



Risk Factors for Unintended Pregnancy in Women: A Nested Case-Control Study

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Received 2019 January 28; Revised 2019 July 08; Accepted 2019 July 13.

Abstract

Background: Unintended pregnancies impose a large financial burden on national resources and health.

Objectives: This study aimed to determine the risk factors associated with unintended pregnancies in women aged 15 to 45 in Sanandaj, Kurdistan, Iran.

Methods: This nested case-control study was conducted in the second half of 2016 (a period of six months) on 800 pregnant women aged 15 to 45. Overall 240 subjects were placed in the unintended pregnancy group (case group) and 560 subjects in the intended pregnancy group (control group). The data were analyzed using STATA 12 software. Logistic regression analysis was done to investigate the final effect of the studied variables.

Results: In multivariate analysis, the significant relationship was found between unintended pregnancy and some studied variables, including mother's age (> 25) (odds ratio (OR): 1.69; 95% CI: 1.07 - 2.41), child gender in the current pregnancy (female) (OR: 2.85; 95% CI: 1.94 - 4.17), higher family income (OR: 0.47; 95% CI: 0.31 - 0.74), a history of unintended pregnancy (OR: 5.07; 95% CI: 3.08 - 8.55), abortion or curettage history (OR: 2.78; 95% CI: 1.47 - 5.10), having not good communication with spouse (OR: 9.09; 95% CI: 2.73 - 17.38), attending family planning classes (OR: 1.54; 95% CI: 1.05 - 2.29), and higher previous pregnancies (OR: 4.62; 95% CI: 2.79 - 7.79).

Conclusions: Our results showed some preventable factors such as mother's age, child gender in the current pregnancy and family income may be related to the unintended pregnancy. Using the study results may help health policymakers in designing interventional programs.

Keywords: Unintended Pregnancy, Risk Factors, Nested Case-Control, Iran

1. Background

Unintended pregnancy is a global problem that often leads to legal or illegal abortion. Preventing unintended pregnancy and minimizing the number of abortion are the key priorities associated with maternal and child health and one of the main objectives of public health policies throughout the world (1, 2). The purpose of reducing unintended pregnancy is mentioned in the WHO report entitled "healthy people in 2000", but the measures and objectives to achieve this goal have only focused on increasing access to contraceptives. Although increased access to contraceptives is an important tool to reduce unintended pregnancies, it is insufficient for solving unintended pregnancy problem (3). On the other hand, changing the demography policies in Iran in recent years towards increasing childbearing can influence unintended

pregnancies. It seems that this policy change has reduced access to free-of-charge contraceptives in health centers across the country (4).

Unintended pregnancies in the world in 2014 were estimated to be 41%, and 50% of these pregnancies led to abortion (5, 6). More than one-third of abortions are unsafe and 95% of them occur in developing countries (7). In various studies, the rate of unintended pregnancies in Iran has been reported to be 24.1% and 18.6% in 2000 and 2005, respectively (8). Although most occurred abortions in Iran have not been reported due to legal restriction, informal statistics show that 1000 unhealthy and unsafe abortions occur daily in Iran (9).

Unintended pregnancy is important and considerable for two reasons; one is to avoid excessive population growth and the other one is its negative effects on the mothers' and children's health. The rapid growth of the

population in the world and especially in some developing countries has many negative effects on the social, economic, and cultural development of countries (10). Unintended pregnancies are associated with negative consequences for both mother and child, including receiving late prenatal care, physical and sexual violence, postpartum depression, suicide, anxiety during pregnancy, low birth weight, lower mother's self-care behaviors such as the lack of using supplements, vaccinations and nutrition, higher rates of risky behaviors of mothers such as smoking, alcohol and drug abuse, negligence and shortcomings in the care and upbringing of the child, child abuse, behavioral problems in children, decreased employment opportunities, economic and educational problems of families (11-16).

Unintended pregnancies impose a large financial burden on national resources and health. Economic, social, and medical burden of such pregnancies is huge, such that direct medical expenditures of those pregnancies have been estimated to be about 5 billion dollars in the U.S in 2003 and 299 million dollars in England in 2010 (17).

Several risk factors have been expressed in relation to unintended pregnancy in different studies in which factors such as low educational level of mothers, maternal age, inaccessibility or non-use of contraception, ineffective use of contraceptive methods, changing contraceptive methods, lack of national contraception guidelines and unintended pregnancies management, and lack of implementation of these guidelines, mothers' suffering from chronic diseases such as diabetes, Spouses' sexual and domestic violence, physical activity and obesity can be mentioned (3, 18-25).

2. Objectives

Given the high prevalence of unintended pregnancies in the country and its negative consequences for mothers' and children's health, this study was carried out to identify potential risk factors related to the unintended pregnancies in women aged 15 to 45 in Sanandaj, Kurdistan, Iran.

3. Methods

This was a nested case-control study conducted in the second half of 2016 (a period of six months). Cases were 240 women with unintended pregnancies based on their states that selected among 800 pregnant women who referred to Be'sat Hospital and health centers for prenatal care or childbirth in Sanandaj, Kurdistan, Iran. The rest of 800 women (560 women) that had intended pregnancies were chosen as the controls.

The data were collected through a checklist prepared by the researchers, including demographic information such as age, marriage age, number of children, socioeconomic status, and specific information about family planning methods and pregnancy status such as prior contraception methods, unintended pregnancy history, abortion and curettage history, the way of receiving contraception method via face to face interviews by the researcher collaborator (medical intern) and midwives in health centers that had already been justified by the researcher. To develop the checklist, the views of 15 related professionals (obstetricians, midwives, faculty members of public health, gynecology, and obstetrics groups) were also obtained.

The data were analyzed using STATA 12 software. To describe the data, descriptive statistics were used. Then potential relationship between unintended pregnancy and each of studied variable was analyzed by chi-square. In multivariate analyses, in order to control potential confounders, logistic regression was performed for the variables with a significance level of less than 0.2. Adjusted odds ratio and 95% CI were calculated for each factor.

Because of ethical considerations, all the subjects were told that their participation in the study was voluntary and they were assured that their participation would have no risk for them and the informed consent form was also completed by them. In addition, the study was ethically reviewed by the Ethics Committee of Kurdistan University of Medical Sciences and was approved with the code: IR 1390/130.

4. Results

In this study, a total of 800 women in two groups, including 240 cases and 560 controls were investigated with the mean \pm standard deviation age of 30.27 ± 7.1 and 27.7 ± 5.4 years, respectively. Among all participants, 60% of cases and 40% of controls, used traditional contraceptive methods, whereas 12% and 21% of the cases and controls used modern contraception methods (oral contraceptive methods and intrauterine device), respectively. Other characteristics of studied participants are summarized in Table 1.

In univariate analysis, statistical significant relation observed between unintended pregnancy and some variables such as mother's age, high risk pregnancy (years), number of previous pregnancies, child gender in current pregnancy, women's education, family income, contraceptive method, method of choosing contraception, unintended pregnancy history, curettage or abortion history, relationship with spouse, attending at family planning classes, and psychiatric problems history had a significant

Table 1. Characteristics of Studied Participants (N = 800)^a

Variable	Cases, N = 240	Controls, N = 560	P Value
Mother's age			< 0.001
< 25	81 (33)	205 (37)	
> 25	231 (67)	283 (63)	
High-risk pregnancy, y			< 0.001
18 - 35	159 (66)	507 (90)	
< 18 or > 35	81 (44)	53 (10)	
Number of previous pregnancies			< 0.001
1	55 (23)	265 (47)	
2	54 (22)	177 (32)	
> 3	131 (55)	118 (21)	
Number of children			< 0.001
< 1	121 (51)	482 (86)	
> 1	119 (49)	78 (14)	
Child gender in the current pregnancy			< 0.001
Male	72 (30)	294 (52)	
Female	168 (70)	266 (48)	
Mother's education level			< 0.001
Illiterate	43 (18)	40 (7)	
Less than diploma	120 (50)	239 (43)	
Diploma	51 (21)	188 (34)	
University graduate	26 (11)	93 (16)	
Husband's education level			< 0.001
Illiterate	22 (9)	18 (3)	
Less than diploma	110 (46)	197 (35)	
Diploma	69 (29)	190 (34)	
University graduate	39 (16)	155 (28)	
Family income			0.004
Low	151 (63)	311 (55)	
Average	65 (27)	203 (36)	
High	24 (10)	46 (9)	
Contraception method			0.001
Traditional	108 (45)	321 (57)	
Modern	132 (55)	239 (43)	
Choosing contraception method			0.009
Herself	131 (55)	350 (62)	
Husband	45 (19)	114 (20)	
Physician	49 (20)	64 (12)	
Other	15 (6)	32 (6)	
Unintended pregnancy history			< 0.001
Yes	113 (47)	62 (11)	
No	127 (53)	498 (89)	
Curettage or abortion history			< 0.001
Yes	76 (32)	101 (18)	
No	164 (68)	459 (82)	
Spouse communication			< 0.001
Good	112 (47)	426 (76)	
Sometimes good	100 (42)	130 (23)	
Not good	28 (11)	4 (1)	
Attending at training classes			< 0.001
Yes	131 (55)	408 (73)	
No	152 (45)	152 (27)	
Psychiatric problems history			< 0.001
Yes	45 (19)	24 (4)	
No	195 (81)	536 (96)	

^a Values are expressed as No. (%).

relationship with unintended pregnancy ($P \leq 0.05$) (Table 1).

In contrast, in multivariate analysis, a significant relationship was found between unintended pregnancy and

some studied variables, including mother's age (> 25) (odds ratio (OR): 1.69; 95% CI: 1.07 - 2.41), child gender in the current pregnancy (female) (OR: 2.85; 95% CI: 1.94 - 4.17), higher family income (OR: 0.47; 95% CI: 0.31 - 0.74), history of unintended pregnancy (OR: 5.07; 95% CI: 3.08 - 8.55), abortion or curettage history (OR: 2.78; 95% CI: 1.47 - 5.10), having not good communication with spouse (OR: 9.09; 95% CI: 2.73 - 17.38), attending family planning classes (OR: 1.54; 95% CI: 1.05 - 2.29), and higher previous pregnancies (OR: 4.62; 95% CI: 2.79 - 7.79) (Table 2).

Mother's view about unintended or intended pregnancy have been significantly changed when they were informed their child gender so that 32 of them changed their view from intended to unintended pregnancy (28 girls, 4 boys) and also 72 women changed their view from unintended to intended pregnancy (5 girls, 67 boys) ($P < 0.001$).

5. Discussion

In this study, we investigated potential risk factors for unintended pregnancy in women referred to a tertiary hospital and health centers of Sanandaj, Kurdistan, Iran. The obtained results showed there is a significant relationship between unintended pregnancy and mother's age, child gender in the current pregnancy, family income, unintended pregnancy history, abortion or curettage history, spouse communication, attending family planning classes, number of children, and the number of previous pregnancies.

According to the results, the mother's age had a significant relationship with unintended pregnancy so that the mother's age increased the likelihood of unintended pregnancy increased too. This finding was consistent with the studies carried out in the U.S. in 2006 (26) and in Tanzania in 2008 (27), but it was not consistent with the results of studies conducted in South Asia in 2011 (18) and Thailand in 2013 (19). The inconsistency could result from differences in the populations under study, data collection time, and research methods. The relationship between mothers' older age and the increase of unintended pregnancy might be due the fact that through the increase of age, more time would pass since marriage, and the start of having sexual relationship which would increase the possibility of facing unintended pregnancy or it might be because women prefer pregnancy at younger ages and after achieving the favorite dimension of the household at these ages, they consider the next pregnancies as unintended.

Another factor for unintended pregnancy was the child gender in the current pregnancy. Women whose child's gender was female were more willing to consider their pregnancy unintended and also if the gender of their child

was specified to be a girl, their opinion changed from intended to unintended pregnancy. The conducted studies in India in 2005 (28) and a review study in 2008 (5) reported such a result. In traditional communities and developing regions, including Kurdistan, due to less cultural and economic development than the developed regions of the world, there is a lot of discrimination between different genders in terms of achieving social and occupational positions and this issue can be a justification for women to change their perspective towards their pregnancies if the child gender is identified and their willingness to the male child.

The results of the study showed that there was a relationship between the lower-income of family and unintended pregnancy. Similar results were achieved in the studies conducted in 2006 in the U.S. (26) and in 2010 in Iran (29). This is probably due to the lack of awareness and lower access to contraceptive methods in low-income women. Moreover, owing to bad economic and income status, such women have problems in supplying the costs of pregnancy and child-rearing and thus they address their pregnancy as unintended.

The results of the study showed the relationship between unintended pregnancy history and the increase of unintended pregnancy. This result was similar to the results of studies conducted in 2007 in China (30), and in 2003 in the U.S. (31). It is likely because of the fact that women who have already had a history of unintended pregnancy, have experienced all its stress, mental, and emotional pressures and are aware of the problems of facing it; moreover, such women have already had special behavioral, social, and economic circumstances and they have the same problems now; so they consider their present pregnancy as unintended.

Another result of the study was the relationship between unintended pregnancy and abortion or curettage history. The result was consistent with the findings of the conducted studies in 2008 in Iran (32) and in 2007 in China (33). The result can be due to the fact that mothers who have already experienced abortion are worried about the unfortunate consequences of pregnancy for their children and themselves, and since abortion in Iran is illegal, illegitimate, and non-customary; this issue enhances the probability to experience unsafe abortion and the appearance of physical and mental problems for mothers.

There was a relationship between couple communication problems and unintended pregnancy such that women who did not have a good relationship with their husbands mainly addressed their pregnancy unintended. The result is consistent with the findings of the study carried out in the U.S. in 2013 (34). The reason may be that such women are not satisfied with their lives and they think it is

Table 2. Logistic Regression for Association of Unintended Pregnancy and Studied Variables

Variable	Unadjusted		Adjusted	
	OR (95% CI)	P Value	OR (95% CI)	P Value
Mother's age				
< 25	1	-	1	-
> 25	1.61 (1.16 - 2.23)	0.04	1.69 (1.07 - 2.41)	0.02
Family income				
Low	1	-	1	-
Average	0.51 (0.29 - 0.78)	0.001	0.47 (0.31 - 0.74)	0.001
High	0.82 (0.43 - 1.71)	0.6	0.86 (0.45 - 1.64)	0.6
Child gender in current pregnancy				
Male	1	-	1	-
Female	2.58 (1.87 - 3.56)	< 0.001	2.85 (1.95 - 4.17)	< 0.001
Unintended pregnancy history				
No	1	-	1	-
Yes	5.73 (3.11 - 8.79)	< 0.001	5.07 (3.08 - 8.55)	< 0.001
Curettage or abortion history				
No	1	-	1	-
Yes	2.62 (1.41 - 5.59)	< 0.001	2.78 (1.47 - 5.10)	0.002
Spouse communication				
Good	1	-	1	-
Sometimes good	9.73 (2.81 - 18.31)	< 0.001	9.09 (2.73 - 17.38)	< 0.001
Not good	2.49 (1.47 - 3.61)	< 0.001	2.23 (1.56 - 3.20)	< 0.001
Attending at family planning classes				
Yes	1	-	1	-
No	2.23 (1.63 - 3.06)	< 0.001	1.54 (1.05 - 2.29)	0.03
High risk pregnancy, y				
18 - 35	1	-	1	-
< 18 or > 35	4.87 (3.31 - 7.19)	< 0.001	1.75 (0.99 - 3.10)	0.05
Number of children				
< 1	1	-	1	-
> 1	6.07 (4.29 - 8.61)	< 0.001	2.05 (1.04 - 4.05)	0.04
Number of previous pregnancies				
1	1	-	1	-
2	1.47 (0.96 - 2.24)	0.07	1.82 (1.15 - 2.87)	0.01
> 3	5.35 (3.65 - 7.84)	< 0.001	4.62 (2.79 - 7.79)	< 0.001

Abbreviations: CI, confidence interval, OR, odds ratio.

very probable to break up with their spouses in the future and consequently, concern about bringing up and growing their children.

Another result of the study was the relationship between attending family planning classes and unintended

pregnancy; thus women's absence in training classes further led to unintended pregnancy. The result was consistent with the findings of the studies conducted in 2005 and 2006 in Iran (35, 36). It is probably because of the fact that lack of presence in such classes by women causes

less awareness and information and insufficient use of preventive methods and ultimately leads to unintended pregnancy.

The results also indicated the relationship between the number of children and unintended pregnancy was consistent with the findings of the studies carried out in 2011 in South Asia (18) and in 2005 and 2006 in Iran (36, 37); therefore, as the number of children increased the probability of unintended pregnancy increased too. This shows families tendency towards having fewer children so that they consider their pregnancy as unintended with increased number of pregnancy.

There is also a relationship between unintended pregnancy and the number of previous pregnancies so that by increasing the number of previous pregnancies the percentage of unintended pregnancy increases too. The results of studies conducted in the U.S. in 2006 (26) and in Iran in 2008 (32) confirm this issue. It may be said that as the number of mothers' pregnancies increases because of ignoring medical issues such as birth spacing, mother's anemia, and physical weakness, the risk of unintended pregnancy increases.

In univariate study, although the relationship between some variables such as women's education, spouse education, contraceptive method, the way of selecting contraception, and psychiatric problems history and unintended pregnancy was evaluated, there was no relationship between the above-mentioned variables and unintended pregnancy in multivariate analysis. Nevertheless, the relationship between these variables and unintended pregnancy has been reported in various studies (27, 38-41), which may be due to the differences in sample size, cultural, social, and economic background of the environment where the studies were carried out and their research methods.

Even though this study was carried out in a large population and on many factors affecting unintended pregnancy, some other important and effective factors such as obesity, smoking, chronic diseases, spouse's violence, and physical activities were not examined and it is recommended that the effect of such factors be measured in future studies.

Preventing unintended pregnancy by establishing appropriate strategies for comprehensive sexual health education, increasing access to contraceptive, paying attention to high-risk pregnancies, providing information about safe abortion, providing comprehensive post-abortion care, providing legal and safe abortion services, counseling, and caring before pregnancy and abortion, emphasizing the role of men in family planning programs, developing evidence-based clinical guidelines that fits culture to reduce unintended pregnancy may be managed.

5.1. Conclusions

The present study showed that there is a relationship between unintended pregnancy and several factors such as mother's age, child gender (female) in the current pregnancy, number of children, number of previous pregnancies, and woman's communication with her husband and so on; therefore, preventing unintended pregnancy requires comprehensive and long-term interventions.

Recent demographic policies in Iran have focused on the increase of population, decrease of family planning program budget, and the increase of legal constraints for cares associated with contraception and abortion, which will increase concern about the increase of unintended pregnancy due to high cost of contraceptive equipment and reduction of access to such services and also will increase unsafe and safe abortions. This raises the necessity to pay more attention and to prioritize the unintended pregnancy problem and its solution.

Acknowledgments

This article is the result of a medical student thesis with the same name supported by the Research Council of Kurdistan University of Medical Sciences. This research would not have been possible without the cooperation of study participants whom the authors appreciate their assistance.

Footnotes

Authors' Contribution: Obeidollah Faraji and Abdorrahim Afkhamzadeh were involved in the study concept and design. Moharam Felehgary was involved in the acquisition of data. Abdorrahim Afkhamzadeh, Moharam Felehgary, Fariba Farhadifar, and Obeidollah Faraji were involved in the study conduct. Obeidollah Faraji and Fariba Farhadifar were involved in the analysis and interpretation of data. Obeidollah Faraji and Abdorrahim Afkhamzadeh were involved in drafting of the manuscript and amendments suggested by other authors. All authors read and approved the final manuscript.

Conflict of Interests: The authors declare that they have no competing interests.

Ethical Approval: The inform consent form was completed by all the participants. In addition, the study was ethically reviewed by the Ethics Committee of Kurdistan University of Medical Sciences and was approved with code IR.MUK.REC.1394.130.

Funding/Support: Kurdistan University of Medical Sciences.

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