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The Assessment of Relation Between Prenatal Care and the Causes of Neonatal Admission at NICUs Tehran University Hospitals

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Abstract: The aim of the study was to investigate the assessment of relation between prenatal care and the causes of neonatal mission at Tehran university hospitals. This research was retrospective study (case-control), study population was 150 mothers that their babies admitted to neonatal word or NICU and 150 mothers who gave birth a healthy baby as a control group. The analysis was based on data from the birth certificate files and mothers Variables included demographic characteristic and adequacy of prenatal care (based on ACOG standards), obstetrical history, past medical history and etc. Information obtained on the neonate included the cause of admission, 1 and 5 min Apgar scores and … The result regulated in the 36 tables and 2 diagrams. The most of mothers in the case and control groups obtained adequate (36%, 9.3%) or intermediate (35.3%, 36.7%) prenatal care. The least of mothers had adequate plus prenatal care (6.7%, 8.7%), also the amount of adequate prenatal care at 2 group case and control were 18.7%. The most cause of admission at NICUs or neonatal wards was Jaundice. The other causes were infection, respiratory complication and preterm labor. There was no statistically significant relationship between adequate of prenatal care and the admission of neonatal with jaundice ($p = 0.98$), preterm and post term labor and growth retardation ($p = 0.19$), medical disorders ($p = 0.26$) and minor malformation ($p = 0.62$). The only relationship was found with seizure, apnea and cyanotic attacks ($p = 0.018$) that mothers of this neonate compared with other neonates obtained fewer prenatal care. Only the adequacy of prenatal care don't prevent adverse outcome at neonates. We must notice the quality of prenatal care.

Key words: Prenatal care, adequacy of prenatal care, neonate, neonatal admission, NICUs

INTRODUCTION

Pregnancy is of the primary events that lead to eligibility for Medicaid and deliveries account for almost 50% of Medicaid inpatient discharges. The women from lower socioeconomic groups experience poorer birth outcomes than those from higher socioeconomic groups. Consequently, delivery claims and high-cost Neonatal Intensive Care Unit (NICU) expenses consume a large portion of Medicaid managed care medical expense budgets, despite advances in prenatal technology in the United States. With the shift of most Medicaid-eligible individuals to Medicaid managed care, enhancing birth outcomes becomes a major challenge for any Medicaid managed care plan (Joseph *et al*., 2005). The expansions in Medicaid lead to significant improvements in prenatal care utilization among women (Dubai *et al*., 2001). Prenatal care is a clinically useful and cost-effective way of decreasing adverse prenatal outcomes such as preterm delivery, intrauterine growth restriction and low birth weight (Krueger, 2000). A recent, nationwide study of 54 million birth reported increasing trends toward more prenatal resource utilization from 1981 to 1995, then other indicators have shown worsening trends in birth outcomes (Koroukian and Rim, 2002). Over the several decades, some have concluded that prenatal care offers no benefits and indeed may be disadvantageous. In an extensive review, Fiscella found no conclusive evidence that prenatal care improved birth outcomes. Other authors concern about the effectiveness of prenatal care because in the 1980 and 1990, when use of prenatal care increased substantively, the rates of low birth weight and preterm birth increased in the United States (Cunningham *et al*., 2005). Women in developed countries typically attend regular prenatal visits, usually seven to 11 times per pregnancy (Colleen *et al*., 2005), although the World Health Organization (WHO) has recommended a minimum of 5 prenatal visits during pregnancy. Documenting prenatal care adequacy is not easy and it is not completely free of bias because woman with preterm

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Table 1: Adequacy of Prenatal Care Utilization (APNCU) index

I. Month prenatal care began (Adequacy of initiation of prenatal care)
Adequate plus: 1st or 2nd month
Adequate: 3rd or 4th month
Intermediate: 5th or 6th month
Inadequate: 7th month, later or no prenatal care

II. Proportion of the number of visits recommended by the American College of Obstetricians and Gynecologists (ACOG) received from the time prenatal- care began until delivery (Adequacy of received services)
Adequate plus: 110% or more
Adequate: 80 - 109%
Intermediate: 50 - 79%
Inadequate: less than 50%

III. Summary adequacy of prenatal care utilization index
Adequate plus: Prenatal care began by the 4th month and 110% or more of recommended visits received.
Adequate: Prenatal care begun by the 4th month and 80 - 109% of recommended visits received.
Intermediate: Prenatal care begun by the 4th month and 50 - 79% of recommended visits received.
Inadequate: Prenatal care begun after the 4th month or less than 50% of recommended visits received.

Note: The APNCU Index requires the use of the following data elements reported on the live birth certificate: The number of prenatal care visits, month prenatal care began and gestational length of pregnancy

deliveries will have fewer antenatal visits. The Kessner and Kotelchunk indexes have been developed to overcome this bias and, although equally criticized, both have shown that prenatal care reduces the risk of preterm delivery (Parades *et al*., 2005). A recent meta-analysis found that reducing the number of prenatal visits did not lead to increased adverse outcomes for the mother or infant; however, women were less satisfied with the reduced-visit schedule. Thirteen Caregiver continuity during the antenatal period has been associated with reduced interventions in labor and improved maternal satisfaction. Fourteen and fifteen care provided by midwives, family physicians and obstetricians was found to be equally effective, although women were slightly more satisfied with care from midwives and family physicians (Colleen *et al*., 2005). In this study, the Adequacy of Prenatal Care Utilization (APNCU) Index was used to measure resource utilization, which is based on the ratio of Observed to Expect (O/E) number of prenatal visits. The expected number of visits is based on the American College of Obstetricians and Gynecologists (ACOG) recommendations which can be shown in Table 1. The index also considers the month of initiation of prenatal care (Koroukian and Rimm, 2002). Krueger and Scholl (2000) reported that inadequate prenatal care is associated with an increased risk of prenatal care on incidence of small-for-gestational-age infants. In developed countries, maternal age, education level and income, as well as race, marital status, physical violence in the home, desire for pregnancy and insurance coverage have been found to influence the adequacy of prenatal care (Parades *et al*., 2005). In the United States, immaturity and low birth weight are the main causes of neonatal admission in Neonatal ward or Intensive Care Units (NICU). Usually prenatal care is considered as a potential way for decreasing of incidence preterm labor. Even though it is not clear that weather they will effect or not? The positive effects of prenatal care in Primary Health Care (PHC) system is emphasized on health of mothers but there are little evidence emphasizes the positive effect of adequacy of prenatal care for prevention of preterm labor (Krueger and Scholl, 2000). The research results of Dubai *et al.* (2001) indicated that increased access to primary care is not adequate if the goal is to narrow the gap in newborn health between poor and non poor population.

MATERIALS AND METHODS

This research is a retrospective study from the sort of case- control which carried out in the hospitals of Tehran medical university. This study involved 150 mothers of newborn in the newborn wards or Neonatal intensive care units as a case group and 150 healthy newborn which had been visited by Doctor as a control group were chosen randomly. The cause of newborn's admission was stated in the medical files. In order to determine the adequacy of prenatal care, The APNCU Index was used. According to this Index categorized mothers as follows: Adequate plus, adequate, intermediate and inadequate. The used method was questionnaire that completed by researcher through newborn's files and interview with mothers. The data was analyzed in the statistical package SPSS and EPI software.

RESULTS AND DISCUSSION

In this study, the effects of prenatal care on the causes of admission high risk newborns were examined in the hospitals of Tehran medical university. For accessibility to more precise conclusions and to confidence the ability of comparison between two group

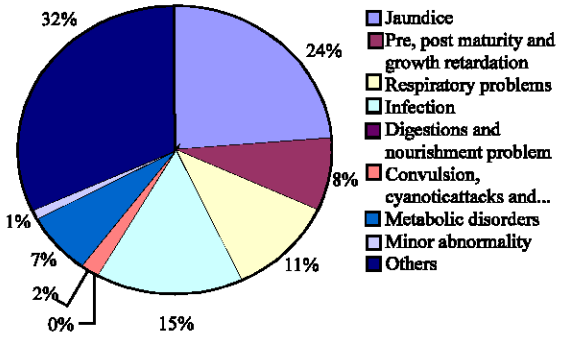

Fig. 1: The percent of causes of neonatal admission at NICUs and neonatal wards

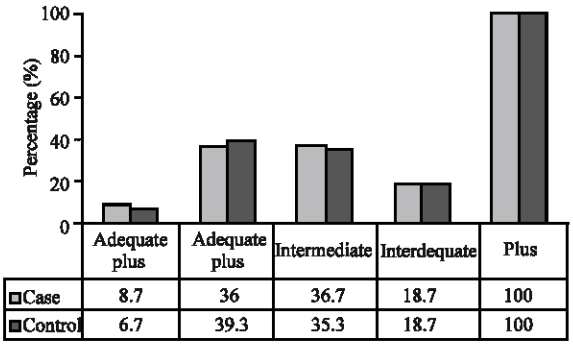

Fig. 2: Comparison of receiving prenatal care at case and control groups

of case and control in these study people, the matching process was done on the variables such as age, job, mother education and etc. The conclusions of this study showed that the maximum age of mothers in both groups was 21-25. Most of them had educated to guidance section and were housewife. The most of the fathers in both groups were in the age-group of 20-30 and had educated it guidance or secondary education and has free job. The most of the mothers in both groups of case and control were experiencing their first pregnancy. According to the results of this research, the relation of mother's abundance with previous child in the neonatal wards or intensive care in case group was a little more than control group (21/5 againstl9/5%), but statistically was not meaning. Most of the mothers in both groups had been referred to general centers or doctor's offices for receiving prenatal care. The most of mothers in both groups had cesarean in their recent child birth. Mothers of both groups at gestational age (p = 0/00) newborn gender (p = 0/027) and birth weight (p = 0/00) and Apgar in 1 min (p = 0/00) and Apgar in 5 (p = 0/019) showed meaning statistical difference. Newborns height mean was in order of 48/16 and 49/73 cm in both group case and control. Head circumference mean was (33/23 against 34/57) and chest circumference mean was (34/83 against 33/36). According to this research, the main cause of newborn admission in the neonatal ward or intensive care units was jaundice which only constituted 24% of admission cause. Other accepting causes in order were sepsis, respiratory problems and immaturity (Fig. 1). The most mothers in both groups of case and control in pregnancy period had been received adequate or intermediate care (Fig. 2). In both groups of case and control, the least percent of mothers had been received adequate plus care (8/7 and 6/8%). According to the conclusions of this study, there were not meaning statistical relation ship between adequacy of prenatal care with newborn admission with the jaundice (p = 0/98), immaturity and growth retardation (p = 0/165), respiratory problems (p = 0/54), sepsis (p = 0/84) and digestive and nourishment problems (p = 0/9) and metabolic diseases (p = 0/26) and minor abnormality (p = 0/62). The only meaning statistical relationship related to neonatal admission with convulsion, Apnea and cyanotic attacks which mothers of these newborns had received more cares in comparison with other case group infants.

CONCLUSION

To assess relation between prenatal care and the causes of admission at neonatal wards or NICU, estimating the adequacy of prenatal are at two group case and control was an essential and primary step. The finds of this research showed that the adequacy of prenatal cares in both groups of case and control had no difference. In this study there was a high rate (36, 39.3%) adequate and (36.7, 35.3%) intermediate of prenatal care at two group case and control. Although 8.7% of two groups had adequate plus, 18.7% of both groups had inadequate prenatal care. Paredes *et al*. (2005) have also reported that their study was a high rate (75.5%) of inadequate prenatal care and 11.2% had no prenatal care at all and 41.7% lived in rural areas. Rural living was found to significant increase inadequate prenatal care. In this study, the main cause of newborn admission in neonatal wards or Neonatal Intensive care units of infants was jaundice. While in most countries like United state of America the first cause of newborn admission is immaturity (Cunningham *et al*., 2005), in this research the immaturity constitutes the forth cause and sepsis and respiratory problems is placed in the second and third place. From the results of this study, one question is that why jaundice in most neonatal wards has devoted the most cause of infant admission. Also the reason of study

showed that there was no meaning statistical relation ship between prenatal care and various cause of infant admission in neonatal wards. Previous studies have found that inadequate prenatal care was associated with increased neonatal mortality in the general pregnant women in both the presence and the absence of high- risk conditions. The observed association between inadequate prenatal care and neonatal mortality may be mediated by increased risk of preterm delivery and low birth weight in these pregnancies. Overutilisation of prenatal care is associated with potential risks for fetal and neonatal development, leading to increased neonatal mortality. Whereas Arizona Department of Health Services (2005) showed women with no prenatal care were at least twice as likely to have an infant that was low birth weight, very low birth weight, preterm infant and require admission to the NICU. This percent for admission to NICU was 12.4 vs 5.6% of women with any prenatal care. In 1998 Monroe reported 108 newborns admitted to the NICU per 1000 births. After implementing the healthy beginnings prenatal program, Monroe plan's NICU rate fell to 88/1000 in 2000 and further to 57/1000 in 2003 (HCS, 2005). The base of this research was investigation of done cares adequacy in the pregnancy period, we can't to come to a conclusion clearly that the prenatal care has no effect on the pregnancy outcome. There are other factors that can affect pregnancy outcome. All effective factors must be controlled or deleted. More extensive researches is needed to comment clearly after control of adequacy, quality of prenatal care and all effective factors of pregnancy in relation to the effect of prenatal care.

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