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# Is maternal education important to improve maternal health in Bangladesh?

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## INTRODUCTION

Maternal mortality remains a significant problem in resource-poor settings within the developing world (1). In maternal-fetal medicine, there is significant disparity in health and mortality outcomes when comparing high and low-income countries. South East-Asia and sub-Saharan Africa account for the highest levels of maternal mortality around the world, namely 85% of the global burden. Bangladesh is included in this statistic (2,3). Bangladesh has an estimated population of 150 million people (4), from 1990 and 2013. Reports have shown that maternal mortality has reduced by 70%, with the latest reports estimating a maternal-mortality ratio of 140-170 per 100,000 (5). The factors contributing to reduced maternal mortality include: increased use of skilled healthcare professionals for assisting delivery, improved female education, enhanced utilisation and access to healthcare facilities, and a reduced total fertility rate, from five births per woman to two between 1990 and 2011 (1). However, the lack of a skilled delivery attendants being present at the time of labour to assist with birth and deal with complex births, remains a significant challenge in Bangladesh (6).

The literature investigating global maternal mortality in low-income countries has put forward a host of recommendations to improve the growing problem (7,8). This includes hygiene-focused maternal health education promoting disease prevention, increasing the availability of qualified healthcare professionals and access to medications (e.g. antibiotics to treat infections), access to emergency obstetric services and safe abortion practices. Despite the progress in maternal health, the maternal-mortality ratio poses a significant challenge to Bangladesh's healthcare system (17).

Maternal Aid Association (MAA) is a grassroots student-led charity working to improve situations in resource-poor settings such as Bangladesh, to bring about safe, effective, quality maternal healthcare. MAA comprises of current King's College London students with further support from

Professor Janice Rymer, Vice President for the Royal College of Obstetrics and Gynaecology, and Dr Daghni Rajasingham, Consultant Obstetrician Guy's and St Thomas' NHS Foundation Trust. The charity's primary objective is to improve maternal health across South East-Asia, beginning with Bangladesh. MAA has studied the literature and actively surveyed and evaluated the current maternal-health state across two major cities in Bangladesh, namely Dhaka and Sylhet. Interventions are aimed to be evidence-based to effectively improve maternal health outcomes. In Bangladesh, the team surveyed government hospitals and carried out interviews with patients. They found significant overcrowding with a poor patient-to-bed ratio, a lack of basic resources crucial to quality healthcare provision and a lack of standardised infection control measures. As an example of this, a member of the team witnessed two patients undergoing major surgery whilst under the care of an anaesthetist who had no electrical monitoring of the patient. This included a lack of electrocardiography (ECG), oximetry or blood pressure measurement.

Interviews with patients and health professionals in Sylhet and Dhaka suggested that the general population lacked basic knowledge about the expected physiological changes during pregnancy, behaviours that pose risks to pregnancy and the developing child, and positive and negative health behaviours. Due to the poor recognition of health, poor access and costs associated with care, patients experiencing red flag symptoms during pregnancy (e.g. abnormal bleeding or high-grade fever) often delayed in presenting to emergency services. This delay in presentation inevitably made management and rescue operations difficult. In addition to this, a lack of basic knowledge and understanding led to the practice of unusual, counterintuitive health-behaviours. For example, women intentionally restricted calories in order to limit the size of the foetus, with the belief that this would allow for an easier labour. A study conducted in Ghana by Greenaway et al. (2012) assessed the relationship

between maternal education and mortality. The results suggested a positive correlation between greater maternal health knowledge and formal education, with better use of formal healthcare services (7). The study further suggests education influencing the timing and decision to access healthcare services. Thus, a lack of education is suggested to be associated not just with poor maternal health status but the decision to access healthcare (7).

The literature further contains reports associating education with lower morbidity. In a study conducted by Saito et al. (1997), there was an inverse association between knowledge about nutrition and child malnourishment (8). The study suggested that mothers who were aware of nutritional requirements and the importance of appropriately feeding children were more likely to ensure their child was not malnourished. In a recent study by Grepin and Bharradaaj (2015), improved maternal education was strongly associated with a significant decline in child mortality, as well as an improvement in fertility and economic outcomes (9). The authors also noted that an additional year of maternal education reduced child mortality by 21%(9). Thus, the literature highlights education as an important factor for improving child development and health.

In Bangladesh, it is reported that up to 70% of births are at home, with only 36% of women giving birth with the aid of a skilled birth attendant (10). Montagu et al. (2011) report an association between home births and an increase in mortality and morbidity, and therefore go onto suggest that as births are predominantly outside of the hospital setting there is a need to focus on community-based interventions to improve maternal-health outcomes.

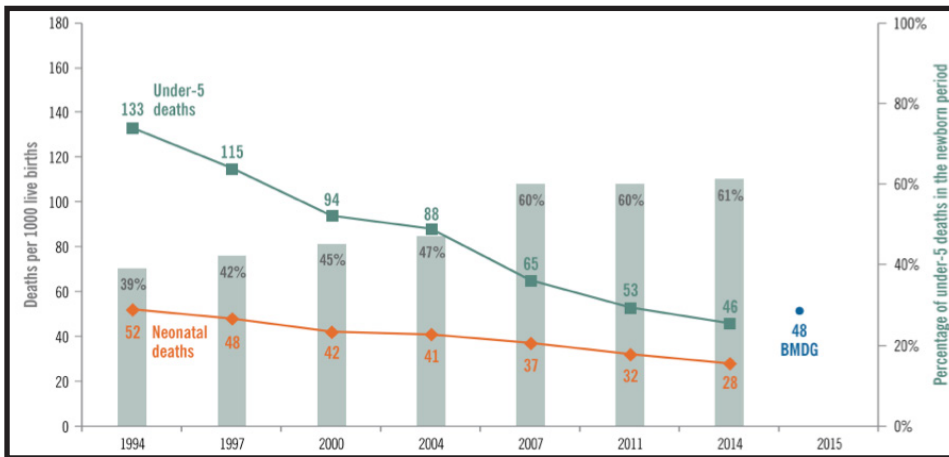
Consequently, there is also a need to improve the contact between the community and healthcare services. Ronsmans et al. (2010) studied over 59,000 pregnancies to evaluate the relationship

between perinatal mortality and care-seeking (11). The study proposed that increased use of health-professional services over time was associated with a reduction in maternal mortality. However, it is important to note the study also found that those who came into contact had greater perinatal death rate (11). This finding suggests that healthcare use is associated with a greater risk of mortality over the perinatal term.

The study has significant limitations, such that it is likely that those into contact with healthcare professionals allow for a greater capture of data for that specific population, while a large amount of those who give birth at home are missed and not captured as part of the data. This introduces a selection bias, as death rates in the home birth group would go un-recorded. A second limitation; contact with healthcare professionals may not be timely, late presentations are associated with an increased mortality, and as a greater proportion of data is based on this population it may be another explanation for the association (Mdala & Mash, 2015). In a meta-analysis conducted by Wilson et al. (2011), skilled birth attendants have been shown to be associated with a significant reduction in pre-natal mortality and morbidity by up to 30% (12). Furthermore, Titilayo et al. (2015) in their study also suggest that improved health-seeking behaviours are associated with better knowledge of maternal health (13). Thus, the literature suggests that maternal education, improved health choices, better engagement with healthcare services and the presence of a skilled birth attendant are avenues which should be targeted to improve maternal health.

MAA has therefore chosen in its inaugural year to invest in educating the Bangladeshi community with the aim of positively influencing health behaviours using evidence-based seminars.





**Figure 1: Under '5 years of age' and neonatal mortality trends in Bangladesh between 1994-2014**

Graph illustrates under 5 years of age and neonatal mortality per 1000 live births in Bangladesh. Graph also highlights the percentage of under 5 deaths in the newborn period between 1994 and 2014 in Bangladesh.

BMDG; Bangladesh Millennium Development Goal

Source: Ministry of Health and Family Welfare, Bangladesh, Partnership for Maternal, Newborn & Child Health, WHO, World Bank and Alliance for Health Policy and Systems Research. (2015). Success Factors for Women's and Children's Health: Bangladesh.

<http://www.who.int/pmnch/successfactors/en/>

## METHODS

To survey the healthcare system in Bangladesh; alongside studying the literature, experience was gained by visiting hospitals and carrying out interviews with healthcare professionals, patients and focus groups. This included comparing and contrasting the differences in facilities, resources and access between rural and urban areas, mainly Dhaka and Sylhet. Hospitals in Dhaka included the largest; Dhaka Medical College and Hospital & Square Hospital. Sylhet hospitals included Sylhet Women's Medical College (SWMC) Hospital, Noorjahan Hospital and the Bhalaganj Health Complex.

MAA with support from the Bhalaganj Health Complex team and SWMC set up a three-day health camp where participants received evidence-based seminars to: a) improve their understanding of pregnancy and expected physiological changes; b) learn how to promote a healthy pregnancy; c) recognise red flag symptoms and contact the appropriate health professional; and d) promote healthy child development.

In conjunction with the seminars, the local women were provided with free basic healthcare checks

including blood pressure, blood glucose, urine screen and fundus examination. While this was an opportunistic screening, it served the purpose of consolidating the seminar teachings about the recommended World Health Organisation antenatal checks. If basic health checks were positive for signs of disease, then a final review by a qualified doctor was provided.

To monitor the impact and influence of the MAA programme on health behaviours, all participants were evaluated and interviewed at the end of the day programme using a questionnaire to see if prior health behaviour preferences and views had changed.

## ETHICAL APPROVAL

The Principal and Vice Principal of Sylhet Women's Medical College and Hospital approved the project in collaboration with the Bhalaganj Health Complex.

## RESULTS

Hospital visits allowed for MAA to assess key areas for improvement; 1) infectious control ; 2) patient monitoring equipment in particular for critically ill

patients ; 3) crowd management, in one particular passageway measured 4 foot by 23, there were 53 people present whilst in one ward with 12 beds contained over 25 people were present; 4) patient privacy; 5) storage and handling of food being consumed on the hospital premises including wards; and 6) control of wild animals and insects.

## HEALTH CAMPS

Over the course of the health camp, 207 females registered for the MAA education and health screening programme. 22% of the participants were pregnant. During the health screen; 46% of participants were reported as being positive for several basic health checks. 52% were found to either have blood/leucocytes/nitrites or protein in the urine, 36% had significantly raised blood pressure (>140/90) and 10% had a significantly raised blood glucose (>140mg/dl). Four paired sample t-tests were conducted to compare ratings before and after the programme, particularly

evaluations relating to food intake, support from partner, future contact with the healthcare system, and health checks. The educational and health screening programme yielded results suggesting a significant improvement in health behaviours for the participants. Data retention was more than 85%.

One of the most important goals of the programme was to dispel the misconception that extreme calorie restriction during pregnancy improved birth outcomes and eased labour. There was a significant difference in ratings before ( $M = 2.85, S.D. = 1.39$ ) and after ( $M = 4.67, S.D. = .69$ ) the programme;  $t(135) = -14.01, p < 0.001$ . This suggests that participants after the programme were more likely to increase their nutritional intake rather than restrict for future pregnancies.

Participants were asked about their likeliness to be in contact with the healthcare system in the future for a pregnancy. There was also a significant difference in ratings before ( $2.62, S.D = 1.49$ )

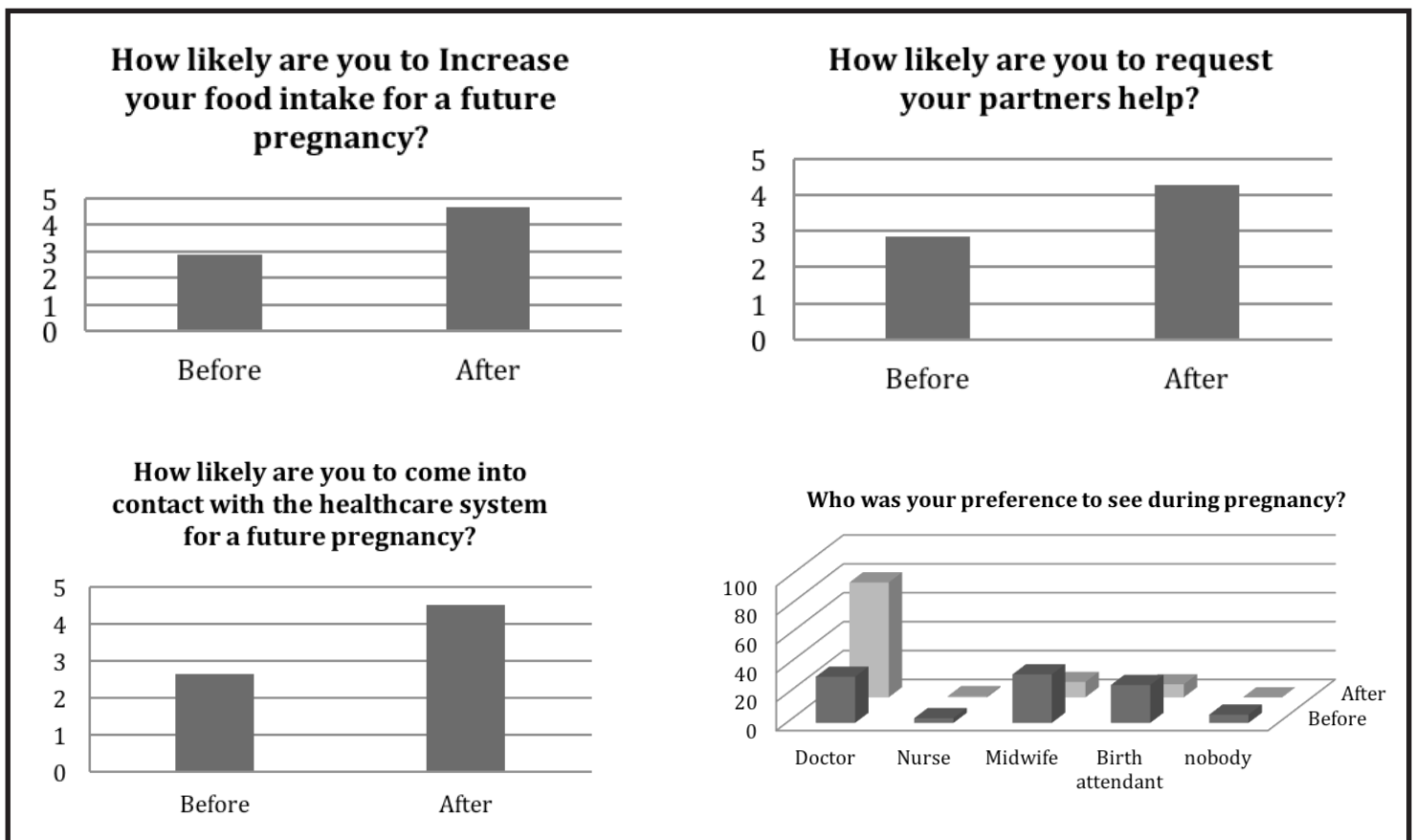


Figure 2: Graphs illustrating results from the participant evaluations.

and after ( $M = 4.51$ ,  $S.D. = 1.49$ ) the programme;  $t(131) = -14.11$ ,  $p < 0.001$ . Pregnant women were also more likely to request help from their partners if they had concerns over their health after the programme ( $M = 4.28$ ,  $S.D. = 1.05$ ) as compared to before ( $M = 2.85$ ,  $S.D. = 1.55$ );  $t(121) = -10.792$ ,  $p < 0.001$ .

Prior to our seminars, 33% of participants would have preferred to be assisted by a traditional birth attendant, however following the programme 80% of participants reported to prefer seeing a medically trained professional. During the seminars the MAA team emphasised the use of the World Health Organisation's recommended antenatal screening. There was a significant difference in views held before ( $M = 2.92$ ,  $S.D. = 1.48$ ) and after ( $M = 4.69$ ,  $S.D. = 6.55$ ) the programme;  $t(130) = -14.25$ ,  $p < 0.001$ . This suggests that participants considered antenatal screening as more important after attending the seminar.

Evaluating access and engagement with healthcare revealed that over 35% of patients did not come into contact with any maternal health services during their recent pregnancy. Reasons included treatment costs and large distances to a hospital. 40% of participants indicated costs to be a significant barrier whilst 20% reported to have to travel more than 30 minutes to the closest hospital. Other reasons included: poor services, long waiting periods and doctors being unavailable.

## DISCUSSION

The results from our project show that educational seminars may have a significant impact; positively influencing health-behaviours of women in Bangladesh.

Previous studies have consistently associated maternal education with health. Karlsen et al. (2011) conducted a cross-sectional study of 287,035 patients, assessing the relationship between maternal education and mortality. The study found that a low level of education was associated with a mortality risk of more than twice

that of those who had been educated (14). While the MAA project is currently unable to monitor long-term mortality, the post-seminar evaluation allowed for a cross-sectional assessment of health behaviours/preferences. From observations, focus groups and anecdotal reports from doctors in Bangladesh, many patients delay or fail to present to healthcare services, citing cost issues and a general lack of awareness of signs of health at risk. Educating the community to recognise signs and symptoms of pathology may promote more timely presentation to healthcare services, which may inevitably allow for a more opportunities to treat the patient.

The programme also focused on promoting infectious control practices to reduce the transmission of infections within communities and households. The literature suggests 4 million neonate deaths occurring annually in low-middle income countries, with up to half at home. This is the predominant place of birth in Bangladesh. Infections are one of the major causes of mortality and thus one of the objectives of MAA was to promote evidence-based practises to improve infectious control. Darmstadt et al. (2005) looked at practical evidence-based home-practices feasible in low-middle income countries. The report highlights interventions which have the potential to reduce neonatal mortality by up to 70% (16) which include; the promotion of clean home delivery, hygienic cord care and breastfeeding- all of which were promoted during the seminar delivered by MAA. To move forward, MAA should consider the provision of sterile-birth kits and care-kits for the immediate post-natal period which may have potential for reducing the infection contraction rate during the immediate term peri-partum.

A significant issue highlighted by the study cohort was the cost of medical treatment and access to healthcare (5). In Koblinsky's report (2008), 44% of women reported that the primary reason for lack of engagement with healthcare was costs associated with care (5). Non-governmental organisations (NGOs) have initiated schemes to solve this problem, however this is currently ongoing. In terms of access, studies have highlighted a number

of deterrents to engagement with healthcare, namely distance to a healthcare centre, lack of a partner to support, and lack of knowledge of location and healthcare professional details (5). Education may improve the provision of support between community members and engagement. Despite this, there is a need for strategically improved healthcare centre locations.

MAA has identified educational seminars as having significant potential for improving maternal health supported by evidence-based literature. In terms of future implication, MAA aims to consider maternal health on a larger scale to better influence the access to healthcare.

## CONCLUSION

The MAA education and health-screen programme 2016 has shown considerable potential in positively influencing health-behaviours, particularly engagement with health professionals. Two issues that MAA will inevitably work to improve include costs and access to healthcare, as they are prominent problems that affect maternal health.

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