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Maternal and Child Health in Borgne, Haiti: An Example Complete-care

In low and middle income countries (LMICs), the health of poor, young mothers is a critical barrier to improving child health. Combined, preventable maternal disorders account for the highest mortality rate among women aged 20-24, and the fourth highest mortality rate among 15-19 year olds in LMICs[1]. Certainly, children of mothers with improved access to modern healthcare services are more likely to survive into adulthood than those whose mothers are poorly educated and lack access to medical care[2, 3, 7]. Inaccessibility of healthcare services due to inability to accommodate user fees and cost of transportation represent individual financial barriers to achieving maternal health and child health in LMICs[2]. Only through subsidized intrapartum-care strategies that nurture breastfeeding, minimize micro-nutrient deficiency and eliminate financial barriers to poor women's access to healthcare will child health improvement be complete.

Internationally, commitment to halving the burden of disease among mothers and children was institutionalized in 2001 by the agreement of Goals 4 and 5 of the Millennium Development Goals (MDGs)[3]. Commitment to the health of all age groups was reaffirmed in 2015 with the adoption of the Sustainable Development Goals (SDGs)[4]. In the last 25 years, reduction of under-five mortality rates from 91 deaths per 1,000 live births in 1990 to around 43 in 2015 illustrates legitimate international improvement of child health[5]. However, international neglect of maternal health remains. Specifically, in most LMICs maternal undernutrition ranges at 10-19%[3]. Furthermore, available evidence argues that user fees and context-dependent transportation requirements restrict young women's access to healthcare services in LMICs[2]. Put together, improvements in maternal health necessitate improving maternal nutrition and removal of context-dependent financial barriers to healthcare access.

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[1] Mokdad, Ali H., et al. "Global burden of diseases, injuries, and risk factors for young people's health during 1990–2013: a systematic analysis for the Global Burden of Disease Study 2013." *The Lancet* 387.10036 (2016): 2383-2401.

[2] Bhutta, Zulfiqar A., Jai K. Das, Arjumand Rizvi, Michelle F. Gaffey, Neff Walker, Susan Horton, Patrick Webb, Anna Lartey, and Robert E. Black. "Evidence-based interventions for improvement of maternal and child nutrition: what can be done and at what cost?." *The lancet* 382, no. 9890 (2013): 452-477.

[3] Black, Robert E., Lindsay H. Allen, Zulfiqar A. Bhutta, Laura E. Caulfield, Mercedes De Onis, Majid Ezzati, Colin Mathers, Juan Rivera, and Maternal and Child Undernutrition Study Group. "Maternal and child undernutrition: global and regional exposures and health consequences." *The lancet* 371, no. 9608 (2008): 243-260.

[4] Mokdad, Ali H., et al. "Global burden of diseases, injuries, and risk factors for young people's health during 1990–2013: a systematic analysis for the Global Burden of Disease Study 2013." *The Lancet* 387.10036 (2016): 2383-2401.

[5] Unicef. *Committing to child survival: a promise renewed*. eSocialSciences, 2015.

Achieving MDG Goal 1 "to halve between 1990 and 2015 the proportion of people who suffer from hunger" remains critical to improving maternal health following 2015[6]. Convincing evidence suggests that fetal and cognitive development, along with neonatal survival, is improved if mothers are well nourished and breastfeed[7,8]. At various times during fetal development, maternal micronutrient deficiency undermines the long-term cognitive ability of the child. In Nepal, children whose mothers received iron or folic acid supplementation during pregnancy scored better on multiple tests of intellectual, executive, and motor function compared with placebo controls.[8] Largely mediated by immunoglobulins, cytokines and other antimicrobial agents in breast milk, breastfeeding contributes to neonatal immunity against several viruses, bacteria and protozoa[9]. In LMICs about half of all diarrhea episodes and a third of respiratory infections would be avoided by breastfeeding[10]. Furthermore, exclusively breastfed infants have only 12 per cent of the risk of death of those who are not breastfed [10]. Breastfeeding is also consistently associated with higher performance in intelligence tests in children and adolescents with 2.6 intelligence quotient points adjusted for maternal intelligence [10].

User fees and transportation costs remain barriers to maternal health improvement. In principle, user fees are enforced through utilization of health services in order to ensure "proper use of the referral system, improve quality of care, and reduce frivolous demand for care."[2] Consequently, "where fees are elicited for maternal health services, households pay a substantial proportion of the cost of provision of facility-based services,"[11] which can amount to an "excess of 10% of yearly household income"[12]. Transport costs are a second costly barrier to maternal healthcare access. In Tanzania and Nepal, transportation can cost almost half of the total expenditure for a normal delivery; and 25% for a complicated delivery[2]. Consequently, "total

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[6] DESA, UN. "Official list of MDG Indicators." *UN Department of Economic and Social Affairs—Statistics Division: New York, NY, USA* (2008).

[7] Filippi, Véronique, Carine Ronsmans, Oona MR Campbell, Wendy J. Graham, Anne Mills, Jo Borghi, Marjorie Koblinsky, and David Osrin. "Maternal health in poor countries: the broader context and a call for action." *The Lancet* 368, no. 9546 (2006): 1535-1541.

[8] Cusick, Sarah E., and Michael K. Georgieff. "The role of nutrition in brain development: the golden opportunity of the "first 1000 days"." *The Journal of pediatrics* 175 (2016): 16-21

[9] Chirico, Gaetano, Roberto Marzollo, Sheila Cortinovis, Chiara Fonte, and Antonella Gasparoni. "Antiinfective properties of human milk." *The Journal of nutrition* 138, no. 9 (2008): 1801S-1806S.

[10] Victora, Cesar G., Rajiv Bahl, Aluísio JD Barros, Giovanny VA França, Susan Horton, Julia Krasevec, Simon Murch, Mari Jeeva Sankar, Neff Walker, and Nigel C. Rollins. "Breastfeeding in the 21st century: epidemiology, mechanisms, and lifelong effect." *The Lancet* 387, no. 10017 (2016): 475-490.

[11] Ensor, Tim, and Jeptepkeny Ronoh. "Effective financing of maternal health services: a review of the literature." *Health Policy* 75, no. 1 (2005): 49-58.

[12] Ranson, Michael Kent. "Reduction of catastrophic health care expenditures by a community-based health insurance scheme in Gujarat, India: current experiences and challenges." *Bulletin of the World Health Organization* 80, no. 8 (2002): 613-621.

(travel and waiting) time costs were estimated at 9-14% of total household expenditure for a delivery in Nepal and 65-93% in Tanzania"[2].

Taken together, concomitant deterrents of maternal health (chronic malnutrition and financial barriers to maternal healthcare services) and ignorance of the importance of breastfeeding necessitate a packaged intervention to improve child health. Robust evidence suggests that nutrient supplementation and births that occur at health facilities reduce maternal mortality "below 200 per 100,000 live births"[13]. Further, during the neonatal period, promotion of breastfeeding and proper maternal nutrition are recommended[14]. Thus, only through a subsidized, intrapartum-care strategy based in a health facility that nurtures breastfeeding, encourages family planning, minimizes micro-nutrient deficiency and eliminates financial barriers poor women's access to maternal healthcare services is child health improvement complete[15].

My experience working with a set of intrapartum-care programs that couples maternal healthcare subsidy and community advocacy in rural Haiti models the real-life application of a complete facility-based intrapartum-care strategy the improves child health. Health Education and Economic activities for Women (SEE Fanm) subsidizes healthcare services for pregnant women, and networks throughout the community to encourage breastfeeding, and advocate for the socio-economic empowerment of uneducated, poor women in Borgne, Haiti. This women's program was initiated in 2014 by the Borgne Health Alliance, in partnership with the Haitian Ministry of Health and Population, (ASB/MSPP) in Borgne in an effort to reduce maternal and child mortality in the community. Through funding from an international consortium of non-government organizations, SEE Fanm eliminates user fees, offering an array of subsidized maternal healthcare services that includes micronutrient supplementation. A network of *Animatris de Teren, "*women community leaders," hosts Mothers' Clubs, *reyinyon* in Haitian Creole, a series of community-based, mobile educational workshops. During *reyinyon*, female leaders encourage breastfeeding, facility-based childbirth and work to eliminate transportation barriers of healthcare access by leading the development of cost-sharing income generation initiatives like cattle cooperatives. In so doing, SEE Famn cultivates a pool of reproductively active, poor women with the financial security to accommodate transport costs associated with unforeseeable maternal healthcare needs.

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[13] World Health Organization. *The World Health Report 2005: Make every mother and child count*. World Health Organization, 2005.

[14] Gogia, Siddhartha, and Harshpal Singh Sachdev. "Home visits by community health workers to prevent neonatal deaths in developing countries: a systematic review." *Bulletin of the World Health Organization* 88, no. 9 (2010): 658-666.

[15] Campbell, Oona MR, Wendy J. Graham, and Lancet Maternal Survival Series steering group. "Strategies for reducing maternal mortality: getting on with what works." *The lancet*368, no. 9543 (2006): 1284-1299.

Before adolescent females in Borgne are eligible to participate in Mothers' Clubs, SEE Fanm offers them a series of family planning workshops called *AJ+*. This is a social literacy program that educates adolescent girls about reproductive healthcare concepts and career opportunities in the medical field. The goal of *AJ+* is to build a better community through civic engagement and educational opportunities that connect motivated learners to literacy and economic skill-development programs. Whereas the focus of the Mothers' Clubs is to encourage breastfeeding, hospitalization and socio-economic empower of pregnant women, *AJ+* begins to nurture healthy reproductive decisions among adolescent girls. Both programs are grounded in the same belief, that child health in the community is rooted in the health of the mother.

The establishment of the MDGs and SDGs marks an unprecedented, international effort to improve health, economic and environmental prosperity for the world's people and environment[16]. However, considered in combination, the significant deterrents of maternal health - chronic malnutrition, financial barriers of access to maternal healthcare services and ignorance of the importance of breastfeeding - necessitate a child health improvement strategy that subsidizes facility-based intrapartum-care for poor mothers. This strategy must encourage breastfeeding, ensure micro-nutrient supplementation and eliminate transportation barriers to accessing maternal care. The women's program, SEE Fanm, in Borgne, Haiti, models application of a complete facility-based intrapartum- care strategy to improve child health that could be used throughout the LMICs.

[16] Sachs, Jeffrey D. "From millennium development goals to sustainable development goals." *The Lancet* 379, no. 9832 (2012): 2206-2211.