Original Article

Importance of Pre-pregnancy Counseling in Iran: Results from the High Risk Pregnancy Survey 2012

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ABSTRACT

Background: To identify the prevalence of behavioural (Pre-pregnancy), obstetrical and medical risks of pregnancy in Iranian women.

Methods: A total of 2993 postpartum women who delivered in 23 randomly selected hospitals of six provinces were enrolled in this nationwide cross-sectional study. A structured questionnaire was completed based on interviewees' self-reports and medical record data, consisting of socio-demographic characteristics, behavioural, obstetrical and medical risks, before and during pregnancy.

Results: Less than 6.0% had no health insurance and 5.0% had no prenatal visit before labour. Unintended pregnancy was reported by 27.5% of women. Waterpipe and/or cigarette smoking was reported by 7.1% of them and 0.9% abused opiates during pregnancy. Physical abuse by husband in the year before pregnancy occurred in 7.5% of participants. The rate of cesarean section was 50.4%. Preterm birth, low birth weight, and stillbirth were seen in 6.8, 7.7, and 1.2% of deliveries respectively. The most frequent medical risk factors were urinary tract infection (32.5%), anemia (21.6%), and thyroid disease (4.1%).

Conclusion: More effort should be devoted by health policymakers to the establishment of a preconception counselling (health education and risk assessment) and surveillance system; although obstetrical and medical risks should not be neglected too.

Background

Improving maternal health is one of the eight goals set at the 2000 Millennium Summit to encourage development in different countries across the globe (1). Maternal mortality, as a target indicator in determining achievement of the Millennium Development Goal (MDG) 5, is not only regarded as an index to find out the quality of medical care in a certain country, but is also a sensitive indicator to discover health equity (2). In 2008, 358,000 cases of maternal mortality were reported globally, of which 99% occurred in developing countries (1). Maternal morbidity is only the tip of the iceberg, i.e. the actual rates of morbidities and complications are frequently ignored, and it must be kept in mind that 'maternal health is more than survival' (3). Maternal health includes physical, mental, and social well-being, all pertaining to pregnancy. Pregnant women, from different physical, social, and economic aspects, represent a vulnerable group, and furthermore, pregnancy related illness does not merely concern the pregnant women themselves but may also compromise children and family health (3). Administration of effective health interventions to improve

maternal health is, accordingly, one of the major responsibilities of governments (1,3).

Based on the reports of World Health Organization, Iran is among the three countries (after Maldives and Romania) that managed to decrease maternal mortality rate (MMR) up to 80% from 1990 to 2008, in such a manner that the figure of MMR fell from 150 per one hundred thousand to 30 per one hundred thousand (1). The attained rate, however, is still a long way from that of developed countries, and therefore, planning to reduce the mentioned rate is necessary to be set as a priority (4). The first and foremost step towards promoting maternal health is increasing the evidence base, on the current circumstances of maternal health as well as the identification of pregnancy risks. High-risk pregnancy refers to a pregnancy, complicated by factors associated with increased probability of maternal and/or fetal morbidity and mortality.

Developed countries maintain ongoing collection of the data concerning pregnant women. The US has developed a surveillance system called Pregnancy Risk Assessment Monitoring System (PRAMS) in charge of recording pregnancy-

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related behavioural, obstetrical and medical risk factors, based on mothers' self-report before, during, and after pregnancy (5). There are also other cases in some Western countries where maternal health related data are recorded and analysed systematically (6), whereas, reports made in developing countries are solely limited to cross-sectional studies, usually restricted to a single hospital or a certain city (7,8). In a study in Egypt on 750 pregnant women, 64% of the subjects were placed in the high-risk group (7). The amount of 55% out of the 330 studied pregnant women in a research in Niger suffered from at least one risk factor (8). To the best of our knowledge, no nationwide study has been conducted in Iran, in which pregnancy risk factors have been investigated comprehensively. The present study aims at depicting the risk factor profile in Iranian pregnant women before and during pregnancy.

Methods

Participants and settings

The protocol of the present nationwide cross-sectional study was carried out between January and March 2012 and approved by the Kerman University Research Ethics Committee (Approval code: K/90/517). Six provinces (i.e., Khorassan-e-Razavi, Kerman, Mazandaran, Sistan Bluchestan, Kordestan, and Lorestan provinces) were selected for their different geographical and cultural conditions as well as health facilities. The sampling framework consisted of all hospitals located in the centre of the selected provinces (n=51) and all hospitals located in other districts which had maternity units. Taking into account the number of births and maternal deaths, 23 hospitals were selected based on quota sampling (16 hospitals from the centre of provinces and 7 hospitals from the remainder districts). Women who gave birth or those who had a miscarriage were consecutively interviewed in a private location, subsequent to ensuring that they have reached a stable condition and have agreed to an informed consent. Since, in Iran only 3% of the total births occur at home (9), the sample obtained could be regarded as representative. A sample size of approximately 3000 subjects was required to estimate the prevalence of risk factors during pregnancy based on the results of a pilot study conducted in one of the Kerman hospitals and figures obtained from the literature (5–7). The sample size was calculated based on expected prevalence of important risk factors to be around 1%, considering a precision of 0.35% at 95% confidence level.

Measurement tool

Questionnaire development and validation: To develop the questionnaire and to identify pregnancies at risk, a list of pregnancy-related risk factors was compiled through an extensive literature review (5,7,10). The content validity of the questionnaire was approved by an expert panel through consensus. The expert panel consisted of 10 experts in the fields of obstetrics & gynecology, health education, community medicine, pediatrics, and women's health.

Questionnaire: The questions of the questionnaire were categorized into four sections.

- Baseline questions, targeting the demographic and insurance status of the individuals.
- Questions regarding behavioural (pre-pregnancy) risks and experiences, mainly concerning the preconception stage, such as pregnancy wantedness, substance usage, adequate intake of folic acid during three month prior to conception,

history of physical violence by the husband during the year leading to conception (violent behaviours including pushing, slapping, punching, etc.), history of induced abortion, history of taking psychiatric medications, and date of the first prenatal care. Unintended pregnancy was categorized to mistimed (the birth occurred earlier than desired) and unwanted (no pregnancy was desired) ones. The history of induced abortions was questioned in an attempt to investigate illegal abortions. With regard to the threatening nature of the mentioned question, the crosswise model was adopted for the calculation of abortion (11), i.e. a question was initially asked from the subject, the probability of which was already known, e.g. "Were you born in spring?" History of induced abortion was then questioned. The first two sections of the questionnaire were filled based on self-report.

- The third section was concerned with different obstetrical problems in the recent pregnancy, complications including high parity (para ≥ 5) (12), preeclampsia, ectopic pregnancy, etc.
- In the fourth part, underlying medical conditions such as anemia, chronic hypertension, pre-pregnancy diabetes, and urinary tract infection were addressed. Anemia referred to cases in which the maternal hemoglobin level was lower than 11 g/dl during pregnancy (12,13). Besides self-report, the third and fourth sections of the questionnaire were filled by studying the medical records of the mother as well.
- Method of data collection and interview: As a whole, nonmedical data and data that were not mentioned in the case records were gathered by interview, and medical and laboratory data were gathered by looking at medical records. The interviews were conducted by experienced midwives subsequent to completing a training course on the principles of interviewing and the risk factors investigated in this study. To ensure their quality of interviews, 10% of the interviews were randomly assessed by field supervisors prior to patient discharge, starting from the beginning of the study.

In order to identify the relationships between the different types of risk factors (behavioural, obstetrical, and medical), forward stepwise logistic regression was employed. For each type of the three categories of pregnancy risks—as outcome variables—a logistic regression model was fitted. Sociodemographic characteristics were entered in the models as predictor variables. Hosmer-Lemeshow test was utilized for the assessment of the goodness of fit. $P<0.05$ was considered as significant.

Results

Sociodemographic characteristics: From the total of 3,002 women invited for the interviews, 2,993 subjects accepted to participate in the study (response rate= 99.7%). Mean (±SD) age of participants was 27.5 (±6.5) years. The majority of the subjects were housewives (Table 1), and a number of 1,131 individuals (37.8%) were in their first pregnancies.

Behavioural (pre-pregnancy) risks: Almost 1% of the subjects were opiate abusers and 7.5% experienced physical abuse by their husbands during one year leading to conception (Table 2). A total of 79.6% of the participants reported at least one behavioural risk factor.

Obstetrical (pregnancy) risks: The cesarean section was performed in 50.1% of the subjects, of which 573 subjects

Table 1. Sociodemographic characteristics of the subjects (n=2993)

Variable	Frequency (%)
Age group	
≤18	104 (3.5)
19–34	2543 (85.0)
≥35	346 (11.5)
Area of residence	
Urban	2364 (79.0)
Rural	629 (21.0)
Women's education level	
Illiterate/Primary	787 (26.3)
Secondary	659 (22.1)
Diploma	911 (30.4)
College	636 (21.2)
Husband's education level	
Illiterate/Primary	648 (21.7)
Secondary	806 (26.9)
Diploma	891 (29.7)
College	648 (21.7)
Occupation	
Household work	2630 (87.9)
Productive work	363 (12.1)
Health insurance	
Yes	2824 (94.4)
No	169 (5.6)

Table 2. Behavioral (pre-pregnancy) risks that may affect the mother and/or fetus (n=2993)

Variable	Frequency (%)
Time of first prenatal care	
1st trimester	2290 (76.6)
2nd & 3rd trimester	551 (18.4)
Not at all*	149 (5.0)
Physical abuse by husband	
Yes	225 (7.5)
No	2768 (92.5)
Tobacco smoking	
Cigarette	27 (0.9)
Waterpipe	167 (5.6)
Both	18 (0.6)
No	2781 (92.9)
Opiate abuse	
Yes	28 (0.9)
No	2965 (99.1)
Unintended pregnancy*	
Mistimed	504 (16.8)
Unwanted	321 (10.7)
Previous induced abortion	
Yes	431 (14.4)
No	2562 (85.6)
Adequate folic acid consumption	
Yes	884 (29.5)
No	2109 (70.5)
Psychiatric drug usage	
Yes	99 (3.3)
No	2894 (96.7)
Body mass index	
< 18.5*	141 (4.7)
18.5-24.9	1965 (65.7)
25-29.9	627 (20.9)
≥ 30*	260 (8.7)
At least one risk factor	2383 (79.6)
*Considered as risk factor	

(19.1%) had a prior cesarean section. Less than 4% of the subjects were placed in the high parity group, and low birth weight (LBW) was observed in 7.7% of the participants (Table 3). A rate of 6.5% of them experienced preeclampsia/eclampsia (Table 3). Forty percent of participants experienced at least one obstetrical risk factor.

Medical risk factors: The most prevalent medical risk factors observed in the participants were urinary tract infection (UTI) and anemia, respectively (32.5 and 21.6 %; Table 4). Of the participants, 0.1% were HIV positive (Table 4). A total of 50.5% of women experienced at least one medical risk factor.

The relationship between sociodemographic variables and each of the three categories of risk factors are presented in Table 5. Behavioral risks were more observable in older women, residing in cities and in couples with low levels of education, while, obstetrical risks were more observable in older ages, and medical risks in subjects with lower levels of education and covered by insurance (Table 5).

Discussion

The prevalence of some risk factors threatening maternal and fetal health among Iranian pregnant women, especially those

Table 3. Obstetrical (pregnancy) risk factors in the participants (n=2993)

Variable	Frequency (%)
High parity	107 (3.5)
Preterm birth	204 (6.8)
Low birth weight	229 (7.6)
Stillbirth	35 (1.2)
Multiple pregnancy	57 (1.9)
Premature rupture of membrane	196 (6.5)
Preeclampsia/Eclampsia	194 (6.4)
Placenta previa	81 (2.7)
Placenta abruptio	34 (1.1)
Uterine atonia	37 (1.2)
Laceration	145 (4.8)
Retained placenta	22 (0.7)
Coagulopathy	13 (0.4)
Miscarriage	212 (7.0)
Ectopic pregnancy	14 (0.5)
Hydatiform mole	11 (0.4)
Gestational diabetes	219 (7.3)
At least one risk factor	1197 (40.0)

Table 4. Medical risk factors in the participants (n=2993)

Variable	Frequency (%)
Anemia	646 (18.6)
Chronic hypertension	43 (1.2)
Cardiac disease	47 (1.3)
Deep vein thrombosis	13 (0.4)
Renal disease	15 (0.4)
Asthma	26 (0.7)
Diabetes	35 (1.0)
Thyroid disease	122 (3.5)
Epilepsy	20 (0.6)
Urinary tract infection	972 (28.1)
HIV +	2 (0.05)
HBS Ag +	12 (0.3)
At least one risk factor	1511 (43.7)

Table 5. The results of three different logistic regression models to determine the association of sociodemographic characteristics with behavioural, obstetrical, and medical risk factors of pregnancy

Variable	Crude Odds ratio	Adjusted odds ratio	95% confidence interval	P
Behavioural risk*				
Age group				
≤18	0.80	0.63	0.33–1.22	0.170
19–34	0.48	0.55	0.39–0.78	0.001
≥35	Reference	Reference	----	---
Area of residence				
Urban	0.76	1.39	1.07-1.80	0.012
Rural	Reference	Reference	----	---
Women's education level				
Illiterate/Primary	4.49	2.50	1.73–3.60	<0.001
Secondary	3.48	2.48	1.78–3.46	<0.001
Diploma	1.86	1.60	1.24–2.05	<0.001
College	Reference	Reference	----	---
Husband's education level				
Illiterate/Primary	5.29	3.00	2.00–4.50	<0.001
Secondary	2.78	1.74	1.28–2.38	<0.001
Diploma	1.67	1.34	1.04–1.71	0.022
College	Reference	Reference	----	---
Obstetrical risk*				
Age group				
≤18	0.42	0.42	0.26–0.66	<0.001
19–34	0.48	0.48	0.38–0.60	<0.001
≥35	Reference	Reference	----	---
Medical risk*				
Women's education level				
Illiterate/Primary	1.84	2.50	1.73–3.60	<0.001
Secondary	1.50	2.48	1.78–3.46	<0.001
Diploma	1.13	1.60	1.24–2.05	<0.001
College	Reference	Reference	----	---
Health insurance				
No	0.79	0.66	0.48–0.92	0.012
Yes	Reference	Reference	----	---
*Having at least one risk factor vs. no risk				

in the domain of preconception behavioural risk factors was in an unacceptable range. The advantage of this study was the inclusion of a comprehensive list of important risk factors from the three crucial aspects of preconception behavioural and obstetrical, as well as underlying medical conditions during pregnancy in a nationwide sample. An important limitation of this study was related to sampling strategy used. According to non-probability sampling, generalization of the results should be taken with caution.

Different studies assessing the prevalence of high-risk pregnancy in pregnant women have reached disparate results (5–8). With regard to the fact that the list of health problems addressed in the mentioned studies fails to follow a single model, and in particular, different age ranges and patient types can lead to differences in prevalences between countries or studies, therefore, such considerations should be taken into account before interpreting the results.

Up to delivery, 5% of women did not receive any prenatal care despite its importance, whereas, the same rate was reported as 1% in the US (10). Regarding the fact that all women in Iran have free access to reproductive health services and prenatal counselling by midwives, the pertaining rate was expected to be lower. The reason may be sought in their illness behaviour and inadequate family support, which are, per se, closely interrelated with their economic status, as well as inadequate

public knowledge regarding the importance of the above gone cares. History of physical violence by husbands was reported by 7.5% of the participants. In an investigation involving 19 countries, the mentioned figure ranged from 2.0% in Australia and the Philippines to 13.5% in Uganda (14), while, the same figure was 4 and 5% respectively in Azerbaijan and Jordan (4), countries adjacent to and near Iran. Other conducted studies in Iran are, similarly, indicative of high rates of violence against pregnant women (15). Although the rate of cigarette smoking was significantly lower compared to that of western countries (5), water pipe and opiate smoking rates were considerably high (Table 2). A study in southern Iran reported that 8% of women smoked water pipe during pregnancy (16). Furthermore, Iran is considered as one of the countries with the most opium abusers (17). The prevalence of unintended pregnancy was 27.3%. Owing to the wide application of traditional contraceptive methods and considering their high failure rates, contrary to the extensive coverage of family planning in Iran (i.e., 81.5%), the prevalence of unintended pregnancies is relatively high (18). The lifetime prevalence of induced abortion was 14.4% for the present study. Despite the application of crosswise model, it seems as though the subjects refrained from telling the truth, considering that abortion is restricted in Iran, as the said figure was 29% in Australia (19), where the total abortion rate is approximately 0.57, i.e. every single female experiences an average of 0.57 abortions

during her reproductive period, while the mentioned figure is estimated to be twice as much in Iran (i.e., 1.2%) (20). It can, therefore, be implicitly concluded that the interviewed subjects under-reported. Adequate preconception of folic acid intake was observed in 30% of the subjects, whereas the foregone rate was 35% in the US (5). Behavioural risk factors were generally more prevalent in subjects over 35 years of age, residing in cities, and with lower levels of education. Higher prevalence in cities is probably due to the fact that Iranian villages benefit from a more all-inclusive and quality primary health care (PHC), including reproductive healthcare, rather than cities.

The status of obstetrical risks, however, contrary to that of behavioural risks which was not desirable in most cases, showed figures relatively comparable to other studies. High parity rate was significantly lower in comparison to that of some countries in the region. In Oman, for instance, a study reported that 48.7% of women were in the high parity group (12), whereas, the obtained figure for the present study was 3.6%. The main reasons for this difference are the society's attitude towards childbearing, employing spacing methods, and lowering total fertility rate in Iran (18). The prevalence of the two main obstetrical syndromes of preterm delivery and preeclampsia has been reported to be 5 to 9% and 3 to 8%, respectively (21), and our obtained figures fall within a similar range (Table 3). Prevalence of many obstetrical risks observed in the subjects, such as ectopic pregnancy, hydatidiform mole, and gestational diabetes fell into the range mentioned in the literature (10,22). The obtained prevalence of third- and fourth-degree perineal lacerations was lower than that reported in some countries, the main reason could be higher cesarean rate in this study (23). Prevalence of the two complications of placenta previa and placenta abruption in the studied subjects was considerably higher than that reported in other countries (10,24). The two mentioned complications are influenced by different factors including race, age, and parity, nonetheless, all these factors combined do not entirely account for such a difference in the prevalence rate. Further studies may be required to find an answer to this finding.

The prevalence of anemia in the present study was lower than that of other developing countries (between 53.8 to 90.2%), and higher than the rate reported in developed countries (25). Furthermore, the prevalence of some underlying medical conditions including cardiac and nephrological diseases, and chronic hypertension was higher compared to their prevalence in developed countries (10). It should be noted that the prevalence of asthma, pre-pregnancy diabetes, and HIV infection was higher in the US studies (10). Prevalence reports of asthma as well as HIV infection in the Iranian general population are also lower than that in the general populations of Western countries; diabetes prevalence, however, in the Iranian general population it is significantly higher, as, the prevalence of diabetes in individuals over 25 years is 7.7% (26). The younger ages of the studied pregnant women, which was restricted to childbearing age, compared to those of the general population, might be the reason for low prevalence of diabetes as a chronic disease. Moreover, population-based studies in Iran indicate that more than half of the individuals are unaware of their diabetic condition (26). Medical risk factors were, as expected, more prevalent in women with lower levels of education, since most chronic diseases are closely related to the socioeconomic status, which, per se, highlights the necessity for addressing the influential social factors on health. Contrary to the initial

impression, the prevalence of these diseases was less probable in individuals not covered by insurance. Considering the existence of a wide range of insurance policies with relatively low costs in Iran, the fact that an individual is not insured indicates that he/she cannot afford to pay even the health insurance premium. It can, accordingly, be concluded that the low prevalence of chronic diseases in this group is due to their lack of referral to physicians and laboratories and their unawareness of their health status.

In sum, it can be concluded that the most prevalent risk factors in Iranian pregnant women are behavioural risk factors which are culture-based on one hand, and on the other hand can, mostly, be detected and treated at the proper time through preconception counselling (health education and risk assessment). Consequently, with regard to the weakness of the preconception counselling system in Iran, it is strongly recommended that health policymakers take the necessary measures towards promoting this absolutely important process. Feasibility studies to determine the feasibility of implementing a pre-pregnancy risk assessment tool are warranted.

Authors' contributions

ME developed the idea and participated in proposal writing and drafting the manuscript. MY, RT, PA, and AR participated in designing the study protocol and developing the questionnaire. They also supervised the data acquisition and contributed to manuscript writing. NN was the principle investigator of the study protocol and substantially contributed to data analysis and manuscript writing.

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