OPINION ARTICLE

Tackling “half” of the non-communicable disease burden in Bangladesh: a diagonal service delivery model with a life-course approach [version 1; peer review: awaiting peer review]

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Abstract

In the context of increasing morbidity and mortality due to non-communicable diseases (NCDs) globally and particularly in low-resource countries, it has become important to explore newer health systems delivery models. In low-and middle-income countries (LMICs) women traditionally challenged with multiple barriers in accessing health services, are at even greater disadvantage compared to men. In Bangladesh, women constitute almost half of the country's population and are disproportionately affected by NCDs like other LMICs. The country's reproductive, maternal, newborn, child and adolescent health (RMNCAH) services are well established and designed to reach women in their households through community health workers (CHWs). This paper discusses how NCDs screening and control measures could be integrated into the existing RMNCAH pathway and proposes a conceptual model for such diagonal service delivery integration. The paper also describes multiple RMNCAH service delivery touchpoints that could be utilized for screening and treating women for NCD risk factors, across their life-course.

Keywords

Non-communicable diseases (NCDs), maternal and child health, diagonal integration, women's health, life-course, LMICs, Bangladesh

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Background

Annually, non-communicable diseases (NCDs) contribute to a total of 41 million deaths, which is 74% of all deaths worldwide. NCDs now constitute the leading cause of death and disability among women with approximately two out of every three women dying from an NCD, which translates to 19 million deaths annually. Eighty percent of all NCD-related deaths occur in low-and middle-income countries (LMICs) which have undergone rapid epidemiologic transition. As an LMIC, Bangladesh experiences similar phenomena with 68% of the country’s total mortality occurring due to NCDs. Households with NCDs were reported to have borne 6.7% higher catastrophic medical expenditure compared to those households without NCDs; households with NCDs have an 85% higher likelihood of selling assets or borrowing money for covering the treatment expenses for NCDs. The rising NCDs burden disproportionately affects women as they are already faced with several barriers to accessing healthcare in low-resource settings. Despite availability of reproductive health services for women, the overall health status of women in Bangladesh remains below par. Since existing policies and programs largely focus on reproductive, maternal, child, and adolescent health (RMNCAH), the magnitude of NCDs-related disability and deaths do not receive adequate focus. Moreover, risk factors overlapping between NCDs and sexual and reproductive disorders are not taken into account. For instance, mothers who suffer from gestational diabetes have a greater risk of developing Type 2 Diabetes Mellitus later in life. The antenatal period provides a window of opportunity for early intervention for prevention of diabetes mellitus among these women. Also, certain exposures (multiple sexual partners, infection with human papilloma virus) during reproductive years are risk factors for female cancers, classified as NCDs at an older age. Women in their postmenopausal years face higher risks of developing the five major NCDs (hypertension, diabetes mellitus, chronic respiratory diseases, cancer and mental disorders) plus other NCDs such as osteoporosis. However, as women age beyond their reproductive years, they are likely to lose contact with the health system. Women in Bangladesh have limited decision-making power and financial capacity that restrict their ability to seek health services on their own. Although current RMNCAH services attempt to reach all rural women at their doorstep, women who are not in their childbearing age are not included within the scope of such services.

The Sustainable Development Goals (SDGs) sets the target “to reduce premature mortality from NCDs by a third relative to 2015 levels, and to promote mental health and wellbeing.” As women constitute about 50% of the population of Bangladesh, it is essential to support the NCDs-related healthcare needs of women to achieve the aforementioned SDG. Women in Bangladesh face several challenges in accessing health care: distance to health facility/lack of transportation, lack of knowledge/cultural stigma and misperceptions, lack of opportunity and time to travel to a health facility due to excessive involvement in household chores, absence of financial ability and decision-making power. Even if they manage to make a preliminary visit to the health facility, at some point they are lost to follow-up. Introducing a separate NCDs screening and referral system targeted towards women require considerable resources. To immediately address the rising burden of NCDs among women, a care continuum with a life-course approach can be established by expanding “diagonally” on existing RMNCAH services. The community health workers (CHWs) who are currently involved in delivering RMNCAH services, can play an important role in the prevention and screening of NCDs risk factors. Similar approaches have been tested and implemented in other LMICs. In Sub-Saharan Africa, CHWs who primarily deal with sexually transmitted diseases in the community are tasked with screening for relevant NCDs. In Pakistan, a lifestyle intervention was delivered by trained CHWs that significantly controlled the increase in blood pressure among children and young adults. In Kerala, India, CHWs successfully conducted a large NCDs prevalence study among 113,462 individuals in five village councils. A health system model that takes on an integrated and synergistic approach to RMNCAH and NCDs services can ensure cost-effective delivery of services that span across the life course of women. This paper introduces the concept of a women-centred, life-course approach for NCDs control based on existing RMNCAH service delivery pathway in Bangladesh, which may be applicable to other low-resource settings.

Opportunities within existing RMNCAH services

RMNCAH services in Bangladesh provide multiple opportunities for women to interact with the health system: at least four ante-natal checkups (ANC) during pregnancy, post-natal visits, post-partum family planning (PPFP) visits, immunization visits, family planning visits and more recently, the government has focused on adolescent counseling and services (Table 1). The national program for screening and control of breast and cervical cancers utilize the existing RMNCAH care pathway. Incorporating other NCDs could potentially prove to be an effective measure. Educating women about the importance of a balanced diet, physical activity and optimal breastfeeding practices can lead to healthier pregnancies and at the same time, reduce the risk of NCDs. Breastfeeding promotion and support can reduce the risks of obesity and type 2 diabetes among children later in life, and the mother’s risks of type 2 diabetes, breast and ovarian cancers (Table 1). Monitoring of blood pressure during pregnancy not only allows to screen for preeclampsia/ eclampsia but also identifies risk factors for cardiovascular diseases (Table 1). Multiple service delivery touchpoints within the RMNCAH pathway present an important opportunity to reach the most vulnerable and underserved women, who otherwise would not seek NCDs services. Moreover, such repeated interactions can address loss-to-follow-up, one
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<th>RMNCAH touchpoints</th>
<th>Target group</th>
<th>Opportunities for action</th>
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| Antenatal Care               | • Pregnant women                                                             | • Health education on balanced and nutritious diet, physical activity for prevention of obesity and associated NCDs risk  
• Teenage girls and elderly family members (during household visits/those accompanying mother and newborn to health facilities)  
• Promotion of optimal breastfeeding practices  
• Screening and referral for pregnant mother with gestational diabetes and hypertension  
• Screening and referral of elderly women in the family for diabetes, hypertension, chronic respiratory illnesses  
• Providing calcium supplements to all women in the household for bone health (prevention of osteoporosis) |
| Childbirth/ Delivery Services| • Mother  
• Newborn                                                                  | • Management of gestational diabetes, preeclampsia/eclampsia during childbirth  
• Promotion of optimal breastfeeding practices to prevent future obesity in newborn child and breast and ovarian cancers in mother  
• Screening for signs of post-partum depression |
| Postnatal Care/PPFP visit    | • Recently delivered mother  
• Newborn                                                                  | • Reassessing NCDs risk factors of mothers with diabetes and hypertension during pregnancy  
• Advice on adequate and nutritious diet for the lactating mother  
• Educating the mother on optimal sunlight exposure for healthy bone development in newborn  
• Screening for signs of post-partum depression |
| Immunization visits          | • Mother  
• Child  
• Elderly female family members (during household visits/those accompanying mother and newborn to health facilities) | • Educating the mother on optimal sunlight exposure for healthy bone development for all family members  
• Screening the mother for signs of post-partum depression  
• Providing calcium supplements to women in the family for bone health (prevention of osteoporosis)  
• Counseling and referring eligible women for breast and cervical cancer screening |
| Family Planning visits       | • Women of reproductive age  
• Elderly female family members (during household visits/those accompanying mother and newborn to health facilities) | • Counseling and referring eligible women for breast and cervical cancer screening  
• Screening for hypertension and diabetes among elderly women in the household (blood pressure and blood glucose measurement) |
| Adolescent services and counseling | • Adolescent girls                                                          | • Counseling on menstrual health and hygiene, safe sex practices for prevention of cervical cancer  
• Health education on balanced and nutritious diet, physical activity for prevention of obesity and associated NCDs risk  
• Screening for signs of depression during puberty  
• Counseling on the dangers of early marriage and childbearing and how they contribute to early onset of NCDs |
of the important challenges in NCDs management. Women with identified NCDs risk factors can then be referred and linked to the mainstream NCDs control program. Adolescent girls and older women in the family could also be screened by CHWs during household visits.

**A diagonal service-delivery model**

A diagonal approach to health system strengthening for NCDs focuses on integrating specific components of NCDs prevention and management within an existing framework of healthcare delivery. In Bangladesh, the Non-Communicable Disease Control (NCDC) Program of the Directorate General of Health Services (DGHS) has operationalized the World Health Organization’s (WHO) Package of Essential Noncommunicable (PEN) diseases initiative to integrate NCDs management at primary health care (PHC) settings across Bangladesh. However, the recent COVID-19 pandemic has stalled the progress of most health-related programs and interventions due to greater health systems focus on the pandemic. While the national NCDs control program is still at the implementation phase, morbidity and mortality associated with NCDs continue to rise. Moreover, the mainstream NCDs control program does not provide particular emphasis on improving access to NCDs-related health services for women, particularly in underserved areas.

In Bangladesh, RMNCAH services are provided through a network of government health facilities and CHWs (Figure 1).

**Household level:** When the CHW visits a household for delivering routine reproductive health services and counseling (antenatal care, postnatal care, family planning), she will also screen for specific NCDs risk factors such as high blood pressure, blood glucose level and BMI. Besides women of reproductive age, she (CHW) will also screen adolescent girls and older women in the household and counsel on how to maintain a balanced diet and physical activity depending on the life-stage of the woman. If any risk factor is identified, she will refer the woman to the nearest healthcare facility for further evaluation (Figure 1).

**Primary health facilities:** The primary health facilities include community clinics (CC), union health and family welfare centre (UHFWC), union subcentre, upazila health complex (UHC). When a woman first visits the nearest primary health facility, she will be screened for NCDs risk factors. Women with risk factors such as high blood pressure and/or blood glucose will be referred to the secondary health facilities for further evaluation and management and will be counseled about her NCDs risk factors and how it can affect her now and in the future. Pregnant women with high blood pressure and/or high blood glucose levels require frequent follow-up and close monitoring and require facility delivery. In many cases, caesarean section maybe necessary. The woman’s family will also be counseled on such issues (Figure 1).

**Secondary health facilities:** Secondary public health facilities include district hospitals (DH), maternal and child welfare centers (MCWCs). In several DHs, there are NCDs corners dedicated to evaluate patients with NCDs risk factors. After being referred from the primary facilities, the patient will be further evaluated at the secondary health facility and if available, treatment will be provided. Patients with moderate to severe risk factors who are not manageable at the secondary level, will be referred to the tertiary level government facilities (Figure 1).

**Tertiary level health facilities:** Tertiary health facilities include medical college hospitals and specialized institutes for NCDs management. National level specialized institutes for NCDs management are National Institute of Cardiovascular Diseases (NICVD), National Institute of Kidney Diseases & Urology (NIKDU), National Institute of Neuro Sciences & Hospital (NINH), National Institute Of Mental Health And Hospital (NIMH) among others. Patients with diagnosed NCDs, who require better management will be referred to the tertiary level. Laboratory tests will be conducted as necessary along with more advanced treatment advice and counseling from specialist physicians. Patients with severe and/or complicated conditions will be referred to specialized institutes for higher level management. Once the patient returns to the community after treatment, the CHW will follow-up on the patient at regular intervals (Figure 1).

**Implications for policy and practice**

RMNCAH programs designed across the reproductive life-cycle of women are strongly positioned to play a crucial role in NCDs prevention. Several existing reproductive health services and counseling contribute to NCDs prevention, such as promotion of balanced diet during pregnancy, promotion of optimal breastfeeding practices. Existing activities can be slightly expanded to incorporate an NCDs prevention focus, which will reduce costs and pluralism. CHWs can screen adolescents and older women for NCDs risk factors during household visits thus broadening their scope of work. This would be a critical step to focus on women who are not in their reproductive age and are currently overlooked. However, a criticism of the model proposed in this paper is the existing workload and capacity of CHWs. In Bangladesh, CHWs are tasked with multiple responsibilities, largely RMNCAH services and activities. Adding more tasks to their existing workload would require additional capacity building and resources. A possible solution would be to employ additional CHWs, particularly in hard-to-reach areas and/or to increase the wages for existing workers.
In Bangladesh, a multisectoral approach is necessary to support a sustainable initiative for NCDs control across the life-course for both women and men. For example, the education sector could emphasize on promoting healthy food and physical education at schools. The food industry and the media can come together to commercialize healthier food options for children and adolescents. The ministries of health and family planning can work together to integrate NCDs screening measures within the existing RMNCAH activities. Community-based organizations can work in collaboration with farmers in utilizing local agricultural resources to make nutritious food available to poor women at a reasonable cost.

Figure 1. Model for integrating NCDs-related services to existing RMNCAH service delivery structure.
Thus, engaging all relevant stakeholders can help provide accessible, timely and cost-effective NCDs control services for women in Bangladesh.\(^{51}\)

**Conclusions**

The rising burden of NCDs in Bangladesh and the fact that it disproportionately affects women calls for shifting health systems priorities. NCDs among mothers means an intergenerational cycle of NCDs risk factors leading to increased morbidity and mortality among future generations. Bangladesh has achieved exemplary success in providing RMNCAH services for women residing in rural and remote communities. To achieve success in NCDs control, the government could consider the service delivery model proposed in this paper and similar models implemented in other LMICs. This can have multiple benefits such as cost containment, reducing redundancy and pluralism in health services, preventing loss-to follow-up and reaching the most vulnerable and underserved populations. A multi-sectoral life-course approach to NCDs management can potentially reduce half of the morbidity and mortality due to NCDs. The intergenerational impacts are anticipated to be even greater. Further research should focus on piloting of diagonal NCDs-RMNCAH service delivery model for women in rural Bangladesh and if found feasible, such interventions should be recommended for scale-up.

**Data availability**

No data are associated with this article.

**References**


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