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ORIGINAL ARTICLE

PREVALENCE AND FACTORS ASSOCIATED WITH MATERNAL POSTPARTUM HAEMORRHAGE IN KHYBER AGENCY, PAKISTAN

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Background: Postpartum haemorrhage (PPH) is one of the main causes of maternal mortality globally. The objective of this study was to estimate the prevalence of PPH and identify factors associated with PPH in Khyber Agency, Pakistan. **Methodology:** A quantitative, cross-sectional study design was selected to estimate the prevalence and associated factors for PPH among married women aged 15–49 years, residing in the Khyber Agency, FATA, Pakistan. A pre-tested structured questionnaire was adapted with some modifications to interview 1,000 women. **Results:** Prevalence of PPH was 21.3% in the study population. Factors associated with PPH were age, number of pregnancies, duration of labour, avoidance of milk, insertion of homemade remedies in vagina, retained placenta, and rest during postpartum period. **Conclusion:** Poor infrastructure, lack of appropriate training for healthcare providers, economic conditions, and negative cultural practices are some amongst the multiple factors that have a perilous impact on women's health, particularly women of reproductive age. The morbidities were the result of malpractices ingrained in the community.

Keywords: Postpartum Haemorrhage, Maternal Mortality, Morbidity, Postpartum, Malpractices

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INTRODUCTION

Excessive bleeding after childbirth, a leading cause of maternal deaths worldwide, has gained international attention among medical and research communities for decades.¹ Haemorrhage, whether antepartum (APH) or postpartum (PPH), abortion or ectopic pregnancy related, remains one of the major killers of child bearing women all over the world.¹

Primary PPH is defined as loss of more than 500 ml of blood *per vaginam* in the first 24 hours following childbirth. It is one of the leading causes of maternal mortality and its related complications.² There are 600,000 maternal deaths reported worldwide every year and 99% of these occur in developing countries. Among them 25% of deaths in developing world are due to PPH.²

A population-based research study conducted in Bangladesh reported PPH as 6% of total maternal morbidities.³ In a two-year longitudinal census in West Africa, the estimated postpartum morbidities through PPH were 28%.⁴ A community-based survey in India has estimated that of the 560/100,000 live births PPH accounted for 35–56% of the deaths.⁵ A study conducted in Pakistan revealed prevalence of PPH as 34%.⁶

PPH is caused by many reasons, the commonest being uterine atony, which is responsible for 80% of the cases. Risk factors for uterine atony includes: prolonged first and/or 2nd stage of labour, augmented labour, retained placenta, placental accreta, multiple pregnancy, polyhydramnios and uterine fibroids. Multiparity and precipitate labour also promotes uterine atony.⁵

The other causes of PPH include uterine rupture, lower genital tract trauma, uterine inversion, and consumptive coagulopathy.⁶ Other reasons reported such as having delivery by unskilled personnel can be a contributing factor of death from PPH.⁶

A longitudinal study conducted from 1994 to 1997 in one of the tertiary care teaching Hospitals of Abbottabad Pakistan, reported Maternal Mortality Rate (MMR) of 9.46/1000 live births, where by PPH attributed to be 7.1%.⁷

A cohort/clinical trial conducted, where two groups were enrolled, one received active management, and the other did not. The group who received active management and reported PPH prevalence of more than 1,000 ml was only 1% while another group who did receive active management reported 3% of PPH.⁷

Another recent study conducted in Karachi, Pakistan reported, haemorrhage (51%), anaemia (21.2%), and dystocia (14.8%) as the causes of maternal mortality. Among these causes haemorrhage was identified in late pregnancy period (44.6%), while the rest were followed by severe hypertensive disorders and abruptio placentae.⁶

Retained placenta is one of the major causes of primary and secondary PPH, associated with increased risk of maternal morbidity and mortality. A retained placenta is often accompanied by heavy bleeding. A study conducted in Liaquat University of Medical & Health Sciences, Jamshoro Pakistan⁸ reported the frequency of retained placenta as 37.7% in women of age group 26 to 30 years, 26.6% up to age of 35 years, 22.2% in age 20–25 years, and it was low between 36–40 years of age, while the frequency was high in women

of low parity (44.4%). Causes included augmentation by oxytocin in 38.8%.^{2,6}

A hospital-based study in the US, reported the risk factors for postpartum reproductive tract infection include: maternal age less than 17 years, postpartum anaemia, manual removal of placenta and prolonged labour. Practices such as use of warm clothes pressed against the vagina for six weeks were also associated with vaginal infections.⁹

Data from around the world show great disparity between maternal morbidity and mortality of the developing and developed world.¹⁻⁵ Identification of all these factors would benefit the mothers, the locality, and the society in general.

The objective of the study was to estimate the prevalence of PPH and identify factors associated with PPH among married women aged 15-49 year residing in the Khyber Agency, Pakistan.

METHODOLOGY

A cross-sectional study design was used to fulfil the study objective.¹⁰ The data for this study was collected from the Khyber Agency, in the Federally Administered Tribal Area, (FATA) Pakistan. The subjects were married women aged between 15 to 49 years who were present in postpartum period, those who refused to provide consent were excluded. Simple random sampling method was used to collect data. A list of all women who satisfied the inclusion criteria were included with the help of FATA directorate. EpiInfo-6 was used to select 1,084 women randomly. The data collectors went to all the randomly selected houses, from each household only one woman was interviewed. If any woman refused to participate another woman from the list was selected from the Bara, Jumrud, and Landi Kotal Tehsils of Khyber Agency. Keeping in view the previous studies^{4,9}, a sample of minimum of 98 women was required at 5% significance level with 0.1% bound of error on estimation. For associated factors^{2,6}, the sample size was calculated to be 900, however to take care of refusals we collected a sample of 1,000 women.

The instrument used was a field pre-tested structured questionnaire with some modifications; from a population based study at Karachi.⁴

The study variables included demographic and history of obstetrics and gynaecological morbidities. For demographics, information was collected on demographic variables, including age, ethnicity, residency, and race. The information was collected on occupation, education, and household assets of study participants. Information was also acquired on the type of family status (nuclear or extended) and type of house. A nuclear family is defined as only the couple and their children residing in one household whereas, extended family includes other family members also. A house is

defined as '*pakka*' if its walls and roof are made of cement, and '*kacha*', when the walls and/or the roof are not made up of cement. The socioeconomic status was assessed on the basis of type of housing (*pakka* or *kacha*), house ownership, and household assets. The information was also collected on ante partum and PPH, previous pregnancy history, antenatal care, marital status, and toxemia of pregnancy, puerperal sepsis, and place of delivery, the person who conducted the delivery, and history of obstructed labour.

The data were collected from December 2005 till March 2006. Before data collection period permission was obtained from the Director Health of Federally Administered of Tribal Area (FATA), and the tribal leader of the district, further, permission was taken from the head of the family, before taking the interview. The respondents were briefed about the objectives of the study, the confidentiality of the interview, and the results. The interviews were conducted in a room where privacy was ensured, if a woman was busy with household chores the data collectors waited for her to finish her chores. All the interviews were taken with written consent from the participants.

Two levels of staff were hired for data collection, the data collectors, and the supervisor, the supervisor endured that quality data may be collected. She was also responsible for field and office editing of each questionnaire. The Principal Investigator supervised the entire field data collection and data management process.

The questionnaire was pre-tested on 10% of sample size in Khyber Agency, to check for appropriateness of the phrases of questions, comprehensiveness of questionnaire, followed by amendments wherever required. The women included in the pre-test were excluded in the final data collection. Data quality was maintained through, intensive training of field staff, daily editing of questionnaire; double entry of data to ensure accuracy, and surprise visits of the investigator at data collection sites. Further, crosschecking of two questions for similar information was also done.

The data were double entered by professional using EpiInfo-6. To minimise wrong entry a check file was made, both the data files were compared to validate data entry. After cleaning and validation of the data it was transferred to SPSS-10 for the purpose of analysis.

Descriptive statistics, including frequency, percent distribution, mean, and their standard deviation, were used to describe the demographic profile of all married women enrolled in the study.

Multiple logistic regression analysis was performed to identify factors independently associated with PPH. Variables selected in the univariate analysis were entered in the model simultaneously. The ethical considerations were taken care of by obtaining approval

from University Ethical Review Committee. Confidentiality of information was ensured during and after the study by using codes and numbers instead of names of participants. All data were secured with a password. Verbal consent was taken from each participant.

RESULTS

Table-1 shows demographic characteristics of study subjects. According to ethnic distribution, most of them were Pathans (99.9%), followed by Punjabis (0.1%). The mean age of mothers was 30.76±16.3 years with a range 13–48 years, and duration of marriage 14.72±4.6 years. Among the women, 1,049 (99.8%) had no formal education, 1% had technical diploma, and a few who could read newspaper (0.1%). A total of 665 out of 1,000 were unemployed/housewives (66.5%) of those who were economically active (26.5%) were in farming and (4.7%) were professionals, such as teachers, lady health workers, involved in technical and related work such as sewing, embroidery etc. About ninety-six percent of the women were living in combined families.

On an average, the women had 7±3 pregnancies, and 436 (43.6%) had at least one abortion. Around 4% of women had received antenatal care. The most common places (82.7%) of delivery for previous pregnancies were at subject's home, 7.1% at TBA's home, 2.6% at hospital, 2.4% at maternity homes, 1.7% at TBA clinics, 1.4% at health centres, 1.3% at doctor/nurse/LHV clinics and 0.4% at mothers' home. The deliveries were mainly conducted by TBAs (58.7%), followed by in-laws/mother (26.6%), neighbours (8.8%), nurses/doctors (4.3%), and LHV/Midwife (1.1%).

Table-2 shows that 56.2% mothers reported at least one maternal morbidity. They mentioned prevalence of PPH (21.3%), vaginal infection (16.2%), lower abdominal pain (9.6%), and high fever (7.1%), urinary tract infection (UTI) (5.2%), backache (4.9), painful intercourse (4.3%), high blood pressure and convulsions (2.8%), and ante partum haemorrhage (1.3%). No morbidity was reported by 438 (43.8%) women, during the postpartum period.

A comparison of women who reported PPH and those who did not report revealed some interesting facts. Women who reported PPH were more likely to be older, compared to those who did not report PPH [OR=1.03, 95% CI (1.01, 1.06)]. In addition, women reporting PPH were more likely to have higher number of pregnancies [OR=1.05, 95% CI (1.01, 1.12)]. Women who reported PPH, compared to those who did not report PPH were more likely to have longer duration of labour in hours

[OR=1.05, 95% CI (1.01, 1.08)]. Women who reported avoidance of milk, insertion of home-made remedies in the vagina, difficulty in delivery of placenta, not taking rest during postpartum period were more prone to PPH (Table-3).

Table-1: Demographic characteristics of women in Khyber Agency

Characteristics	n (%)
Occupation	
House wife	665 (66.5)
Farmer	265 (26.5)
Professional, Technical and related work	47 (4.7)
Clerical & related work	19 (1.9)
Retired/unemployed	4 (0.4)
Education	
Illiterate (including <i>madrasa</i> education)	998 (99.8)
Can just read a newspaper	1 (0.1)
Technical diploma	1 (0.1)
Kinds of Family	
Combined/extended	963 (96.3)
Nuclear	37 (3.7)
Ethnicity	
Pathan	999 (99.9)
Punjabi	1 (0.1)
Marital Status	
Married	977 (97.7)
Widow/separated /divorced	23 (2.3)
History of abortion	
Yes	436 (43.6)
No	564 (56.4)
Antenatal Care Checkups	
Traditional Birth Attendant	600 (60)
Health Center	150 (15.0)
Clinic	130 (13.0)
Hospital	120 (12.0)
Place of Delivery	
Self Home	827 (82.7)
TBA Home	71 (7.1)
Hospital	26 (2.6)
Maternity Home	24 (2.4)
TBA Clinic	17 (1.7)
Health Center	18 (1.8)
Doctor/Nurse/LHV	13 (1.3)
Mother Home	4 (0.4)
Delivery Conduct By	
TBA	587 (58.7)
In-Laws / mother	266 (26.6)
Neighbor hood	88 (8.8)
Nurses/Doctors	48 (4.8)
LHV/Midwife	11 (1.1)
Number of Pregnancies (Mean±SD)	7.0±3.0

Table-2: Prevalence of reproductive and postpartum morbidity among married women in Khyber Agency

Perceived morbidity*	n (%)
Postpartum haemorrhage	213 (21.3)
Vaginal infection	162 (16.2)
Lower abdominal pain	96 (9.6)
Fever	71 (7.1)
Urinary Tract Infection	52 (5.2)
Backache	49 (4.9)
Painful intercourse	43 (4.3)
High Blood Pressure & Convulsion	28 (2.8)
APH	13 (1.3)
No morbidity reported	438 (43.8)

*Multiple responses possible

Table-3: Univariate analysis of PPH

	PPH+ n (%)	PPH- n (%)	aOR	95% CI
Respondents age	31.23±5.7	30.63±6.00	1.03	(1.01–1.06)
No. of pregnancies	8.11±3.41	7.80±3.49	1.05	(1.01–1.12)
Duration of labour	7.54±4.76	6.73±4.57	1.05	(1.01–1.08)
Milk-products avoided				
Yes	138 (64.8)	279 (35.5)	1	(2.52–4.97)
No	75 (35.2)	508 (64.5)	3.54	
Vaginal medication inserted				
Yes	57 (26.8)	120 (15.2)	1	(1.40–2.98)
No	126 (59.2)	667 (84.8)	2.04	
Rest during postpartum period				
Yes	87 (40.8)	421 (53.5)	1	(1.21–2.31)
No	126 (59.2)	366 (46.5)	1.76	
Difficulty in delivery of placenta				
No	172 (80.8)	699 (88.8)	1	(1.44–3.32)
Yes	41 (19.2)	88 (11.2)	2.20	
History of abortion				
Yes	100 (46.9)	336 (42.7)	0.84	(0.62–1.14)
No	113 (53.1)	451 (57.3)		
Antenatal care received				
Yes	10 (4.7)	28 (3.6)	0.75	(0.36–1.66)
No	203 (95.3)	759 (96.4)		
Place of delivery				
Safe delivery place	16 (7.5)	65 (8.3)	1.11	(0.63–1.96)
Unsafe deliver place	197 (92.5)	722 (91.7)		
Type of delivery				
Normal delivery	197 (92.5)	727 (92.4)	0.99	(0.55–1.75)
Complicated delivery	116 (7.5)	60 (7.6)		
Delivery conducted by skilled birth attendant				
Yes	12 (5.6)	47 (6.0)	4.06	(0.55–2.04)
No	201 (94.4)	740 (94.0)		

The final multivariate logistic regression analysis included milk product avoidance; homemade vaginal remedies insertion, and duration of labour. Women who reported PPH were more likely the ones who avoid milk products, while adjusting for other variables in analysis [aOR=3.17, 95% CI (2.22, 4.27)]. Women who reported PPH as compared to those who did were more likely to have inserted home-made vaginal remedies [aOR=1.49, 95% CI (1.10, 2.27)]. In addition, women who reported prolonged duration of labour were more likely to report PPH as compared to those who did not report prolonged duration of labour (OR=1.04, 95% CI 1.01, 1.07).

Table-4: Multivariate model of PPH

	aOR	95% CI
Milk products avoided		
Yes	1	
No	3.17	(2.22–4.27)
Vaginal medication inserted		
Yes	1	
No	1.49	(1.10–2.27)
Duration of labour		
	1.04	(1.01–1.07)

DISCUSSION

Pregnancy and childbirth related complications are among the leading causes of morbidity and mortality in women of reproductive age in developing countries. Among these complications various studies have shown PPH as the highest cause of maternal morbidity and mortality.^{10,11} The results of this population-based study also showed that majority of the women (21.3%) had PPH, which is higher than the population based study conducted at Karachi by Ali *et al*¹¹ in 2006 at Urban Karachi. In addition, our

reported prevalence of PPH is lower than the PPH of 31% which was reported by a hospital based study conducted in Karachi.¹² Similarly another hospital based study reported PPH as 7.1% in a tertiary care hospital in Abbottabad.² The differences in these estimates could have occurred because the average number of pregnancies in the Khyber agency is higher, women have lesser health facilities, and belong to the lower socio-economic strata. Other studies previously conducted in Karachi were mainly facility based, however, Ali conducted a similar population based study. Our sample size was larger than Ali's study. Therefore, our results reveal more reliable estimation of PPH among married women having had at least one pregnancy.¹¹

This study identified association of postpartum haemorrhage among married women of the Khyber Agency with milk product avoidance, homemade herbal remedies inserted in the vagina, and duration of labour. However we were not able to confirm gravida and age as associated factors reported by previous studies.¹¹

Significantly increased odds of PPH with avoidance of milk product were noted in our study, which is in accordance with other studies.^{4,11,12} The restriction of milk and milk products can cause PPH in multiple ways. The vaginal bleeding after delivery occurs directly from the raw surface of the placental site. The body needs adequate fluid and nutrition intake to heal the bleeding sites. It has been supported by a number of studies and also Beckmann in his secondary article.^{13–15} Due to less fluid and nutrition intake among the study participants, uterine muscles become weak, and fail to contract, which leads to excessive bleeding after delivery. A study explained that many women avoiding milk will have long-term bad health consequences such as pain in the bone for lifetime, backache, body aches, weakness, and fever in the next pregnancy.¹² When milk products are avoided, it delays the healing of placental site, supports the growth of the organisms leading to inflammation, and further damage of uterus occurs.¹⁴ The nutrients present in milk contains (vitamin A, thiamine, riboflavin, vitamin B₆, vitamin B₁₂, iodine, and selenium) which are needed for wound healing.¹⁶

The insertion of vaginal homemade herbal remedies as reported in our study has been identified in other studies too.¹⁷ It is a common customary practice in Pakistan, as well as in neighbouring countries like Bangladesh, India, to insert herbal remedies inside the vagina or uterus during the postpartum period, as well as to wash the perineum with unclean material.^{4,9} This practice is believed to clean 'impurities in the women's uterus which is caused from the blood that collects inside the mother during her entire pregnancy and it is necessary that this unclean (*napak*) blood be released.¹¹ It is documented that insertion of these materials

provides a source for organisms to be transmitted to the upper reproductive tract, which leads to PPH.¹⁸

Prolonged labour was found to be associated with PPH in our study, as also reported by others.^{19,20} Possible reasons for prolonged labour leading to PPH are atonia of the uterus at the time of delivery.^{11,18,19} The remaining factors found to be significant in this study such as rhesus incompatibility, smoking, induced labour, and precipitous labour were not investigated in many other studies. Prolonged labour leading to PPH could also be because of multigravida.²¹ However, we were unable to find any significant association between multigravida and PPH in our study.

The results of the present study were revealed through interviews, however the findings could not be matched with the medical records due to unavailability of health records. Furthermore, the cultural norms of the community under study prohibited examination of vagina. As this is a cross-sectional study, temporal relationship of the factors associated with PPH cannot be established thus inference regarding causality cannot be drawn.

The beneficiaries of this study are both the health providers and the women of the local community. It would also provide valuable insight to the policy makers to develop policies for better maternal health. In addition this study could be replicated in other provinces of the country.

CONCLUSION

Women's health is a blend of physical, emotional, social, cultural and spiritual wellbeing. However, poor infrastructure, lack of appropriate training for health care providers, economic conditions, and negative cultural practices are amongst multiple factors that have a perilous impact on the health of the women, particularly women of reproductive age. The morbidities under question were a result of the malpractices ingrained in the community.

RECOMMENDATIONS

Educating the community will play a significant role to decrease maternal morbidities and mortality. Further study to assess the biologically and socially important associations is recommended. As majority of deliveries are conducted at home by Traditional Birth Attendants (TBAs), a comprehensive training program of the TBAs should be organised emphasising on referral to different levels of health care settings whenever needed.

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