed via Stata software using descriptive statistics, mean, and standard deviation, and chi-square, t, and Fisher exact tests.

**RESULTS:** Mean age of participants was  $33.45 \pm 7.49$  years; mean working hours per shift was  $6.26 \pm 2.50$  hours; mean working hours per month was  $201.63 \pm 93.54$  hours; and the mean work experience was  $9.53 \pm 7.37$  years. The history of abortion among the participants was 22.23%. There was statistically significant relationship between age, working hours, working shifts, working ward, and work experience with spontaneous abortion ( $P < 0.05$  for all).

**CONCLUSION:** The rate of spontaneous abortion among nurses working in the hospitals of Sanandaj City is higher than other studies. Therefore the decisions must be made to minimize adverse pregnancy outcomes in nurses.

**KEYWORDS:** Spontaneous Abortion, Nurse, Pregnancy Outcomes

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### Introduction

Spontaneous abortion is a common complication at the beginning of the pregnancy.<sup>1</sup> Spontaneous abortion is involuntary termination of a non-viable intrauterine pregnancy before 28 weeks of pregnancy.<sup>2</sup> About 15% of pregnancies are at risk of abortion in first trimester.<sup>1</sup> Common causes of spontaneous abortion are

chromosomal abnormalities, congenital or acquired abnormalities, thyroid and anti-phospholipid antibodies, and mothers' infection.<sup>3</sup> However, the main cause of abortion in spontaneous abortion is unknown.<sup>1</sup>

Among external factors affecting spontaneous abortion, occupational exposures could be noted.<sup>4</sup> Health care providers including nurses have the most occupational exposures.<sup>5</sup> More than two million women are employed as nurse annually that 4% of them are in the United States.<sup>6,7</sup> Nurses work in a unique working

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environment which can require rotating and night shifts, long hours, prolonged standing, heavy lifting, and exposure to chemicals and X-ray radiation. They also encounter with various hazards during pregnancy including anesthetic gases, anticancer drugs, antiviral medicines, disinfectants, and X-ray.<sup>8</sup>

Many of the previous studies on nurses' exposure and spontaneous abortions lack sufficient number of exposed cases in order to adjust confounding variables. Although knowledge for exposure to dangerous drugs has increased, but the rules to reduce health care professionals' exposure to these dangerous drugs is not enough.<sup>9-11</sup>

Since the role of nurses as educated people who are among health care providers and also are in contact with many occupational exposures is very important, the previous studies often reflects the need for more studies on this topic and presenting strategies for prevention. Therefore, the aim of this study was to determine the incidence of spontaneous abortion and its related factors among nurses working in the hospitals of Sanandaj City, Iran, in 2014.

## Materials and Methods

In this descriptive analytical cross-sectional study, the study population consisted of 431 married nurses working in all hospitals in Sanandaj City that at least had one pregnancy.

A researcher-made questionnaire was used to collect the data. Data were analyzed via Stata

software (Version 11, StataCorp, College Station, TX, USA). Descriptive statistics, mean, and standard deviation, and chi-square (for qualitative variables), t (for quantitative variables), and Fisher's exact tests at the significant level of  $P < 0.05$  were used to analyze the data.

## Results

The mean age of participants was  $33.45 \pm 7.49$  years. The mean hours of standing in a shift were  $6.26 \pm 2.50$  hours, the mean of working hours per month was  $201.63 \pm 93.54$  hours, and the mean work experience was  $9.53 \pm 7.37$  years.

57.17% of nurses had worked more than 170 hours per month, 42.92% of them aged 20-30 years, and 36.89% of nurses had less than 5 years of work experience (Table 1).

48.14% of nurses had a history of pregnancy for 1-3 times, of which 77.67% had no history of abortion. Among those with a history of abortion, 15.58% had a history of at least one abortion (Table 2).

There was a statistically significant association between abortion during pregnancy and shift work ( $P = 0.017$ ); so that the highest rate (47.62%) was related to nurses who had been working in the evening shift. There was also a statistically significant relationship between having an abortion during pregnancy with the working ward ( $P = 0.012$ ). The highest percentage of abortions was observed in the age group of over 50 years ( $P = 0.001$ ) (Table 3).

**Table 1. Frequency distribution of quantitative variables in participants**

Variables		n (%)	Confidence interval (95%)
Working hours in a month	170 hours and less	107 (24.83)	20.73-28.92
	More than 170 hours	324 (75.17)	71.07-79.26
Standing hours in a shift	6 hours and less	244 (56.67)	51.95-61.39
	More than 6 hours	187 (43.33)	38.60-48.04
Age (year)	20-30	185 (42.92)	38.23-47.61
	30-40	172 (39.91)	32.26-44.54
	40-50	69 (16.01)	12.53-19.48
	> 50	5 (1.16)	0.14-2.17
Work experience (year)	< 5	159 (36.89)	32.31-41.46
	5-10	127 (28.77)	24.47-33.06
	10-20	59 (13.69)	10.34-16.94
	> 20	44 (10.21)	7.33-13.07

**Table 2. Frequency distribution of qualitative variables in participants**

Variables		n (%)	Confidence interval (95%)
Number of pregnancies	No history of pregnancy	202 (46.90)	42.24-51.71
	1-3	207 (48.14)	43.39-52.88
	4-6	20 (4.65)	2.65-6.64
	More than 6	2 (0.47)	0.22-0.68
Number of abortions	No history of abortion	334 (77.67)	73.72-81.66
	1	67 (15.58)	12.13-19.02
	2	23 (5.12)	3.02-7.20
	3	4 (0.93)	0.01-1.84
	4	2 (0.47)	0.18-1.11
	5	1 (0.23)	0.22-0.68
Working shift	Morning	112 (25.99)	21.28-30.14
	Evening	21 (4.87)	2.83-6.91
	Night	26 (6.03)	3.77-8.28
	Rotating	272 (63.11)	58.29-67.45

Between having an abortion and work experience, a statistically significant association was found, and the highest risk of miscarriage was in nurses who had work experience of more than 15 years ( $P < 0.001$ ).

There was no significant relationship between abortion and educational degree of nurses ( $P = 0.637$ ). There was also no significant relationship between abortion and hours standing in a shift ( $P = 0.269$ ).

There was significant relationship between abortion and work hours per month, and nurses with more than 170 hours per month of work time had the highest history of abortion ( $P = 0.017$ ).

## Discussion

The results of this study showed that most nurses aged 20-30 years, and had less than

5 years of work experience; they worked 7 hours per shift on average, and about 300 hours per month. Most participants in this study had no history of abortion, and among those with a history of abortion, 15.58% had a history of at least one abortion.

In a study by Lawson et al., the nurses' abortion rate was reported as 11%<sup>8</sup>, which was more than our findings. Knutsson in a study described the effect of shift work on physiological function of health professionals. Knutsson also showed the strongest association between shift work with peptic ulcer disease, coronary heart disease, and compromised pregnancy outcome.<sup>9</sup> Axelsson et al. also reported increased risk of miscarriage in women who worked irregular hours or rotating shifts compared with day workers [Relative risk (RR):1.44, 95% Confidence interval (CI): 0.83-2.51].<sup>10</sup>

**Table 3. The relationship between shift work, age groups, and hours standing in shift with spontaneous abortion among nurses**

Variables		n (%)			$\chi^2$	P
		Yes	No	Total		
Shift work	Morning	29 (25.89)	84 (74.11)	113	10.25	0.017
	Evening	10 (47.62)	11 (52.38)	21		
	Night	5 (19.23)	21 (80.77)	26		
	Rotating	52 (19.19)	219 (80.81)	271		
Age (year)	20-30	16 (8.65)	170 (91.35)	186	42.74	< 0.001
	30-40	48 (28.07)	123 (71.93)	171		
	40-50	29 (42.03)	40 (57.97)	69		
	> 50	3 (60.00)	2 (40.00)	5		
Hours standing in shift	6 hours and less	60 (24.38)	184 (75.62)	244	1.09	0.269
	More than 6 hours	37 (20.11)	150 (79.89)	187		

In a study by Uehata and Sasakawa which conducted on 2264 women, the results showed that irregular menstruation and abortions were more common in shift workers.<sup>12</sup> Shift work is a factor which possibly related to a risk of spontaneous abortion and reduced fertility.<sup>13</sup> Knutsson found an association between shift work and pregnancy outcome in terms of miscarriage, low birth weight, and preterm birth.<sup>9</sup>

Valanis et al. compared the rates of spontaneous abortion and stillbirths for pregnancies without antineoplastic exposure and exposed pregnancies in which the pregnant woman or her husband handled antineoplastic agents either before or during the pregnancy. Considering age during pregnancy, prior gravidity, maternal smoking during the pregnancy, and occurrence of a spontaneous abortion or stillbirth in a prior pregnancy, exposure of the mother to or the handling of antineoplastic agents during the pregnancy was investigated. Results showed that the risk of spontaneous abortion was significantly increased.<sup>14</sup>

The results of the present study showed that there was a statistically significant relationship between abortions during pregnancy with the working ward; so that nurses who worked in high stress hospital wards such as emergency and intensive care unit (ICU) had the highest abortion rate. Between abortion and work experience, a statistically significant association was found, and the highest risk of miscarriage was in nurses who had work experience of more than 15 years. It seems that more exposure in stressful wards affects the reproductive health of nurses.

In our study, the highest rate (47.62%) of abortion was related to nurses working in the evening shift. Moen et al. showed that the permanent night-shift workers had experienced significantly more abortions than the other shift groups and the three-shift

rotation workers had the lowest number of abortions.<sup>13</sup>

## Conclusion

The results of this study showed that the prevalence of abortion in nurses working in Sanandaj City hospitals was high. Working hours, shift work, age, and working ward had associated directly with spontaneous abortion in nurses, and these factors increased the risk of miscarriage. Therefore, decisions must be made to minimize adverse pregnancy outcomes in nurses. It is recommended that nurses who are pregnant and nurses who are at higher risk, work in low-stress wards, their working hours reduce as much as possible, and they work in fixed shifts instead of rotating shifts.

## Conflict of Interests

Authors have no conflict of interests.

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