

Relationship between the Time of Intrauterine Insemination and Pregnancy Outcome, Based on Islamic Recommendations

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Abstract

Background and Objectives: Intrauterine insemination (IUI) is one of the methods of infertility treatment. When is the best time to do this assisted reproduction procedure? There are many Islamic narrations about the appropriate time for fertilization in order to give birth to a physically, mentally, and spiritually healthy child. Therefore, this study examined the relationship between the time of IUI performance and its consequences according to Islamic narrations.

Methods: The present historical cohort study was conducted at an Infertility Center affiliated with the Academic Center for Education, Culture, and Research of Qom, Iran using the medical records of patients who underwent sex selection IUI procedure from 2011 to 2015. The data were collected using a researcher-made checklist consisting of demographic characteristics, factors affecting the pregnancy outcome in terms of medicine and narrations, as well as the pregnancy outcome. The collected data were analyzed in SPSS software (version 20).

Results: The findings indicated that the time of IUI performance based on Islamic recommendations and the pregnancy test result had a significant relationship ($P=0.003$). Moreover, the time of IUI based on Islamic recommendations had a significant relationship with pregnancy outcomes ($P=0.023$). The highest number of abortions and neonatal disorders were observed in pregnancies that had happened at the disapproved times according to the narrations (e.g., the end of the lunar month and when the moon is in Scorpio). Besides, the highest number of births of healthy infants happened when the insemination had happened at the recommended times (e.g., Thursday noon).

Conclusion: Due to the relationship between the time of IUI based on Islamic recommendations and the pregnancy outcome, it is recommended that IUI be performed based on Islamic recommendations and at times other than the disapproved times so that better results will be achieved in pregnancy. However, further studies are needed in this regard.

Keywords: Abortion, Intrauterine, Insemination, Islam, Pregnancy outcome, Religion.

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Introduction

The population growth rate in Iran has been reduced to 1.24% which has recently attracted the attention of the country's authorities (1). Despite widespread family planning policies in recent years,

couples are less reluctant to have more than one child. Moreover, infertile couples have to pay a large sum of money to infertility treatment centers and even if they succeed to become pregnant, there is still a risk of

pregnancy loss or congenital anomalies in the neonate for a variety of reasons (2). Depression and anxiety following the loss of pregnancy (3,4) and the expenditure of significant amounts of time and money are the challenges facing many couples.

A normal pregnancy is expected to result in the birth of a healthy neonate with the proper weight. However, there is always the possibility of premature birth, low birth weight, birth defects, infant death, and abortion (5). According to previous studies, there are various reasons for the loss of the pregnancy, such as endocrine causes (e.g., luteal phase defects (6), diabetes (7), hypothyroidism (8), and polycystic ovaries (9)), infectious causes (10), anatomical defects of the uterus (11), environmental causes (e.g., smoking (12), alcohol consumption (13), air pollution (14), and excessive coffee consumption (15)), and old age of parents (4, 16, 17). In infertility centers, only the medically known factors are considered and examined in infertile couples and in many cases, despite the elimination of all barriers to fertility and the use of pharmacological and invasive methods, the success rate of fertility is still very low. The Center for Disease Control and Prevention has reported the success rate of intrauterine insemination (IUI) to be 4-9% and in vitro fertilization in those below 35 years old and over 35 years old to be 31-46%, and 13%, respectively (18). However, the cause of many early abortions, genetic disorders, or other adverse outcomes is still unknown (19) and requires extensive research.

In the searches conducted in the database of articles and dissertations in the field of medicine and seminary education, no domestic or foreign study was found about the factors affecting the pregnancy outcome with an Islamic approach. On the other hand, in valid Islamic sources, such as Man La Yahduru al-Faqih (20), al-Kafi (21), and Wasa'il al-Shia (22), there are many narrations about the time of fertilization and its effect on the physical, mental, and spiritual health of the infant at the time of birth and even later years. For example, according to a quotation by Imam Sadiq (PBUH), fertilization at the beginning,

middle, and end of the lunar month is one of the factors that lead to physical deficiency and abortion (20). Moreover, the Prophet Muhammad (PBUH) who considered characteristics, such as eloquence, intelligence, and wit as the signs of spiritual health (23), has pointed out the effect of the time of fertilization on the child's spiritual health. Furthermore, he has said that the result of sexual intercourse on Friday night is the birth of an orator and eloquent child (22).

Given the valuable treasure of the Ahl al-Bayt's recommendations on various aspects of life, as well as the limited and incomplete nature of the experimental sciences, the researchers hope that by relying on the advice of the Infallibles, they will be able to improve the pregnancy outcomes and facilitate the birth of healthy children with the best physical, psychological, and spiritual characteristics. Therefore, the present study was conducted to determine the relationship between the time of IUI and the pregnancy outcome based on Islamic narrations.

Methods

The present historical cohort (descriptive-analytical) study was conducted in the infertility center affiliated with the Academic Center for Education, Culture, and Research in Qom province, Iran. The study population was the couples who referred to this infertility center during 2011-15, underwent sex selection IUI procedure through the Erickson method, and consumed folic acid according to the instructions. The eligible couples were enrolled in the study using the census sampling method. The exclusion criteria were 1) repeated abortions, 2) primary infertility, 3) poor sperm quality and quantity, 4) anatomical abnormalities of the uterus, 5) endocrine and autoimmune disorders, and 6) untreated genital infections.

In total, out of the 325 existing medical records, 298 couples met the inclusion criteria. It should be noted that all the studied couples were under the supervision of an urologist and had the minimum quality and quantity required for sperm to undergo IUI.

The data were collected through a checklist

which included variables, such as the age, education level, occupation, and nationality of the spouses, as well as cousin marriage or not, marriage duration, gravidity, previous pregnancy outcome, history of secondary infertility, smoking, time of IUI (disapproved, recommended, and neutral times), pregnancy test result, pregnancy outcome (if the pregnancy test is positive), and the gender of the fetus. It should be noted that in this study, the unhealthy pregnancy outcome includes abortion, ectopic pregnancy, premature birth, and neonatal abnormalities.

In this study, the medical record of the couples who underwent sex selection IUI procedure was reviewed and the time of IUI was compared with the Islamic recommendations. Therefore, the records were divided into three groups. The first group was those whose IUI was performed during the Islamic makruh (disapproved) time including the time when the moon is in Scorpio or in shadow (20, 22, 24-26) [when the moon is in the Scorpio or in front of the constellation Scorpio, which happens about 4 days per month and is calculated according to accurate astronomical calculations] (27), at the beginning, middle, and the end of the lunar month (20- 22, 24-25, 27), in the afternoon and on the nights of Eid al-Fitr, Eid al-Adha, and Mid-Sha'ban, the time between the false dawn and true dawn, between the adhan and iqama, at the time of natural disasters (22, 24).

The second group of people underwent IUI procedure during the mustahabb (recommended) times based on Islamic narrations including Aries [April], Aquarius [February], Taurus [May] (28), Thursday noon, Thursday, Monday, Tuesday and Friday nights, during and after the Friday evening (22,24).

Finally, the third group consisted of those whose IUI procedure was performed during mubah (neutral) times (without mentioning whether it is recommended or not in Islamic traditions). Finally, during the telephone interview, the results of the IUI procedure, including positive and negative pregnancy tests, and, if positive, the pregnancy outcome were determined and the checklist was

completed.

The collected data were analyzed in the SPSS software (version 20). Moreover, the Kolmogorov–Smirnov test was used to check the normality of quantitative variables. Furthermore, the research hypotheses were also analyzed using the chi-square, Fisher's Exact, and Mann-Whitney U tests.

Regarding the confidentiality of the data, a code was assigned to each record file which was also put on the questionnaire and the data collection sheets. Moreover, this research was approved by the Regional Ethics Committee of Qom University of Medical Sciences, Iran (registration code IR.MUQ.REC.1396.27).

Result

In this study, out of the 298 couples, the pregnancy test of 54 couples was positive. In couples with positive pregnancy test results, the mean and standard deviation of the age of men and women were 37.9 ± 3.5 (32-46), and 32.2 ± 3.8 (24-39) years. It was found that the age of the father ($P=0.48$) and mother ($P=0.80$) had no significant relationship with the pregnancy outcome. The demographic characteristics of the study subjects are shown in Table 1 based on the pregnancy outcome.

Furthermore, the Kolmogorov-Smirnov test results revealed no significant difference between the distribution of marriage duration with the normal distribution ($P=0.51$). Therefore, the independent t-test was used to investigate the relationship between pregnancy outcome and marriage duration. Based on the results of this test, the mean values of marriage duration in the two groups did not have a significant difference ($P=0.87$).

The results of the Kolmogorov-Smirnov test showed a significant difference between the distribution of the gravidity with the normal distribution ($P<0.0001$). Therefore, the Mann–Whitney U test was used to investigate the relationship between the pregnancy outcome and the number of pregnancies; however, no significant relationship was found ($P=0.88$).

The findings of this study revealed a significant difference between the three groups in terms of positive pregnancy test results ($P=0.003$). Moreover, a significant relationship

was found between the time of IUI performance and the pregnancy outcome (in 298 couples) ($P=0.023$) so that the highest number of healthy births (20%) was observed

in those who underwent IUI procedure at the recommended times (Table 2).

Out of 54 couples with a positive pregnancy

Table 1. Demographic characteristics of couples with a positive pregnancy test based on the pregnancy outcome

Variable		Pregnancy outcome				p-value*
		Healthy		Unhealthy		
		Number	Percent	Number	Percent	
Education level of the husband	Below high school	10	71.4	4	28.6	0.71
	High school/Associate degree	14	66.7	7	33.3	
	Bachelor degree and above	14	82.4	3	17.6	
	Seminary education	2	100	0	0	
	Total	40	74.1	14	25.9	
Education level of the wife	Illiterate	0	0	1	100	0.32
	Below high school	15	83.3	3	16.7	
	High school/Associate degree	14	70	6	30	
	Bachelor degree and above	11	73.3	4	26.7	
	Total	40	74.1	14	25.9	
Occupation of the husband	Clerk	19	82.6	4	17.4	0.32
	Self-employed	19	65.5	10	34.5	
	Student of theology	2	100	0	0	
	Total	40	74.1	14	25.9	
Occupation of the wife	Clerk	7	70	3	30	0.11
	Self-employed	0	0	1	100	
	Housewife	33	76.7	10	23.3	
	Total	40	74.1	14	25.9	
Nationality of couples	Iranian	39	73.6	14	26.4	1.00
	Non-Iranian	1	100	0	0	
	Total	40	74.1	14	25.9	
Cousin marriage	Yes	11	68.8	5	31.2	0.74
	No	29	76.3	9	23.7	
	Total	40	74.1	14	25.9	
Outcome of the previous pregnancy	Birth of neonate with congenital diseases	1	100	0	0	1.00
	Preterm birth	1	100	0	0	
	abortion	5	83.3	1	16.7	
	Birth of a healthy neonate	32	71.1	13	28.9	
	Total	39	73.6	14	26.4	
History of secondary infertility	Yes	7	77.8	2	22.2	1.00
	No	33	73.3	12	26.7	
	Total	40	74.1	14	25.9	
Smoking	Yes	4	66.7	2	33.3	0.64
	No	36	75	12	25	
	Total	40	74.1	14	25.9	

*Fisher's Exact Test

Table 2. Frequency of IUI results based on the time of procedure(298 couples)

Time of IUI procedure	Pregnancy test result		p-value*	IUI result		p-value*	Total Number Percentage
	Positive	Negative		Healthy neonate	Unhealthy neonate+Negative pregnancy test result		
Disapproved	25	64	0.003	16	73	0.023	89
	28.1%	71.9%		18%	82%		29.9%
Recommended	13	47		12	48		60
	21.7%	78.3%		20%	80%		20.1%
Neutral	16	133		12	137		149
	10.7%	89.3%		8.1%	91.9%		50%
Total	54	244		40	258		298
	18.1%	81.9%		13.4%	86.6%		100%

*Chi-Square Test

test result, the frequency of healthy births was 74.1%. The highest and lowest frequency of healthy infants based on the time of IUI was found at the recommended (92.3%) and

disapproved time (64%), respectively. Moreover, based on the time of IUI, the highest and lowest frequency of abortions were found in the disapproved time, especially the

time of the moon in Scorpio (25%), and the recommended time, especially on Thursday noon, respectively. However, no significant relationship was found between the time of IUI (recommended, disapproved, and neutral) and

the pregnancy outcome (healthy and unhealthy) (Table 3).

Furthermore, no significant relationship was

Table 3. Frequency of pregnancy outcome, based on the time of IUI in couples with positive pregnancy test results (54 couples)

Table 5: Frequency of pregnancy outcome, based on the time of IUI in couples with positive pregnancy test results (54 couples)								
Time of IUI		Pregnancy outcome					p-value*	
		Healthy neonate	Unhealthy neonate					
			abortion	Preterm labor	Neonatal anomaly	Ectopic pregnancy		
Recommended	Aries, Aquarius, and Taurus	10 91%	1 9%	-	-	-	0.19	
	Thursday noon	2 100%	-	-	-	-		
	Total	12 92.3%	1 7.6%					
	Beginning, middle, and end of the lunar month	6 75%	1 12.5%	-	1 12.5%	-		
Disapproved	Moon in Scorpio	9 75%	3 25%	-	-	-		
	Afternoon	1 20%	1 20%	1 20%	1 20%	1 20%		
	Total	16 64%	5 20%	1 4%	2 8%	1 4%		
	Neutral	Except disapproved and recommended	12 75%	3 18.7%	-	-		1 6.3%
	Total	40 74.1%	9 16.6%	1 1.9%	2 3.7%	2 3.7%		

*Fisher's Exact Test

found between the time of IUI performance and the accordance of the gender of the newborn with the selected gender ($P=0.45$)

Discussion

The present study was the first research that investigated the relationship between IUI time and its results according to Islamic traditions. In this study which was performed on a statistical population of 298 couples, the most important finding was that there is a significant relationship between the time of IUI performance and its outcome. For this purpose, the number of IUI cases that resulted in pregnancy and finally the birth of a healthy infant were compared to the number of IUI cases whose results were negative or even if they were positive, did not lead to the birth of a healthy neonate. Eventually, it was found that insemination at the recommended time resulted in the highest number of birth of healthy neonates.

Investigation of the studied pregnant women (54 subjects) revealed no significant relationship between the time of IUI performance and pregnancy result ($P=0.19$),

which could be due to the small sample size (54 couples). However, the comparison of the obtained percentages indicated a significant difference between the groups with recommended and disapproved times, regarding the birth of healthy or unhealthy neonates, the rate of abortion, and ectopic pregnancy. In this regard, 92.3% of all the pregnancies which were the result of insemination at the recommended time resulted in the birth of a healthy child, while the lowest rate belonged to those that happened at the disapproved time (64%). In other words, 36% of pregnancies that were conceived at disapproved times led to problems, such as abortion, premature birth, ectopic pregnancy, or neonatal abnormality. Nevertheless, the rate of such issues was only 7.7% in pregnancies that were conceived at the recommended time. These findings are in line with the quotes of the Infallibles since many of them have discouraged fertilization at the beginning, middle, and end of the lunar month, afternoons, when the moon is in Scorpio and in shadow (when the moon is in the Scorpio or in front of the Scorpio constellation which

happens about 4 days per month and is calculated through accurate astronomical calculations). They also have referred to negative physical, mental, and spiritual consequences for pregnancies that are conceived during these times. Some of them have even have considered them as disapproved in general. For example, Al-Hurr al-Amili quotes from Imam Sadiq (PBUH) in *Wasa'il al-Shia* that: "Fertilization, when the moon is in Scorpio, causes the humans not to see what they want and what is good for them" and he continues that in another narration Imam Sadiq (PBUH) says: "If intercourse during this time results in conceiving a child, it will be aborted before the pregnancy is complete" (22). In another narration from Imam Musa al-Kadhim (PBUH), it is stated that "Intercourse during this time will put the conceived child at the risk of abortion before the pregnancy is finished" (21). Moreover, according to Imam Sadiq (PBUH) narration, sexual intercourse at the beginning, middle, and end of the lunar month causes the abortion of the conceived child and if a child is born, it will have mental or physical disorders (20).

In this study, more than half of the abortions (55%) happened to inseminations were done at disapproved times, especially when the moon was in Scorpio, which is consistent with the recommendations of the Infallibles (21,22). However, the rate of abortion at the recommended time was only 11%.

Furthermore, in the present study, the highest number of healthy newborns (92.3%) was related to insemination at the recommended times, especially during April, May, and February, which is consistent with a quotation from Imam Reza (PBUH) which is: "Astronomical positions affect the practice of sexual intercourse and it is better to have intercourse on the nights when the moon is in the Aries (April) or Aquarius (February). Even better than these two is Taurus (May), which is the Sharaf Qamar (when the moon is in its strongest form). When the moon is in Taurus, it strengthens the zygote into embryo in the uterus" (28).

In the present study, no significant relationship was found between the pregnancy

outcome and parental age which is agreed with a study performed by Hurley EG and DeFranco EA which found that the increase of the paternal age did not lead to a significant increase in the rate of preeclampsia, preterm delivery, fetal growth restriction, congenital anomaly, genetic disorder, or hospitalization in the neonatal intensive care unit (29). However, in a study conducted by Riffat J et al., if the age of the father was more than 35, it was associated with an increased risk of abortion (16). Furthermore, a study carried out by Khalil A et al. found that the risk of abortion, preeclampsia, diabetes, and low birth weight increased with the increase of maternal age (5). The results of these two studies are inconsistent with those of the present study. This inconsistency could be due to different statistical populations and the age of parents in this study. Since in the present research, the mean of the paternal age was about 38 years old and the mean of the maternal age was 33 years old; therefore, the majority of the participants were below 35 years old.

In this study, no significant relationship was found between smoking and drug use with pregnancy outcomes. However, the results of a study conducted by Wang L, Yang Y, Liu F et al. indicated that parental smoking was associated with abortion (12), and thereby are inconsistent with those of this study.

In the present study, the desired gender of the newborn coincided with the actual gender of the neonate in 62.5% of the cases. Moreover, the overall rate of abortion was 16.6% while this rate at disapproved and recommended times was 20% and 7.7% respectively. Nevertheless, in a study performed by Khalili et al., more than 70% of cases gave birth to their desired child and the rate of abortion was 12.5% (30).

As a limitation of this study, it is mentioned that in Islamic narrations, various times of day and month have been described as disapproved and recommended. For instance, nights of Monday, Tuesdays, Thursdays, Fridays, and during and after Friday evenings have been declared as recommended times. In addition, Wednesday nights, Mid-Sha'ban, Eid al-Fitr, and Eid al-Adha have been declared as

disapproved. However, due to the working hours of infertility centers which are from morning till evening, official holidays, such as Fridays, Eid al-Fitr, and Eid al-Adha, many instances mentioned in quotations cannot be investigated and only a limited number of disapproved and recommended times can be studied. Therefore, it is suggested that more extensive studies be conducted by the conduction of night shifts and the performance of IUI procedures at night so that all the disapproved and recommended times can be thoroughly examined.

Conclusion

According to results, the time of IUI had a significant effect on the health of the infant. Therefore, the right time for the IUI should be emphasized and the results be evaluated in future studies. Moreover, the couples who are planning to become pregnant should be advised to avoid intercourse during disapproved times and choose the recommended times for conceiving to achieve the desired results and give birth to a healthy child. Furthermore, children who were conceived at recommended times are hoped to have certain positive moral characteristics, such as eloquence, wisdom, satisfaction with God's will, and memorization of the Quran. The result of conceiving at the disapproved times may lead to the birth of a child with unpleasant characteristics such as wickedness, cruelty, bloodthirstiness, and stinginess. The determination of these matters requires a prospective study within a span of several years. Such a study will be very valuable and necessary since if such a relationship is significant, one can hope for a better outcome by adherence to religious orders.

Conflict of interest

The authors declare that they have no conflict of interest regarding the publication of this article.

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References

1. Presidency of the I.R.I. Selected results from the General Population and Housing Census. Tehran: Statistical Center of Iran. Office of the Head, Public Relations and International Cooperation; 2017 50 p. [Persian]
2. Francine R, Pascale S, Aline1a H. Congenital Anomalies: Prevalence and Risk Factors. *Universal Journal of Public Health*. 2014;2:58-63. [Link](#)
3. Hunter A, Tussis L, Mac Beth A. The presence of anxiety, depression and stress in women and their partners during pregnancies following perinatal loss: A meta-analysis *Journal of Affective Disorders*. 2017; 223:153-164. [Link](#)
4. Giannandrea SAM, Cerulli C, Anson E, Chaudron LH. Increased Risk for Postpartum Psychiatric Disorders Among Women with Past Pregnancy Loss. *J Womens Health*. 2013;22(9):760-8. [Link](#)
5. Khalil A, Syngelaki A, Maiz N, Zinevich Y, Nicolaides KH. Maternal age and adverse pregnancy outcome: a cohort study. *Ultrasound Obstet Gynecol*. 2013;42(6):634-43. [Link](#)
6. Ford HB, Schust DJ. Recurrent pregnancy loss: etiology, diagnosis and therapy. *Rev Obstet Gynecol*. 2009; 2(2):76-83. [Link](#)
7. American Diabetes Association. Management of Diabetes in Pregnancy: Standards of Medical Care in Diabetes. *Diabetes Care*. 2018;41(Suppl. 1): S137-S143. [Link](#)
8. Gahlawat P, Singh A, Nanda S, Kharb S. Thyroid dysfunction in early pregnancy and spontaneous abortion. *Biomed Biotechnol Res J*. 2017;1:81-4. [Link](#)
9. Rai R, Backos M, Rushworth F, Regan L. Polycystic ovaries and recurrent miscarriage-a reappraisal. *Hum Reprod*. 2000;15(3):612-5. [Link](#)
10. Petit E, Abergel A, Dedet B, Subtil D. The Role of infection in preterm birth. *J Gynecol Obstet Biol Reprod (Paris)*. 2012;41(1):1425. [Link](#)
11. Lin PC. Reproductive outcomes in women with uterine anomalies. *J Womens Health*. 2004;13:33-9. [Link](#)
12. Wang L, Yang Y, Liu F, Yang A, Xu Q, Wang Q, et al. Paternal smoking and spontaneous abortion: a population-based retrospective cohort study among non-smoking women aged 20-49 years in rural China. *J Epidemiol Community Health*. 2018;72:783-9. [Link](#)
13. Van Heertum K, Rossi B. Alcohol and fertility: how much is too much?. *Fertility Research and Practice*. 2017;3:10. [Link](#)
14. Delpisheh A, Direkvand moghadam A, Direkvand moghadam F. The impact of air pollution on pregnancy outcomes: A systematic review. *IJOGI*. 2014;17:7-11.

- [Persian] [Link](#)
15. Lyngsø J, Ramlau-Hansen CH, Bay B, Ingerslev HJ, Hulman A, Kesmodel US. Association between coffee or caffeine consumption and fecundity and fertility: a systematic review and dose-response meta-analysis. *Clin epidemiol*. 2017;9: 699-719. [Link](#)
 16. Jaleel R, Khan A. Paternal factors in spontaneous first trimester miscarriage. *Pak J Med Sci*. 2013;29(3):748–52. [Link](#)
 17. Slama R, Werwatz A, Boutou O, Ducot B, Spira A, Hardle W. Does Male Age Affect the Risk of Spontaneous Abortion? An Approach Using Semiparametric Regression. *Am j epidemiol*. 2003; 157(9):815-24. [Link](#)
 18. Centers for Disease Control and Prevention, American Society for Reproductive Medicine, Society for Assisted Reproductive Technology. 2007 Assisted Reproductive Technology Success Rates: National Summary and Fertility Clinic Reports, Atlanta: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention; 2009. 573 p. [Link](#)
 19. Cunningham FG, Leveno KJ, Bloom SL, Dashe JS, Hoffman BL, Casey BM et al. *Williams Obstetrics* [B. Ghazi jahan , trans]. Tehran: Gholban publication; 2018.p.227. [Persian]
 20. Saduq S, ibn Babaway M. *Man la Yahduru al-Faqih*. Qom: Islamic Publications Affiliated to Jame'ah Modarresin Qom; 1989; p . 394-403. [Arabic]
 21. Kolehini M. al-Kafi. Tehran: Darol Kotobel Islamiah; 1986;5. p. 498-500. [Persian]
 22. Ameli M. *Vasael al-Shi'a*. vol 20. Qom: Al-Al-Bait Institute; 1988. p. 114-255. [Arabic]
 23. Vashiyan, AA, Spiritual Health Indicators in the Health Document, *Journal of Health Promotion*. 1396;1: 83-8. [Persian] [Link](#)
 24. Sadooq S. *Illal Al-Sharaie: Reasons for Islamic Practices*. Qom: Davari; 2006. p. 514-7. [Arabic]
 25. Toosi AJ. *Tahzib al-Ahkam*. Tehran: Dar al-Kitab al-Islamia; 1985. p. 407-12. [Persian]
 26. Saduq S, ibn Babaway M. *Uyun al-Akhbar al-Reza*. Tehran: World; 1999. p. 289. [Arabic]
 27. Mosaddegh, MH. *Preliminary Astronomy*. Tehran: House of Culture; 2003. p. 87. [Persian]
 28. Amyrsadghi KN. Translation of *Teb Al-Reza*. Imam Reza (Authors). Tehran: Meraji. 2002:172. Attributed to Ali ibn Musa al-Reza. *Teb Al-Reza* [N. Amyrsadghi, trans]. Tehran: Meraji; 1997. p. 174. [Persian]
 29. Hurley EG, DeFranco EA. Influence of paternal age on perinatal outcomes. *Am J Obstet Gynecol*. 2017; 217(5): 566.e1-566.e6. [Link](#)
 30. Khalili MA, Khani B, Baghazadeh Sh, Tabibnejad N. Sex selection by using albumin gradient technique for sperm separation in IUI cycles. *J Reprod Infertil*. 2007; 8(3):213-20 [Persian] [Link](#)