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Causes of Different Types of Abortion in Women Referring To Educational and Medical Centers in Shiraz, Iran

Sedighe Alipanahpour (MSc)[1], Naeimeh Tayebi (MSc)[2], Mina Taheri (MSc)[3,4], Marzieh Akbarzadeh (MSc)[3,4*]

[1] Lecturer, Department of Midwifery, School of Nursing and Midwifery, Shiraz University of Medical Sciences, Shiraz, Iran
[2] Lecturer, Department of Midwifery, School of Nursing and Midwifery, Bam University of Medical Sciences, Bam, Iran
[3] Lecturer, Maternal–fetal Medicine Research Center, Shiraz University of Medical Sciences, Shiraz, Iran
[4] Department of Midwifery, School Of Nursing and Midwifery, Shiraz University of Medical Sciences, Shiraz, Iran

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ABSTRACT

Background & aim: Abortion in Iran, like some countries in the world, has long been a culturally, socially, politically and religiously sensitive issue. So the present study was conducted to investigate the causes of abortions in pregnant women referring to Shiraz educational and medical centers.

Methods: : In this cross-sectional study, 437 woman who had an abortion, were selected by examining 5176 pregnant women using sequential sampling method during 4 months from educational and forensic medicine centers in Shiraz, Iran, in 2017. A self-structured questionnaire including demographic characteristics and obstetric data was completed for each mother. Data analysis was carried out using descriptive statistics.

Results: Out of 88 abortions with a legal permission from the forensic medicine, 9.1% were due to maternal illness and 90.9% were due to fetal disease, the most common cause of which was fetal cranial and cerebral disorders (17.1%). Out of 105 cases of spontaneous abortion, 8 cases were due to maternal cause (the most common cause of uterine defects (4.8%) and 97 cases were due to fetal cause. Out of 244 induced abortions with obstetric indication, the most common cause was missed abortion (32%).

Conclusion: In all three types of abortion, fetal causes were the most common cause of abortion. It seems that education, access to information and awareness raising activities involving the whole community will have a significant effect on preventing the occurrence of abnormalities. Emphasis is placed on the importance of conducting prenatal screening before 20 weeks of gestation.

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Introduction

About 830 women die each year from pregnancy and childbirth complications in the world, and 99% of such deaths occur in low- and middle-income countries (LMICs) (1,2). Globally, from 2010 to 2014, 25% of pregnancies ended in abortion, and the global abortion rate is estimated at 35 abortions per 1000 women of reproductive age each year. The rate of abortion has decreased significantly in high-income countries, while it has remained unchanged in LMICs (3). In a study in Iran, the overall prevalence of legal abortions performed in public educational and medical centers including both spontaneous and induced abortions was 7.46%, with the highest prevalence being of induced abortion with non-forensic causes (4.17%), induced abortion with forensic permission (1.5%), and spontaneous abortion (1.79%) (4).

Abortion is one of the most important causes of maternal death. One of the consequences of unplanned pregnancy is an increase in unsafe abortions, especially in countries where abortion is illegal (5). A recent study of 115

* *Corresponding author:* Marzieh Akbarzadeh, Lecturer, Maternal –fetal Medicine Research Center, Shiraz University of Medical Sciences, Shiraz, Iran. Tel: 00989177150234; Email: akbarzadm@sums.ac.ir

countries from 2003 to 2009 reported 7.9% of maternal deaths due to abortion (6). The number of deaths due to abortion might be even higher, and it is likely to be under-reported (1). In Nepal, for example, abortion has been reported to be the third leading cause of maternal death (7). Abortion may be spontaneous or induced, occurring safely or unsafely. Abortion (especially unsafe) can have serious health consequences and cause complications such as hemorrhage, sepsis, and uterine perforation (8-10). One in four mothers with an unsafe abortion is very likely to have severe complications and need to be hospitalized (11). In addition to physical effects most women experienced grief, depression, or both after a spontaneous abortion (12).The number and types of distress response symptoms described in abortion-related literature were grouped into four domains of psychological, emotional, physical, and cognitive-behavioral (13). Induced abortion is performed for various reasons such as unwanted pregnancy, the unwillingness of the mother or father to have a child, diagnosis of an abnormality or disorder of the fetus, or the mother's illness (14-15).

In recent years, statistics on illegal abortions, the mortality rate of pregnant women, and fetal abnormalities in Iran, as well as the lack of laws in this area, have caused relevant organizations such as the Ministry of Health and forensic medicine to pay attention to this issue and discuss it in research and scientific centers, which led to the passage of the "Legal Therapeutic Abortion" law in June 2005. According to the law, abortion is legal in cases where the mother's life is in danger, as well as in cases of fetal abnormalities such as anencephaly, pregnancy with neonatal disorders such as thalassemia major, or bilateral polycystic ovary disease. However, therapeutic abortions require the approval of three specialist physicians, consent of the mother, and final permission by the forensic center. Legal abortion is allowed only before the 20th week of pregnancy (16). In general, any condition that threatens the health of the mother and endangers the pregnancy is considered a sign of therapeutic abortion (17). Since maternal health is a key element of family and community health, the lack of information among pregnant women about legal abortion centers and the consequences of illegal and unhealthy abortions endangers their health and imposes financial burdens on the national health system. In addition, the development of appropriate strategies and proper planning in this area appear to be useful. Therefore, the present study was conducted to examine the prevalence and symptoms of different types of abortion in pregnant women referring to Shiraz educational and medical centers in Iran.

Materials and Methods

This was a cross-sectional study conducted in 2017. The study population included all pregnant women in Shiraz, Iran. According to the study by Abalovich et al.(18) and considering 95% confidence, the sample size was estimated as 4706 people based on the formula and considering 10% loss, it was finalized as 5176 people. For four months, all women who were hospitalized due to abortion and women who have referred to forensic centers and obtained written permission for abortion were finally included in the study (437 people). Sequensial sampling method was used in the second stage to select participants. Data were collected using a self-structured questionnaire consisting of 60 items in two parts: (i) demographic and (ii) obstetric data.

$$N = \frac{Z^{2}_{1-\alpha/2} \times P(1-p)}{d^{2}}$$

The inclusion criteria were: age range of 10 to 49 years, with one of the types of spontaneous or induced abortion (induced abortion with forensic permission and non-forensic induced abortion), no psychological treatment including medication or psychotherapy, willingness to participate in research, literacy to answer the questionnaires, resident of Shiraz, and Iranian citizenship (The health of the research units is based on the hospital record or women's self-report.). The exclusion criteria were the occurrence of a crisis or stressful event (based on women's self-report.), and willingness to withdraw the study at any time. Inevitable abortion, complete abortion, missed abortion, incomplete abortion and induced abortion are all subgroups of the abovementioned types of abortion and are allocated to one of the

categories mentioned above considering induced or spontaneous abortion.

The content validity was used to determine the validity of the questionnaire so that after studying scientific books and articles and fully recognizing the intervening variables, the questionnaire was prepared and then approved by some faculty members.

To collect data, after reviewing the inclusion and exclusion criteria and making subjects informed of the study objectives, the researcher asked the participants to complete the questionnaire (including demographic and obstetric data). Meanwhile, subjects were ensured that all their information would be confidential. Data were analyzed by SPSS-21 software using descriptive statistics.

Results

The sresults showed that 34.1% and 31.6% of women and their spouse's age was in the range of 30-34 years, respectively. Also, in terms of education, 41.65% and 42.1% of women and their spouse e in the level of high school. Aditionally, 75.5% of housewives and 66.9% of spouses had freelance jobs (non-administrative).

Among 88 abortions with legal permission from the forensic medicine, 8 cases (9.1%) was due to maternal diseases, and 80 were due to fetal disease, mostly fetal cranial and cerebral disorders (17.1%) (Table 1). Among 105 spontaneous abortions, eight cases were due to maternal causes (mostly uterine defects (4.8%) and 97 were due to fetal causes (mostly retained products of conception and treatment for them) (46.7%) (Table 2). Table 3 shows the prevalence of induced abortions without legal permission from the forensic medicine due to obstetric indications and reasons for maternal hospitalization. There were 244 such cases, mostly due to missed bortion (32%), hemorrhage, pain, and rupture of membranes (15.9%).

Table 4 shows the comparison of maternal physical symptoms in induced and spontaneous abortions.

Table 1. Prevalence of induced abortions with legal permission from forensic medicine according to embryonic and maternal causes

Cause of induced abortions	Fetal causes N (%)
Cerebral cranial disorders	15(17.1)
Thalassemia major	13(14.8)
Trisomy 21	11(12.5)
Trisomy 18	2(2.3)
Hydrops fetalis	3(3.4)
Cystic hygroma	1(1.1)
Fetal heart defects	3(3.4)
Neuromuscular atrophy	2(2.3)
Hydrops and Cystic hygroma and Hydronephrosis	5(5.7)
Multiple skeletal defects	14(15.9)
Renal and urinary tract defects	11(12.4)
Total	80 (90.9)
Cause of induced abortions	**Maternal causes N (%)**
Kidney disease	1(1.1)
Lupus	1(1.1)
Liver problems	2(2.3)
Cancer	2(2.3)
Muscular dystrophy	2(2.3)
Total	8(9.1)

None of the mothers had no physical symptoms before abortion in abortions with legal permission from the forensic medicine, while bleeding was the most observed symptom in induced abortion without legal permission from the forensic medicine (26.6%) and in spontaneous abortions (61%). Bleeding was the most common symptom among all abortions (29.6%).

Table 2. Prevalence of spontaneous abortions according to maternal and fetal causes

Fetal causes	N (%)	Maternal causes	N (%)
Construction defects	3 (2.9)	Uterine defects	5 (4.8)
Spontaneous exit and residual remains and Treatment for embryonic remains (Incomplete)	49 (46.7)	Diabetes	2 (1.9)
abruption (Complete)Spontaneous fetal and placental	45 (42.8)	Lupus	1 (1)
Total	97 (92.4)	Total	8 (7.7)

Table 3. Prevalence of induced abortion without legal permission m forensic medicine according to the reasons of the mother's referral to the hospital

Cause of induced abortions (without legal permission from forensic medicine)	N (%)
Out-of-hospital misoprostol use	30 (12.3)
Bleeding	34 (13.9)
Opening of the cervix and rupture of the membrane with pain and bleeding	39 (15.9)
Car accident	2 (0.8)
Rupture of the amniotic sac	9 (3.7)
Amniotic fluid disorders	11 (4.5)
Rupture of the amniotic sac after amniocentesis	8 (3.3)
Blighted Ovum	29 (10.8)
Dead fetus (forgotten abortion)	78 (32)
Chorioamnionitis	4 (1.6)
Fetal abnormality	2 (0.8)
Total	244 (100)

Table 4. Comparison of maternal physical symptoms in induced and spontaneous abortions

Maternal physical symptoms	Induced abortions		Spontaneous abortions	Total
	Non-forensic medicine			
	N (%)	**N (%)**	**N (%)**	**N (%)**
No symptoms	88 (100)	83 (34)	9 (8.6)	179 (41.1)
Bleeding	0 (0)	65 (26.6)	64 (61)	129 (29.6)
Pain	0 (0)	1 (0.4)	1 (1)	2 (0.5)
Rupture of the amniotic sac	0 (0)	33 (13.5)	9 (8.6)	42 (9.6)
Exit the amniotic sac	0 (0)	0 (0)	2 (1.9)	2 (0.5)
Exit the amniotic sac with bleeding and pain	0 (0)	1 (0.4)	7 (6.7)	8 (1.8)
Spotting and pain and rupture of the membranes	0 (0)	3 (1.2)	0 (0)	3 (0.7)
dyspnea with cough and hemoptysis	0 (0)	1 (0.4)	1 (1)	2 (0.5)
Rupture of the amniotic sac with bleeding and pain	0 (0)	40 (16.4)	7 (6.7)	47 (10.8)
Bleeding and pain	0 (0)	17 (7)	5 (4.8)	22 (5)
Total	88 (100)	244 (100)	105 (100)	437 (100)

Discussion

The mean abortion rates are almost the same in all parts of the world, as it is 31, 29, and 21 per 1000 women in Latin America, Africa and Asia, and North America, respectively. Only in Europe, the rate is below 15 abortions per 1000 women. Women in many parts of the world today, like through the history, must choose abortion to terminate their pregnancies for a variety of reasons. They will do so even if the termination of the pregnancy is against the law or even if an unsafe abortion threatens their lives. Legal restrictions do not prevent abortion and legal authorization does not increase it, but law status has a significant impact on abortion safety and women's health.

According to the results of the present study, the most common cause of legal abortion with permission was fetal cranial and cerebral disorders (17.1%), Also, skeletal defects (15.9%), thalassemia major (14.8%), and trisomy 21 (12.5%) were the second, third, and fourth most common reasons for issuing legal abortion permissions.

Qadi Pasha et al. (2007) reported thalassemia major (54%) as the most important fetal disease for legal abortion permission (19), while Rostamnejad (2009) reported thalassemia major and hydrops fetalis as the second most common reason after neural tube defects (20). In the present study, thalassemia major (14.8%) was the third most common reason for abortion permission. Therefore, the frequency of abortions with legal permissions due to thalassemia major in the present study is relatively lower than previous studies, probably due to increased indications of legal abortions, increased awareness of medical staff of the legal

abortion law, and the reduced absolute abundance of such abortions over recent years because of adopted policies by the Ministry of Health for preventing marriage of people with thalassemia minor with each other and pre-marriage counseling and pre-pregnancy diagnosis. However, according to the national thalassemia screening program, these statistics are very unexpected.

In a study by Rostamnezhad (2008), the highest fetal indication for legal abortion permission was related to neural tube defects (20). In a study by Soleimanpour (2017) and Naeeji (2011), the highest fetal indication was fetal cranial (37%) and cerebral (21.5%) disorders. The highest rate of such disorders were reported by Soleimanzadeh related to hydrocephalus and anencephaly (21, 22), and by Nayigi related to anencephaly (17.8) and hydrocephalus (10.2), which is consistent with the findings of the present study. This indicates the need for more attention of health officials, especially obstetricians and gynecologists to the fetal risk factors and the ways to prevent hydrocephalus and anencephaly, as indications for therapeutic abortion. Proper nutrition and taking vitamins before and during pregnancy prevent neural tube defects. The use of a sufficient amount of folic acid (vitamin B9) is very important. Women of reproductive age should use multivitamins that have at least 400 micrograms of folic acid. Other sources of folic acid are green leafy vegetables, beans, and orange juice. Also, since 68% of the causes of legal abortions are related to genetics, early diagnosis of them for timely issuance of abortion permission is of paramount importance. In addition, providing pre-marriage and pre-pregnancy training for women is highly crucial to preventing and screening neural tube defects.

According to the results of this study, out of 88 cases of therapeutic abortion, 9.1% were due to maternal diseases, of which liver problems, cancer and muscle dystrophy were the most common. Evidence showed that maternal muscular dystrophy can progress and worsen during pregnancy, so induced abortion is performed with forensic permission to save maternal life in Iran (two cases in this study). Rudnik-Schöneborn reported 13 cases (13%) of premature abortion and four cases of abortion in the second trimester in women with dystrophy, indicating poor outcomes of pregnancy in these patients, which is consistent with the present study (23). However, Ghodrati et al. (2018) reported thalassemia (79.9%) and other abnormalities (20.9%) as the most common maternal causes, which is not congruent with the findings of the current study (24). Another 7-year study in Iran about legal abortions reported that 79.6% of abortions had fetal reasons and 20.4% had maternal reasons, with the highest frequency of maternal causes being related to blood and thalassemia causes (24.18%) and cardiac causes (19.46%). The age of most embryos was 17-20 weeks (29.4%) (10, 25).

Various studies report different causes for issuance of forensic permissions due to maternal and fetal diseases, which can be due to the differences between congenital anomalies and genetic diseases in different regions of the country and the difference in living environment, climates, and racial differences, which requires planning to investigate the common fetal problems in different parts of the country to reduce them.

Among the 105 cases of spontaneous abortion, the most maternal cause was uterine defects (4.8%) and the most fetal cause was spontaneous expulsion and treatment for retained products of conception (46.7%). A study by Ghi on women with uterine defects showed that 33.3% of their pregnancies were aborted and the pregnancy outcome in these women was poor (26). Various causes are reported for spontaneous abortion including genetic factors, immunity factors, occupational exposures, and environmental factors, which are not reported here due to limitations in this study which only addressed types of abortion, such as spontaneous embryonic expulsion and other causes. Due to Islamic laws in Iran, abortion is not carried out based on the desire of the mother and other reasons that are common in other countries, and induction abortions are only performed when there is a risk for the mother, or the fetus has certain abnormalities. Also, in our study and other studies (27-33) on spontaneous abortion, retained products of conception had a large percentage, usually due

to placental prematurity and adhesions that need treatment for expulsion. In this study, there were 244 cases of induced abortions without forensic permission, 32% of which was due to missed miscarriage, while 15.4% of cases in a study by Yasayi and 17.8% of cases in a study by Shekarchi were due to missed miscarriage, which ccan be attrbuted to the larger sample size in this study (34, 35). In this study, none of the mothers with forensic permission had symptoms before the abortion. Bleeding was the most reported (29.6%) symptom in all cases. Bleeding in pregnancy, although prevalent, is a dire symptom predicting bad pregnancy outcomes proven in numerous studies, which had a high prevalence before abortion in this study. Accordingly, the medical staff needs to increase pregnant women's awareness of the time limit of issuing abortion permissions by forensic medicine, emphasize timely screening and diagnostic measures, and timely refer them to the forensic organization, to reduce the number of cases referring after the settled time, because these women may seek illegal abortions which can increase their complications and problems. Since more accurate examination of each of the factors associated with the incidence of abnormalities can contribute to the prevention of abnormalities or birth of abnormal children, further studies are necessary in this fields to provide results to the medical community, especially obstetricians in medical health centers, as well as to women intended to become pregnant. Counseling before and after abortion appear necessary to prepare women to deal with it, which requires a team of professionals including gynecologists, pediatricians, religious advisers, medical ethics experts, psychiatrists, and clinical psychologists (36).

A study also indicated that low medical team awareness, especially along with a positive attitude toward abortion, can increase the hidden risk of abortion. The approach to increasing the level of medical team's knowledge about legal, moral, and religious laws of abortion needs abortion to be one of the health education priorities (37).

One of the strengths of this study was using multi-stage sampling method, dividing the number of samples based on the target population in the city and the equal chance of selecting women, which greatly decreased the likelihood of bias and increased the generalizability of the results. One of the limitations of this study was its cross-sectional nature, which required prospective and correlational studies to measure the relationship between some variables.

Since more detailed studies regarding any of the factors associated with the occurrence of abnormalities can help to prevent the occurrence or prevention of fetal birth with abnormalities, it is necessary to conduct more rigorous studies in this field. To explore the various dimensions of abortion as an important public health problem, qualitative studies in relation to etiological, cultural, religious, and socioeconomic dimensions are recommended.

Conclusion

The most common fetal cases of abortion were cranial and cerebral abnormalities, which affect the body during the lifetime and its restoration is impossible. Thus, educating, informing, and raising awareness of the whole society will have a significant effect on preventing such abnormalities. Also, considering issues such as the number of pregnancies, history of stillbirth, abnormalities in parents, abnormalities in siblings of the embryo, history of multiple pregnancy, premature birth history, kinship relations of the parents, and preconception maternal age, along with recommendations to women for screening seems to be effective in this relation. Unknown abnormalities, genetic and environmental factors, and congenital defects also influence fetal abnormalities, and education and genetic testing during and before pregnancy can reduce the birth of infants with defects and a healthy community. Since abortion permission is only issued before week 20 of gestation, the need for maternal awareness of risk factors and the importance of performing fetal health screening during pregnancy before week 20 is very important.

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Conflicts of interest

Authors declared no conflicts of interest.

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