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An Investigation of the Causes and Methods of Termination of Pregnancy in Medical Abortions Referred from Forensic Medicine in Babol Hospitals within a Four-Year Period

N. Dadkhah (MD)[1], Sh. Yazdani (MD)[2], A. A. Manouchehri (MD)[*3], H. Shirafkan (PhD)[3], A. Khaleghi Tabari (BSc)[3]

1.Student Research Committee, Babol University of Medical Sciences, Babol, I.R.Iran.

2.Clinical Research Development Unite of Rouhani Hospital, Babol University of Medical Sciences, Babol, I.R.Iran.

3.Clinical Research Development Unit of Shahid Beheshti Hospital, Babol University of Medical Sciences, Babol, I.R.Iran.

***Corresponding Author: A. A. Manouchehri (MD)**

Address: Clinical Research Development Unit of Shahid Beheshti Hospital, Babol University of Medical Sciences, Babol, I.R.Iran.

Tel: +98 (11) 32256285. **E-mail:** drmanouchehri@yahoo.com

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ABSTRACT

Background and Objective: Today, abortion treatment is performed legally for reasons such as preserving the health and life of the mother and fetus with disabilities. The aim of this study was to investigate the basic information and determine the main reasons for legal abortions in medical abortions referred from forensic medicine in Babol as a basis for designing and conducting studies in the future regarding the improvement of reproductive health among women of reproductive age.

Methods: This cross-sectional study was conducted via census sampling method among 104 cases of medical abortion referred from the forensic medicine of Babol to affiliated hospitals of Babol University of Medical Sciences in 2017-2020. Information related to individual and social factors and maternal and fetal causes leading to abortion was collected by a researcher-made checklist. Then, the data were reviewed and compared in terms of gestational age, termination of pregnancy, and maternal and fetal causes leading to abortion.

Findings: The mean gestational age at termination of pregnancy with fetal causes was 16.21±2.35 weeks and for maternal causes was 10.33±3.96 weeks. There was a statistically significant relationship between the history of underlying disease, gender at the time of abortion, gestational age, and the causes of termination of pregnancy ($p<0.05$). In maternal causes of abortion, the highest frequency (50%) was related to maternal cardiovascular causes, and in fetal causes of abortion, the highest frequency (51.08%) was related to genetic causes of the fetus. Misoprostol was used to terminate the pregnancy of 23.1% of mothers.

Conclusion: The results of the study showed that a large number of cases of medical abortions are related to the fetal cause.

Keywords: *Medical Ethics, Pregnant Women, Legal Abortion, Iran.*

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Introduction

About 140 million pregnancies occur annually, of which about 25% end before the fetus reaches life due to spontaneous or induced abortion (1). Abortion is defined as the termination of pregnancy in order to remove the fetus before it can survive outside the womb (2), which occurs in two ways: intentional (3) and unintentional (4). Intentional abortion is a method to terminate an unwanted pregnancy that may be used by non-specialists or in an environment that lacks minimum medical standards or both (5-7). Today, intentional abortion is one of the most important global challenges in terms of public health and human rights (8, 9). Intentional abortion around the world has always involved challenges in the fields of moral, legal, religious, philosophical and reproductive health (10). The conditions for performing an intentional abortion around the world depend on the pregnancy and fetal conditions and the law and culture governing that country (11-13). In general, countries with restrictive abortion laws have reported high rates of unsafe abortion (14-16).

Intentional abortion is mainly used in the field of health, which is called medical abortion (17). Abortion treatment refers to the termination of pregnancy, before the life of the fetus, to preserve the mother's health, or due to fetal diseases (18). In some countries, medical abortion is allowed for medical reasons, with the permission of the legislature (19). Iran is one of the countries where abortion can be performed with the permission of the legislator (20). In Iran, since 2002, a national committee on abortion was formed in the Research Vice-Chancellor of the Forensic Medical Organization of the country to determine the indications for therapeutic abortion, and in the first step, a regulation with 49 indications was proposed (21). Finally, in 2005, the Islamic Council approved the abortion law for malformed fetuses, according to this law, abortion treatment can be performed with the definitive diagnosis of three specialists and forensic medical confirmation (21, 22). If a fetal or maternal problem is diagnosed by the prenatal care providers (gynecologists and midwives) during the initial screenings and examinations, the pregnant mother will be referred to a specially selected center for forensic medicine of the province and after receiving the permit, she is referred to the hospital with permission to have a safe abortion under the supervision of health care providers (23, 24). Currently, the most common indication for abortion treatment is to prevent the birth of a baby with a significant anatomical, metabolic or intellectual disorder (24, 25).

According to the aforementioned law, abortion treatment is performed only in a specific period of pregnancy and for special cases of maternal and fetal diseases. Therefore, studying the files of clients of abortion treatment can make the medical community aware of the cases leading to abortion treatment and know the frequency of indications leading to abortion treatment. Therefore, this study was conducted with the aim of investigating the causes and methods of termination of pregnancy in legal abortions referred from the forensic medicine of Babol, northern Iran in 2017-2020.

Methods

After being approved by the ethics committee of Babol University of Medical Sciences with the code IR.MUBABOL.REC.1400.146, this retrospective cross-sectional study was performed in the form of a census and by examining all the cases that referred to Forensic Medicine Center of Babol for legal abortion in 2017-2020. According to the census, 106 legal abortions were registered in the forensic medical center of the city during the period of 2017-2020. Information was recorded in a checklist that included demographic information and maternal and fetal causes.

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A researcher-made checklist was used to collect data, which was developed using scientific sources and a literature review. This checklist consisted of two parts: the first part included questions related to individual and social factors including (age, body mass index, place of residence, education). The second part included questions related to maternal and fetal causes leading to abortion (gestational age, history of underlying disease, placental abruption, gender at the time of abortion, type of termination of pregnancy, pregnancy termination complications). The validity of the questionnaire was investigated using face validity method and qualitative and quantitative content. In order to determine the validity, each question in the checklist was presented to 10 faculty members, including 3 members of the women's group, 4 members of the forensic medicine group, and 3 members of the pathologist group, and CVI (Content Validity Index) and CVR (Content Validity Ratio) were calculated for each question. Therefore, all questions have acceptable validity in terms of necessity. The reliability of the checklist was also measured using Cronbach's alpha coefficient (internal consistency of the instrument) and in this regard, the internal correlation for the checklist was 0.92.

The inclusion criteria included the completeness of the information in the files. In this study, two cases were excluded from the study due to the incompleteness of the information, and a total of 104 cases were examined. After obtaining permission to access the data from the General Department of Forensic Medicine of Babol, the researcher collected information related to the research by referring to the archives of the Forensic Medicine Center and studying the patients' files. The collected data were analyzed in SPSS version 22. According to the Kolmogorov-Smirnov test, the variables did not follow a normal distribution. Descriptive statistics (mean and standard deviation, frequency and percentage) were used to report demographic variables. In order to investigate the relationship between variables, Chi-squared and Mann-Whitney tests and Spearman's correlation coefficient test were used to correlate variables, and $p<0.05$ was considered significant.

Results

In this study, the total of 104 pregnant mothers who visited the hospitals of Babol in 2017-2020 were examined for the causes and type of legal abortions. 29 mothers (27.9%) were 35-45 years old and had reasons for termination of pregnancy. 41 mothers (39.4%) had a body mass index of 25-29.9 and had reasons for fetal termination. 7.7% of the mothers lived in the city and had reasons for termination of pregnancy. 26.9% of mothers had university education and had fetal termination reasons. There was no significant relationship between mother's age, mother's body mass index, mother's place of residence, mother's education and the causes of pregnancy termination (Table 1).

55.8% of mothers had no history of underlying disease and reasons of fetal pregnancy termination, and 10.6% of mothers had a history of underlying disease and reasons of maternal pregnancy termination (Table 2). There was a statistically significant relationship between the history of the underlying disease and the reasons of termination of pregnancy of the mothers ($p=0.001$); in mothers with no history of underlying disease, the reasons of termination of pregnancy were mostly fetal. 31.7% of male fetuses were aborted due to fetal reasons. There was a statistically significant relationship between the gender of the fetus and the reasons of termination of pregnancy of the mothers ($p=0.003$); all female fetuses had reasons of termination of fetal pregnancy.

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Table 1. Examining the demographic characteristics of the studied subjects according to the causes of termination of pregnancy

Variable / Group	Causes of pregnancy termination: Fetal Number(%)	Maternal Number(%)	p-value
Mother's age (years)			
15-24	19(18.3)	3(2.9)	
25-34	44(42.3)	4(3.8)	0.795
35-45	29(27.9)	5(4.8)	
BMI			
18-24.9	34(32.7)	4(3.8)	
25-29.9	41(39.4)	4(3.8)	0.50
≥30	17(16.3)	4(3.8)	
Place of residence			
City	46(44.2)	8(7.7)	0.277
Village	46(44.2)	4(3.8)	
Education			
School	24(23.1)	5(4.8)	
High school diploma	40(38.5)	5(4.8)	0.442
University	28(26.9)	2(1.9)	

Table 2. Examining the medical characteristics (history of underlying disease, history of abortion, placental abruption, method of termination of pregnancy, complications of pregnancy termination, age of pregnancy) and fetal characteristics (gender at the time of abortion) according to the reasons of pregnancy termination

Variable / Group	Causes of pregnancy termination: Fetal Number(%)	Maternal Number(%)	p-value
History of the underlying disease			
No	58(55.8)	1(1)	0.001
Yes	34(32.7)	11(10.6)	
History of abortion			
No	57(54.8)	9(8.7)	0.377
Yes	35(33.7)	3(2.9)	
Placental discharge			
Incomplete	72(69.2)	10(9.6)	0.686
Complete	20(19.2)	2(1.9)	
Gender during abortion			
Boy	33(31.7)	2(1.9)	
Girl	24(23.1)	0(0)	0.003
Unknown	35(33.7)	10(9.6)	
Method of termination of pregnancy			
Misoprostol	24(23.1)	3(2.9)	
Misoprostol and curettage	62(59.6)	8(7.7)	0.97
Not agreeing to perform curettage after receiving misoprostol	6(5.8)	1(1)	
Complications of termination of pregnancy			
No	55(52.9)	5(4.8)	0.232
Yes	37(35.6)	7(6.7)	
Gestational age (weeks) (Mean±SD)	16.21±2.35	10.33±3.96	0.001

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33.7% of the mothers had a history of abortion and reasons for termination of fetal pregnancy. 8.7% of mothers had no history of abortion and reasons for maternal pregnancy termination. 69.2% of mothers had incomplete placental abruption and reasons for termination of fetal pregnancy. 1.9% of mothers had complete placental abruption and reasons for maternal pregnancy termination. 1.23% of mothers had misoprostol and the reasons for pregnancy termination was fetal. 52.9% of mothers had no pregnancy termination complications and had fetal termination reasons. There was a statistically significant difference between the mean gestational age (weeks) at the end of pregnancy with fetal reasons and with maternal reasons (p=0.001). In other words, the mean gestational age in the reasons for fetal termination was significantly higher than the mean gestational age in the reasons for maternal termination. There was no statistically significant relationship between other medical characteristics of pregnant mothers and the reasons for their pregnancy termination.

Considering that none of the variables had a normal distribution, Spearman's correlation coefficient was used to evaluate the relationship between the variables and the gestational age. The results of Spearman's correlation test showed that there was no significant relationship between misoprostol dose and gestational age. In addition, there was a statistically significant relationship between the time of receiving the first dose of misoprostol until the delivery of the fetus and the gestational age (correlation coefficient r=0.244 and p=0.013) (Table 3).

Table 3. Relationship between misoprostol dose and time between intake and fetal discharge and gestational age

Variable	Gestational age: Correlation test results r	p-value
Misoprostol dosage	-0.008	0.933
The time between receiving the first dose and the expulsion of the fetus	0.244	0.013

In maternal causes of therapeutic abortion, the highest frequency is related to maternal cardiovascular causes with a frequency of 6 cases, which includes 50% of maternal causes. These cardiovascular causes include severe valvular disorders (4 people) and severe heart failure (2 people). In fetal causes of abortion, the highest frequency is related to genetic causes with a frequency of 47 cases, which includes 51.08% of fetal causes (Table 4).

Table 4. Evaluating the frequency of abortion causes by separating the causes

Causes of abortion	Number(%)
Maternal causes	
Cardiovascular	6(50)
High blood pressure	1(8.33)
Kidney disorders	1(8.33)
Cirrhosis of the liver	1(8.33)
Cancer	2(16.66)
Myasthenia gravis	1(8.33)
All maternal causes	12(100)

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Fetal causes	
Cardiovascular	2(2.17)
Digestive disorders	4(4.34)
Kidney disorders	3(3.26)
Brain (anencephaly)	8(8.70)
Cerebral (other)	8(8.70)
Musculoskeletal Disorders	4(4.34)
Genetically	43(46.74)
Combined (hydrops and genetic)	4(4.34)
Hydrops	10(10.87)
Combined (other)	6(6.52)
All embryonic causes	92(100)

Discussion

The results of the present study showed that the most common reasons for termination of pregnancy were related to fetal disorders. The studies of Sharifi et al. (23), Khajehnoori et al. (26), Dadipoor et al. (27), Astaraki et al. (28) and Sayedoshohadaie et al. (29) are similar to the results of the present study. In fact, a large number of abortions occur due to fetal disorders (30, 31). The results of the present study showed that the most common fetal disorder was the genetic causes of the fetus. The results of studies by Mahdavi et al. (21), Sharifi et al. (23) and Khajehnoori et al. (26) were similar to the results of the present study. However, the results of the present study were inconsistent with the results of Fatemi et al. (32), Rahimparvar et al. (1) and Asadollahi et al. (33). In their study, the most common fetal disorder was related to neural tube disorders. In fact, according to the findings, prenatal screening makes it possible to identify fetal risk factors and also determine the risk of chromosomal abnormalities in the fetus (34, 35). According to the results of the current research and previous studies, the risk of genetic disorders in the fetus increases with the age of mothers (36, 37), therefore, more interventions should be made to increase the awareness of women at older ages in relation to genetic disorders before fertility (38, 39).

The results of the present study showed that less than 10% of the authorizations are related to maternal indications. In fact, abortion treatment with maternal indication reduces adverse pregnancy outcomes and ultimately saves the mother's life (40). The results of the present study also showed that the most common maternal reasons for termination of pregnancy were severe valvular disorders, severe heart failure, and cancer, respectively. The results of this study are consistent with the results of Sharifi et al. (23), Mahdavi et al. (21) and Khajehnoori et al. (26). But it is inconsistent with the results of the studies of Astaraki et al. (28) and Dadipoor et al. (27). In their study, hypertension was the most common reason for termination of pregnancy. It is suggested that cardiologists and obstetrics and gynecology specialists help prevent such consequences by providing necessary and preventive training for this group of mothers. In the current study, among the causes leading to the issuance of abortion authorization, maternal cardiac disorders and fetal genetic abnormalities were the most frequent. Considering the favorable coverage of prenatal care in Iran and also considering that in Iran's health system, abortion without authorization is illegal, it is recommended that most of the cases be referred to the forensic medicine after the diagnosis of any type of fetal genetic abnormalities and significant maternal disorders.

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