Pattern of Risk Status of Antenatal Cases in a Tertiary Care Hospital

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Abstract   Although pregnancy is a physiological process, it is not hassle free.Any normal pregnancy can turn anytime into a life threatening event despite all cares being taken. Maternal Mortality is still very high in many of the low resource countries compared to the developed countries. Available DATA suggests that in many countries MMR is still very high and not lowering even within a reasonably organized health care set up. In Nepal, Safe Motherhood Program was started during 1997 and some significant progress was made in health care infrastructure. But the millennium development goal (MDG 5) of 213 maternal deaths per 100,000 live births by 2015 is yet to be achieved. Present hospital based study was an attempt to identify antenatal cases with risk factors by using pre validated simple score card, to observe risk status of mothers during prenatal period and intrapartum period , link pattern of risk factors to have a base line data in Nepal. The study comprised of 2466 antenatal cases. out of them 726 were in high risk and 1740 at low risk group. both the groups received adequate antenatal care in the ANC clinic of Manipal Teaching Hospital. More risk factors were present in high risk group than low, bad obstetric history, mild anemia and poor weight gain during pregnancy were the common risk factors present. In the low risk group average risk factors per woman was 1.17 while the average was 2.56 in the high risk category. Out of 726(29.44%) cases who were initially at high risk,529(70.91%) remained at high risk during intrapartum period whereas the remaining 197 (26.41%)were converted to low risk. Out of 1740(70.56%) initial low risk cases, 346(19.88%) developed complications later on thus subsequent risk status of 1923 (77.98%) was low and 543 (22.02%) high respectively. Prolonged labour (2.34%), Premature rupture of membrane (44.63%) and traumatic deliveries (1.52%) were more in high risk group. Interventions like induction of labour and artificial rupture of membrane were higher in high risk group. The study suggests that it is possible to identify at risk expectant mothers with a simple risk scoring system during antenatal period. Intervention in time can reduce the risk and will have an impact in reduction of maternal mortality rate.

Keywords: pattern, risk status, antenatal cases, Nepal

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1. Introduction

In an woman's life motherhood is one of the greatest gift she can have in her lifetime. Giving birth and rearing a child is another great achievement any mother can dream of. Although pregnancy is a physiological process, it is not hassle free. Any normal pregnancy can turn anytime into a life threatening event despite all cares being taken. In most of the developed countries with improved health care facilities maternal mortality and morbidity are within certain limits, much less than those of the low resource countries. Most of the under developed countries and developing countries are trying to improve the health status of women, trying to lower the mortality and morbidity linked with pregnancy and child birth. Yet the

Maternal Mortality is still very high in many of the low resource countries compared to the developed countries.

It is also very difficult to forecast, when will a normal pregnancy develop complications and turn fatal any time during antenatal, confinement or during postnatal period.

With the WHO guidelines and primary health care approach to achieve Health for All by the year 2000, there were improvement in overall health status in many countries. But the available DATA suggests that in many countries MMR is still very high and not lowering even within a reasonably organized health care set up. There are many reasons behind this. Main cause is lack of fund and resources in most of the developing and underdeveloped countries.

All the member countries of World Health Organization agreed to improve the health situation from base line data

of 1990 with a set target to be achieved by 2015, the Millennium Development Goals [1-7].

Safe motherhood program has been initiated in many countries with an objective of a healthy mother and a healthy baby at the termination of pregnancy. This could be possible if an integrated approach of MCH care is implemented through appropriate ante natal care deliveries under medical supervision, and postnatal health checkups with timely management of complications.

In Nepal, a developing country, Safe Motherhood Program was started during 1997 and some significant progress was made in health care infrastructure and training of health care personnel [8].

Due to Nepal's National Safe Motherhood Plan (2002-2017) and the revised Safe Motherhood and Neonatal Health Long Term Plan (SMNHLTP 2006-2017), maternal mortality was reduced from 850 maternal deaths per 100,000 live births in 1990 to 281 in 2006.The millennium development goal target (MDG 5) of 213 maternal deaths per 100,000 live births by 2015 is yet a big hurdle to be achieved [8,9,10,11].

It is seen that people have identifiable risk factors that usually are present in about 20 to 30 per cent population. And more than 80 per cent of mortality and morbidity happen amongst these people with risk factors. If these people with risk factors are identified early and special care is instituted, even with limited resources there will be perceptible impact on mortality and morbidity rate.

Similarly the pregnant mothers can be checked up for risk factors. Those having bad history or existing problems can be identified during antenatal checkup. Special care and attention will try to ensure timely intervention and safe delivery, thereby reduce maternal mortality or morbidity [12].

There was an attempt to find out the risk profile during antenatal period and follow up care using a pre validated simple score card and impact of risk status on out come of pregnancy at community level [13,14,15].

In the present hospital based study an attempt was made to identify antenatal cases with risk factors by using same pre validated simple score card, to observe risk status of mothers during prenatal period and intrapartum period, link pattern of risk factors to have a base line data in Nepal.

2. Materials and Method

2.1. Setting and Design

A prospective cohort of antenatal cases from ANC clinic at Manipal Teaching Hospital (the hospital of Manipal College of Medical Sciences) Pokhara, Nepal were studied from January 2014 to December 2014.

A prevalidated scoring system with 28 prenatal and 16 intrapartum factors were used to identify mothers at risk and antenatal cases were grouped into low and high risk at the time of booking and again during intranatal period [13,14,15]. Informed consent was obtained from the expectant mothers. Kuppuswamy's Socioeconomic Status Scale was used to categorise SE Status [16]. Mothers were checked up regularly in the ANC clinic throughout the period of pregnancy. The mothers and the neonates were followed up for 7 days after delivery.

2.2. Approval of Ethical Committee

Approval from Institutional ethical committee was taken. The latest version of the Declaration of Helsinki was followed in the Research protocol.

2.3. Inclusion Exclusion Criteria

The antenatal cases who were registered in the Manipal Teaching Hospital and reported regularly for follow up till delivery at Manipal Teaching Hospital were included in the study.

2.4. Outcome Variable

The final cohort was of 2466 antenatal cases who full filled the criteria.

2.5. Statistical Analysis

Excel 2003, R 2.8.0 Statistical Package for the Social Sciences (SPSS) for Windows Version 16.0 (SPSS Inc; Chicago, IL, USA) and EPI Info 3.5.1 Windows Version were used to analyze the DATA.

3. Results

The study comprised of 2466 antenatal cases. out of them 726 were in high risk and 1740 at low risk group. both the groups received adequate antenatal care in the ANC clinic of Manipal Teaching Hospital.

All these cases were assessed at the time of registration, followed up and scored for risk factors. All the study cases were again scored during intrapartum period and grouped into low and high risk.

Immediately after delivery assessment of the new born was done according to the risk factors present.

3.1. Pattern of Risk Factors in Antepartum Period

More risk factors were present in high risk group than low, bad obstetric history, mild anemia and poor weight gain during pregnancy were the common risk factors present. (Table 1)

The Table 1 shows the pattern of risk factors during antenatal period in low and high risk groups.

In the low risk group of 1740 there were total of 2036 risk factors (average risk factors per woman 1.17). in the high risk category there were in all 1859 risk factors which gives the average as 2.56. 42.56 factors belonged to the categories of Bad Obstetrics History in the previous pregnancy.

6.75% of risk factors in the high risk group are the associated conditions like Cardiac disease. Hypertension and other medical disorders while 0.17% risk factors in low risk group were linked with the associated conditions.

The third major group was the risk factors during current pregnancy. The frequency of anemia was quite high in the both high and low risk groups. There were total 2234 (90.6%) antenatal cases with mild anemia in low 92.36% and 86.36% high risk groups respectively. In 44 (6.06%) and 16 (0.92%) cases in high and low risk groups respectively had blood hemoglobin level less than 8 gm%.

Table 1. Pattern of Risk Factors in Antepartum Period

Risk Factors	Low Risk	High Risk
	No	No
I. Previous Pregnancy		
H/O Infertility	1	1
Contracted Pelvis	0	12
Incompetent Cervix	0	4
Pre eclampsia	0	94
LSCS	0	88
Abnormal Presentation (Twin,Breech etc)	0	8
Still birth	1	26
Neonatal Death	10	71
Previous Gynae Surgery (D&C etc.)	2	5
Sub group Total	14(0.80)	309(42.56)
II.Associated Conditions		
Diabetes Mellitus	0	1
Essential Hypertension	1	2
Cardiac Disease	0	16
Chronic Renal disorder	1	2
Sickle cell Anemia	0	3
Bronchial Asthma	0	2
Epilepsy	0	2
Serology Positive (VDRL)	0	1
Pulmonary Tuberculosis	0	12
Viral Hepatitis	0	5
Severe Anaemia with hypoproteinaemia	0	2
Goitre	0	1
Post Polio	1	0
Sub group Total	3(0.17)	49(6.75)
III. Present Pregnancy		
Age <15 yrs > 35 yrs	0	41
Height <145 cms > 175cms	0	24
Weight Gain < 7 kgs	68	147
Grande Multiparity	0	15
Pregnancy Multiple	0	41
Breech	0	76
Malpresentation / Transverse Lie	0	12
Contracted Pelvis	0	21
Small for Dates	2	6
Prolonged Pregnancy	6	2
Blood Haemoglobin		
a. < 8 gms%	16	44
b. 8-10 gms%	1607	627
Bleeding < 20 Weeks of Gestation	2	9
Polyhyramnios	1	1
Sub group Total	1702(97.82)	1066(146.83)
Grand Total	1719(98.79)	1424(196.14)

There were 3.9% of poor weight gain cases in low and 20.25% in high risk groups respectively, frequency of mi Id anaemia was more in the high risk group.

26.41% high risk cases were converted into low risk due to intervention strategy where as 19.88% low risk cases developed complications later on. (Table 2)

3.2. Initial and Subsequent Risk Status

Table 2. Distribution of Low and High Risk Cases as Per Incidence in Risk Groups

Risk Group	Antepartum		Intra partum				Total	
			Remained as such		Converted to other group			
	No	%	No	%	No	%	No	%
Low	1740	70.56	1394	80.12	346	19.88	1740	100.00
High	726	29.44	529	70.91	197	26.41	746	100.00
Total	2466	100.00	1923	77.98	543	22.02	2466	100.00

$\chi2=628.09$, P = <0.0001.

The above tables show the distribution of the cases based on the antepartum and intrapartum scoring. There are four groups, 1740 cases initially in low risk group was converted either to high risk group due to factors increasing the risk potential or remained as low. Age, Socioeconomic status and Parity wise distribution of Low and High Risk cases during Antenatal Period is given in Table 3.

Table 3 (A). Age. Socioeconomic status and Parity wise distribution of Low and High Risk cases during Antenatal Period

Age in Years	Low Risk		High Risk		Total	
	No	%	No	%	No	%
15-20	200	11.49	70	9.64	270	10.95
20-25	992	57.01	324	44.63	1316	53.37
25-30	426	24.48	198	27.27	624	25.30
30-35	122	7.01	101	13.91	223	9.04
Above 35	0	0	33	4.55	33	1.34
Total	1740	100.00	726	100.00	2466	100.00

$\chi2=123.96$, P = <.0001.

Age wise major representation was from young age groups from 20 to 30 years from both the low and high risk groups.

Table 3. (B)

Socio Economic Class	Low Risk		High Risk		Total	
	No	%	No	%	No	%
I Upper	2	0.12	2	0.28	4	0.16
II Upper Middle	47	2.70	15	2.07	62	2.51
III Lower Middle	132	7.59	59	8.12	191	7.75
IV Upper Lower	1545	88.79	599	82.51	2144	86.94
V Lower	14	0.80	51	7.02	65	2.64
Total	1740	100.00	726	100.00	2466	100.00

$\chi2=79.35$, P = <.0001.

The above table shows the socio-economic status wise distribution of antenatal cases as per the risk groups. Major representation was from socioeconomic upper lower scale (IV).

Table 3. (C)

Parity	Low Risk		High Risk		Total	
	No	%	No	%	No	%
0	705	40.52	277	38.15	982	39.82
1	532	30.58	206	28.38	738	29.93
2	397	22.82	136	18.73	533	21.61
3	99	5.68	59	8.12	158	6.41
4	7	0.40	33	4.55	40	1.62
5 and Above	0	0	15	2.07	15	0.61
Total	1740	100.00	726	100.00	2466	100.00

$\chi2=64.8$, P = <.0001.

Major representations were from primi gravida to second para combined (91.36%). Age, Socioeconomic status and Parity wise distribution of low and High Risk cases during Antenatal Period andsSubsequent change in Risk status is given in Table 4.

Table 4. (A) Age. Socio Economic status and Parity wise distribution of low and High Risk cases during Antenatal Period and Subsequent change in Risk status

Age in Years	Low/Low		High/Low		Low/High		High/High		Total	
	No	%	No	%	No	%	No	%	No	%
15-20	156	11.19	17	8.64	44	12.72	53	10.02	270	10.95
20-25	799	57.32	103	52.28	193	55.78	221	41.78	1316	53.37
25-30	350	25.11	49	24.87	76	21.97	149	28.17	624	25.30
30-35	89	6.38	17	8.63	33	9.54	84	15.88	223	9.04
Above 35	0	0	11	5.58	0	0	22	4.16	33	1.34
Total	1394	100.00	197	100.00	346	100.00	529	100.00	2466	100.00

$\chi2=143.16$, P = <.0001.

Table 4. (B)

Socio Economic Class	Low/Low		High/Low		Low/High		High/High		Total	
	No	%	No	%	No	%	No	%	No	%
I Upper	1	0.07	1	0.51	1	0.29	1	0.19	4	0.16
II Upper Middle	43	3.08	6	3.05	4	1.16	9	1.70	62	2.51
III Lower Middle	94	6.74	15	7.62	38	10.98	44	8.32	191	7.75
IV Upper Lower	1248	89.53	168	85.28	297	85.84	431	81.48	2144	86.94
V Lower	8	0.58	7	3.55	6	1.73	44	8.32	65	2.64
Total	1394	100.00	197	100.00	346	100.00	529	100.00	2466	100.00

$\chi 2 = 143.16$, P = <.0001.

Table 4. (C)

Parity	Low/Low		High/Low		Low/High		High/High		Total	
	No	%	No	%	No	%	No	%	No	%
0	541	38.81	75	38.07	164	47.40	202	38.18	982	39.82
1	438	31.42	57	28.93	94	27.17	149	28.17	738	29.93
2	330	23.67	37	18.78	67	19.36	99	18.71	533	21.61
3	79	5.67	16	8.12	20	5.78	43	8.13	158	6.41
4	6	0.43	10	5.08	1	0.29	23	4.35	40	1.62
5 and above	0	0	2	1.02	0	0	13	2.46	15	0.61
Total	1394	100.00	197	100.00	346	100.00	529	100.00	2466	100.00

$\chi 2 = 79.39$, P = <.0001.

Age wise major representation was from young age groups from 20years to 30 years from both the low and high risk groups.

The socio-economic status wise distribution of antenatal cases as per the risk groups is as follows:

In the low/low group, 89.53% are in upper-lower, 6.74% in lower middle, 3.08% in upper middle class while only 0.07% and 0.58% representations are in the upper and lower social class respectively.

In the high/low group, 85.28% are in upper-lower, 7.62% in lower middle, 3.05% in upper middle, 0.51% in upper and 3.55% in lower social class.

In the low/high group, 85.84% are in upper lower, 10.98% in lower middle, 1.16% in upper middle, 0.29% in upper and 1.73% in lower social class.

In the high/high group 81.48% are in upper lower, 8.32% in lower middle, 1.7% in upper middle, 0.19% in upper and 8.32% in lower social class.

Major representation is in the nulliparity and first para group. In the low/low group, 38.81% are in nulliparity, 31.42% in parity one, 23.67% in parity two, 5.67% in parity three and 0.43% in parity four, there is no case in parity five and above. In the high/low group, 38.07% are in nulliparity. 28.93% in parity one, 18.78% in parity two. 8.12% in parity three, 5.08% in parity four while only 1.02% are in parity five and above.

In the low/high group, 47.4% are in nulliparity, 27.17% in parity one, 19.36% in parity two, 5.78% in parity three and 0.29% in parity four but no representation from parity five and above

In the high/high group, 38.18% are in nul Iiparity. 28.17% in parity one, 18.71% in parity two, 8.13% In parity three, 4.35% in parity four and 2.46% in parity five and above..

3.3. Pattern of Risk Factors during Intrapartum Period

Prolonged labour (2.34%), Premature rupture of membrane (44.63%) and traumatic deliveries (1.52%) were more in high risk group. Interventions like induction of labour and artificial rupture of membrane were higher in high risk group.(Table 5)

Table 5. Pattern of Risk Factors in Intrapartum Period

Risk Factors	Low Risk		High Risk	
	No	%	No	%
I. LABOUR				
Labour >20 hrs	21	1.21	12	1.65
II Stage >2.5 hrs	7	0.40	5	0.69
Medical Induction	63	3.62	40	5.51
PROM> 12hrs	174	10.00	324	44.63
ARM	12	0.69	15	2.07
II. SURGICAL INTERVENTION				
Primary CS	311	17.87	476	65.56
Repeat CS	0	0	88	12.12
III. COMPLICATIONS				
Traumatic Delivery	30	1.72	11	1.52
Meconium Stained Amniotic Fluid				
Light Stained	6	0.35	1	0.14
Heavy Stained	0	0	13	1.79
Presentation Breech	0	0	78	10.74
Malpresentation	0	0	25	3.44
Multiple Pregnancy	0	0	41	5.65
Premature Delivery	41	2.36	36	4.96

4. Discussions

In the initial low risk group, average risk factors per woman was 1.17 while in the high risk category the average risk factors was 2.56. The pattern of risk factors in low and high risk categories reflected that average of risk factors was more than double the former average value. 0.80 factors in low risk .42.56 factors belonged to the categories of Bad Obstetrics History in the previous pregnancy. The difference in the two groups was

remarkably high. These factors are important because they cannot be controlled as they have occurred in the past.

The frequency of anemia was quite high in the both high and low risk groups. Anemia can be an important contributing factor for low birth weight and perinatal deaths. It can be totally controlled by proper antenatal care. Poor weight gain is another such factor again totally preventable. Other preventable factors are pre- eclampsia. multiparity etc. whereas factors like short stature, contracted pelvic deformity are not amenable to treatment.

Numerous studies have been carried out on one or more 'risk factors' and their prevalence with special reference to measure the suboptimal outcome of pregnancy.

History of fetal and chi Id losses have been proved to be associated with the recurrence of still births and early neonatal deaths in subsequent pregnancies. Sokol also found frequency of mi Id anemia more in the high risk group [17,18].

Initially identified as high risk cases converted into low risk group due to intervention care, and some remaining in high risk, the risk factors being unaltered.

All five Socio-economic categories viz. upper, upper-middle, lower-middle, upper-lower and lower are represented in the two groups of antenatal cases [16]. The upper class has a very low representation in both the risk groups. This low representation is due to the fact that most of the upper class prefer health care from private practitioners or nursing homes which cater for personal care. Only those with complications reported to apical institution for expert technical care hence major representation is from upper lower and lower middle classes in both the groups. There was preponderance of cases of upper lower category which mostly represents poor families.

Parity wise major representation was from nulliparity, first and second parity almost similar in both the risk groups.

By intervention strategy, out of 726(29.44%) cases who were initially at high risk, only 529(70.91%) remained at high risk during intrapartum period whereas the remaining 197 (26.41%)were converted to low risk. Out of 1740(70.56%) initial low risk cases, 346(19.88%) developed complications later on thus subsequent risk status of 1923 (77.98%) was low and 543 (22.02%) high respectively.

In this study 22.02% cases continued to remain in high risk. This cannot be considered as failure of intervention strategy or lack of proper antenatal care because certain risk factors like bad obstetric history, height below 145 cms are not amenable to treatment. 26.41% cases were converted to low risk. This may be because of several factors. Firstly the factors initially responsible for high risk status could be controlled to a larger extent like anemia, associated diseases like hypertension and pre-eclampsia etc. This high conversion rate also perhaps reflects the efficacy of the appropriate antenatal care and providing special care to the high risk group.

Nepal being a developing country risk approach for management of antenatal cases will be a cost effective option to be incorporated in the health care delivery system. The target of millennium development goal (MDG5) in maternal mortality for Nepal is 213 maternal, deaths per 100,000 live births by 2015. From the mountain region, hilly area and plains (Terai) of Nepal and also in urban and rural areas the statistics vary [11].

In the new national health policy, the government of Nepal has targeted for 66% reduction in maternal mortality between 1990 to 2015 [10]. The health services have undertaken Birth Preparedness Package and mother and neonatal health (MNH) activities, rural ultra sound program ,emergency referral fund for women from poor communities, safe abortion services and Aama Program.

The Aama program initiated a cash incentive scheme for four antenatal visits, safe institutional delivery and for health worker for home delivery [8].

But due to the paucity of the available resources there is need to equitable distribution on need based requirement and rational approach to the overall MCH problems to have an impact on the mortality and morbidity indicators.

5. Conclusion

The study suggests that it is possible to identify at risk expectant mothers with a simple risk scoring system during antenatal period. Adopting a risk care approach in a low resource country like Nepal is ideal in lowering maternal mortality and morbidity. The present risk scoring system can be used to identify risk status of the pregnant women by identifying the risk factors present in them . Intervention in time can reduce the risk and will have an impact in reduction of maternal mortality rate.

List of Abbreviations

CS/LSCS: Lower Segment Caesarean Section
D& C: Dilatation & Curettage
SD: Standard deviation
SPSS: Statistical Package for the Social Sciences
Hb: Hemoglobin
>: More than
>: Less than

Authors' Contributions

Asis, Abhijit, Aashika & Arpana responsible for concept of article, designing article, review of literature, critical analysis and write up of manuscript. Asis, Manash & Komal collection of DATA & compilation, Brijesh responsible for statistical analysis and writing of manuscript, Manas, Abhijit & Komal responsible for review of literature and revision of the manuscript. The final document was approved by all authors.

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What the Study Adds

Hardly there is any study on risk approach on Nepali Expectant Mothers .This study tried to add some base line

information about the status of antenatal cases, further studies on the subject will have wider scope to tackle the causes to reduce MMR.

Declaration of Conflicting Interests:

The authors declare that there are no conflicts of interest with respect to the research, authorship and /or publication of this article

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