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Examining Prevalence of Fetal Defects and Related Factors in Neonates Born and Hospitalized in Kerman Reference Hospital: A 66-Month Study

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Abstract

Background: Congenital malformations are one of the most important causes of disability and mortality of neonates. Many of these defects can be prevented. Therefore, recognizing and preventing the threatening factors that cause the adverse outcomes of pregnancy can prevent excessive costs to the family and society. The present study was performed to determine the prevalence of congenital malformations and some related factors in Afzalipour Hospital in Kerman, Iran.

Materials and Methods: In this cross-sectional study and historical cohort, 1089 neonatal files were selected from 43076 files in the period of March 2014 to September 2019 by stratified sampling method with proportional allocation. Maternal and neonatal information including gender of infant, maternal and neonatal blood type, first and fifth minute Apgar score, LMP-based gestational week, maternal underlying disease, history of disease in pregnancy, maternal addiction, maternal number of pregnancies, number of childbirths, number of live children, number of stillbirths, history of abortion and stillbirth, type of childbirth and the congenital anomalies and its type were extracted from the files and recorded in the researcher-made checklist.

Results: The prevalence of congenital malformations in neonates was 16.6%. The most common malformations were cardiovascular malformations (55.3%) and genitourinary malformations (19.3%). Girl gender, lack of maternal addiction, increasing maternal pregnancy, low Apgar score, and hospitalization in NICUs increase the chances of congenital malformations in neonates.

Conclusion: The prevalence of congenital malformations in neonates was 16.6%. The most common malformations included cardiovascular malformations and genitourinary malformations.

Key Words: Congenital malformations, Prevalence, Neonate.

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1- INTRODUCTION

Fetal defects are defined as malformations that occur during pregnancy due to genetic or environmental or integrated factors and the fetus suffers from defect in the structure of function and metabolism or a combination of these defects in some parts of the body (1, 2). Studies conducted in different parts of the world show that the prevalence of congenital malformations varies in different countries (3, 4). For example, the prevalence of malformations in the United Kingdom is estimated 8.7 percent and in the United States, it is estimated 2.76 percent (5, 6). Studies have shown that the overall prevalence of malformations in Iran is 2.6% and in boys and girls is 2.8% and 2%, respectively. The highest prevalence of malformations is related to the musculoskeletal system (29.1%) and the lowest is related to the respiratory system (2.9%) (7). These defects may be insignificant or may lead to major problems in the main organs of the fetus that make fetal life impossible (2).

In fact, congenital malformations are developmental errors of the fetus that exist at birth and may occur at any stage of fetal development and they are alternative in terms of factors causing the type, extent and frequency of occurrence (8). Various factors such as drugs, infections, various diseases, smoking, malnutrition, age and being exposed to radiation in pregnancy are the causes of malformations (8, 9). For example, abnormal births are more common in mothers with urinary tract infections (10). Neonate weight, parental age, especially maternal age, and birth weight are also associated with some fetal abnormalities (11). Also, in various studies, the prevalence of birth with congenital malformations is higher in mothers older than 40 years and younger than 19 years (12). Internationally, about 7.9 million people are born with birth defects each year, of which approximately 3.3 million die before five year old (13). Despite advances in the etiology and pathogenesis of the malformations, 22% of neonates' mortality is caused by major congenital malformations. The cost of health care for them is more than 6 million per year (14-16). Birth, care of a fetus and then a neonate with an abnormality affect the physical, mental, psychological, social and economic dimensions of the neonate's family (17). Children with disabilities, depending on the type and severity of the disability, can experience a vegetarian or relatively normal life, in which case they will face special problems (18).

Some people in the society believe that having a child with a disability is a nightmare that is reasonable to prevent and eliminate (19) and on the other hand, pregnancy with abnormal fetuses is a factor that challenges the family, community and physician in making decisions (20). These parents are in conflict with their surroundings to make a decision about this abnormal child (21); while in most cases, the necessary facilities for optimal life are not available to these families, as a result, the quality of life of the disabled person and his companions will not have a desirable level (22). Therefore, identifying and eliminating the threatening factors that may lead to the adverse outcomes of pregnancy is in a priority for communities to eliminate excessive costs to society and the family by eliminating them (23).

For example, with the improvement of care of pregnancy periods and other public health measures that increase the number of term deliveries, especially by targeting mothers of fetuses with chronic heart defects, birth weight and long-term health are expected to be improved (24). Therefore, due to the geographical, cultural, social and economic differences of societies, regional studies can be an effective step in preventing the occurrence of congenital malformations and mortality

and disability causing by it (4). Therefore, the present study was performed to determine the prevalence of congenital malformations and some factors affecting their incidence in Afzalipour Hospital in Kerman, which can provide the basis for other research to reduce the prevalence of malformations and, if possible, prenatal diagnosis of subsequent children.

2- MATERIALS AND METHODS

2-1. Study design and population

In this cross-sectional study and historical cohort, the study population was all live neonates born in Afzalipour Hospital in Kerman, Iran, from the beginning of 21 March 2014 to the 22 September 2019. The total number of newborns born during this period was 43,076 files, of which 1089 were randomly selected.

2-2. Method

The samples studied in this study were collected through stratified sampling with proportional allocation. The information was collected through the file in the hospital and recorded in a checklist prepared by researchers and the information collected by researchers. In this hospital, there are 4 wards for neonatal hospitalization and in this study; the sample size was randomly selected according to the volume of each ward.

2-3. Measuring

Congenital neonatal defect status (yes= 1 and no= 0) was considered as the response variable. Independent variables studied in this study include neonatal gender (boy, girl), maternal age (year), hospitalization ward (cesarean section (gynecology ward), normal ward (midwifery ward), NICU1 and NICU2), Apgar score 1 minute, Apgar score 5 minutes, week of pregnancy based on LMP, underlying maternal disease (yes and no), maternal disease during pregnancy, drug use during pregnancy (yes and no), maternal addiction (yes and no), neonatal jaundice (yes and no), number of pregnancies, number of childbirths, number of abortions, number of stillbirths (yes and no), number of stillbirths, number of live children, mother blood type and child blood type.

2-5. Inclusion and exclusion criteria

Neonates who died in the early stages of birth were excluded from the study due to lack of knowledge about some abnormalities, also infants who sent from other centers as well as infants born at home were excluded from the study. All newborns and neonates admitted to the intensive care unit of Afzalipour Hospital in Kerman were included in the study within the defined period.

2-6. Ethical consideration

In this study, after obtaining a license from the Vice Chancellor for Research of Kerman University of Medical Sciences (IR.KMU.REC.1398.274), and Razi School of Nursing and Midwifery and submitting a license to the director of Afzalipour Hospital, the research objectives and working methods were explained to the officials and after obtaining permission from the hospital director, the research was conducted.

2-7. Data Analyses

Due to the fact that the information was collected through the file in the hospital, the information in some of the files was incomplete. Before performing logistic regression, the missing information was estimated by multiple imputation method. Significance level (α) was considered equal to 0.05. SPSS software version 16.0 was used for statistical analysis. In the descriptive part of this study, the variables were described using the statistics of mean, standard deviation, frequency and percentage. In the analytical part, Chi-square and t-test were used to compare the prevalence of congenital defects in each of

the variables and also logistic regression was used to examine the factors affecting congenital defects

3- RESULTS

In this study, information of 1089 births was collected. The mean age of mothers (standard deviation) was 28.44 (6.34) years and the mean were 28 years. Regarding maternal blood type, 29.3% had blood type A, 25.2% had blood type B, 37.4% had blood type O and 8.1% had blood type AB. The mean gestational age (standard deviation) was 35.96 (4.79) weeks. **Table.1** shows the descriptive information of mothers and infants studied in Kerman. The percentages reported in this table were calculated by removing incomplete items.

Table.1 showed that 25.4% of mothers had underlying disease. Also, 36.5% of mothers suffered from at least one disease during pregnancy and 25.1% of mothers took medication during pregnancy. In this study, 5.7% of mothers were addicted to drugs. Maternity information was recorded from 256 mothers, 65.6% of whom had a cesarean section. In this study, 32.9% of mothers had their first history of pregnancy and 41.3% had their first history of childbirth. The average number of mothers giving birth was 2.1. Also, 1% had a history of stillbirth and 22.7% of mothers had a history of abortion. Among the neonates, 559 (51.6) boys and 525 (48.4) girls were born and also the file information of 5 infants was unknown. Jaundice was observed in 14.8% of neonates. The mean Apgar score of one and five minutes after birth was 8.44 and 9.52, respectively. As shown in **Table.1**, 181 (16.6%) neonates had birth defects. Among them, 7 neonates (3.9%) had nervous system problems, 100 neonates (55.3%) had cardiovascular problems, 10 neonates (5.5%) had gastrointestinal defects, 8 neonates (4.4%) had Musculoskeletal problems, 17 neonates (9.4%) had organ problems, 1 neonate (0.6%) had ear and eye defects, 3 neonates (1.6%) had respiratory problems and 35 neonates (19.3%) had urinary and genital defects.

Table-1: Descriptive information of mothers and neonates admitted to Afzalipour Hospital in Kerman from 2014 to 2019.

Variables		Number	%	Variables		Number	%
Mothers information				History of abortion	Yes	247	22.7
Maternal blood group	A	261	29.3		No	841	77.3
	B	225	25.2	Neonates information			
	O	334	37.4	Gender	Male	559	51.6
	AB	72	8.1		Female	525	48.4
Underlying disease	Yes	275	25.4	Jaundice	Yes	161	14.8
	No	807	74.6		No	928	85.2
Disease during pregnancy	Yes	397	36.5	Blood group	A	282	28.9
	No	692	63.5		B	295	30.2
Mothers took medication during pregnancy	Yes	273	25.1		O	347	35.6
	No	816	74.9		Ab	52	5.3
Maternal addiction	Yes	62	5.7	Congenital neonatal defect	Yes	181	16.6
	No	1027	94.3		No	907	83.4
History of stillbirth	Yes	11	1				
	No	1077	99				

Tip: The percentages reported in this table were calculated by removing incomplete items.

In this study, 42.4% of neonates were hospitalized in cesarean section (women), 33.3% in normal ward (midwifery), 6.9% in NICU1 ward and 17.4% in NICU2 ward. The prevalence of congenital malformations in each of these sections was equal to 0.04, 0.08, 0.31 and 0.58, respectively. Using chi-square test, the prevalence of congenital defects in these sections are significant ($p<0.001$). The prevalence of congenital defects for other variables and their comparison using chi-square test is shown in **Table.2**. As it can be seen in **Table.2**, the prevalence of neonatal defect is significant based on maternal blood groups, neonatal gender, and jaundice at 5%. Also to compare the mean of quantitative independent variables (Apgar score 1 and 5 minutes, maternal age, gestational week, number of pregnancies, number of childbirth, number of abortions, number of stillbirths and number of live births) at two levels of infant congenital malformations (yes and no), T-test was used. The results of this test showed that the variables of Apgar score of 1 and 5 minutes, week of pregnancy, number of abortions and number of stillbirths were significant.

Table-2: The prevalence of congenital defects for other variables and their comparison using chi-square test.

Variables		Prevalence of neonatal defect (%)	P-value	Variables		Prevalence of neonatal defect (%)	P-value
Maternal blood group	A	11.6	0.02	History of stillbirth	Yes	9.1	0.49
	B	19.9			No	16.8	
	O	16.7		Neonatal gender	Male	13.8	0.01
	AB	22.1			Female	19.5	
Underlying disease	Yes	16.8	0.97	Jaundice	Yes	35.4	0.001
	No	16.7			No	13.5	
Disease during pregnancy	Yes	19.4	0.07	Neonatal blood group	A	15.4	0.71
	No	15.2			B	18.1	
Mothers took medication during pregnancy	Yes	19	0.23		O	17.1	
	No	15.9			AB	13.3	
Maternal addiction	Yes	4.9	0.63				
	No	16.8					

Multiple logistic regressions were used to investigate the factors affecting congenital defects. The status of the neonate's congenital disorder was considered as the response variable. Before performing logistic regression, the values of samples with missing information were estimated through multiple imputation methods. **Table.3** lists the factors associated with neonates' congenital defect. **Table.3** shows that female neonates with a lower score of 1 minute Apgar test, no addiction, and hospitalization in normal wards, NICU1 and NICU2, as well as more frequent maternal pregnancies increase the chances of congenital defect. According to these results, the chance of defects in male neonate is 0.42 less than female neonate. As each Apgar test score increases, the chance of death decreases by 0.34. The chance of neonate defect in mothers with addiction is 0.61 less than mothers without addiction. The chance of neonatal defect in normal wards, NICU1 and NICU2 are 2.51, 8.36 and 28.55 of neonates admitted to cesarean section. By increasing in the number of pregnancies of mothers, the chance of birth defects in neonates increases by 1.15 times. Maternal age variables, Apgar score 5 minutes,

gestational week, maternal underlying disease, maternal disease in pregnancy, drug use in pregnancy, neonatal jaundice, number of abortions, stillbirth history, maternal blood type and child blood group have significant effect on neonates' defects. Also, the effect of variables on number of birth births, number of stillbirths and number of live children due to high correlation (greater than 0.6) with other variables were removed from the logistic regression model.

Table-3: The factors affecting congenital defects in Kerman from 2014 to September 2019 using logistic regression test.

Variables		Beta	P-value	OR	95% CI
Gender	Female	Reference			
	Male	-0.55	0.01	0.58	0.39 – 0.87
Apgar score 1 minute		-0.42	<0.001	0.66	0.57 -0.75
Maternal addiction	No	Reference			
	Yes	-0.95	0.04	0.39	0.16– 0.94
Hospitalization ward	Cesarean Section	Reference			
	Normal Wards	0.92	0.01	2.51	1.36–4.62
	NICU one	2.12	<0.001	8.36	4.1 – 17.03
	NICU two	3.35	<0.001	28.55	16.03 – 50.83
Number of pregnancies		0.14	0.03	1.15	1.01– 1.31

OR: Odds ratio, CI: Confidence interval.

4- DISCUSSION

The present study was performed to determine the prevalence of congenital malformations and some related factors in Afzalipour Hospital in Kerman, Iran. The findings of this study showed that the incidence of congenital malformations in neonates born in Afzalipour Hospital in Kerman from April 2014 to the end of September 2017 was 16.6%. The results of the present study were lower than the research of Mashuda et al in 2012 in Tanzania with a prevalence of 29% (35), while according to the research of Irani et al. in 2018, this rate was 2.6% in the whole country (7), and also in other surveys conducted in other cities, this percentage is close to the percentage of the whole country. For example, in a study in Sabzevar, the incidence of fetal defects was 2.4% (25) and it was 3.1% in Shariati Hospital in Tehran from 2002 to 2004 (26). In a study in Birjand, the incidence of defects was reported to be 1.83 per 1000 live births (27), and in another study in Ardabil, this rate was estimated 8.2 per 1000 live births (10). This discrepancy can be due to the following factors: In other studies, most of the obvious and major fetal defects were considered in the initial examination of the neonate, but in the present study, by carefully examining the files of neonates admitted to neonatal wards that according to more exact clinical examinations of neonatologists and the requested tests and imaging on neonates with complications, more abnormalities such as cardiovascular and gastrointestinal abnormalities have been diagnosed. According to the educational nature of the hospital, people with lower socioeconomic status refer to these hospitals that according to a study, low socioeconomic status is one of the factors affecting the incidence of congenital defects which is probably due to lack of health care and inadequate nutrition (28). Also, Afzalipour Hospital is the only reference hospital in

Kerman where mothers at high risk for childbirth, including preterm childbirth, preeclampsia and other high-risk disorders, are referred to this center from other parts of the province as well as from the neighboring province of Sistan and Baluchestan province.

Since consanguineous marriage is very common in Iran and especially in the southeast of Iran (29), and in some studies, consanguineous marriage has been suggested as a factor in increasing the prevalence of congenital malformations (10, 30), it can be an effective factor in increasing this rate which has not been included in the present study. On the other hand, pregnancies that are performed through methods of helping reproduction in this center are terminated in the same hospital, and since the history of non-reproductive and the use of methods of helping reproductive can have a positive effect on the prevalence of congenital defects (31), it can affect the high prevalence of congenital malformations in this hospital. In this study, the prevalence of congenital defects in girls was higher than boys, so that the chance of defect in boys is 0.42 less than girls.

In the study conducted by Mashuda et al. (2012) in Tanzania, being a girl is one of the factors influencing the incidence of malformations (35). In other studies, the prevalence of defects in boys has been reported more (12, 23, 27, 32, 33). Irani et al. have reported it 2% in girls and 2.8% in boys in a systematic review study from 1986 to 2018 in the country (7). In the present study, cardiovascular malformations with 55.3% had the highest percentage and genitourinary malformations with 19.3% had the next rank. In the study conducted by Kavianyn et al. in Golestan (34), the most congenital malformations is related to the cardiovascular system, which is consistent with the results of this study, while in the study of Alijahan in Ardabil (10) Aliakbarzadeh et al. in Sabzevar (25), the highest prevalence of malformation has been reported musculoskeletal system malformation and also in the study conducted by Shkouhi et al. in Hamedan (23), the most common defect was related to the genitourinary system. In the present study, the chance of neonatal malformation in normal childbirth wards (midwifery), NICU one and NICU two were 2.51, 8.36 and 28.55 times higher than cesarean ward (women), respectively. The prevalence of congenital malformations was higher in NICU two that this may be due to the fact that more neonates with malformations have been admitted to this ward, and according to clinical trials performed on them, more congenital defects have been diagnosed. In addition to being a girl and being hospitalized in natural wards and neonates, other factors that have been effective on the prevalence of congenital malformations in this study were the lower score of the minute 1 Apgar test, the increase in the number of maternal pregnancies and the mother's lack of addiction. In a study in Babol (39), there was a significant relationship between the number of maternal pregnancies and the incidence of congenial defects.

In some studies, maternal addiction has increased the risk of congenital malformations (36, 37). In studies in Tanzania and Iraq (38), no relationship has been found between the prevalence of malformations and smoking and alcohol consumption, which may be similar to the present study. Since most families refuse to tell the truth due to social and moral issues, it can affect this factor. In the present study, blood groups, maternal age, week of pregnancy based on LMP, underlying maternal disease, maternal disease in pregnancy, neonatal jaundice, number of abortions and stillbirth had no significant effect on neonatal defects. In the study conducted by Gholipour et al. on blood groups, no relationship between

them and congenital malformations has been reported (38), which is similar to our study. In the study conducted by Hajian et al., no significant relationship was found between major obvious malformations and maternal age and maternal underlying disease (39). In the study conducted by Alijahan et al. in Ardabil, the history of abortion and stillbirth had increased the likelihood of abnormal birth (10), which is contrary to this study. In the study conducted by Dehghani et al. (2018), drug use in pregnancy along with other factors such as elderly parents during fertilization, maternal diabetes, influenza and febrile diseases during pregnancy, lack of multivitamins during and before pregnancy are some of the factors affecting the incidence of congenital heart defects in neonates (40) that many of these factors have not been considered in the present study, so due to the high prevalence of congenital malformations and especially cardiac malformations in this study, details such as father's age, specific diseases such as diabetes, not taking multivitamins, infections, etc. should be considered in future studies, this issue was not possible in this study due to retrospective research and lack of access to all information of parents and neonates.

5- CONCLUSION

According to the results of this study, the prevalence of congenital malformations in neonates was 16.6%. The most common malformations included cardiovascular and genitourinary malformations. Due to the very high prevalence of fetal malformations in this study, the need for an exact planning to further investigate the factors associated with the incidence of defects as well as effective interventions to reduce risk factors, especially in pregnancy care, seems necessary.

6- CONFLICT OF INTEREST: None.

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8- REFERENCES

1. DeSilva M, Munoz FM, Mcmillan M, Kawai AT, Marshall H, Macartney kk, et al. congenital anomalies and guidelines for data collection, analysis, and presentation of immunization safety data. Vaccine. 2016; 34(49): 6015 – 6026.

2. Sadler TW. Longman's Medical Embryology. Philadelphia: Walters Kluwer Lippincott Williams & Wilkins; 2010, p. 149-50.

3. Shawky RM, Sadik DI. "Congenital malformations prevalent among Egyptian children and associated risk factors". Egypt Med Hum Genet 2011; 12(1):69-78.

4. Tomatir AG, Demirhan H, Sorkun HC, Koksal A, Ozerdem F, Cilengir N." Major congenital anomalies: a five year retrospective regional study in turkey". Genet Mol Res 2009; 8(1):19-27.

5. Kurinczuk JJ, Hollowell J, Boyd PA, Oakley L, Brocklehurst P, Gary R." The contribution of congenital anomalies to infant mortality". Oxford: National Prenatal Epidemiology Unit, University of Oxford; 2010.

6. Zahed Pasha Y, Vahedi A, Zamani M, Alizadeh-Navaei R, Zahed Pasha E. "Prevalence of Birth Defects in Iran: A Systematic Review and Meta- Analysis". Arch Iran Med. 2017; 20(6): 376 –85.

7. Irani M, Khadivzadeh T, Asghari Nekah F, Ebrahimipour H, Tara F. " The prevalence of congenital anomalies in Iran: A systematic review and Meta_Analysis". IJOGI .2018;4(21): 29-41.

8. Wong DL. Nursing care of infants and children 6thed Philadelphia; Mosby, 1999: 85.

9. Lorente C, Cordier S, Biand F, Dewalle H, Knill JR. "Tobacco and alcohol during pregnancy and risk of oral clefts". Am J public Health, 2000.

10. Alijahan R,Mirzarahimi M, Ahmadi Hadi P, Hazrati S. "prevalence of congenital abnormalities and its related factors in Ardabil , Iran,2011". IJOGI .2013; 16(54):16-25.

11. Hagberg C, Larson O, Milerad J. Incidence of cleft lip and palate and risk of additional malformation, CleftPalate Craniofac J. 1998. 35(1): 40-5.

12. Cosme HW, Lima LS, Barbosa LG. " prevalence of congenital anomalies and their associated factors in newborns in the city of Sao Paulo from 2010 to 2014"Rev Paul Pediatr. 2017;35(1):33-8.

13. Dolk H, Loane M, Garne E. 2010. The prevalence of congenital anomalies in Europe. Adv Exp Med Biol 686:349–64.

14. Lee K, Khoshnood B, Chen L, et al. Infant mortality from congenital malformations in the united state, 1970-1997. Obstet Gynecol. 2001; 98: 620-7.

15. Petrini J, Damus K, Johnston RB. An overview of infant mortality and birth defects in the United States. Teratology. 1997;56:8-10.

16. Young ID, Clarke M. Lethal malformations and prenatal mortality: a 10 year review with comparison of ethnic differences. Br Med J. 1987; 295: 89-91.

17. Abbasi M, Shamsi Gooshki E, AllahbedashtiN. Abortion in Iranian legal system: a review. IranJ Allergy Asthma Immunol 2014; 13(1): 71-84.

18. Kamali M, Iran F." the review on rights of disabled children." Social Welfare. 2003; 2(7):93-110.

19. Jotkowitz A, Zivotofsky AZ. The ethics of abortions for fetuses with congenitalabnormalities. Eur J Obstet Gynecol ReprodBiol 2010; 152(2): 148-51.

20. Brown SD, Donelan K, Martins Y, et al. Does professional orientation predict ethicalsensitivitiesAttitudes of paediatric and obstetricspecialists toward fetuses, pregnant women andpregnancy termination. J Med Ethics 2014; 40(2):117-22.

21. García E, Timmermans DR, van Leeuwen E.Women's views on the moral status of nature in the context of prenatal screening decisions. J MedEthics 2011; 37(8): 461-5.

22. Hosseini H, Safari F."Disability, Poverty and Social Exclusion. "Social Welfare. 2008; 8(30 and 31): 265-84.

23. Shkouhi M, Mani kashani K. "prevalence of obvious comgenital anomalies and some related factors in newborns in Fatmieh hospital of Hamedan during March to September 1999." J Mazandaran Uni Med Sci. 2002;12(35):42-7.

24. Wogu AF, Loffredo CA, Bebu Lonut, Lute George: Mediation analysis of gestational age, congenital heart defects and infant birth-weight. BMC Research Notes, 2014; 7:926.

25. Aliakbarzadeh R, Rahnama F, Hashemian M, Akaberi A. The incidence of apparent congenital anomalies in neonates in mobini maternity hospital in Sabzevar, Iran in 2005-6. J Sabzevar Univ Med Sci. 2008; 15(4):231-6.

26. Shajari H, Mohammadi N, Karbalai Aghai M. Prevalence of Congenital Anomalies in Iran: A Review Article. Iran J Public Health. 2017 Jun; 46(6): 733–43.

27. Faal G, Abbasi R, Bijari B." The Prevalence of Major Congenital Anomalies Among Live Births inBirjand, Iran" Mode Care J. 2018 April;15(2):e81084.

28. Vrijheid M , Dolk H , Stone D, Abramsky E, Scott J E S. " Socioeconomic inequalities in risk of congenital anomaly". Arch Dis Child, 2000; 82:349–52.

29. Saadat M, Ansari-Lari, Farhud D. Short report consanguineous marriage in Iran" Annals Of Human Biologymarch–April 2004; 31(2): 263–69.

30. Tayebi N, Yazdani K, Naghshin N." The Prevalence of Congenital Malformations and its Correlation with Consanguineous Marriages" Oman Med J 2010; 25(1):37-40.

31. Hansen M, Kurimczuk J J, Milne E, Klerk N, Bower C. Assisted reproductive technology and birth defects: a systematic review and meta-analysis. Human Reproduction Update, 2013;19(4): 330-53.

32. Al-Zubaidi KA, Methak adulRazzaq SH, Widad H Y."survey of congenital malformation concerned to multiple factors in Al-Zahraa hospital childbed in Al-Najaf Al-Ashraf". J Contemp Med Sci,2016;2(7):83–7.

33. Ghahramani M, Moshki M, Ebadi A. A survey of causes and prevalence of congenital anomalies in live Bornneonates in Gonabad 22 Bahman Hospital (1994-2001). Horizon Med Sci 2002; 8(1):1-6. (Persian).

34. Kavianyn N, Mirfazeli A, Aryaie M, Hosseinpour K, Golalipour MJ. Incidence of birth defects in Golestan province. J Gorgan Univ Med Sci 2016; 17(4):73-6.

35. Mashuda F, Zuechner A, Chalya P, Kidenya B R, Manyama M." Pattern and factors associated with congenital anomalies among young infants admitted at Bugando medical centre, Mwanza, Tanzania" BMC Research Notes 2014, 7:195.

36. Lind J N, Interrante J D, Alies E C, Gilboa S M, Khan S, Frey M T, Dawson A L, Honein M A, Dowling N F, Razzaghi H, Creanga A A, Broussard C S." Maternal Use of Opioids During Pregnancy and Congenital Malformations: A Systematic Review" Pediatrics. 2017; 139(6): doi:10.1542/peds.2016-4131.

37. Sharifian J, Jahamian M, Tavassoli F, AfzaAghaee M, Afshari R,Shahfarhat A, Farhody F" The Fate of Motherhood, Fetuses and Neonates in Drug Addicted Pregnant Women" Journal of Shahid Sadoughi Univ Med Sci; 19(2): 183-91.

38. Gholipour Sh.1, Gholipour Sh.2, Zargham A." Correlation of congenital abnormalities with blood groups in children admitted to the pediatric surgery ward of Isfahan Alzahra Hospital in 2008-2014" Sci J Iran Blood Transfus Organ 2017; 14(2): 135-39.

39. Hajian K, Sharifi FS, Sharifzadeh-Baii M, Shareapour M. Prevalence of major abnormality and some of its related factors in the newborns in Shahid Yahyanejad hospital in Babol (2001). Med J Guilan Univ Med Sci 2005; 14(55):70-5.

40. Dehghani A, Taheri Soodejani M, Lotfi M H, Fallahzadeh H, Noori Shadkam M." tudy of Prevalence &Risk Factors of Congenital Heart Defect (Review Article)" J Tolooebehdasht Sci 2017; 16(3):106-16.