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Effectiveness of Maternal Health Care and Role of Social Determinants on Pregnancy Outcome

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A B S T R A C T

Healthy Mothers & Babies are valued hopes and dreams of families of all cultural heritages and national health goals in several countries round the world prioritize infant health. It has long been understood that health outcomes are profoundly shaped not just by biological factors but also by the social، economic and cultural environment، including people's positions in various social hierarchies. Increasing evidence suggests that it is possible to improve pregnancy outcomes through action on these social determinants of health and maternal health care. This document contributes to the ongoing debate by considering maternal health and asking what can be done to improve maternal health outcomes through action on social determinants and prenatal and preconception care. A cohort of 600 pregnant women was recruited from 20 public and one private antenatal health care service in Tabriz city. After stratification by geographical region centers randomly was selected and they were followed up from the time of pregnancy diagnose till 3 months after delivery (August2013 to September 2014). Socioeconomic indicators and pregnancy care based upon health ministry guidelines; and Pregnancy outcomes were measured and assessed. Chi square test، regression analysis (univariate and multivariate) was done by SPSS version 17. we found significant relationship between preconception care and pregnancy complication (0R:2.6).the incidence of complication at all was 19.2% PTL: 4.6%, LBW: 9.2%, Preeclampsia: 4.2, Gestational diabet: 3.9% macrosomia: 2.8 ،Cesarean section: 74%. Complications were seen in rural area: 83.3 %(most common: PTL), private office: 10.4% (Most common: bleeding and diabetes) and urban centers: 6.2%. (Most common: abortion) Maternal education showed a significant relation with cesarean section and abortion. BMI plays a major role in almost all poor pregnancy outcomes (LBW، PTB، Cesarean section، miscarriage) and income status was the first predictor of low birth weight. Socio demographic and behavioral factors were particularly important for predicting miscarriage، preterm labor and low birth weight. Social determinant of health's and Disparity in distribution of resources in rural and urban area was one of the main factors that complicated pregnancy and damaged family.

Introduction

Having a healthy baby and a healthy mother is the desire of every individual and family in all cultures and societies and prevention of maternal and neonatal mortality and morbidity is the national goal in many countries (1). Birth of a baby is a memorable and sweet event everywhere in the world, however, for many families; experience of giving birth to children is a kind of desperation (2).

Every year, about 585,000 women die of complications of pregnancy and childbirth and more than 99% of deaths occur in developing countries. Approximately 40% of pregnant women experience health pregnancy-related problems during and after pregnancy and 15% suffer long-term or serious complications, which may sometimes, continue for their whole life (3).

The environment surrounding a woman plays a major role in determining the health of her child, which includes factors such as: income, level of education, social support, physical environment and employment status and social determinants (4).

Several studies have shown the relationship between sociodemographic factors, socioeconomic status, certain medical conditions such as diabetes, hypertension, gestational hypertension and abnormal BMI in pregnant women and the adverse pregnancy outcomes (5-9). Also, several studies have shown that prenatal and pregnancy cares significantly reduce the adverse maternal, fetal and neonatal complications of pregnancy (10-12). Studies such as Mc Donagn's suggest that these cares have no certain role in reducing the incidence of maternal complications, and have introduced bleeding, sepsis, hypertension, abortion and problems during childbirth as the most important causes of maternal mortality and other biological factors, including age under 15 and over 35 years and the number of pregnancies more than 8 have been counted as the causes of incidence of complications.

By improving the index of access to healthcare services, improving the quality of service by setting an appropriate approach to early identification of women at risk and their timely referral was necessary. For this purpose, the Department of maternal health, Office of Population, family and schools Healthcare has finished standardizing the care services on external level and its pilot implementation began in 2003. Today, the significance and effectiveness of proper implementation of care programs before and during pregnancy on improvement of indices is so obvious (13), however, the important issue now are the differences. Yet millions of women are deprived of such services and despite the wide coverage of services, there is no equitable distribution of the quantity, quality and access to services. Considering the importance of issue and the mission of public health in the promotion of health for everybody, especially for mothers and children as the most important parts of the family, a prospective study was conducted on the efficiency of pre-pregnancy and pregnancy care based on the assessment of processes and outcomes in the private and public sectors, urban and rural areas of Tabriz.

Method

One urban and one rural center were randomly selected out of each cluster from different geographical areas of Tabriz. All pregnant women eligible for inclusion were invited to participate in the study which included 600 pregnant woman referred to urban, rural public and private health centers

in equal numbers of 200 people per each group. All mothers participating in the study were already under notification and in case of tendency to participate, were followed up during pregnancy, during delivery and up to 3 months after delivery in terms of the consequences of pregnancy and childbirth. Multivariate logistic regression analysis was used to analyze the data and examine the relationship between the pregnancy outcomes and the variables studied providing odds ratio (OR) index and confidence interval of 95%.

Results and Discussion

The mean age of women in total was 27.66±5.5 years. The mean age of women in the urban health center was 27.5±89.61 years. The mean age of women in rural health centers was 26.16±6.06 years. The mean age of women in private clinics was 28.92±4.54 years. 87% of pregnancies were in the age range of 18-35 years.

There was a significant difference in parents' education, income and occupation between the rural and urban areas as well as the private and public sectors (p≤0001) (Table 1) and income was considered as the leading predictor of LBW.

The birth interval was within the range of 2-15 years and the mean of 5.3±93.07 years in urban centers and within the range of 1-8 years and the mean of 4.2±7.8 years in rural areas. In 5.3% of the pregnancies the birth interval was less than two years.

Birth interval between urban and rural centers showed a significant difference. However, no significant difference was observed between urban and private centers. The results show that the increase of pregnancy weight in the first trimester is 1.09 (1.35) in urban areas, 1.1 (1.82) in rural areas and 2.35 (1.40) in the private sector and the increase of pregnancy weight in the last trimester is 5.5 (3.29) in urban areas, 4.49 (2.7) in rural areas and 4.08 (1.20) in the private sector. The rate of weight gain in urban areas is higher than rural areas and in the private sector is less than the public urban centers. The overall weight gain was 10.51±3.61. There was a significant relationship between weight gain during pregnancy and birth weight and preeclampsia (p=0.02).

Weight gain more and less than the standard, according to maternal body mass index, both can complicate a normal pregnancy. In this study, 24.5% of pregnancies in urban health center were high risk pregnancies, while this rate was 75% and 70% in rural health centers and private centers, respectively (Table 3). A significant difference was observed between rural and urban centers and the private sector.

The results show that the initiation of the first care in the first 10 weeks was 24.5% in urban areas, 2.5% in rural areas, and 97% in the medical office; and the care after week 15 was 10% in urban areas, 12.5% in rural areas, and 1% in the medical office.

The percentage of unintended pregnancy was reported 27% in urban areas, 30% in rural areas and 19% in the private sector.

12.7% of pregnant women in urban areas and 35% in rural areas were under pre-pregnancy care (p<0.001). The people who were under pre-pregnancy care were 2.26 times less likely to suffer pregnancy complications. Complication was observed in 31.9% of those under care and 68.1% of those out of care (p=0.001 and OR=2.26(1.16-4.38)). 93 people in total had complaints during pregnancy: 34.3% complained of abdominal pain, 5.4% of

urinary symptoms and 60.2% of other symptoms.

In total, 71.6% of the examinations were normal.

Gestational diabetes in 3.9%, abortion in 3.7%, preterm delivery in 4.6%, BW<2.5kg in 9.2%, BW>4kg in 2.8% and bleeding in 4.2% of cases was observed.

The rate of LBW was obtained as 9% in urban areas, 13.2% in rural areas and 5% in the medical office (p=0.014).

67% of deliveries in rural areas, 57% in urban areas and 70% in private centers are done by cesarean section (P<0.001).

The most common complications of pregnancy were abortion in urban areas, preterm delivery and LBW in rural areas, and bleeding and diabetes in the private sector.

Rate of post-delivery complaints was 5.3 in urban areas, 30% in rural areas and 6.4% in the medical office.

The most common post-delivery complaints were bleeding in 42.9% of cases in urban areas, vaginal discharge and nervous irritations in 40% of cases in rural areas, and bleeding and vaginal discharge in 28.6% of cases in the private sector.

There was a relationship between the medical and behavioral factors and social determinants, and between the mother's occupation and abortion and low birth weight. Employed mothers had more abortions (OR=3.11(2.18-4.12)) and the rate of LBW in employed mothers was higher than housewives, which probably was due to work stress, high job demands or heavy physical work (OR=2.03(1.53-2.79)).

Earning had a significant relationship with LBW (OR=2.33(1.74-3.15))

Violence increased the risk of premature birth (OR=4.37(3.1-5.55)). Depression was associated with preterm birth (OR=1.81(1.36-2.42)) and LBW (OR=1.85(1.31-2.48)).

Depression and unintended pregnancy lead to reduced visits to health centers and private medical offices (p=0.001). Unintended pregnancy increased the rate of abortion (P<0.05).
Mother's education level had a significant relationship with abortion and the rate of CS and preterm delivery.

Maternal and neonatal health is the developmental goal of the Millennium and as an important index of health and development; it represents one of the most important differences between developed and industrial societies and the developing countries. The high percentage of high-risk pregnancies in medical offices are due to the referral of cases with risk factors from the health centers, however unfortunately, in rural areas despite the lack of facilities, it is due to the underlying diseases and economic and social and cultural issues that was social determinants. In an analytical and historical cohort study on 420 women in the city of Sari, Mazandaran province, Iran, the highest percentage of care-related problems was inadequate care with 36%, a situation in which the probability of preterm delivery is reported 1.36 times higher than the groups with adequate and special care. There has been no significant relationship between the care groups in terms of age, occupation, education, body mass index and attendance in antenatal classes, however, there was a significant difference between the care groups in terms of the first visit time, the

number of visits, type of delivery, implementation of full pregnancy tests and the number of ultrasound imaging during pregnancy.

A study by Dr. Pitchaya *et al* showed that the incidence of premature rupture of membrane and LBW have a significant relationship with maternal BMI as well as weight gain during pregnancy. The incidence of preeclampsia showed no significant relationship with maternal BMI; however, it had a significant relationship with weight gain during pregnancy. Obese or overweight pregnant mothers have weight gain more than women with normal weight (13). In this study as well, there was a significant relationship between the weight gain during pregnancy and birth weight and preeclampsia, which is consonant with the above-mentioned study. As mentioned in this study, 86.4% of the cases were housewives and 54.5% were high school graduates. There was a significant relationship between the number of referrals and occupation and education (13). In this study, The percentage of inadequate care was higher in employed women, that can be because of the social responsibilities of women and their involvements. In a study by Michele-Kiely *et al* in 2011, pregnancy complications were studied on 1044 women from six prenatal clinics and the complications were as follows: abortion in 2.4%, IUFD in 1.9%, LBW in 12.8%, VLBW in 1.7%, preterm birth (PTB) in 13.4%, VPTB in 2.5%, LGA in 9.4%, CS in 29.1% and hospitalization in NICU 13.2% of the cases. In that study, preeclampsia was determined as the most important factor for LBW, gestational diabetes as the most important factor for PTB, and admission to ICU and BMI as the leading predictor for VPTB, LGA, CS and perinatal death. Occupation is known implicated in abortion (3). These results are widely consistent with the present study and the existing differences are negligible regarding the context of the population under study, which was selected from metropolitan center with relatively high income.

The study was conducted on 1797 pregnant women admitted to hospitals. In this study, no significant relationship was observed between socioeconomic factors such as education, income and occupation and LBW, SGA and preterm delivery, a reason for which is probably the selection of the research population that does not represent the whole of pregnant women and does not include the PHC clinics and rural centers (27). Low statistics of complications in this study is however plausible and predictable with these explanations.

Malloy *et al* showed that the overall rate of infant death is reported 2.7 per 1000 in cases using prenatal care, and 14.1 per 1000 in cases without care. Failure of receiving prenatal care increases the risk of stillbirth by 3.3 times, and is associated with increasing twice the risk of preterm birth (12). The remarkable point in the present study is the percentage of CS. The rate of CS was 74%. Iran ranks the second in the world in terms of cesarean section, which is more than four times the standard of the World Health Organization. The World Health Organization recommends that CS should not be more than 15% and 5-10 percent is the optimum. In this study, the rate of CS was 5 times the standard (74%), although the experts believe that natural childbirth is better in every respect for the health of the baby and CS is very complicated and has very dangerous complications on the mother and child. The major causes of women's tendency toward CS are their anxiety of natural delivery and its severe pain, the belief that CS is a modern phenomenon, and unawareness in

some cases, e.g. the unscientific argument suggesting that CS puts no pressure on the baby's head.

By identifying social determinants and making interventions to equalize the access and providing fair and comprehensive pre-pregnancy care and its fast and accurate implementation and systematic follow-up, it is possible to eliminate inequalities and maintain a healthy pregnancy and promote physical and mental health of family and take essential steps for improving the health of mothers, children and society.

Table.1 Qualitative variables affecting outcomes in women referring to health centers in urban, rural and private sectors of Tabriz

	Urban area group	Rural area group	Private Sector group	P
Mother's education level				
Illiterate	7(3.5%)	5(2.5%)	1(0.5%)	<0.0001
Primary	17(34%)	45(22.5%)	5(2.5%)	
Pre-diploma	21(42%)	80(40%)	41(20.5%)	
Diploma / Associate degree	95(47.5%)	65(32.5%)	114(57%)	
College degree	22(11%)	5(2.5%)	39(19.5%)	
Father's education level				
Illiterate	4(2%)	0	0	<0.0001
Primary	39(19.5%)	65(32.5%)	0	
Pre-diploma	56(28%)	70(35%)	22(11%)	
Diploma / Associate degree	81(40.5%)	55(27.5%)	142(71%)	
College degree	19(9.5%)	10(5%)	36(18%)	
Mother's occupation				
Housewife	184(92%)	195(97.5%)	123(61.5)	<0.0001
Employed	16(8%)	5(2.5%)	77(38.5%)	
Father's occupation				
Laborer	48(24%)	75(37.5%)	5(2.5%)	<0.0001
Office employee	45(22.5%)	25(12.5)	62(31%)	
Self-employed	105(52.5%)	90(45%)	86(43%)	
Other	2(1%)	0	52(26%)	

Table.2 The frequency of previous Pregnancy outcomes in women referring to health centers in urban, rural and private sectors of Tabriz

Previous Pregnancy	Urban area group	Rural area group	Private Sector group
	%(95% Confidence Interval)	%(95% Confidence Interval)	%(95% Confidence Interval)
0	40(30.4-49.6)	60(50.4-69.6)	53.5(43.72-63.28)
1	20(12.14-27.84)	25(16.51-33.49)	31(21.94-40.06)
2	15(8-22)	12.5(6.02-18.98)	10(4.12-15.88)
>2	12(5.63-18.37)	5(0.73-9.27)	4(0.16-7.84)

Table.3 The frequency of high-risk pregnancy status outcomes in women referring to health centers in urban, rural and private sectors of Tabriz

High-risk pregnancy status	Urban area group	Rural area group	Private Sector group
Gestational age less than 18 years	1(2%)	10(6.7%)	3(2.1%)
Gestational age more than 35 years	9(18.4%)	15(10%)	24(16.9%)
Spacing pregnancies less than 3 years	10(20.4%)	20(13.3%)	49(34.5%)
First pregnancy	28(57.1%)	80(53.3%)	64(45.1%)
Fifth pregnancy	0	5(3.3%)	2(1.2%)
Height less than 150 cm	1(0.5%)	10(6.7%)	0
Addiction	0	10(6.7%)	0
Total	49(100%)	150(100%)	142(100%)

The following strategies are recommended in line with the results achieved in the present study:

1. Empowerment and active participation of society, consistent with the health workers providing services in health centers for integrated maternal health care

2. Trying to activate the physiological delivery in rural and urban medical training centers to reduce unnecessary cesarean section or vaginal delivery without pain promotion based on the instructions of the Bureau of Family Health and the Office of the Society of Maternal Health

3. Identification and active follow-up of women exposed to high-risk pregnancy for significant reduction of unintended pregnancies and undesirable pregnancy outcomes

4. Drawing the inter-sectoral and cross-sectoral cooperations to enhance the physical and social access to prenatal care and paying attention to the active role of the mass media, particularly the provincial media, in transmission of health messages in order to increase the public health literacy

5- Sensitizing all organizations involved, particularly the supervisor groups to monitor and follow up until the elimination of the existing problems in prenatal and pregnancy care

6. Localization of the guidelines of maternal health (Similar to the experiences of some countries such as India).

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