Maternal and Perinatal Mortality: A snapshot on the Egyptian situation.

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Abstract— Improving maternal health as one of the Millennium Development Goal (MDG 5) is the least likely to be achieved in the developing low source African and some Asian countries. This review aimed at highlighting the situation of maternal and perinatal mortality in Egypt, with special emphasis on one of the common cause of maternal mortality namely postpartum hemorrhage. In Egypt, according to the available data, maternal mortality ratio (MMR) showed a significant decline although it took 25 years to reach the 66/100,000 live births, many agencies linked that decline to the wide coverage and utilization of the antenatal care services. A sizable portion of MMR in Egypt is attributed to avoidable causes in particular the substandard care and lack of supplies necessary for management of life threatening pregnancy-related complications. On the other hand, with perinatal mortality rate of 28/1000 live births, and with overall annual neonatal deaths of 22,729, Egypt may achieve or even surpass the MDG4. While substantial progress has been made towards improving on the existing interventions for managing primary postpartum hemorrhage (PPH) in many developed countries, the burden of PPH still persists in Egypt as the current interventions are inadequate. Although declined, the current status and trend of MMR in Egypt which caused by avoidable factors like PPH may hinder the country from achieving MDG.

Keywords — Egypt, Maternal Mortality, Millennium goals, Morbidity, Postpartum Hemorrhage.

I. INTRODUCTION

Nearly 300,000 women lives are claimed and many more will be permanently disable, mostly in developing countries yearly by pregnancy related complications despite the availability of low cost intervention and the amenability of prevention. Perinatal mortality accounted for more than 2.6 million as stillborn and 2.9 million as neonatal deaths, coupled with a sizable portion that will suffer neurodevelopmental disabilities and impairments 1. Improving maternal health as one of the Millennium Development Goal (MDG 5) is the least likely to be achieved especially in the developing low source African and some Asian countries 1. Despite availability of knowledge on determinants, causes, and effective clinical and public health strategies 2 acknowledging that a substantial proportion of maternal deaths are preventable, the goal of reducing the maternal mortality ratio (MMR) between 1990 and 2015 by three quarters is unlikely to be met. This is occurring despite that maternal and newborn health has received scrutinized attention from International bodies, national governments, non-governmental organizations, and the societies 3. Several factors interplay for non-achieving MDG5 goal in these countries, the least is the foundation of valid, accurate and comprehensive data 4 enable effective response that may prevent future deaths. Health disparity is another dilemma that heralds the availability of effective health services including emergency to those most in need especially in rural areas and frontiers. This is exponentially augmented by high illiteracy rate, non affordable costs and shortage in trained manpower 5. Effective, low-cost interventions are available, but they are not reaching all women and neonates in need, many women deliver at home and rarely seen by a trained healthcare provider before or after delivery. In addition, the scarcity of skilled providers in poor countries which often coupled with lack to access to current management tools is another major barrier towards reduction of MMR in the developing countries 1. Egypt is not exceptional and suffers the same political setbacks affecting support of health programs, resources-related issues, and manpower problems that slow its strides towards achieving the Millennium Development Goals 5.

Maternal mortality in Egypt, magnitude, trend and causes: Definitions and trend: Maternal mortality is defined as the death of a woman while pregnant or within 42 days of pregnancy termination, irrespective of duration or site of pregnancy, from any cause related to or aggravated by pregnancy or its management but not from accidental or incidental causes. The World Health Organization classified maternal mortality as either: direct associated with or resulting from management of obstetric complications during pregnancy, labor or puerperium or indirect if associated with a
disorder aggravated by pregnancy. MMR is the number of women died while pregnant or within 42 days of pregnancy termination/100,000 live births. Figure 1 displays the MMR trend in Egypt from year 1995 to 2008. According to the available data MMR in Egypt showed a significant decline although it took 25 years to reach 66/100,000 live births, many agencies linked that decline to the wide coverage and utilization of the antenatal care services.

Figure 1. Maternal Mortality Ratio: Egypt 1995 to 2010 (per 100,000 live births) and antenatal coverage (%) years 1995 to 2008.

Causes of maternal mortality: Figure 2 depicts the causes of maternal mortality in Egypt abstracted from the Egyptian National Maternal Mortality Survey (ENMMMS) 1992/93 and 2000 as well as those from the available hospital based studies, at Cairo and Tanta (Lower Egypt) University Hospitals. ENMMMS 1992/93 estimated an overall MMR of 174/100,000 live births. The main causes of death were postpartum hemorrhage (25%), hypertensive diseases (16%), antepartum hemorrhage (8%), and sepsis (8%) and rupture uterus (7%). The ENMMMS 2000 showed no significant changes in trends of previously mentioned causes of maternal deaths. On the contrary, hospital based studies demonstrated sizable differences from ENMMMS 92-93 and 2000 especially in regard maternal hemorrhage and other direct causes of maternal mortality.

Figure 3 displays the percentage of maternal mortality contributed to avoidable causes revealed from ENMMS 92-93 and year 2000. A sizable portion of MMR in Egypt is attributed to avoidable causes in particular the substandard care and lack of supplies necessary for management of life threatening pregnancy-related complications.

Fig. 2. Causes of maternal mortality in Egypt, comparison between Egyptian National Maternal Mortality Surveys 92-93/200 and two hospital-based studies. Source: Campbell et al 2005,ENMMS, El Gharib et al 2010 (Tanta), Saleh et al 2013 (Cairo).

Maternal morbidity: While reliable and comprehensive statistics (or studies) on the prevalence of maternal morbidity in Egypt is insufficient, one study revealed that as many as 56% of rural Egyptian women suffer from pregnancy-related genital prolapse. Many women in developing countries who survive...
childbirth often suffer long-term injuries due to complications during pregnancy and/or at delivery. These morbidities are due to complications resulting in obstetric fistula, uterine scarring, severe anemia, pelvic inflammatory disease, or reproductive tract infections, and infertility. In one hospital-based study Saleh et al found that the cesarean section rate for MMR was 40% 12.

**Perinatal mortality:** Despite enormous global progress in child survival since the 2000 Millennium Declaration, only 23 (out of 75) countries are on track to meet Millennium Development Goal 4 (MDG4) targets 16. An estimated 2.6 million stillbirths occur worldwide every year, of which over 40% are intrapartum 17. Stillbirths are likely to be underestimated, because of the lack of vital registration in many countries, unavailability of consistent classification system, and poor reporting 18. Figure 4 displays the trend of perinatal mortality in Egypt from year 2000 to 2008. Over the past two decades, Egypt has made significant progress on maternal and under-five mortality. Rural Upper Egypt has higher neonatal mortality rates than urban Lower Egypt (20 vs. 11.2/1000 live births respectively). In the meantime, the neonatal mortality rate in urban governorates shows steady increase from 17 (year 2005) to 21 (year 2008), most likely due to the increasing urbanization and growth of slums 19.

![Fig. 4. Perinatal mortality per 100,000 live births, Egypt from 2000 to 2008.](image)

**Health care services:** Antenatal care (ANC) is provided through a network of Primary care centers (≈4000 in Egypt) with referral to District General hospital at each directorate, another level at the capital or major city of each governorate, university-teaching hospitals for tertiary care are also available. Before the conduction of Egypt’s Health and Demographic Survey in 2008 (EDHS) 20, ANC was provided for almost 75% of women who gave births, and 2/3 received ≥ four visits from health staff, figures which were higher than those reported from the EDHS (1995) where only 40% received any ANC and 28% received regular (≥ 4) ANC visits. ANC is higher in urban than rural areas (figure 1). ANC increased in all regions over the last two decades, though disparities still exist according to regional and urban/rural indicators (Figure 5).

![Fig 5. Antenatal care coverage (%) in Egypt from 1995 to 2008 by urban-rural distribution (EDHD 2008).](image)

On average, 85% of women in urban Governorates received regular ANC, while rural women in Upper and Lower Egypt who received regular ANC was comparatively lower (64% in rural Lower Egypt and 49% in Upper Egypt). The place of delivery varies according to the place of residence, 89% of women in urban governorates delivered in a health facility. Out of those women, 49% delivered in a private facility and 40% in public facility. In addition, the percentage of home deliveries is roughly 50% in rural areas of Upper Egypt. About 1/4 of deliveries in frontier governorates, rural Lower Egypt and urban Upper Egypt occurred at home. 20 Egyptian women who delivered at home rarely reported receiving postnatal care, and only 7% of those who delivered at home reported receiving postnatal care compared with > 80% of those who delivered in health facility 9,10. Overall, Egypt’s service capacity to provide emergency obstetric care received a rating of 59 out of 100 using the Maternal and Neonatal Effort Index (composite of 81 items evolved from 13 categories reflecting the different aspects of maternal and neonatal care) rating maternal health services and programs) 21. Figure 6 shows the ratings of the capacity of health centers and district hospitals to provide specific obstetric services. Blood transfusions are the least available service among those assessed at district hospitals in Egypt. Both health center and district hospital services in Egypt generally received higher ratings when compared to services in

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**Perinatal mortality rate 2008=28/1000 live births**
**Stillbirth rate (2009)=13/1000**
**Neonatal mortality rate (2012)=12/1000**
**Annual neonatal deaths=22,729**
**UNICEF 2013**

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other countries from the Middle East/North Africa region. Although urban access scores were consistently high, there are large gaps in the ratings for rural and urban differentials, the largest disparities being between rural and urban areas. The content of care pregnant women receive according to EHDS 2008 weighing and had their blood pressure taken during at least one visit (87%), only 44% of women received iron tablets/syrup during these same ANC visits. Only 34% of women were informed about pregnancy complications. Around 28% of deliveries reported in EDHS 2008 were caesarean sections (an increase from 18% in EDHS 2000).

Maternal morbid condition ‘Primary Post partum Hemorrhage in Egypt’

Primary postpartum hemorrhage (PPH) is the single largest contributor to maternal mortality worldwide. Hemorrhage accounts for 30% or more of all maternal deaths in Asia and Africa, most of which is PPH. Even if effective antenatal screening existed, hemorrhage often occurs in women with no identifiable antepartum risk factors. Despite the severe burden of PPH, few studies have examined risk factors, incidence and prevention of PPH in developing countries.

Despite a 52% reduction in the Egyptian MMR during the 1990s, PPH remained the main cause of death. Postpartum hemorrhage is the leading factor contributing to 27% of maternal deaths, with poor obstetric management cited as the most frequent avoidable factor, contributing to 43% of maternal deaths. Previous research has identified demographic, antepartum, and intrapartum risk factors that are associated with PPH and the majority of these studies pertain to women in the U.S.A. or Europe where delivery circumstances are different for women in developing countries. From a prospective cohort study recruited 2510 pregnant (with singleton vaginal deliveries) women over a 6 month period was carried out in Egypt during 2004, the incidence of PPH was 3.7% (n = 93). In the full multivariable model, which included both ante and intrapartum variables, increased number of ANC visits (2-3 visits Odds ratio (OR) = 5.9; ≥4 visits OR = 7.4), history of PPH (OR = 305.1), anemia (OR = 2.7), labor augmentation (OR = 2.3), retained placenta (OR = 21.7), and length of 1st and 2nd stage (3-4.9 hours: OR = 4.9; 5+ hours: OR = 5.7) were significantly associated with increased risk of PPH. History of PPH, non-use of cord traction, and retained placenta each had a predictive probability of 20% or higher. Applying a post model probability estimates showed that by screening and diagnosing women with 3 risk factors, 10% of women who will develop PPH could be identified and screening for 4 risk factors may identify 31% of women who will develop PPH. This study showed that demographic and antepartum risk factors have little association with development of PPH, with the exception of history of PPH, low hemoglobin, and high usage of ANC.

Another Egyptian study applied a multi-faceted observational methodology to document routine normal labor practices at one of the largest public sector maternity teaching hospital in Egypt during 2001, with a case load of 20,000 deliveries annually. In this study, PPH was the most frequent cause of maternal death at the study site in the year preceding the study (employing facility records). Active management was appropriately done for only 15% of women and 3rd stage management deviations from standard guidelines were observed in 85% of deliveries. Uterotonic drugs were given after rather than before delivery of the placenta (65%), without concurrent use of controlled cord traction (49%). Providers stated that the inappropriate practices were due to the following factors, first, the facility had written protocols in place for obstetric emergencies but not for normal vaginal delivery. Secondly, providers in training poorly understood steps of passive and active management. Some of them believed that passive management meant not giving uterotonic drug, even if early clamping and cord traction were done. Many providers were not aware of the contribution of PPH to maternal mortality in Egypt, thus choosing to manage the 3rd stage in what they believed was passive management. Observations also revealed that cord traction and early clamping were not done in spite of administration of uterotonics drugs in 49% and 7%, respectively, of observed deliveries where 3rd stage management was not appropriately followed. If similar mismanagement pervades other obstetric facilities (which are not yet explored and those deliveries managed at home by non-trained or even trained DAYA the traditional birth attendants which is the dominant mode of delivery in many rural, frontier and some urban areas in Egypt), this could partially explain postpartum hemorrhage incidence in Egypt. Every year about 14 million women around the world suffer from PPH. The risk of maternal mortality from hemorrhage is 1 in 1 000 deliveries in developing countries (100 / 100 000 live births). Most deaths (about 99%) from PPH occur in low and middle income countries compared with only 1% in developed nations. Therefore, in order to reduce the MMR and achieve MDG5, it is essential to achieve a major reduction in the incidence of PPH. The WHO and professional bodies recommend active management of the 3rd stage of labor for all vaginal births in order to prevent PPH. This involves prophylactic administration of uterotonic before delivery of placenta in addition to other interventions, such as late cord clamping and controlled cord traction (in settings where skilled birth attendants are available). Oxytocin injection is the recommended first line uterotonic medicine for preventing and treating PPH because it is more effective than other uterotonics.
REFERENCES

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[11] PATH. Newsflash: Oxytocin can take the heat... More storage flexibility available or where the bleeding may be partly due to trauma.

with relatively fewer side effects but unstable and needs cold chain maintenance, furthermore parenteral oxytocin requires the involvement of skilled health personnel. Based on evidence, the WHO 2012 guidelines for managing PPH advice the use of misoprostol in situations where the use of oxytocin is not possible despite its lower potency, side effects and the possibility of misuse in abortion induction. The 2012 WHO guidelines also recommended the use of tranexamic acid (antifibrinolytic agent used in surgery) to reduce blood loss as an alternative treatment for PPH when other uterotones are unavailable or where the bleeding may be partly due to trauma.

II. Conclusions

Although declined, the current status and trend of MMR in Egypt which caused by avoidable factors like PPH may hinder the country from achieving MDG and the burden of PPH still persists and the current interventions are inadequate. Efforts to address the research opportunities will help meet the PPH prevention and treatment needs.

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