Impact of Socioeconomic Conditions on Perinatal Mortality in Karachi

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Abstract

Objective: To study and compare the perinatal mortality (PNM) in hospitals located in various socio-economic areas of Karachi.

Design: A prospective review of all births was done from May 1996 to April 1997. Precoded proformas were provided to each hospital and the birth and details of each mother and baby delivered recorded.

Setting: All mothers and their newborn delivered during the time period mentioned.

Outcome measures: Comparison of PNM in hospitals located in various socio-economic areas of Karachi.

Results: A total of 4957 proformas were filled, 63.5% by doctors, 32% by LHVs, 2.9% by administrator and 2.3% by paramedics. Overall 92.3% mothers were housewives, less than 45% of the mothers received primary! secondary education; 42% mothers were of the age 21 to 25 years. More than 52.3% fathers were unskilled labourers. Only 27% mothers were booked while the rest were unbooked or came to deliver on walk in basis. Majority (62%) of the mothers had a> 37 week duration of pregnancy and 51% newborns were male and 49% female. Twenty three percent of the newborns weighed <2500 grams, remaining weighed > 2500 grams but less than 4500 grams; 24.5% newborns died on day one of birth. The PNM per 1000 births in the high, middle and low socioeconomic hospital was 16.4±23.6, 24.9±51.20 and 80.4±1 77.78 respectively. A statistical significance (p <0.0000) by the Chi-square for several proportions was seen between the high middle and low socioeconomic hospitals of Karachi.

Conclusion: The present socioeconomic conditions will take some time to change. However, this study indicates that perinatal mortality rate may be changed by an improvement in antenatal care of the mother, hence the fetus (JPMA 51 :354,2001).

Introduction

The infant mortality rate (IMR), defined as deaths occurring from birth to 12 months of age per 1000 live births per year, is divided into neonatal deaths which occur in the first 4 weeks of life and postneonatal deaths which occur between I to 11 months of age, varies in different countries. A perinatal death is defined as still birth (equal or less than 24 weeks of gestation) or a death occurring during the first week of life and PNM is estimated per 1000 total births which occur in a one year period[1].

In 1996 the IMR reached 7.2 per 1000 live births in the United States with all time low for white and black infants[2]. In Hong Kong IMR fell from 60.9 in 1956 to 5.9 per 1000 live births in 1990 and neonatal mortality rate fell from 24.2 to 3.8 per 1000 live births[3]. However, in deprived areas of Papua. New Guinea the IMR is 133 per 1000 live births[4], figures similar to that of developing countries, as in South-East Asia. In Pakistan, the under[5] IMR has fallen from 137 and 221 respectively in 1960 to 95 and 137 per 1000 live births in 1992g.

The Pakistan demographic and health survey 1990/1991 estimates that IMR and under 5 mortality rate

for the five year period preceding the survey are 91 and 117 per 1000 live births respectively, with 57% of IMR and 45% of under 5 mortality rate occurring in first 4 weeks of life. The under five mortality rate is 29% lower in urban than in rural areas (94 versus 132 per 1000 live births)[6].

The PNM m developed countries such as Denmark and Sweden is 8.0 per 1000 and 6.5 per 1000 total births respectively[7] while a country wide prospective survey conducted by the Society of Obstetricians and Gynecologists of Pakistan during 1990 showed that of a total of 8231 deliveries that took place, there were 783 perinatal deaths, 563 still births and 220 neonatal deaths within 7 days of birth. Thus the overall PNM was 95.1 per 1000 total births, the still birth rate 68.3 and the neonatal death rate 26.[7,8].

A demographic survey using pregnancy histories in eight lower socio-economic squatter settlements of Karachi, showed PNM of 54.1 per 1000 births and maternal mortality of 281 per 100 000 live births. This work suggests that perinatal mortality may be a surrogate indicator of maternal mortality[9].

In Pakistan, like other developing countries with IMR of 95 per 1000 live births, the sum of late neonatal and postnatal deaths exceeds the early neonatal death rate. It should be possible to achieve a striking decrease of the total IMR by means of simple inexpensive, widely used and acceptable interventions in the same way as was done 30-50 years ago in Europe[10]. In Pakistan the systemic study of trends and differences in mortality is impeded by paucity of reliable data. Although a system of vital registration has been in existence in the country for the last quarter of the nineteenth century, recorded data suffer from the errors in coverage and inaccuracies in the information provided[6]. Census data are also of little use and generally sample surveys have been used for estimate of mortality[10].

PNM at a major government teaching hospital of Sindh was 145.24 per 1000 births[11]. Maternal and infant mortality survey (MIMS) of 10135 households randomly selected from the Aga Khan University Hospital Urban Primary health care field sites and other periurban low socioeconomic areas in and around Karachi, showed that the overall infant mortality rate in all births occurring in 1988 was 71 per 1000 live births[12]. Given the primary health care coverage in the AKU field sites, this estimate is not naturally a representative of Pakistan.

Extensive work done by Jalil et al from Lahore, showed an overall perinatal mortality rate of 56 per 1000 births with rates of 60, 75, 36 and 33 per 1000 births for the village, periurban, slum and upper middle class, while this and other studies have concentrated on determining the causes of high infant and perinatal mortality in Pakistan[13-15].

The aim of this study was to compare the perinatal mortality in hospitals located in the various socio-economic areas of Karachi and to study related maternal and newborn factors such as education of mother, parity, age, income, antenatal care etc.

Patients and Methods

The perinatal survey was conducted in seven different socio-economic areas of Karachi from May 1996 to April 1997. Catchment areas of the hospitals included, high socio-economic areas residence, Defence Housing Society, Clifton, Gulshan-e-Iqbal, some from Nazimabad etc. Low socioeconomic areas, residences were Lyari, Orangi, Korangi, Pathan Colony, Liaquatabad etc., while the middle socio-economic areas were mixed.

Teaching hospitals government, private and semiprivate were selected. The patient turnover was known to be large, in these hospitals and it was a random selection.

In the high and middle socioeconomic hospitals the personnel filling the proformas knew that the family had deposited Rs. 10,000 or greater and by appearance did look well to do. While in the low socio-economic it was about Rs. 20 for the bed only, other than some medications which the patient had to buy, the rest i.e., the consultation etc was free. The respective amount in each hospital had to be deposited some weeksIdays prior to expected date of delivery. This was confirmed with the account

section/administration of the respective hospital.

Survey of each of the seven hospitals was taken before start of the study and permission obtained from the Head of the Institution of each hospital. Pre-coded performas were provided to all hospitals in the time period mentioned. A total of 4957 performas were completed. The personnel concerned with delivery of the mother and care of the newborn i.e., labour room staff mainly were trained to collect and document the relevant information.

A perinatal death was defined as stillbirth or a death occurring during the first week of life and perinatal mortality rates were estimated per 1000 total births which occurred in the one year period. In all proformas perinatal deaths were recorded and cause of death if known was documented. A small pilot study was done in each hospital, followed by continuation of the actual project. The information filled in the proformas by the personnel of the various hospitals was repeatedly checked by the investigators. The proformas were usually filled by the same person in a month. Also due to the location of the labour room and postnatal ward it was easy to follow both the mother and baby till the time of discharge from the concerned hospital.

In all hospitals, except one, the mother returned for follow-up with newborn within the first 4 weeks of delivery or earlier less than 7 days of age of newborn if a complication developed in mother or newborn. At or immediately after delivery if the newborn developed complications and needed neonatal intensive facilities, it was admitted in the respective hospitals unit. In both above cases, the concerned hospital team filling the proformas informed the research team and hence it was possible to follow the newborn and its mother in first 7 days of life.

The proforma was completed within a period of first 24 hours of life of newborn and contained detailed information including mothers[9] education, occupation, parity, age, duration of present pregnancy, income and details of the newborn including sex, birth weight, apgar score, outcome and cause of death if any. Despite vigilant collection of data about 5% of the proformas filled had incomplete information. The proformas were collected regularly at the end of every 2 weeks from each of the hospitals by the Principal Investigator. The data was initially scrutinized, missing information if any filled with the help of the concerned personnel of the respective hospital and data fed into the computer on a weekly basis. The Chi-squared test was carried out to determine the association between the socio economic risk factors and perinatal mortality rate. Criteria for inclusion of risk factors was a p value of less than 0.1.

Results

The perinatal mortality per 1000 total births in the high, middle and low socioeconomic hospital was 16.6 ± 23.62, 24.96 ± 51.20 and 80.42 ± 177.78 respectively. Overall there were 224 perinatal deaths out of 4957 births in all the three socioeconomic areas, giving a PNM of 45.18 per 1000 total births.

Table . Socioeconomic and demographic health care factors related to PNM in Karachi, Pakistan, 1997.

Risk factors	High socio-economic area n = 605	Middle socio-economic area n = 327	Low socio-economic area n = 4025
Maternal age			
< 16	000	000	0010
16-20	036	014	0780
21-25	236	117	1740
26-30	213	125	1035
31-35	098	052	0330
36-40	017	017	0073
> 40	002	002	0011
P < .01			
Maternal occupation			
*Housewives	488	302	3786
Working Mothers	045	016	0083
P < .01			
Maternal education			
Primary	011	055	1037
Secondary	193	202	0736
Postgraduate	104	044	0129
None	002	010	1147
P < .01			
Parity			
0	213	098	1295
1 - 4	354	192	2110
5 - 8	031	030	0509
8+	007	003	0078
P < .01			
Antenatal care (booked by)			
Doctor	490	296	3142
Nurse	000	000	0052
Midwife	000	000	0434
TBA	000	001	0000
Dr / Midwives	000	000	0009
Dr / Nurse	000	000	0005
P < .01			
Antenatal care (unbooked)			
Doctor	113	027	0337
Midwives /Nurse	000	000	0016
P < .01			
Maternal illness			
Hypertens. Disease of Pregnancy	018	017	0133
Prolonged Labour	014	025	0042
A.P.H.	007	003	0029
Others	021	019	0057
No Illness	545	263	3764
P < .01			
Duration of pregnancy			
< 28 weeks	004	001	0050
28-37 weeks	125	049	1400
> 37 weeks	470	254	2350
One week of Postnatal	005	012	0165
P < .01			
Mode of delivery			
NVD	366	179	3170
Vacuum Extraction	025	000	0098
Internal Vers. Br. Ext.	000	000	0023
Outlet Forcep.	026	029	0047
LSCS	168	013	0356
Others	013	000	0271
P < .01			
Newborn			
Male	315	180	2065
Female	289	136	1858
Un-Determined	000	000	0014
P < .01			
Birth weight			
>4500 g	010	003	0284
>2500 g	541	285	2999
1000-2500 g	045	036	0595
< 1000 g	003	001	0073
Upto 1500	000	016	0367
P < .01			
Father's income			
1501 - 2000	000	002	0620
2001 - 2500	000	004	0613
2501 - 3000	000	006	0895
3001 - 3500	000	004	0144
3501 - 4000	000	016	0409
4001 - 4500	000	010	0116
4501 - 5000	002	038	0308
5000 +	044	218	0497
P < .01			
Causes and rate of Perinatal mortality			
Meconium Aspiration	000	000	0003
Abruptio placentae	000	001	0001
L B W	000	001	0003
Foetal Malformation	002	000	0007
Mechanical	000	000	0003
Anti Partum Haemorrhage	000	000	0011
Med. Disor.	000	000	0001
Hem. Dis. Of New born	000	000	0001
Sepsis	000	000	0001
** IUGR	001	000	0003
**Unknown	002	001	0015
**Others	000	004	0091
PNM Rate	18.18	24.46	50.93
C.I.	7.22, 29.14	7.16, 41.76	43.81, 58.04

* not gainfully employed are housewives ** includes still birth CI — confidence interval
LBW— Low Birth Weight
Hem. Dis.— Hemolytic Disease

Table shows the distribution of selected risk factors influenced by the high, middle and low socio-economic status/areas. In the lower socio-economic group an increased risk of perinatal mortality was found especially in relation with maternal age, occupation, parity, antenatal care received by the

mother, maternal illness, duration of pregnancy, mode of delivery whether spontaneous vaginal delivery, forceps, LSCS, birth weight and fathers' income. No statistical difference related to the cause of perinatal mortality in the mother or newborn could be found in the various socio-economic areas. An increased perinatal mortality was found in unbooked cases; these mothers did not receive regular antenatal care and were from low socio-economic areas. A statistical significance was seen when the three different socio-economic areas were compared regarding antenatal care and the outcome compared in terms of perinatal mortality. A higher perinatal mortality being found in low socio-economic areas. The duration of pregnancy maternal illness and mode of delivery when compared in the three socio-economic areas showed a statistical significance.

A greater number of mothers delivered with a gestation of less than 37 weeks in the middle and low socioeconomic areas as compared to the high socio-economic areas. Also more deliveries by LSCS were seen in the high socio-economic as compared to the middle and low socioeconomic areas. Fathers' income though not recorded in 84.1% (559 / 605), it can be very safely assumed was greater than Rs. 5000 per month, as minimum amount deposited for ordinary deliveries in this socio-economic area / hospital was greater than Rs. 10,000 per delivery. This amount of money had to be deposited at the hospital some weeks/days prior to the expected date of delivery. Also majority of these mothers were booked, with regular antenatal follow-up.

Discussion

In recent years considerable data is being brought forward, regarding perinatal mortality in Pakistan[6,9,11-19]. from government teaching hospitals[11,18,19] and very little from prospective community based studies[9,13,15]. The latter studies have concentrated on neonatal and infant mortality and hardly any work on perinatal mortality has been done prospectively.

However, a considerable amount of work has been done in other countries[20-25]. The present study aims to study the perinatal mortality rate, its causes in various socio-economic areas of Karachi by surveying hospitals 'which are attended by patients from these areas. The hospitals located in the high socio-economic areas were attended by patients mainly from the high socio-economic status. These hospitals were private or semi private with expenses for a normal delivery equivalent to approximately a minimum of Rs 12000 (approx. $ 26). This compared to government hospitals where the cost was only of the medicines which the patient had to buy for the delivery itself and about Rs 20 (approx. $ 0.43) per day for the bed charges. A total of not more than a few hundred rupees (approx. $6) for a normal delivery. However, expert obstetricians were available round the clock but the high perinatal mortality was due to patients being referred to the respective institute in a sorry state, when all tried measures had failed e.g., by untrained TBAs.

In this study perinatal mortality in the high, middle and low socioeconomic hospitals of Karachi was studied. The perinatal mortality per thousand total births was 80.42 ±1 77.78 highest in low socio-economic. 24.96±51.20 in the middle socioeconomic hospitals and 16 .74±23.62 in the high socioeconomic hospitals of Karachi. The PNM was influenced by the antenatal care, whether the mother was booked or unbooked. It was seen that in the low socioeconomic hospitals, majority of mothers were unbooked and a significant difference was seen in the perinatal mortality rate in the three socio-economic hospitals.

In the various socio-economic hospitals, factors such as the occupation of mother, her education, parity, age, duration of pregnancy, whether she received antenatal care or not all affected the perinatal mortality. The birth weight of the newborn, father's income, also affected the PNM in the various socio-economic areas. Father's income was recorded in less than 80% as the parents, especially the mother was very vague regarding father's income in hospitals from low socio-economic areas. However, in the high and middle socio-economic hospitals, the personnel filling the proformas, quoted

that since the family had given a deposit of Rs. 10,000 or greater and by appearance did look well to do, an income greater than Rs. 5000 was quoted. This was despite repeated efforts on part of our research team. The above variables had a significant effect (p<0.001) when compared in the high, middle and low socioeconomic areas. However, the sexes of newborn time/day of death of newborn, mode of delivery, mother's illness were not significantly related to the perinatal mortality in the three socio-economic areas.

Our results show an overall perinatal mortality rate of 45.18 per 1000 total births in various hospitals of Karachi as expected, but not documented before by all the hospitals. The PNM in the low socio-economic hospitals of Karachi coincides with studies done in government teaching hospitals and PNM in the middle socio-economic hospitals with the work done in Lahore at a village, periurban, slum and middle class[11,13,16,19]. An improvement in the maternal mortality in certain areas of the country has been documented after an intervention with expert planning, commitment and foreseeing problems which the mothers may face[26]. In a similar manner and dedication, a fall in the perinatal mortality may be possible in all the provinces of the country. The feasibility of using PNM as an indicator for maternal mortality has generated much debate and a review that examined this issue concluded that perinatal deaths, which is a more common outcome, may be a reasonable proxy indicator of maternal mortality. This study did not look at the maternal mortality. Some studies have suggested that PNM might have some utility as a surrogate indicator of maternal mortality.

In this study factors that were found to be significantly associated with an increased risk of mortality in univariate tabulations retained their significance after adjustment by multivariate logistic regression. Our results indicate that in this sample lower socio-economic populations, indicators of poverty such as lack of maternal education, occupation, remained significant after controlling for selected biological factors. The highest attributable risks were, associated with maternal illiteracy and poverty which suggests that in this population, overall improvement in PNM will be difficult without improvement of socioeconomic conditions including raising the level of education for women of child bearing age. Perinatal mortality was increased in low socio-economic hospitals, proved earlier on also by other studies on perinatal deaths, as well as many investigations of infant and child mortality.

In Pakistan most deliveries occur at home under care of untrained BA, especially in rural areas of the country. This association of hospital care with increased perinatal mortality in this study may possibly reflect self-selection or referral of high-risk mothers to hospitals, especially government teaching hospitals, rather than indicating poor obstetric care provided by trained personnel. Thus utilization of physician services in a hospital is a proxy for complications of pregnancy or delivery. This is a suggestion and in the next study involving the rural and urban areas, specific questions regarding reasons for referral will be considered.

As suggested by Fikree et. al[9] studies on the level and determinants of PNM can be conducted using pregnancy histories from demographic surveys. These studies should be conducted at country level and all deliveries recorded by TBA or by the parents transferring the information to the appropriate authorities for national record purpose and as indicated for improvement of neonatal-perinatal care at especially a community level.

This work is representative only of patients coming from various socio-economic areas to the respective hospitals in that region of Karachi. For a true representation of the perinatal mortality in Karachi, Sindh and its improvement, further work will have to be done as perhaps outlined by the groups of Bashir et a! and Jalil et. a!. Also it is our observation that the perinatal mortality in the low socio-economic areas can be decreased to a respectable figure by means of an easily affordable short term intervention such as improvement of antenatal care and long term intervention of improvement in the socio-economic conditions in this country of the mother and its family.

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