



Maternal Age and Birth defects in Iran

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Birth defect is a global health problem with more severe consequences in low and middle income countries (LMICs), where it is estimated that more than 94% of severe defects and 95% of affected children's death occur (1). Congenital anomalies are considered as leading cause of perinatal mortality and childhood morbidity whom survivors may suffer several mental and physical disabilities (2). Several studies have been carried out to detect the factors affecting the incidence of congenital anomalies; however the identification of factors which influence the survival of children suffering congenital anomalies is a major issue in the management of these diseases and especially of a great value for their families and especially for health care professionals in planning for future needs. In recent studies, many predictors of long-time survival of congenital anomalies have been detected, in which maternal age remains controversial, nevertheless little is known about the elements interfering in the survival of congenital anomalies early (in short course) after birth (3). In this study we aimed to clarify the association between maternal age and short-time mortality of children born alive with congenital anomalies.

This study was conducted at the Tabriz Registry of Congenital Anomalies (TROCA) in the northwest of Iran. An overall number of 531 children with one of congenital anomalies were identified and registered in TROCA and were coded based on the International Classification of Disease (ICD-10) and British Pediatric Association (BPA) coding system. Demographic characteristics and other relevant characteristics of the study sample were recorded at birth and then they were all followed until 59 days of their life. They received periodical routine visits by specialists. In the case of mortality, it was identified by regional monitoring system and registered in the registry. In this case-control study, the case group comprised the children died by the end of two months

after birth compared to control subjects who were still alive at the end of the study. Ages fewer than 18 and over 35 were considered as "risk group" to predict the mortality during the first two-month of life and Odds Ratio (OR) was calculated for the analysis of data. There were a total number of 531 live births with one of the congenital anomalies registered during the study period of which 221 cases (41.6%) died until the 59th day of their lives. Among all the study subjects, 102 cases (19.2%) were born to mothers in the high-risk age group consisting of 3 cases (0.5%) aged under 18 and 99 cases (18.6%) aged over 35 years old. The results showed that maternal ages fewer than 18 and over 35 years increase the risk of two-month mortality of children born with congenital anomalies by 60 percent; with estimated risk of 1.6 (OR = 1.60, 95% CI: 1.03-2.46). While considering two high-risk groups separately, the estimated OR for children born to mothers under 18 compared to controls was 1.65 (95% CI: 1.52-1.78). The same risk for the other high-risk group (over 35 years old) was 1.70 (95% CI: 1.09-2.64). The probability of mortality between two high-risk groups (under 18 and over 35 years) was not statistically significant ($p=0.114$).

Many researchers have studied the effect of maternal age on the occurrence of birth defects and came to this conclusion that there is a direct correlation between the mother's age and congenital anomalies. The age group under 18 and over 35 years old has been shown to increase the risk of malformations (4). However little is done about the survival indicators of congenital anomalies and short-course prognosis. Our findings indicated that the mortality rate until two-month of life in children born alive with congenital anomalies is 41.6 percent. In a population based study in the United Kingdom, 20-year survival of children born with congenital anomalies was 85.5%, (5) and in a similar study in New York the overall 25-year survival was also reported

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82.5% (3). This remarkably poor survival in this study may be due to lack of effective treatment services in the area. We found that the maternal age is a predictor for mortality of children born with congenital anomalies in the first eight weeks after birth. This is in consistent with the study which found maternal age as a significantly important risk factor of 25-year survival of birth defects (3).

In this study we could not control the confounding effect of some other relevant characteristics, especially the effect of consanguineous marriage, as it has been already shown that in consanguineous marriages the age of pregnancy is lower and it might therefore have considerable role in congenital anomalies prognosis (6). Further investigation is recommended to address this issue. These findings may be considered as a useful tool in clinical and public health settings and genetic counseling. The age at first marriage in Iran, like other middle East countries, is rapidly rising and although child marriage, defined by UNICEF as marriage under 18 years old, is decreasing trough past 20 years but still remains a pervasive problem in South Asia, where it is estimated that more than half of child marriages occur (7). In many Asian countries including Iran, timing of first pregnancy is associated with the marriage age as it has been shown that marriage at very young age is more likely to result in early pregnancy (7). Therefore it seems that the age of marriage and consequently the age of pregnancy are shifting from the optimal ages toward the two extremities of reproductive age. One study in Iran showed that 14.5 percent of pregnancies occur in mothers aged under 20 years, 73.5% in mothers aged 21-35 years, and 11.6 % in mothers over 35 years (4). These finding along with the results of our study indicate the potentially high risk of congenital anomalies in the country. Marriage counseling centers, where all new couples are screened for health purposes, are an opportunity to implement the interventional programs

for prevention of the risk of birth defects.

Taking together we hypothesize that maternal age can be considered as a predictor for mortality of children with congenital anomalies in the first eight weeks after birth. However Further investigation is recommended to clarify different risk factors for mortality of children with congenital anomalies after controlling the confounding.

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