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Antecedents of Maternal Mortality in Well- and Under-Resourced Countries: a case of United Kingdom and Bhutan

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ABSTRACT

Despite 88.4% reduction in maternal mortality between 1984 and 2017, Bhutan remains 70 years behind the United Kingdom. Due to difference in resource availability, disparity in access to specialized care and high-end investigations are expected. Fortunately, the variations in Routine Perinatal Care (RPC) are adjustable. Therefore, instead of complete reliance on existing long-term policy-level strategies, initiating a robust maternal mortality reviews and report dissemination; tied with a well-formulated quality metrics for RPC may contribute significantly towards achievement of SDG target 3.1: to reduce global Maternal Mortality Ratio to less than 70 per 100000 live births by 2030.

Keywords: Maternal Mortality; Perinatal Care.

INTRODUCTION

Maternal Mortality (MM) is annual number of female deaths from any causes related to or aggravated by pregnancy or its management during pregnancy and childbirth or within 42 days of termination of pregnancy¹. This can indicate a health system's capacity to effectively prevent and address complications of childbirth. It could also highlight inadequate nutrition and general health of women; and reflect lack of fulfilment of their reproductive rights². MM in Bhutan reduced from 770 per 100000 livebirths in 1984 to 89 per 100000 livebirths in 2017³. Bhutan achieved the Millennium Development Goals target 5A: to reduce MM by three quarters between 1990 and 2015. It is said to be on track to achieve, the SDG target 3.1: to reduce global Maternal Mortality Ratio (MMR) to less than 70 per 100000 live births by 2030³. However, as per Trends in Maternal Mortality:2000 to 2017, the world will fall short of this target⁴. Similarly, as per Institute for Health Metrics and Evaluation(IHME), Bhutan is "not meeting expectations"⁵. Meanwhile, as shown in Figure 1, MMR in developed countries like the United Kingdom (UK) has been below 10 women per 100,000 maternities for decades. While closing this gap through enhancement of specialized care alone is ambitious, understanding the antecedents of MM and capitalising on existing well-established Routine Perinatal Care (RPC) would be instrumental.

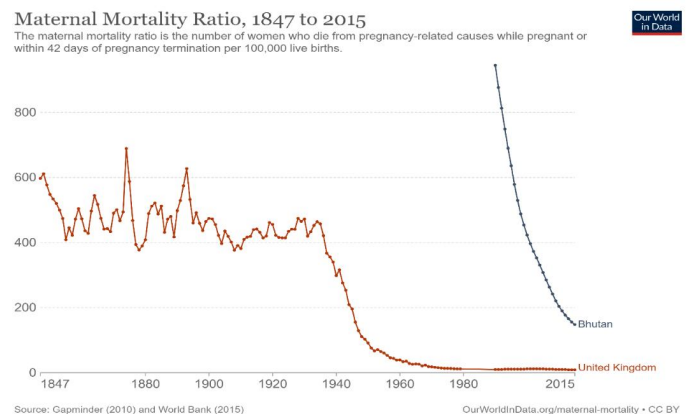


Figure 1. Maternal Mortality Ratio in the United Kingdom and Bhutan⁶

UK has a centuries-old medical history whereas Bhutan's Allopathic medical service began in 1950s. Healthcare development was initially directed towards human resource and infrastructure improvement. Health Information dissemination through Annual Health Bulletin (AHB) began in 1985 and MMR figures were based on National Health Survey (NHS) 1984, 1994, 2000, 2012 and Population & Housing Census of Bhutan 2005 and 2017.

Bhutan's MMR of 89 per 100000 livebirths, places it in JP Souza et al Stage III of Obstetric Transition, when quality of care become a major determinant of healthcare outcome⁷. Similarly, Dorji et al. noted that Delay1 (deciding to seek care) and Delay2 (identifying and reaching health facility) have declined. Delay3

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(not receiving appropriate treatment in time at health facility) due to human resource shortages and logistics deficiencies remain a challenge. Further, a fourth delay where mothers deliberately don't seek help for social reasons (for example, to hide pregnancy occurring out of wedlock and underage pregnancy) was identified⁸. Addressal of these issues require policy-level, multisectoral intervention. However, improvement of quality of care at health facility can be achieved by efficient use of available resources through enhancement of RPC. This will in turn even encourage mothers to avail perinatal care confidently and without fear of prejudice.

As per findings from the Maternal Neonatal Death Surveillance and Response system, Postpartum Haemorrhage(PPH) was the leading cause of MM in Bhutan from 2001 to 2017⁸. It was followed by Medical Conditions and Sepsis. Pre-eclampsia was the fourth most common cause of MM. However, according to IHME hypertensive disorders was the topmost MM disorder in 2017, not PPH⁵.

To understand this discrepancy, a graph (Figure 2) was plotted with data from AHB and NHS on triennial basis like that of Mothers and Babies: Reducing Risk through Audits and Confidential Enquiries across the UK (MBRRACE-UK) Report. "Other Complications of Pregnancy" was the leading cause of MM during 2018 - 2020 and it was followed by Prolong Labour. This is concerning because only 50% of Healthcare Professionals (HCP) attending deliveries have Good Knowledge on partograph; and partograph completion rate is 16.0%⁹. Pregnancy Induced Hypertension (PIH) and PPH were in third place. Abortion was fourth common cause. Incidentally, abortion is legal under only three conditions: to save woman's life; in case of rape and incest; and in cases where mother is of unsound mental condition¹⁰. Contraception failure is not included.

Contrastingly, UK's leading cause of MM is cardiac disease, followed by neurological causes. Thrombosis and thromboembolism are topmost direct cause of MM during puerperium and Maternal Suicide, the leading cause within a year of delivery¹¹. MM review findings are published regularly as MBRRACE Report. A similar, user-friendly, up-to-date

information on MM in Bhutan would prove critical in provision of effective RPC.

Routine Perinatal Care in Bhutan and the UK

Bhutan has a government-run, 3-tiered, free healthcare system with volunteers in communities and government funded ex-country referral for services not available within the country. 87.7% of population live within 2 hours of nearest health facility³. There are 48 hospitals, 184 Primary Health Centre(PHC) and 13 Gynaecologists/Obstetricians for a population close to 750,000^{3,12}. RPC is provided by Health Assistants in PHCs and hospitals. Majority of deliveries are conducted by Nurses in hospitals. When encountering complicated cases Gynaecologist/Obstetricians or other relevant doctors are consulted.

Few elements differentiate RPC in UK and Bhutan. With the exception of use of Electronic Medical Records (EMR) in UK and paper-based records in Bhutan and unavailability of antenatal screening for thalassemia, sickle cell disease, Down's, Edwards's and Patau's syndrome in Bhutan, RPC in UK and Bhutan is similar. Some variations are mentioned in Table 1.

In general, critical components of RPC are equally available to women in the two countries. In fact, Bhutan does an excellent job of conducting more face-to-face consultations and screening for GDM. However, only 25.9% of pregnant women complete the recommended 8 antenatal visits. Half of pregnant women do not register their pregnancies before second trimester and postnatal coverage for any visit is 77.7%¹⁷.

Further, in the UK, considerable time is spent on communicating pregnancy and childcare related messages; and assessing/supporting non-physical health needs. Perhaps, these determinants of health, often overlooked by under-resourced countries, is what leads to a better pregnancy outcome.

Where is Bhutan now?

Despite 88.44% reduction in MMR, Bhutan is 70 years behind UK. Unfortunately, as seen in Figure 1 it seems to be plateauing. The preceding steep drop of MMR resembles that of UK's between 1930s and 1950s (Figure 1), after it experienced major healthcare milestones¹⁸. Bhutan didn't have to go through that because, by the time borders opened to outside world, there were ample lessons to learn from.

DISCUSSION

Both UK and Bhutan have government-sponsored Healthcare Systems. Due to difference in resources, access to specialized care and high-end investigations vary. Additionally, care-seeking behavior, care acceptance and extent of successful implementation of healthcare activities are affected. Undoubtedly, under-resourced settings compromises healthcare outcome in Bhutan. The limited assets need to be used effectively and a little more focus on maternal and child health issues could prove critical in determining MMR trend henceforth. Fortunately, RPC presents opportunities to make this possible and accordingly through

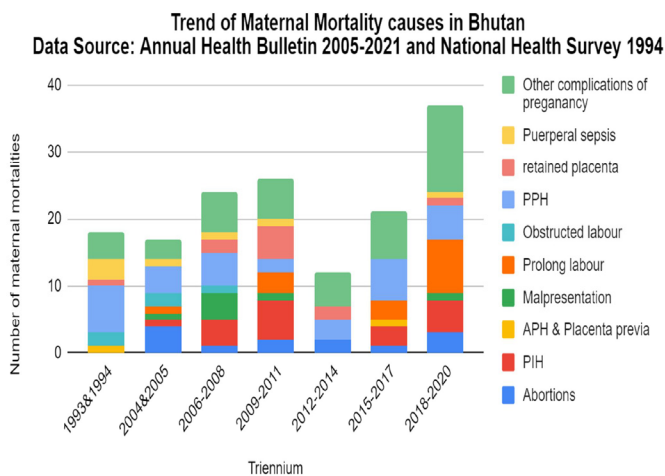


Figure 2. Causes of Maternal Mortality in Bhutan

Table 1. Comparison of Perinatal Care in United Kingdom and Bhutan¹³⁻¹⁶

Antenatal Care	United Kingdom	Bhutan
Mode of delivery	Some face-to-face and some over the phone	All face-to-face
Recommended number of antenatal appointments	11 for nulliparous, 8 for others *If not delivered by 40 weeks(w) another appointment at 41w	8 *If not delivered by 40w another appointment at 41w
High risk age	< 20 years	<20 years, > 40 years
Recommended Booking visit	At 10w	At 8w, after confirmation by Ultrasound scan (USS) where available
USS	Done if women want, between 11w-14w1d, 18w-20w6d	Done where available before booking, 20w-26w, 36w, 40w
Obesity	Assessed and managed with guideline for morbidly obese mother	Assessed and considered risk factor for Gestational Diabetes Mellitus (GDM)
Venous thromboembolism	Routinely screened	Not screened
GDM	Screened at booking. OGTT offered to high-risk cases	Screened at booking and every antenatal visit (glycosuria check). OGTT at 26w
Breech Presentation	Options: External Cephalic Version, Breech Vaginal Birth, Caesarean birth.	Referred to Gynaecologist for Caesarean section.
Continuity of care	Same HCP involved throughout antenatal, intrapartum, and postpartum period	Different HCP at each stage
Mental Health	Screened during antenatal and postnatal visits	Not done.
Postnatal care	Discussed during and after 28w	Discussed during postnatal period
Delivery plan	Any birth setting (home, freestanding midwifery unit, alongside midwifery unit or obstetric unit) depending on women's preferences and explanation of risks.	Institutional delivery encouraged
Sleep position	Advised to avoid sleeping on back after 28w. Mothers are explained that there may be a link between sleeping on her back and stillbirth in late pregnancy.	Sleeping on left side are discussed with regards to relieving discomfort and varicose veins
Intrapartum care		
Monitoring tool	Cardiotocography (CTG) discouraged in low-risk women	<ul style="list-style-type: none"> • Partograph use mandatory • CTG used where available
Hygiene measures	Tap water may be used for cleansing before vaginal examination (VE). Routine Hygiene measure including hand hygiene and single use non-sterile gloves. Selection of PPE based on risk factors	VE performed using aseptic technique. Clean plastic or rubber apron, rubber boots, facemask, and eye goggles/face shield used. High-level disinfectant or sterile surgical gloves are worn.
Postpartum care		
Schedule	4 visits within 8weeks of birth <ul style="list-style-type: none"> • 36hrs by Midwife • 7-14 days by Health Visitor • 6-8w by GP 	4 visits in Health Facility <ul style="list-style-type: none"> • Day 3, 7, 21 and 42 after delivery • Referred to doctor in case of complications
Assessment and care of woman	Aside from physical health, women are screened for mental health and concerning issues like domestic abuse. Discussion on signs and symptom of potential postnatal physical problems, importance of pelvic floor exercise, nutrition and sexual intercourse take place.	Mental Health screening is not included in National Standard. Pelvic floor exercise not mentioned specifically. Concerns on sexual intercourse and perineal hygiene not addressed.
Bed sharing	Parents strongly advised not to share bed with low-birth-weight baby	Rooming-in practice encouraged for initiation and sustaining breastfeeding i.e., reduce risk of hypoglycaemia and hypothermia.
Breastfeeding Support	Women and HCPs would have discussed and decided feeding method. Woman can choose how to feed her baby. Breastfeeding care tailored to individual needs and provided by following ways <ul style="list-style-type: none"> • Face-to-face support • Written, digital or telephone information to supplement face-to-face support • Peer support information • Information for partners 	Exclusive breastfeeding promoted, unless contraindicated. Women come to hospital for face-to-face consultation/classes.

Table 2. Summary of this paper using modified SWOT and STAR approach

Strength	Weakness	Opportunities	Threats
Good Primary Healthcare coverage	Resource shortage	MOH plans to enhance RPC usage	Brain drains Unaddressed SDH*
Rapid MMR improvement in 4 decades	No EMR with Vital Registration linkage	RPC well established	Client readiness unknown (Low Female Literacy Rate, could indirectly indicate the extent of participation of mothers in health-related decision making)
Free Healthcare	RPC Quality Metrics inadequate		
Situation	Task	Action	Remark/Responsibility
Bhutan's MMR 70years behind that of UK.	Increase Human Resource	More training opportunities	Policy level intervention
		Improve Health work environment	Health Human Resource Management to improve
		Explore possibility of private maternity hospitals	Policy level intervention
Need to meet SDG target 3.1 by 2030	RPC to effectively detect and avoid preventable MM	Institute a robust MM Review system	Program level intervention
		Develop RPC-specific KPIs	Health Center and Program level intervention
		Update HCP on effective RPC	
(* Aspirational Result: Bhutan's MMR equal to that of a developed country like UK)	Client Centered Care	Conduct Needs Assessments	Multidisciplinary approach
		Improve HCP communication skills	
		Expand Health Education medium: digital, peer groups, etc.	
		Involve Allied HCP in RPC	
		Improve healthcare seeking behavior	
Improve health and living conditions of women and children	Ensure availability of reliable MM data	Initiate EMR and digital Vital Registration	Multisectoral approach
		Ensure	
		<ul style="list-style-type: none"> Nutritious food availability Safety and social support 	

**Social Determinants of Health*

Accelerating Mother and Child Health Policy, the Ministry of Health intends to incentivize use of existing Mother and Child Healthcare Services¹⁷. Closing the 70-years gap, without addressing resource shortage is impossible. Initiation of EMR linked with Vital Registration require multidisciplinary approach. Similarly, improvement of Female Child Education, Nutrition and Safety need multisectoral approach. Collaboration with non-health sectors and evidence-based planning will go a long way in reducing Bhutan's MMR.

As a late comer in the realm of modernization, much of what Bhutan has achieved was due to successful adoption of strategies from other countries. Now, a proactive and contextualized approach to improve Bhutanese Women's Health has become a necessity. Fortunately, essential components of RPC in Bhutan are comparable to developed countries like UK. Banking on this, for Bhutan to achieve SDG target 3.1,

instituting timely MM reviews and dissemination of clinically relevant findings would be instrumental. This would enhance RPC into a dynamic, evidence-based service. Obviously, having more Obstetricians would help save complicated cases, but for now, they too depend on effectiveness of RPC to act promptly. Additionally, involvement of Allied HCPs (Nutritionists, Physiotherapists, Counselors, etc.) in RPC should be considered.

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