

## Research Article

# Primary PPH What Worsen Maternal Outcome?

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**\*Corresponding author:** Reham El Khateeb, Assistant Professor, Department of Obstetrics and Gynecology, Minia University, Egypt**Received:** September 06, 2022; **Accepted:** October 19, 2022; **Published:** October 26, 2022**Abstract****Objective:** The aim of the study was to explore factors that worsen maternal outcome (maternal morbidity and mortality) in cases developed Primary Postpartum Hemorrhage (PPH).**Methodology:** Cross sectional observational study carried out during the period from July 2016 till June 2017, 387 cases were recruited in the study from those who developed 1ry PPH. All data concerning cases were recorded including personal, obstetric, medical history, details of medical services received, complications and maternal mortality. Analysis of data recorded was done to determine factors associated with worse maternal outcome (morbidity and mortality).**Results:** 387 cases developed 1ry PPH (either managed in or referred) to hospitals of Minia Governorate (two secondary hospitals and one tertiary hospital) during the period of the study. 87 cases were excluded due to incomplete records. 1y PPH was common in MG 53% , residents' rural areas 63.7%, patients not booked for ANC 59.7% and anemic patients 67.9%. Bivariate correlation of factors that worsen maternal outcome showed positive correlation between maternal complications and maternal age, parity, residence (rural areas), distance between residence and hospital (far), positive history of medical problems (anemia), blood transfusion and number of blood units. Maternal complications developed in 13.3%, coagulopathy was the most common 37.5%. 9 cases developed maternal mortality (3%) most common cause of death was irreversible shock 44.4%.**Conclusion:** Factors that worsen the maternal outcome in patients who developed primary PPH are residence in rural areas, decrease awareness of ANC importance, high parity, advanced maternal age, prevalence of anemia and decrease number of well qualified hospitals.**Keywords:** PPH; Risk factors; Maternal morbidity and mortality.**Trial Id:** ACTRN12616000632493**Abbreviation**

1ry: Primary; PPH: Postpartum Haemorrhage; MG: Multigravida; ANC: Antenatal Care; BMI: Body Mass Index; HIV: Human Immunodeficiency Virus

**Introduction**

Post-partum haemorrhage is defined as the loss of 500 ml of blood or more after vaginal birth or the loss of at least 1,000 ml of blood after a caesarean delivery within first 24 hours of delivery [1]. Post-partum haemorrhage has been a nightmare for obstetricians since centuries, it is a leading cause of maternal mortality worldwide. 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], however another study reported 27.1% of maternal death due to PPH [3].

Globally, maternal mortality contributes a major health problem, particularly in developing countries where more than 50 % of maternal deaths occurred and where the lifetime risk of maternal death is 10 times higher than that in high-income countries [4]. The global total number of maternal deaths decreased by 43 % from 532,000 in 1990 to 303,000 in 2015. The global Maternal Mortality Ratio (MMR)

declined by 44 %, from 385 maternal deaths per 100,000 live births in 1990 to 216 in 2015—an average annual decline of 2.3% [5]. The goal 5a of the Millennium Development Goals (MDGs) calls for the reduction of maternal mortality by 75 % between 1990 and 2015 [6].

In Egypt, postpartum hemorrhage is one of the leading causes of maternal morbidity and mortality. The maternal mortality ratio declined from 84 deaths per 100,000 live births in 2000 to 54 deaths in 2009 then to 52.5 in 2013 [7], but has plateau since then. About 20% of maternal deaths nationwide are due to postpartum hemorrhage [8].

The estimated total cost to treat one patient with PPH amounts to roughly 730 Egyptian pounds (£E). Labor contributes 7% to this total; laboratory tests 18%; and drugs, supplies and materials (including blood products) 75%. For 2013, the estimate that the direct costs to the Egyptian health system were about £E20.5 million to treat an estimated 28,000 cases of PPH, however, the actual total cost, including indirect costs, may be £E40 million or more [8].

Postpartum hemorrhage lead to serious maternal morbidity include cardiovascular complication, respiratory, renal, coagulation, hepatic, neurological, uterine hazards [9].

A better understanding of the factors associated with maternal morbidity and mortality related to PPH would help health care providers to rapidly identify women at highest risk for dying and provide appropriate care in preventing PPH and help care providers to strengthen both diagnosis and treatment of PPH among women at high risk.

### Methodology

This study is a cross-sectional observational survey study. It was carried out at hospitals of Minia Governorate (Maternity hospital of Minia university, Minia General hospital and Misr Al-horra hospital), Egypt. It was carried out during the period from July 2016 till June 2017..A total of 387 women developed PPH and managed in or referred to those hospitals were recruited in the study but 87 patients were excluded due to incomplete records.

### Ethical Approval

Study was approved by ethical committee of Minia university faculty of medicine on 2/6/2016. It was registered in ANZCTR (ACTRN12616000632493).

Informed consent was taken from cases or their relatives before recruitment in the study.

Cases distribution per hospital were as follow:

Maternity hospital of Minia University (191 cases).

Minia General hospital (total number 144 cases) 46 were excluded and 98 were recruited.

Misr Al-Horra hospital (total number 52 cases) 41 were excluded and 11 were recruited.

**Inclusion criteria:** All women developed primary PPH

**Exclusion criteria:** Women with incomplete data collection during labor or postpartum period.

All data about the cases were recorded including: personal history, demographic characters, obstetrical data, medical data, data related to medical services received, maternal complications and maternal mortality due to PPH.

### Statistical Analyses

All statistical analyses were performed using Statistical Package for Social Science (SPSS) version 21 under windows 7 operating system. Results are expressed as means ± SD for quantitative data and by No. (%) for qualitative data. Comparisons between groups were conducted by Student’s t test for parametric data and by Mann Whitney test for Non-parametric data. Chi-Square test was used to test the significance between categories regarding qualitative data.

Bivariate correlation and regression analyses were done to determine factors associated with maternal morbidity and maternal mortality related to primary PPH.

Probability level (P-value) was assumed significant if less than 0.05 and highly significant if P-value was less than 0.01. P-value was considered non-significant if greater than or equal to 0.05.

### Results

See Figure 1 and Tables 1-5.

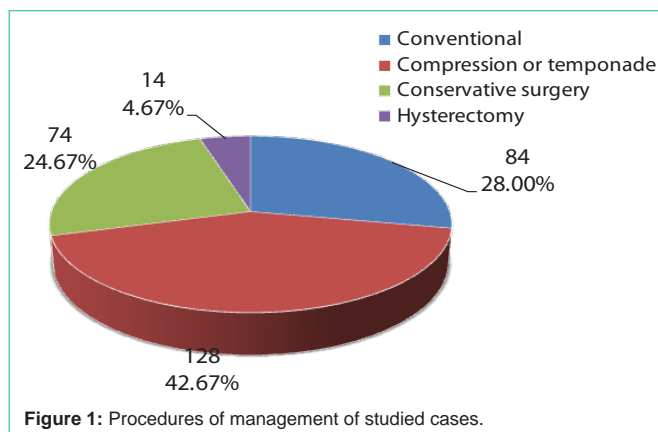


Figure 1: Procedures of management of studied cases.

Table 1: Demographic characteristics of the studied cases.

Variable		Frequency (n=300)	Percentage (%)
Age (year) mean ± SD (Range)		26.4 ± 5.8 (16-41)	
Parity	PG	97	32.3
	MG	159	53
	GM	44	14.7
Level of education	Illiterate	22	7.3
	1 <sup>st</sup>	83	27.7
	2 <sup>nd</sup>	176	58.7
	3 <sup>rd</sup>	19	6.3
Social level	Low	84	28
	Moderate	185	61.7
	High	31	10.3
Residence	Urban	109	36.3
	Rural	191	63.7
Mode of delivery	Vaginal	217	72.3
	CS	83	27.7

Table 2: Medical disorders in studied cases.

Medical history	Frequency (n=300)	Percentage (%)
Hepatic	6	2
Anemic	203	67.8
Hypertension	26	8.7
Anti-partum fits	7	2.3
Preeclampsia	9	3
Cardiac	4	1.3
Coagulation disorder	6	2
HELP	1	0.3
Diabetes mellitus	3	1

### Discussion

Minia governorate is one of the Egyptian agricultural governorates located in the northern part of Upper Egypt with an estimated 6.3 million inhabitants and it is the located 240 km to the south of Cairo. Minia is surrounded by villages and rural areas where most deliveries at home or private clinics and the complicated

**Table 3:** Maternal complication in studied cases.

Variable		Frequency (n=300)	Percentage (%)
Type	Hysterectomy	14	35
	Coagulopathy	15	37.5
	Renal impairment	1	2.5
	Hepatic impairment	2	5
	Respiratory failure	1	2.5
	Infection	2	5
	M O F	5	12.5

**Table 4:** Maternal mortality and its causes among the studied cases.

Variable		Frequency (n=300)	Percentage (%)
Cause	Number	9	3
	Acute heart failure	2	22.2
	Irreversible shock	4	44.4
	Hepatic failure & sepsis	2	22.2
	DIC	1	11.1

**Table 5:** Bivariate correlation between morbidity, mortality and other risk factors.

Variables	Complications		Mortality	
	r	P. value (Sig.)	r	P. value (Sig.)
Age	0.55	0.012*	0.38	0.04*
Parity	0.42	0.031*	0.41	0.02*
Residence (rural)	0.51	0.00**	0.43	0.021*
Residence to hospital (far)	0.45	0.016*	0.011	0.092 NS
Level of education	-0.54	0.013*	0.11	0.081NS
Gestational age	-0.62	<0.001**	0.07	0.246 NS
ANC	-0.57	0.00**	0.38	0.02*
Birth weight	-0.59	<0.001**	0.01	0.751 NS
Medical data (positive)	0.52	0.006**	0.01	0.952 NS
Hospital referral	0.46	0.019*	0.06	0.307 NS
Hospital type	0.56	<0.001**	0.01	0.834 NS
Blood transfusion	0.67	<0.001**	0.05	0.439 NS
Blood units number	0.68	<0.001**	0.52	0.006**

r = Correlation coefficient.

Grades of correlation or association: 0.00 to 0.24: weak or no association, 0.25 to 0.49: fair association, 0.50 to 0.74: moderate association, + 0.75: strong association.

NS Non-significant. \*Significant (P.<0.05) \*\*Significant (P. < 0.01)

cases are referred to Minia University Hospital. Minia governorate had estimated maternal mortality ratio of (385.9/100,000 live birth) in 2015 and (210.8/100,000 live births) in 2016 (data from Annual reports of Minia Maternity & Children University Hospital).

Most of primary hospitals in Egypt generally and in this governorate particularly suffer from shortage in the availability of blood, well qualified staff and infrastructure.

This study revealed that there is a significant positive correlation between maternal complications and residence in rural areas, increase distance between residence and hospital, this was agree with other studies showed higher rates of PPH in the rural areas [11-13].

Also the results of the regression analysis for risk factors of morbidity showed that illiterate education and Grand Multigravida (GM) are associated with increase in PPH related complications this was in accordance with findings in others studies [14-16]

*Ujjigaa et al., (2014)* [17] documented that certain demographic characteristics like advanced maternal age, low educational, employment status and grand multiparty are associated with PPH related complications. *Magann et al., 2005*, reported that same previous factors and prolonged Labour are leading causes of bad impact in cases developed PPH [18].

*Prata et al., (2011)* documented that among demographic characteristics that associated with increased risk of PPH were non-white ethnicity, increased maternal BMI , grand multiparty, and advanced maternal age. Furthermore ante-partum risk factors including history of PPH, history of blood disorders, ante-partum hemorrhage, irregular prenatal visits, lack of iron supplementation/ anemia, over distended uterus, pregnancy induced hypertension have been significantly associated with PPH [19].

Study of risk factors for postpartum hemorrhage in Uganda revealed cesarean section delivery, multiple pregnancy, foetal macrosomia ≥4000 gm and HIV positive sero-status were the most common factors [13].

It has been well reported that the general maternal health status exerts a strong influence on the severity of PPH. Women who presented with anemia, which is highly prevalent in Egypt, are at risk for sever PPH than others [23] also it increase severity of PPH and its complications [24]. Any chronic diseases alter the physiological health status of the woman and increase the risk of organ dysfunctions when a hemorrhagic complication arises [25]. Most of cases developed PPH in current study delivered vaginal this was discordant with previous studies that reported cesarean births is being associated with increased risk of PPH [15,16,22]. However, few studies report a protective effect of cesarean section against PPH when compared to vaginal births [26,27].

In current study we found level of education is strong risk factor, PPH was more common in mothers who were illiterate and primarily educated. We could explain that these women had little knowledge of reproductive health issues, lack of the awareness of ANC and access to basic health services.

In current study we found that grand multiparty is strong risk factor for PPH related complications. because multiparity considered dangerous to both the mother and the fetus it increases the complications during pregnancy including medical complications (gestational diabetes, hypertension, anemia) and obstetric complications (placental abruption, placenta previa, preterm labour, malpresentation, malposition) . also increase incidence of complications during labour like cervical dystocia and uterine rupture.

On the other hand, our results are not in accordance with Ali et al., 2006 who did not confirm gravidity and age as associated factors [28].

## Conclusion

Reduction of maternal morbidity and maternal mortality related to PPH is the objective of obstetricians especially in poor resources countries. But it is still difficult aim due to decrease number of well qualified hospitals especially in rural areas, decrease awareness of ANC importance, inherited habits of some families to have high number of children. Repeated pregnancies increase the risk of the other complications e.g multiparity, anemia and, advanced maternal age.

## Conflict of Interest

All authors declare no conflict of interest related to this study.

## References

- American College of Obstetricians and Gynecologists. ACOG Practice Bulletin: Clinical Management Guidelines for Obstetrician-Gynecologists Number 76, October 2006: postpartum hemorrhage. *Obstet Gynecol.* 2006; 108: 1039-47.
- Gani N, Ali TS. Prevalence and factors associated with maternal postpartum haemorrhage in Khyber Agency, Pakistan. *Journal of Ayub Medical College, Abbottabad. JAMC.* 2013; 25: 81-5.
- Say L, Chou D, Gemmill A, Tuncalpo O, Moller A-B. et al. Global Causes of Maternal Death: A WHO Systematic Analysis. *The Lancet Global Health.* 2014; 2: e323-33.
- WHO, (2012): UNICEF, UNFPA and The World Bank estimates. Trends in maternal mortality: 1990 to 2010. Geneva: World Health Organization; 2012.
- WHO, (2015): (World Health Organization). 2015. Trends in Maternal Mortality: 1990 to 2015. Estimates by WHO, UNICEF, UNFPA, the World Bank and the United Nations Population Division. Geneva: WHO.
- Filippi Véronique, Doris Chou, Carine Ronsmans, Wendy Graham, Lale Say. *Reproductive, Maternal, Newborn, and Child Health: Disease Control Priorities, Third Edition.* 2016; 2.
- Ministry of health and population, maternal mortality Bulletin 2012 and 2014 .accessed in May 2015.
- Vlassoff M, Abdalla HA and Gor V, The Cost to the Health System of Postpartum Hemorrhage in Egypt, New York: Guttmacher Institute, 2016. <https://www.guttmacher.org/report/cost-of-postpartum-hemorrhage-in-egypt>
- Firoz T, Chou D, Dadelszen PV, Agrawal P, Vanderkruik R, Tunçalp O, et al. Measuring maternal health: focus on maternal morbidity. *Bulletin of the World Health Organization.* 2013; 91: 794-796.
- Soltan MH, Sadek RR. Experience managing postpartum hemorrhage at Minia University Maternity Hospital, Egypt: No mortality using external aortic compression. *Journal of Obstetrics and Gynaecology Research.* 2011; 37: 1557-1563.
- Carroli G, Cuesta C, Abalos E, Gulmezoglu AM. Epidemiology of postpartum haemorrhage: a systematic review. *Best practice & research. Clinical obstetrics & gynaecology.* 2008; 22: 999-1012.
- Li X, Zhu J, Dai L, Li M, Miao L, Liang J, et al. Trends in maternal mortality due to obstetric hemorrhage in urban and rural China, 1996-2005. *J Perinat Med.* 2011; 39: 35-41.
- Ononge Sam, Florence Mirembe<sup>1</sup>, Julius Wandabwa, Oona MR. Campbell. Incidence and risk factors for postpartum hemorrhage in Uganda. *Reproductive Health.* 2016; 13: 38
- Al-Zirqi I, Vangen S, Forsen L, Stray-Pedersen B. Prevalence and risk factors of severe obstetric haemorrhage. *BJOG: An International Journal of Obstetrics & Gynaecology.* 2008; 115: 1265-1272.
- Kamara M, Henderson JJ, Doherty DA, Dickinson JE, Pennell CE. The Risk of Placenta Accreta Following Primary Elective Caesarean Delivery: A Case-Control Study. *BJOG.* 2013; 120: 879-86.
- Sheldon W, Blum J, Vogel J, Souza J, Gülmezoglu A, Winikoff B, et al. Postpartum haemorrhage management, risks, and maternal outcomes: findings from the World Health Organization Multicountry Survey on Maternal and Newborn Health. *BJOG Int J Obstet Gynaecol.* 2014; 121: 5-13.
- Ujjigaa Thomas Tako Akim, Jared O Omolob, Mathias O Aketch, Erneo Benardo Ochid. Risk factors associated with postpartum haemorrhage at Juba Teaching Hospital, South Sudan, 2011. *South Sudan Medical Journal.* 2014; 7: 3.
- Magann EF, Evans SF, Hutchinson M, Collins R, Howard BC, Morrison JC. Postpartum Hemorrhage After Vaginal Birth: An Analysis of Risk Factors. *Southern Medical Journal.* 2005; 98: 419-422.
- Prata Ndola, Sabry Hamza, Suzanne Bell, Deborah Karasek, Farnaz Vahidnia, Martine Holston. Inability to predict postpartum hemorrhage: insights from Egyptian intervention data. *BMC Pregnancy and Childbirth.* 2011; 11: 97.
- Tort J, Rozenberg P, Traoré M, Fournier P, Dumont A. Factors associated with postpartum hemorrhage maternal death in referral hospitals in Senegal and Mali: a cross-sectional epidemiological survey. *BMC Pregnancy and Childbirth.* 2015; 15.
- Tunçalp Ö, Souza JP, Gülmezoglu M. New WHO recommendations on prevention and treatment of postpartum hemorrhage. *Int J Gynecol Obstet.* 2013; 123: 254-6.
- Souza JP, Gülmezoglu AM, Vogel J, Carroli G, Lumbiganon P, Qureshi Z, et al. Moving beyond essential interventions for reduction of maternal mortality (the WHO Multicountry Survey on Maternal and Newborn Health): a cross-sectional study. *The Lancet.* 2013; 381: 1747-1755.
- Allen VM, O'Connell CM, Liston RM, Baskett TF. Maternal Morbidity Associated with Cesarean Delivery without Labor Compared With Spontaneous Onset of Labor at Term. *Obstetrics & Gynecology.* 2003; 102: 477-482.
- Liu S, Heaman M, Joseph KS, Liston RM, Huang L, Sauve R, Kramer MS, Maternal Health Study Group of the Canadian Perinatal Surveillance S. Risk of maternal postpartum readmission associated with mode of delivery. *Obstet Gynecol.* 2005; 105: 836-42.
- Ali TS, Fikree FF, Rahbar MH, Mahmud S. Frequency and determinants of vaginal infection in postpartum period: a cross-sectional survey from low socioeconomic settlements, Karachi, Pakistan. *JPMA. The Journal of the Pakistan Medical Association.* 2006; 56: 99-103.