Original research article

Antenatal morbidity experiences and pregnancy outcome in a cohort of women – a community based study

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Abstract

Objective

To describe the antenatal morbidities experienced by a community cohort of mother and to describe the available pregnancy outcomes of the same cohort of mothers

Methodology

A community based sample of mothers resident in two Medical Officer of Health areas in Colombo district were identified before 10 weeks of pregnancy and followed up until delivery. At the time of recruitment, height, weight, and haemoglobin levels were measured and a clinical examination and basic investigations were done. Morbidity during pregnancy, pregnancy outcome and birth related information was obtained in a sample of women using three interviewers administered and one self-administered questionnaires.

Results

Anaemia was the commonest condition (26.2%) during pregnancy with respiratory diseases being reported among 5.2%, heart disease in 1.4%, infections of the urinary tract and genital tract among 2.5% and 2.7%. Gestational Diabetes and Pregnancy Induced Hypertension were observed in 4.6% and 9.5% of pregnant mothers respectively with oligohydramnios and polyhydramnios being present among 4.7% and 2.7 %. Pregnancy weight gain of less than 10 kg was seen among 55.8% of mothers. The pregnancy wastage rate was 4.9% and among the singleton pregnancies only 65.5% were normal vaginal deliveries while 14.7% were low birth weight new-borns.

Conclusions

Anaemia, low BMI, pregnancy induced hypertension and gestational diabetes was the commonest conditions observed in the cohort.

Key words: Antenatal morbidity, pregnancy outcome, community based study

Introduction

Morbidity experiences during antenatal period and delivery provide background information useful in improving the health services for pregnant women thereby contributing to the achievement of millennium development goals related to maternal and child health. Such data has to be obtained at the community level to enable assessment of the "illness load" that will form the basis of planning for provision of care at both, community and institutional levels. In many developing countries including Sri Lanka, studies on antenatal morbidity and morbidity related to delivery based on community level data are relatively scarce, with the available data being limited to mostly hospital based studies on severe maternal morbidities[1-3].

This descriptive study was undertaken to obtain information on the pattern of antenatal morbidity among a cohort of women, resident in two Medical

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Officer of Health (MOH) areas in the district of Colombo. They were identified in early pregnancy prior to 10 weeks of gestation and were followed up until after delivery to study the pregnancy outcome.

Methodology

The study was carried out in two out of the thirteen MOH divisions within the district of Colombo, the MOH areas, Kaduwela and Homagama.

All pregnant women registered by Public Health Midwives (PHM) before 10 weeks of pregnancy and were planning to deliver in one of the five selected hospitals in the area and those who consented were included (n=1832). Pregnant mothers were recruited by the PHMs for the study for a period of 6 months (January to June 2010). The study had two components, one of which was to study the morbidity pattern among a cohort of the pregnant women whose period of gestation (POG) was approximately 8 -10 weeks at the time of registration and the other to study the available pregnancy outcomes of women from this cohort.

At the time of the recruitment, demographic details were collected by a pre-tested structured questionnaire and the nutritional status of the mother was assessed using anthropometric measurements, (height and weight) during a routine field clinic visit by a pre-intern medical officer (PIMO). Further she carried out the urine investigations using the Uristrips[4] and haemoglobin level was assessed using the Hemocue machine[5] during the same visit. The standard guidelines provided by the manufacturers on method of using, calibration and safety precautions were strictly adhered to. The assessment of the blood pressure and the Ultra Sound Scan to ascertain the period of gestation (POG) were carried out according to the standard procedures using standardized instruments by the principal investigator (PI) during the same day. He was trained by a senior Obstetrician for the purpose for a period of 3 months in a leading maternity hospital in Colombo. We used a CHISON 600M portable ultrasound scanner with a curvilinear probe of 3.5 MHz.

The stress level of the pregnant mother is an important risk factor for low birth weight[6] and was assessed during the same visit using a self-administered General Health Questionnaire-30 (GHQ-30) which was validated to Sinhalese[7] and used in Sri Lanka[8,9] previously.

The GHQ-30 was self-administered again to the same pregnant mothers in a routine field clinic around 24-28 weeks of POG to capture the stress level during the second trimester by the PHMs.

The information on any medical and obstetric conditions that the mother may have, were obtained from herself and from mother's records (hospital and field antenatal clinic records) where relevant during the field clinic visit at approximately POG of 32 to 34 weeks of pregnancy by the PHM using a structured interviewer administered questionnaire.

The routine post-partum visit by the PHM after delivery was used to obtain the information on morbid conditions that may have occurred during the period after the clinic visit around 32 – 34 weeks, until the time of the visit. Pregnancy outcome details and usage of clinic services were collected by utilizing the records of the field clinic and the hospital clinic (Antenatal card, diagnosis cards and CHDR). PHMs were supervised and assisted by the PI, PIMO, public health nursing sisters and the medical officers in the clinics during the data collection process.

The labour room staffs of the selected five hospitals were trained on proper birth weight, length and head circumference measurements and the importance of accurate recording the data on the CHDR. Instruments utilized were periodically standardized and the process was supervised by the in-charge nursing officer of the labour room and by the PI.

There were three interviewer administered and one self-administered questionnaires utilized in this study and the first one was filled by the PIMO and the other two were filled by the PHMs. Adequate training was provided to them by the PI prior to the data collection and supervised throughout the study.

Ethical approval for the study was granted by the ethics review committee of the Colombo Medical Faculty and the informed written consent was obtained from the participants.

Results

Morbidity data are presented in sections; assessment of the nutritional status, clinical examination and the investigations at the time of the recruitment and medical and obstetric complications developed during the pregnancy. Details related to birth and intra-partum complications are presented in respect of mothers whom all birth details were available.

Assessment of the nutritional status, clinical examination and investigation findings at the time of recruitment

Indicators used to assess the nutritional status were weight (in early pregnancy) in kilogrammes (kg), height in centimetres (cm), BMI (kg/m^2) and haemoglobin level in grams per decilitre (g/dl) (Table1).

A majority of the mothers (94.1%) had a body weight more than 38 kg at the time of recruitment and 93.3% of the mothers were taller than 145cm. (These two cut off values were considered appropriate because they used to identify the high risk mothers in the routine ante-natal care system.) Most mothers had normal BMI (54.4%) with 20.5% having low BMI values. Approximately one fourth of the mothers belonged to the overweight (19.9%) and obese (4.9%) categories. The systolic blood pressure less than 120 was observed in 96.2% and the diastolic blood pressure less than 80 was observed in 98.4% of the pregnant mothers at the initial assessment.

Table 1: Height, weight, BMI and blood pressure of pregnant mothers in early pregnancy

	N=1832	No	%
Maternal Weight			
<38kg		108	5.9
<38kg		1724	94.1
Mean (SD) kg	52.58 (10.45)		
Maternal Height			
<145cm		123	6.7
<145cm		1709	93.3
Mean (SD) cm	153.84 (6.36)		
Maternal BMI (kg/m^2)			
<18.5 (Underweight)		376	20.5
18.5 - 24.9 (Normal weight)		1003	54.7
25 - 29.9 (Over weight)		363	19.9
>30 (Obese)		90	4.9
Mean (SD)	22.19 (4.06)		
Systolic BP			
<120 Hgmm		1762	96.2
>120 Hgmm		70	3.8
Diastolic BP			
< 80 Hgmm			98.4
> 80 Hgmm			1.6

Assessment of the level of haemoglobin (Hb)

Of all mothers, 20.4% were anaemic (Hb levels < 11g/dl), of whom 13.5% and 6.9% mothers had mild and moderate anaemia respectively with none belonging to the category of severely anaemia (Table 2).

Assessment of the urine full report (UFR), at the time of recruitment

Abnormal urine full reports were observed in 22.7% of the pregnant mothers. A majority among this group, 16.8% had pus cells in their urine. RBC, albumin and sugar in urine was observed in 5%, 13.3% and 2.2% of the pregnant mothers respectively. (Table 2)

Table 2: Distribution of the level of haemoglobin and the assessment of the urine full report (UFR), at the time of recruitment

	N=1832　　No	%
Anaemia status		
Anaemic <11	374	20.4
Not anaemic >11	1458	79.6
Level of Haemoglobin		
Severe Anaemia (<7)	0	0
Moderate Anaemia (7-9.9)	126	6.9
Mild Anaemia (10-10.9)	247	13.5
Normal Hb level (11-15)	1458	79.6
Mildly High Hb level (16-17)	3	0.1
Overall UFR Results		
Normal UFR	1417	77.3
Abnormal UFR	415	22.7
Pus Cells in Urine		
Present	308	16.8
Absent	1524	83.2
RBC in Urine		
Present	92	5.0
Absent	1740	95.0
Albumin in Urine		
Present	243	13.3
Absent	1589	86.7
Sugar in Urine		
Present	41	2.2
Absent	1791	97.8

Table 3: Frequency distribution of the streess level at the first and second trimesters

	No	%
Level of stress (Trimester 1, n=1832)		
Not stressed (<6 GHQ30)	1152	62.9
Stressed	680	37.1
Total	1832	100.0
Level of stress (Trimester 2, n=1832)		
Not stressed (<6 GHQ30)	1260	68.8
Stressed	572	31.2
Total	1832	100.0

Assessment of stress levels

The cut off level was taken as < 6 as 'not stressed'. Percentages of mothers who were identified as 'stressed' using this tool during the first and second trimesters of the pregnancy were 37.1% and the 31.2% respectively. (Table 3)

Medical and Obstetric complications developed during pregnancy

Anaemia was the commonest observed condition (26.2%) during pregnancy. Respiratory diseases were reported among 5.2% and heart disease in 1.4%. Infections of the urinary tract and genital tract were reported among 2.5% and 2.7% of the mothers.

Gestational Diabetes and Pregnancy Induced Hypertension were observed in 4.6% and 9.5% of pregnant mothers respectively. Among the obstetric complications, per se, the commonest was oligo hydramnios and polyhydramnios seen among 4.7% and 2.7% respectively.

Low pregnancy weight gain of less than 10 kg, though strictly cannot be considered as a morbid condition, and was seen among 55.8% of the mothers.

Use of clinic services

All mothers attended the field based antenatal clinics and a majority of mothers (97.2%) had good compliance to haematinics and 98.7% mothers were immunized with tetanus toxoid with a high percentage having undergone de-worming during pregnancy (98.5%)

Details related to birth and intra-partum complications Assessment of the birth details

The second component of the study was carried out on a sample of 1280 mothers from the same cohort in whom birth details were available. Of them, 18 (1.4%) were twin pregnancies, 1200 were singleton pregnancies, with 60 (4.7%) ending in an abortion with 2 (0.2%) still births giving a pregnancy wastage rate among singleton pregnancies to be 4.9% (Table 4). Of the mothers, who had live singleton births, a majority (45.7%) occurred at a period of gestation of 40 weeks. Incidence of preterm delivery (POG <37 weeks based on an ultrasound scan) occurred in 65 (5.4%) of the pregnancies.

Caesarean Section was the mode of delivery in 402 (33.5%) mothers, of the live births and in this group, 131 (32.6%); the indication for the Caesarean Section was a previous Caesarean Section. Mean pregnancy weight gain was 10kg and there were 55.6% of pregnant mothers with less than 10Kg of weight gain.

Of all neonates, 14.7% were LBW babies and 16.9% were short in length (< -1 SD of the mean length of the neonates included in the study) at birth. Of the live births, 9.3% were admitted to the Special Care Baby Unit (SCBU) and in a majority (19.6%) the reason for admission was given as 'being a Low Birth Weight baby' in the diagnosis card given by the SCBU. (Table 5).

Table 4: Birth details of singleton pregnancies

	No	%
Nature of Birth (n=1280)		
Live singleton births	1200	93.7
Abortions	60	4.7
Still Births	2	0.2
Twins	18	1.4
POG (Wks) by USS (n=1200)		
32	6	0.5
33	2	0.2
34	4	0.3
35	19	1.5
36	34	2.8
37	55	4.7
38	172	14.4
39	291	24.3
40	549	45.7
41	54	4.5
42	6	0.5
43	8	0.7
Preterm (n=1200)		
< 37 Wks	65	5.4
> 37Wks	1135	94.6
Mode of delivery (n=1200)		
Normal Vaginal Delivery	787	65.5
Caesarean Section	402	33.5
Forceps / Vacuum	11	1.0
Nature of the Caesarean Section (n=402)		
Planned	235	58.7
Emergency	167	41.3
Indication for Caesarean Section (n=402)		
Past Section	131	32.6
Foetal Distress	60	14.9
PIH	36	9.0
Prolong Labour	26	6.5
Unstable Lie	21	5.2
Unfavourable Cervix	16	4.0
Thick Meconium	15	3.7
SGA	14	3.5
Primi Breech	12	3.0

Discussion

This study provides data on the nutritional status and the prevalence of morbid conditions among a cohort of pregnant women in two MOH areas in Colombo district, from a community based sample of mothers identified in early pregnancy and followed up until delivery.

Reported studies on morbidity during pregnancy are based mostly on institutional data and often on severe maternal morbidities[1-3]. The routinely available data on morbidity patterns are also not readily available, in Sri Lanka with the exception for nutritional status related morbidities.

Anaemia in pregnancy has been reported in many studies in Sri Lanka and in other countries of the region. The Nutrition and Food Security Survey (NFSS) [10] conducted at national level reported that in Sri Lanka, the prevalence of anaemia among pregnant women to be 16.7% which is lower than the reported figure of 20.4% in this study. Anaemia as an important risk factor of maternal ill health has been highlighted in a prospective study in rural Bangladesh[11]. A review paper on nutrition and maternal mortality and morbidity also highlights the strong link between malnutrition and illness during pregnancy[12].

In the NFSS, the nutritional status of pregnant women was assessed using mid upper arm circumference with the cut-off of 23 cm identifying women who were underweight. The percentage underweight identified using this method was 13.4%. As the anthropometric assessment in the present study were made in early pregnancy (approximately at 10 weeks of pregnancy), the data on BMI could be considered as proxy indicators among non-pregnant women. The percentage with low BMI (Underweight) in this group of mothers was 20.5%, which is higher than the reported value among non-pregnant women in the NFSS[10], though the figures are strictly not comparable.. A report published by World Bank indicating that in the urban sector, the percentage of women with low BMI is 12.7% which is closer to the figure from NFSS and lower than that observed in the present study which was carried out in an urban/ semi urban setting[13].

In West Africa, a multi country study on direct obstetric complications during the antenatal period identified hypertension, abortion and sepsis to the common morbidities along with haemorrhages and dystocia[3].

A hospital based study on antenatal morbidity in Kenya reported urinary tract infections 2.1% to be an important cause of maternal illness[14]. Study of the morbidity pattern among antenatal mothers in peri urban areas of coastal districts in Tamil Nadu reported a prevalence of 19.5% of women reporting urinary tract infections, 1.35% of gestational diabetes and a similar percentage having pregnancy induced hypertension[15]. The present study reported a higher prevalence pregnancy induced hypertension (9.6%), gestational diabetes (4.6%) and a lower prevalence of urinary tract infections (2.5%).

The community based study on the prevalence of antenatal morbid conditions among women in an underserved population[16] is the most recent available community based data on this topic from Sri Lanka. This study has identified all risk conditions which included teenage pregnancies, pregnancies in the older women and prevalence of anaemia and low BMI and other risk conditions and reported that 52% of the total sample of 392 had one or more risk conditions. Prevalence of anaemia among this group was reported as 8.2% and low BMI, also among 8.2%. These figures are much lower than those observed in the present study whereas the expected prevalence in an underserved population could be higher. However, methodological differences may account for these differences to some extent.

Study done in a developed country reported that the psychosocial stress among antenatal mothers were around 78% in low-moderate level and 6% at high level[17]. Study done in Sri Lanka on antenatal stress using the same instrument reported that 35.5% of the mothers in the first trimester and 17.6% of the mothers in the second trimester were suffering from the condition[18]. Present study observed stress levels of 37.1% and 31.2% in the first and the second trimesters. Study conducted using 2,618,777 live births in Sweden from 1973 to 2004 revealed that stress during second trimester was associated with the greatest risk of low birth weight[19].

A study carried out in two MOH areas in Sri Lanka reported a pre-term birth rate of 12% in 2005[20] while

the present study observed a much lower value of 5.4%. The caesarean section rate was observed as 33.5% and the study done in 2007[21] reported 30.6% as the national value and it has rising trends[22]. The low birth weight was observed as 14.7% and it was reported as 16.7% according to the demographic and health survey 2007[23]. An admission rate of 9.3% was observed for the special care baby units in the present study while the similar figure was 19.5% in 2009 in India[24].

Conclusions and recommendations

The common morbid conditions among this cohort were anaemia, low BMI and respiratory diseases which are mostly linked with poor nutritional status. While high stress level during second trimester and insufficient pregnancy weight gain also important conditions worth considering for interventions. Conditions linked to pregnancy such as pregnancy induced hypertension and gestational diabetes were also important causes of morbidity.

Contribution of Authorship

T. R was the Principal Investigator and DF and HS were the supervisors for the methodological component and the obstetric component respectively.

Details of ethics approval

Ethics approval was granted by the Ethics Review Committee, Faculty of Medicine, Colombo in 2009. (Approval number EC-09-083)

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