EPIDEMIOLOGICAL SURVEILLANCE INDICATORS FOR MATERNAL AND NEONATAL HEALTH

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ABSTRACT

Aim and Objectives: The aim of the present study is to determine a baseline data and estimates of maternal and neonatal health indicators, which can be used in establishing a pilot surveillance system in Mosul City. Study Design: Cohort study design. Participants: Nine hundred and forty three women and their live births new borns (n = 948). Study Setting: Al–Khansaa and Al–Batool maternity hospitals and related community. Methods: Cases were those pregnant women in the last trimester, who attended the mentioned maternity hospitals for delivery. Selection of the cases was on consecutive sampling basis. All information needed was included in a special questionnaire form prepared for this purpose. Cases were interviewed and examined at the time of admission and at the 7th and 42nd days after delivery (together with their newborns). Results: It has been found that 94.0% of the studied women received antenatal care. Maternal morbidity occurred in 99.4% in one or more of periods: the last four weeks of gestation, at the time of labour and puerperium. There was only one maternal death making a maternal mortality ratio of 106/100,000 live births. Almost all pregnancies ended with live births. Four fifth (86.6%) were within normal range of birth weight, and 77.2% showed Apgar score ≥7 at first five minutes of life. The estimated total neonatal morbidity was 61.6%, while neonatal mortality approached 17/1000 live births. Conclusion: The present study tried to indicate a set of indicators that can be used in a surveillance system to monitor the progress of maternal and neonatal health.

INTRODUCTION

Surveillance is the ongoing systematic collection, analysis and interpretation of health data essential to the planning, implementation and evaluation of public health practice, closely integrated with the timely dissemination of these data to those who need to know.[1] Maternal and neonatal health care surveillance system including the monitoring of pregnancy outcomes which enables local and district–level health officials to determine baseline estimate of neonatal, infant and maternal mortality and other obstetric care indicators.[2] The goal is to help health care providers and underlie every maternal death and identify those which could have been avoided. Every maternal and infant deaths identified and studied can help to prevent death of others from similar causes.[3] The aim of this study is to determine a baseline data and estimates of perinatal, neonatal and maternal morbidity and mortality as well as other obstetric indicators (i.e., access to health care services and birth outcomes), which can be used in establishing a pilot surveillance system in Mosul City.

PATIENTS AND METHODS

To achieve the aim of the present study, a Cohort study design was adopted. Cases were those pregnant women in the last trimester who attended one of the two main maternity hospitals in Mosul (Al-Batool and Al-Khansaa Teaching Hospitals) for delivery, regardless of weeks of gestation. Because of difficulties in completing the intended follow up outside Mosul City, women living in rural areas were excluded. Selection of study sample was on consecutive sampling basis. All information needed for maternal and neonatal health surveillance was included with a special questionnaire form prepared for this purpose. In fact, such questionnaire incorporates three main subdivisions. The first part deals with general information related to the pregnant woman in addition to past and current obstetrical history, presence or absence of antenatal care (ANC) and its characteristics. The second part concentrates on the results of clinical examination and laboratory investigations of both cases and their newborns; while the third part of the questionnaire had been specialized for the follow–up of the two groups of study population. Regarding follow up, women were interviewed at the time of admission and at the 7th and 42nd days after delivery. During each meeting, clinical and obstetrical examination was carried out in addition to hemoglobin level determination which was repeated in the first and second meeting and general urine examination which was only done in the second visit because the vaginal blood flow may

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prevent proper examination. During each meeting any type of maternal morbidity was detected. Furthermore, maternal death during such period was regarded as a maternal mortality according to its definition. During follow up of neonates clarifying the type of feeding was done. Looking for early and/or late neonatal morbidity was also indicated. Similarly, presence or absence of health care was looked for. If the baby died during the first week of life, such death would be registered as an early neonatal death and was included within the perinatal mortality. While if the baby's death occurred after that and before completing 28 days of life, it would be recorded as a late neonatal death. Causes of maternal and neonatal mortality were interpretated and reported properly. The present study lasted for seven months from the first of September 2002 to the thirty first of March 2003.

RESULTS

(Table-1) shows, sociodemographic characteristics of the studied women. More than half (55.6%) of them had the present pregnancy in their twenties, 11.7% were teenagers, and 14.7% aged 35 years or older. Among the study sample, 8.4% were illiterate and only 15.7% had university certificates. Regarding education of the male partners, illiteracy rate had a fraction of 5.3%, and 28.5% had higher education. The majority (84.6%) had skilled, semiskilled or unskilled occupation.

(Table-2) clarifies the obstetric background of the studied women. Almost three quarters (71.0%) of the women had at least one child. Stillbirths appeared in almost one tenth (9.7%) of their histories, and just less than one quarter (23.6%) had their last pregnancy more than three years ago.

Table 1. *Sociodemographic background of the study population*

Variables (n= 943)	No.	%
1. Mother's Characteristics		
Age		
≤ 19	110	11.7
20–24	283	30.0
25–29	241	25.6
30–34	171	18.1
≥ 35	138	14.7
Occupation		
Housewives	853	90.5
Workers	90	9.5
Education		
Illiterate	79	8.4
Primary	398	42.2
Secondary	318	33.7
University	148	15.7
2. Father's Characteristics		
Occupation		
Professional	54	5.7
Intermediate	70	7.4
Skilled	544	57.7
Semiskilled	127	13.5
Unskilled	126	13.4
Un–employed	22	2.3
Education		
Illiterate	50	5.3
Primary	300	31.8
Secondary	324	34.4
University	269	28.5

Table 2. *Obstetric background of the study population*.

Variables (n= 943)	No.	%
1. Parity		
Primigravidae	244	29.0
1–4 (Multigravidae)	546	56.2
≥ 5 (Grandmultigravidae)	153	14.8
2. No. of Live Births		
0	279	29.6
1–4	537	56.9
≥ 5	127	13.5
3. No. of Stillbirths		
0	852	90.3
1	69	7.3
> 1	22	2.4
4. Spacing (Months) n = 690*		
< 18	200	29.0
18–35	327	47.4
≥ 36	163	23.6

* Primigravidae were excluded

(Table-3), determines the surveillance indicators that emerged from the present study. The present study indicates that maternal morbidity rate is 99.4% classified as follows: Prenatal morbidity; i.e., during the last four weeks of pregnancy in 67.1%, natal maternal morbidity

(72.5%) and postnatal maternal morbidity in 90.8%. In the present study there was only one maternal death making a maternal mortality rate of 105.5/100,000 live births. The present study indicates that 94.0% of study pregnant women received ANC during the present pregnancy, mostly (80.8%) via doctors in primary health care centers (PHCc) or private clinics. Although 41.9% had seven visits or more, only 28.7% followed the scheduled visits. Iron-folate supplementation had been ingested by 21.9% and tetanus toxoid vaccination had been administered for 55.0% of studied women. During the period of puerperium 19.7% had received postnatal care after seven days of labor and mostly by doctors in private clinics (78.4%). Another 16.2% received the care within the next five weeks also mostly by

doctors in private clinics (81.0%). Regarding pregnancy outcome indicators, the incidence of low birth weight was 13.2%, while the incidence of low 5-minute Apgar score was 23.0%. Perinatal mortality rate was 19.8/1000 total births stillbirth rate = 11/1000 total births, and first week neonatal death rate = 9.5/1000 live births. Considering the neonatal health indicators, overall neonatal morbidity was 61.6% and neonatal mortality rate was 16.9/1000 live births. The majority of neonates (90%) had received no health care neither in the early nor in the late neonatal period. However, almost all (96.7%) of new borns had received BCG, zero dose of polio vaccine and hepatitis B vaccination.

Table 3. *Surveillance indicators emerged from the present study.*

Surveillance Indicators	No.	%	Rate/Ratio
1. Maternal Health Indicators			
a. Maternal Morbidity (Overall)	937	99.4	
Prenatal	633	67.1	
Natal	684	72.5	
Postnatal	855	90.8	
b. Maternal Mortality	1	0.1	105.5/100,000*
c. Maternal Access to Health Care			
Antenatal	886	94.0	
Postnatal	186	19.7	
Early Postnatal	186	19.7	
Late Postnatal	153	16.2	
2. Pregnancy Outcome Indicators			
a. Incidence of LBW	125	13.2	
b. Incidence of low 5–minutes Apgar Score	218	23.0	
c. Perinatal mortality	19	2.0	19.8/1000**
Stillbirth Rate	10	1.1	11.0/1000**
First Week Neonatal			
Mortality Rate	9	1.0	9.5/1000*
3. Neonatal Health Indicators			
a. Neonatal Morbidity	584	61.6	
Early Neonatal Morbidity	524	55.4	
Late Neonatal Morbidity	121	12.9	
b. Neonatal Mortality	16	1.7	16.9/1000*
Early Neonatal Mortality	9	1.0	9.5/1000*
Late Neonatal Mortality	7	0.7	7.4/1000*
4. Neonatal Access to Health Care			
Early Neonatal Health Care (n= 948)			
Present	98	10.3	
Absent	850	89.7	
b. Late Neonatal Health Care (n= 939)			
Present	93	9.9	
Absent	846	90.1	
c. Vaccination			
Present	917	96.7	
Absent	31	3.3	

* The denominator is the total number of live births (948).
** The denominator is the total number of live and stillbirths (958).

DISCUSSION

To protect the health of public adequately, public health professionals need to identify the population that may be pushed into poor health, either by social and economic forces or by specific public policies. Skills in surveillance and needs for assessment can contribute to the identification of vulnerable population and settings that can be addressed with programmatic or policy intervention.[4] Most countries use surveillance data to monitor the incidence of maternal health indicators, and to determine the leading causes of maternal deaths, the underlying conditions and the preventability of maternal deaths. In all countries with the surveillance system, the Ministry of Health receives the results of data analysis.[5] The present study expresses a simple surveillance system indicators that include data about maternal and neonatal health from cases attended to hospital for delivery. So, it is a hospital-based study. This type of study carries much of biases, hospital-data refer to what clinicians see and experience in health care establishments, which may be limited in some cases. Thus it may be unrepresentative for the whole community. Community-based surveillance can be more accurate in assessing maternal and fetoneonatal health than hospital-based system. However, this system carries a lot of problems such as it is time consuming, high cost and also there is the problem of non-participants.[6] The present study tried to minimize losses in the process of follow up by arranging home visits in order to collect the required data. It is important to have a complementary set of indicators reflecting diverse aspects of the programme from implementation to impact in order to achieve a more dynamic approach. As a general role, indicators should be action-oriented and provide workable direction. In general, obtaining accurate information about the nature and extent of maternal morbidity is notoriously difficult, but in recent years, there has been an increasing interest in this field.[7] The present study estimates the overall maternal morbidity rate as 99.4% which is considered to be very high. The most important explanation for this high rate is that, it was estimated from a hospital-based sample where most of pregnant women who attended hospital have a complain to do so. In the prenatal period *(last month of pregnancy)* the maternal morbidity appeared in about 67.1% of the study sample. This rate was lower than that calculated in natal and post–natal period. Since its estimation depended upon information taken from the study subject concerning any illness that occurred during the last four weeks prior to the interview. Recall bias may play a role and has an effect in the under-estimation. Almost three quarters of studied women (72.5%) had one or more of maternal morbidity at the natal period. The increased level of morbidity could be explained by the fact that many low risk pregnancy during the first and second trimesters may become a high risk. Al-Jawadi[8] in her follow up study found that the probability of low risk group women to become a high and severe risk during the third trimester is 0.321. Further elevation of maternal morbidity in the present study appeared in the postpartum period where it reached 90.8% of the total study women. The postpartum period covers a critical transitional time for a woman, her newborn and her family, on a physiological, emotional and social level. Poor quality care reduces opportunities for health promotion and for early detection and adequate management of problem and diseases.[7] The present study indicated that 94.0% of pregnant women attended antenatal care at least once. The described rates do not reflect the real picture because studied women were living in urban areas. So, they were intended to have hospital delivery, while those living at the periphery usually consult traditional birth attendants, who may be untrained. The present study showed that only 28.7% of the study sample followed the scheduled visits. The high rate of attendance to antenatal care may be reflected by high rate of maternal morbidity. It may be a selection bias since this study is a hospital-based. The present study elicited that the postpartum health care was requested by less than one fifth of the studied mothers. Postpartum care has been a relatively neglected aspect of maternity care. In the Middle East and North Africa, rates of postnatal care are even lower than this figure.[9] Regarding pregnancy outcome birth weight of an infant is the single and most important determinant of newborn survival. The present study indicated 86.9% of newborns had normal

birth weight, while 13.2% were classified as low birth weight neonates. The monthly average of low birth weight babies in 1994 was 21.1% against 4.5% in 1990, while the monthly average by the end of July 1995 was 21.5%.[10] Perinatal mortality rate is a sensitive and useful indicator for monitoring changes of care's quality in different population and in various areas of a country. The perinatal mortality rate in the present study was 19.8/1000 total births including 11.0/1000 total births were stillbirths and 9.5/1000 live births died in the first week of life. These rates are lower than that found by a study done in 1995 when the perinatal mortality rate was 44.6/1000 total births.[11] The improvement in perinatal mortality was not only due to improvement in obstetrical and neonatal health care services, but due to improvement of the whole socio-economic status. Neonatal mortality was found in the present study to be 16.9/1000 live births, 9.5/1000 occurred during the first week of life and mainly between the age of four to seven days. The remaining babies died during the late neonatal period and mainly (57.2%) during the fourth week of life, 28.6% at the age of two weeks and 14.2% between the age of 15-21 days. The rate of neonatal mortality that has been found by the present study is higher than that recorded in USA and other industrialized countries.[12] The present study tried to depict a set of indicators that can be used in a surveillance system to monitor the progress of maternal and neonatal health.

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