

# Epidemiological Study of Legal Abortion due to Fetal Defects in the Files Referred to Fars Province Forensic Medicine Centers from 2007 to 2013

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## Abstract

**Background:** Sometimes the fetus suffers some abnormalities that damage its physical and mental growth. There have already been some indications for legal abortion and in fact, since 2005, some other conditions have been added in the Islamic republic of Iran under certain conditions.

**Objectives:** This study was aimed to study the fetal causes of legal abortion referred to the Fars province forensic medical centers from 2007 to 2013.

**Methods:** This is a descriptive-analytic retrospective study. The subjects included are the cases referred to the forensic medicine centers in Shiraz, Iran, during the years of 2007 and 2013. There were 1,664 samples in total and the sampling was done upon census. The variables of demography, midwifery, mother's disease, fetal disease and reasons for abortion were considered in the checklist of the questionnaires. The gathered data was analyzed by SPSS, version 16.

**Results:** The highest frequency of abortion was observed and 31.5% related to mothers between the ages of 25-30. In 79.6% of the cases, abortion certificates were issued for fetal causes, 35.25% for thalassemia major and 23.4% for neural system congenital disorders. Consanguineous marriage accounted for 60.8% of abortion cases and 83.42% had an abortion before the fourth month of their pregnancy. Furthermore, in about 16.58% of the cases, an abortion certificate was issued for mother's distress and constrictions. Approximately 36.75% of the couples had a family history of thalassemia and 17.65% of them already had a child with congenital abnormality.

**Conclusions:** The most frequent causes of fetal abortion licenses were due to the thalassemia and congenital malformations of the nervous system.

**Keywords:** Abortion, Legal Medicine, Fetus

## 1. Background

Unhealthy abortion is one of the major challenges for healthcare systems in developing countries. In the countries with restricted abortions by virtue of law and religion, the women with unintended or unwanted pregnancy commit hazardous interventions and unsafe abortions (1), which is one of the major factors of a higher mortality rate in the majority of Asian countries (2). Since for each death there are over a hundred women who have morbidity (3), high mortality rates for mothers has become one of the main concerns of health and treatment systems. Deaths due to unsafe abortion accounts for 13% of all maternal deaths, particularly in the countries where abortion is illegal (4). The high mortality rate for pregnant mothers due to unsafe abortions (abortions operated by unskilled people or in risky situations, or both), especially in poorer

countries, was one of the major concerns and debates in the international conference on population and development (ICPD) in 1994, which was approved in Cairo by 179 states (5).

Therapeutic abortion is a kind of induced abortion that is prescribed for protecting the mother's health due to a disease or due to the physical imperfection of the fetus. At present, the commonest indication for therapeutic abortion across the world is preventing the fetus from suffering serious anatomic and metabolic defects or mental disorders (6).

The issue of abortion certificates and the authenticity of the abortion are amongst the issues with different jurisdictions and rules in different periods of time depending on the Sharia law, legal and political conditions. Although abortion is forbidden in Islam as well as the major-

ity of religions, the problems resulting from an absolute prohibition of abortion have made the majority of countries allow legal abortion. Some of the conditions for legal abortions including saving a mother's life, pregnancy due to rape, fetal defects as well as special social and economic conditions. Since pregnancy and mother's diseases cause various problems for the mother and her fetus, fetal abnormalities are classified as social and economic calamities for the family and society and abortions were allowed in 1991 before the ensoulment of the fetus for protecting the mother's life, but there was no problem with the fetus.

In 1997, Ayatollah Khamenei's response on abortion regarding fetuses suffering from thalassemia major due to serious psychological, social and economic problems for their families was issued as follows:

"If the diagnosis of the disease in the fetus is certain and if keeping such fetus alive will cause serious problems, it is thus authorized to do abortion before ensoulment of the fetus, but its blood money must be paid" (7).

This was a turning point and caused a drastic change in attitudes toward abortions (8) and it paved the ground for formulation of the abortion law with fetal indications.

For the first time in the history of the Islamic revolution abortion due to thalassemia major was allowed in 1997 upon a decree by the Supreme Leader. Nonetheless, in 2002, Iranian forensic medicine organization issued a circular containing a list of 49 permissible abortion cases for fetal indications (9).

As a result, the abortion of deformed and handicapped or mentally retarded fetuses that were previously allowed by Sharia jurists including the Supreme Leader was legalized and in 2005 the Abortion Law was passed in the Iranian Parliament on 2005/05/31 and approved at the guardians council on 2005/06/15.

Upon the ratification of the above-said single act in 2005, abortion is allowed in the following cases:

- 1- If the fetus is up to four months of age (before ensoulment)
- 2- If the disease in the mother or fetus is certain according to the list
- 3- Upon mother's satisfaction
- 4- If the certainty of disease is approved by three specialized physicians
- 5- Upon the certificate of Iranian legal medicine organization

## 2. Objectives

This study aim was to determine fetal indications for legal abortions referred to forensic medicine centers in the Fars province during the years 2007 and 2013.

## 3. Methods

This is a descriptive retrospective study. The statistical population comprises of the cases referred to the forensic medicine centers in Shiraz, Iran during the years 2007 and 2013. There were 1,664 samples in total and the sampling was done upon census. After collecting the certificates from the Shiraz University of Medical Sciences and the forensic medicine organization, the cases were reviewed at clinical examination centers.

The quantitative variables examined in this study were demographic characteristics, previous obstetric and midwifery history, mother's disease, fetal disease and reasons for abortion and were all considered in the checklist of the questionnaires. The data gathered was based on maternal and fetal indications as well as the fetal age for abortion. The data was processed by SPSS, version 11 software and the analysis was done based on descriptive statistics.

## 4. Results

The highest frequency of abortion by forensic medicine certificate happened during the years of 2009 and 2010 with 41.35% (689), with the least frequency belonging to the year 2007. The highest frequency for abortion belonged to mothers the age of 25 - 30 (31.5% or 524 people) and then in mothers the age of 20 - 25 (26.75% or 445 people). Approximately 67% (1,115 people) of the subjects were housewives and the rest were involved in other jobs. In 79.6% of cases (1,325 people) the reason for issuance of abortion certificate was fetal defects and in the rest (20.4% or 339 people) it was due to maternal causes (such as cardiac disease, diabetic and hypertension, cancer, depression etc). Thalassemia minor (35.4%) and maternal abnormalities of the neural system (23.7%) were amongst the causes of abortion for fetal defects (Table 1). There was a significant association between the maternal age and fetal malformations ( $P \leq 0.001$ ). The highest incidence was thalassemia mostly in the age of 20 - 25 years old (45.3%) and then 25 - 30 years old (30.6%). The second greatest incidence was nervous system diseases, which occurred in the age of 25 - 30 and 30 - 35 years in the mother 32.8% (Table 2).

There was a significant association between the father's age and fetal malformations. The highest incidence was thalassemia, which was seen mostly in the age of 25 - 30 years old (38.6%) and then 20 - 25 years old (26.5%). The second highest incidence was nervous system diseases in fathers aged 30 - 35 years old (34.4%) and then 35 - 40 years old (30.5%) (Table 3).

Family marriage accounted for 60.8% of the abortions (Table 2). The abortion certificates were predominantly is-

**Table 1.** Distribution of Legal Abortions Based on Fetal Causes

Fetal Defects	N (%)	Fetal Etiology	N (%)
Major thalassemia	467 (35.25)	Hydrops fetalis and cysts	127 (9.6)
Trisomy and chromosomal defects	61 (4.6)	Abdominal wall defects	62 (4.7)
CNS defect	310 (23.4)	Multiple defect	46 (3.5)
kidney and urinary system	98 (7.4)	Metabolic disease	26 (1.96)
Musculoskeletal disorders	82 (6.2)	Other cases	46 (3.5)

**Table 2.** The Relationship Between Maternal Age with a Variety of Fetal Malformations<sup>a</sup>

Mother Age	Fetal Etiology										Total
	MT	Tri	CNS	URO	Musculo	Hydrops	Abdominal	MD	Multiple	Other	
Under 20	87	3	4	2	2	6	2	0	2	2	110
	18.8%	5.2%	1.3%	2.1%	2.4%	4.8%	3.2%	.0%	3.9%	5.7%	8.4%
20 - 25	210	6	52	22	18	32	16	11	13	17	397
	45.3%	10.3%	16.7%	23.2%	21.4%	25.8%	25.4%	42.3%	25.5%	48.6%	30.3%
25 - 30	142	20	102	40	31	35	25	7	19	11	432
	30.6%	34.5%	32.8%	42.1%	36.9%	28.2%	39.7%	26.9%	37.3%	31.4%	33.0%
30 - 35	19	14	102	12	24	29	8	6	9	3	226
	4.1%	24.1%	32.8%	12.6%	28.6%	23.4%	12.7%	23.1%	17.6%	8.6%	17.2%
35 - 40	5	12	39	17	6	18	5	1	4	1	108
	1.1%	20.7%	12.5%	17.9%	7.1%	14.5%	7.9%	3.8%	7.8%	2.9%	8.2%
Upper 40	1	3	12	2	3	4	7	1	4	1	38
	0.2%	5.2%	3.9%	2.1%	3.6%	3.2%	11.1%	3.8%	7.8%	2.9%	2.9%
Total	464	58	311	95	84	124	63	26	51	35	1311
	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Abbreviations: MT, Major thalassemia; tri, Trisomy and chromosomal; CNS, CNS defect; URO, kidney and urinary system; Musculo, Musculoskeletal disorders; Hydrops, Hydrops fetalis and cysts; MD, Metabolic disease; Multiple, Multiple defect.

<sup>a</sup> Pearson Chi-Square: value = 374.985, df: 45,  $P \leq 0.001$ .

sued for fetuses between the ages of 17 - 20 weeks (29.4%) and around 16.58% of the certificates have been issued for fetuses with more than 20 weeks of age and with maternal origin (Table 3).

As to the history of disease in the families of the couples, thalassemia was observed in 36.75% and 17.65% with maternal abnormalities in children (Table 4).

## 5. Discussion

The forensic medical organization, the authorized body for issuing abortion certificates, has a list of 51 cases of fetal and maternal disorders such as hydrops fetalis (fetal hydrops) and the conditions that cause stillbirth, which allow issuance of the abortion certificates (10).

In this study, the commonest fetal causes for issuance of abortion certificates were thalassemia major (35.25%) and maternal defects of neural system (23.4%), respectively. In similar studies carried out by Qadhi Pasha and associates (11) as well as Tofiqi and associates (12), thalassemia major has been the most common cause of abortion; this

is the same with our study's results. In Sayedshohadaei et al.'s study, the most common fetal cause of abortion is 20.6% encephalitis and 8.8% beta-thalassemia major, the results of which is different from our results (13).

The difference in the results of the two studies on the most common fetal causes of abortion may be attributed to the difference in the prevalence of maternal abnormalities and genetic diseases in various regions. This needs programming for the study of common fetal problems in various regions of the country for reducing the abortions.

According to the UN statistics, one in seven widespread causes of abortion across the world is fetal defect. Furthermore, according to the same source, the legal abortion rates due to fetal defects have grown from 44% in 2005 to 50% in 2011. Moreover, the number of countries authorizing therapeutic abortion has grown from 41% in 1996 to 50% in 2011, 38% of which belongs to the developing nations and the rest to the developed countries (14). Moreover, according to the studies carried out on 806 patients suffering from thalassemia major in Cooley's Ward of Shahid Dastgheyb Hospital in Shiraz, the incidence of

**Table 3.** The Relationship Between Father Age with a Variety of Fetal Malformations<sup>a</sup>

Father Age	Fetal Etiology										Total
	MT	Tri	CNS	URO	Musculo	Hydrops	Abdominal	MD	Multiple	Other	
Under 20	35	1	1	2	1	1	1	0	1	1	44
	7.5%	1.7%	0.3%	2.1%	1.2%	0.8%	1.6%	.0%	2.0%	2.9%	3.4%
20 - 25	123	3	21	8	8	13	5	2	7	4	194
	26.5%	5.2%	6.8%	8.4%	9.5%	10.5%	7.9%	7.7%	13.7%	11.4%	14.8%
25 - 30	179	11	37	29	15	37	19	9	15	12	363
	38.6%	19.0%	11.9%	30.5%	17.9%	29.8%	30.2%	34.6%	29.4%	34.3%	27.7%
30 - 35	88	17	107	26	31	38	20	9	13	13	362
	19.0%	29.3%	34.4%	27.4%	36.9%	30.6%	31.7%	34.6%	25.5%	37.1%	27.6%
35 - 40	33	21	95	25	26	25	12	4	6	3	250
	7.1%	36.2%	30.5%	26.3%	31.0%	20.2%	19.0%	15.4%	11.8%	8.6%	19.1%
Upper 40	6	5	50	5	3	10	6	2	9	2	98
	1.3%	8.6%	16.1%	5.3%	3.6%	8.1%	9.5%	7.7%	17.6%	5.7%	7.5%
Total	464	58	311	95	84	124	63	26	51	35	1311
	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Abbreviations: MT, Major thalassemia; tri, Trisomy and chromosomal; CNS, CNS defect; URO, kidney and urinary system; Musculo, Musculoskeletal disorders; Hydrops, Hydrops fetalis and cysts; MD, Metabolic disease; Multiple, Multiple defect.

<sup>a</sup> Pearson Chi-Square: value = 327.563, df:45, P ≤ 0.001.

**Table 4.** Distribution of Legal Abortions Based on Marriage

Kind of Marriage	Non-Familial Marriage	Familial Marriage	Total
N (%)	652 (39.2)	1012 (60.8)	1664 (100)

**Table 5.** Distribution of Legal Abortions Based on Fetal Age

Fetal age (week)	8 >	9 - 12	13 - 16	17 - 20	21 - 24	< 24	Total
N (%)	61 (3.6)	154 (9.25)	684 (41.1)	489 (29.4)	229 (13.79)	47 (2.82)	1664 (100)

**Table 6.** Distribution of Legal Abortions Based on the Couple's Family History of the Disease

Disease	Children with Thalassemia	Previous History of Malformation in Children	History of Malformation in the Family	Family History of Abortion or Herself	Others in the Family	Total
N (%)	179 (36.75)	86 (17.65)	118 (24.2)	86 (13.96)	36 (7.4)	1664 (100)

some implications such as splenectomy (28.7% with a median age of  $11.46 \pm 5.7$ ), cardiovascular implications (15.9% with a median age of  $16.93 \pm 5.4$ ), diabetes (7.5% with a median age of  $17.19 \pm 4.8$ ) and Hepatitis C (14.4%) have been reported, all of which boost the cost price of the patients (15).

With respect to the prevalence pattern of this disease and its high prevalence in Asia, preventing thalassemia major outbreak through pre-marriage screening should be taken seriously since screening labs are easily accessible, thanks to the healthcare system in Iran (16). Although the frequency of the disease has been on the fall since 1997 (the start of the plan for thalassemia prevention), appro-

appropriate planning for promoting the quality of consultation services, taking care of the vectors and effective information dissemination amongst the target groups in the society in a bid to completely eliminate the disease are all necessary (17). The results, however, show that supervision and control are not sufficient.

Some studies in Iran have shown that the most important reasons behind the birth of children with thalassemia major in screened parents are the inadequate genetic consultations, cultural weaknesses and lack of cooperation by the vector couples (20.6%) in line with preventive measures according to the national plans and the fault in screening tests (11.8%) (17). However, it is common in the world to pass

the screening tests for thalassemia from the 12th week to 17 years of age as a diagnostic and preventive measure (18). In the Muslim country of Pakistan, this has been carried out since 2003 (19). Some researchers have shown that in their studies, even parents with thalassemia intermedia prefer to terminate pregnancy upon pre-natal diagnosis. That is why various health centers in the world, including Iran, prevent the birth of children with thalassemia major (20-22). In this study, the abortion certificates for fetal factors have been more than the maternal factor abortions; this conforms to other studies in Iran. In Sayedoshohadaei's study, a considerable increase has been observed in the number of abortions for fetal factors from 8.6% in the years 2000-2002 to 37.9% in the years 2003-2007. This shows the positive impact of the enactment of abortion law for therapeutic reasons in line with facilitating therapeutic abortion for fetal problems (13).

In our study, 60.8% of couples with abortion certificates had a family marriage. World statistics show that 3 to 4 percent of the mortality rate in infants is due to genetic disorders. The risk of the outbreak of maternal diseases in a general population of each pregnancy in the ordinary population is 1 in 40 (2.5%) (23). In family marriages, there are 5 to 6 percent of handicapped births in the families. The risk stands with a probability of repeating the disability future children in the family as well (24). Maternal diseases like neural tube defects, cardiovascular diseases and many other defects have been reported as well (25). Some studies have shown that family marriage is one of the agreeable grounds for the emergence of the hidden and recessive disease genes (26).

Studies on over 300,000 couples of various Iranian races show that 38% of these marriages are hereditary and over 27% are first cousins (27). Family marriage in Turkey is something between 20 to 25 percent (28). Another study has focused on the relationship between fertility and family marriage and fetal abnormalities in Asian populations, essentially Indian and Pakistani (29).

The least family marriages happen in Western Europe, North America and Oceania with 1% and the highest rate belongs to North Africa, Central and Southern Asia and the Middle East with 25% (30). In another study, the highest family marriage with 20% to 50% was observed in North Africa, Asia, etc. This is associated with low socioeconomic conditions, illiteracy and life in rural areas (25, 31).

Family marriages are major risk factors for bipolar disorders. This system sees marriage as an important factor for the appearance of recessive autosomal disorder and maternal disorders such as hydrops fetalis, post-axial polydactyly of the hand, CLP cleft lip and cleft palate, bipolar disorders, depression, dysferlinopathy, fertility disorders, infertility, infant fertility, reported infant fertility, abor-

tion, stillbirth, etc.

The risk of birth defects in first cousin matings in comparison with non-consanguineous marriages has been increased from 3% - 2% to 8% - 5%, respectively (32). The relationship between family marriage and clinical genetics has been focused in various studies (25, 28, 33, 34).

In Iran, religious, cultural and social beliefs as well as the belief in more sustainability of the families and social and economic advantages account for the majority of family marriages. In some studies, reviews on clinical genetics of family marriages suggest that from a religious point of view, family marriage is neither undesirable and disavowed, nor recommended (24).

In another study, family marriage accounted for 45.95% of maternal abnormalities in new births (35) whereas the figure stands at an average 38% in Iranian society (36). This is indicative of the role of family marriage increasing the maternal abnormalities. With respect to the influential role of religious beliefs in social behaviors of the people in Iran and the wrong suppositions that family marriage has been recommended in Islam, promoting awareness of the society over this issue has cultural and conventional roots than religious grounds and is necessary (24, 36).

In our study, there was a significant relationship between parental age and with a variety of fetal malformations ( $P \leq 0.001$ ). Various studies have reported the incidence of congenital malformations in children of mothers aged 35 and above (37). The effect of paternal age was associated with trisomies 13 and 18. The risk of a child with down syndrome (DS) with young fathers is nearly double (38). A meta-analysis was done to examine the relationship between parental age and the incidence of nonsyndromic oral clefts.

In one study, it was shown that fathers aged 40 or older, compared with those between the age of 20 and 39 years had a higher chance of having a child with cleft palate by 58%. The risk of having a child with a cleft palate was 20% higher in the maternal age between 35 and 39 years, compared with those between 20 and 29 years. Mothers aged 40 years or over were 1.56 times more likely to have a baby with cleft lip with or without palate compared to those between the ages of 20 and 29 years old. No evidence of a link between maternal and paternal age with the incidence of oral clefts was observed (39). The results of this study are consistent with those of our survey. Therefore, the age of having children is the most important factor in having a healthy child and should be considered in the planning of education and health.

According to studies, 83.42% of cases terminating their pregnancy have happened in the 20th week of the gestation and 16.58% after the 20th week due to various fetal abnormalities, maternal problems and in emergency condi-

tions for which abortion certificates have been issued.

In view of the Islamic jurisprudence, abortion is forbidden in Islam and fetal abortion, even before ensoulment (4 months), is not permissible and is only permissible due to the distress and embarrassment of the mother (9). This has been explicitly mentioned in the single act:

“By virtue of single act passed on 2005/05/31 by the Islamic consultative assembly [Iranian parliament], abortion is allowed at the approval of three specialized physicians and verification of Forensic Medicine Organization in cases of fetal abnormalities that make it not viable after birth such as anencephaly or difficulties for mother before ensoulment (4 months) upon satisfaction of the mother for which there shall be no punishment or responsiveness for the associate specialized physicians” (9).

There is much debate on this law despite its usefulness in solving many family problems. The first point is that “fetal abnormalities” have not been specified in full; thus, it will be subject to time conditions and common law. Therefore, abnormality may mean the lack of a hand for some while others may not believe in this; or some may consider special diseases as the instances of abnormality. For instance, a court did not approve abortion for a couple due to the fact that the lack of the hand and feet is not a case to allow parents to terminate the pregnancy (40). The second point is that abortion is forbidden for defectiveness before 4 months of age unless the fetal defectiveness creates difficulties for the mother. The word “difficulties” is a general term and it needs a clear-cut definition. For instance, the difficulties arising from a handicapped fetus shall not be treated the same as difficulties for economic pressure coming from unintended abortion or rape. Therefore, if difficulties have to refer to hardships and toils, there is no distinction between the two. In this sense, it is necessary to refer to the common law to discern the attribution of “difficulties” (9).

The results of this study showed that in 16.58% of cases, termination of pregnancy has happened after 20th week of pregnancy for the protection of the life of the mother and for her difficulties.

In Imamiyah jurisprudence, according to the majority of the clergymen, abortion is never permissible after 4 months of pregnancy and ensoulment. However, a few jurists allow abortion even after ensoulment and under certain circumstances but they point out different reasons. Ayatollah Khoiyi, for instance, allows abortion in cases where abortion saves the mother’s life and recommends fixed blood money to be paid by mother (41).

Some contemporary jurists have allowed abortion due to the clash of laws or defense (42).

On defense: According to verse 195 of Baqarah (43), defending oneself and the need to protecting one’s life is le-

gitimate. This means that mothers can terminate pregnancy to protect their lives.

On clash of laws: When two laws contradict each other so that both cannot be enforced at the same time, it is called clash of laws (44). Imam Khomeini, however, does not give priority over keeping the mother or fetus after ensoulment. He believes that if the death of both is ascertained and if there is the possibility of keeping one alive, it shall be the “draw” to decide which one should survive. However, if there is the possibility of risking the mother’s life, abortion is allowed at the discretion of the specialist, before ensoulment of course (45, 46).

### 5.1. Conclusion

This study showed that in 79.6% of the abortion certificates were issued for fetal causes. Thalassemia major and maternal abnormalities of the neural system are amongst the most common factors for abortion due to fetal causes. In the majority of cases, family marriage accounts for the abortion. The abortion certificates were chiefly issued for fetuses of 17-20 weeks of age and around 16.58% of the certificates have been issued for fetuses above 20 weeks of age due to mother’s difficulty and emergency cases threatening the life of mothers.

Although therapeutic abortion has helped remove problems in the family, health system, society and amongst the judges and thinkers, it seems the following fields need more studies:

- The instance of “difficulty” should be elaborated more to avoid different decisions by decision-makers and authorities in the courts.

- The word defectiveness is a general term. Such cases as hemophiliac and thalassemia infants with abortion certificates are not defective physically.

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### Footnotes

**Ethical considerations:** This study was approved by the ethics committee of Shiraz University of Medical Sciences. Besides, written informed consents to publish the results

in the study were obtained forensic medicine, proposal. Number: 93-01-21-7745 and Ethics Number: 1394-8-4-7745. In sampling from the archives of the forensic, the identity of the individuals was unclear and individuals were identified with a code. Moreover, the publication of the results is licensed by the legal medicine organization (date: 16/8/2015)

**Conflict of Interest:** None declared.

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