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COMMENTARY

Emigration of skilled healthcare workers from developing countries: can team-based healthcare practice fill the gaps in maternal, newborn and child healthcare delivery?

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ABSTRACT

Background and Introduction: Emigration of healthcare workers from developing countries is on the rise and there is an urgent need for policies that increase access to and continuity of healthcare. In this commentary, we highlight some of the negative impacts of emigration on maternal and child health and discuss whether team-based healthcare delivery could possibly mitigate the shortfall of maternal and child health professionals in developing countries.

Methodology: We cross-examine the availability of supporting structures to implement team-based maternal and child healthcare delivery in developing countries. We briefly discuss three key supporting structures: culture of sharing, telecommunication, and inter-professional education. Supporting structures are examined at system, organizational and individual levels. We argue that the culture of sharing, limited barriers to inter-professional education and increasing access to telecommunication will be advantageous to implementing team-based healthcare delivery in developing countries.

Conclusion and Global Health Implications: Although most developing countries may have notable supporting structures to implement team-based healthcare delivery, the effectiveness of such models in terms of cost, time and infrastructure in resource limited settings is still to be evaluated. Hence, we call on usual stakeholders, government, regulatory colleges and professional associations in countries with longstanding emigration of maternal and child healthcare workers to invest in establishing comprehensive models needed to guide the development, implementation and evaluation of team-based maternal and child healthcare delivery.

Key words: Emigration • Skilled health workers • Developing countries • Maternal and child health • Newborn •Team-based health care

1. Introduction

1.1. Effects of emigration on maternal, newborn and child health

The backbone of any health system is its healthcare workforce. This is no different in the provision of healthcare services for maternal and child health (MCH). The current shortage of trained healthcare professionals due to emigration is a critical limitation to the improvement of maternal, newborn and child health in developing countries. In this commentary, we ask whether team-based healthcare delivery with non-physicians having expanded scopes of practice could possibly mitigate the shortfall of maternal and child healthcare professionals in developing countries.

Emigration of healthcare workers is among the two main sources of shortage of MCH professionals in developing countries.[1] Generally speaking, the tendency to migrate to higher economic countries is due to a search for better wages and working conditions. Consequently, low-income Sub-Saharan African countries are the most affected (Figure 1).[2] Although very little is known about the proportion of the active healthcare workforce that emigrates yearly from these Sub-Saharan African countries, evidence in receiving countries like the United States suggests emigration is an important source of healthcare worker shortage (Figure 2). A notable observation is that of the decreasing emigration of doctors from Madagascar and South Africa. Interestingly, the emigration of doctors from Africa to the United States was highest in French speaking African countries such as Benin, Ivory Coast, and Senegal.[3] Healthcare worker shortage is among the key factors often associated with negative maternal, newborn and child health outcomes in developing countries.[4,5] For example, after controlling for per capita income, female literacy and absolute income poverty in 85 low-income and lower-middle income countries, Anand and Bärnighausen found that doctors, nurses, and midwives together significantly lower maternal, infant, and under-five mortality.[6] Likewise, Kruk and colleagues showed that nurses and doctors were significantly associated with utilization of skilled birth attendants and measles immunization rates in several developing countries. However, they highlighted the potential role of other healthcare professionals such as community health workers in providing a substantial proportion of health services.[7] In a nutshell, shortage of health professionals reduces the quality of care and the number of health services available to mothers and their children.

We recognize that increased emigration of health workers can also impact continuity of healthcare received by mothers and their children in both source and destination countries. However, in this commentary we focus on the impact of increased emigration on continuity of healthcare in source countries (mostly low-income nations). In infants, continuity of care has been previously associated with reduced neonatal intensive care admissions, increased birth weights, reduced rheumatic fever incidence and adherence to immunization.[8] Likewise, significantly reduced caesarean sections rate and higher likelihoods of delivery without interventions have been associated with women who see the same midwifery team during their prenatal period.[9] A randomized trial had shown that, women whose hospital maternity care was provided by a team of four midwives over a 2-year period were associated with greater care continuity at all levels [10] They spent less time at antenatal clinics, and felt more satisfied and well-prepared for child care than those who received care from non-team based healthcare practitioners.[10] Patient satisfaction is an important indicator of care continuity and is commonly associated with healthcare provider's technical competence and commitment to patient care. Emigration of committed and competent maternal and child healthcare providers oftentimes leads to patient dissatisfaction and consequently discontinuity of care

1.2. Policies used to mitigate the global shortfall of health professionals

Thus far, in developing countries with increasing emigration of health workers, especially low-income Sub-Saharan African countries, "train and retain" policies have been suggested to mitigate the short fall of health professionals.[11] The high physician emigration rates from poor nations as seen in Figure 1 and 2, calls for alternative policies

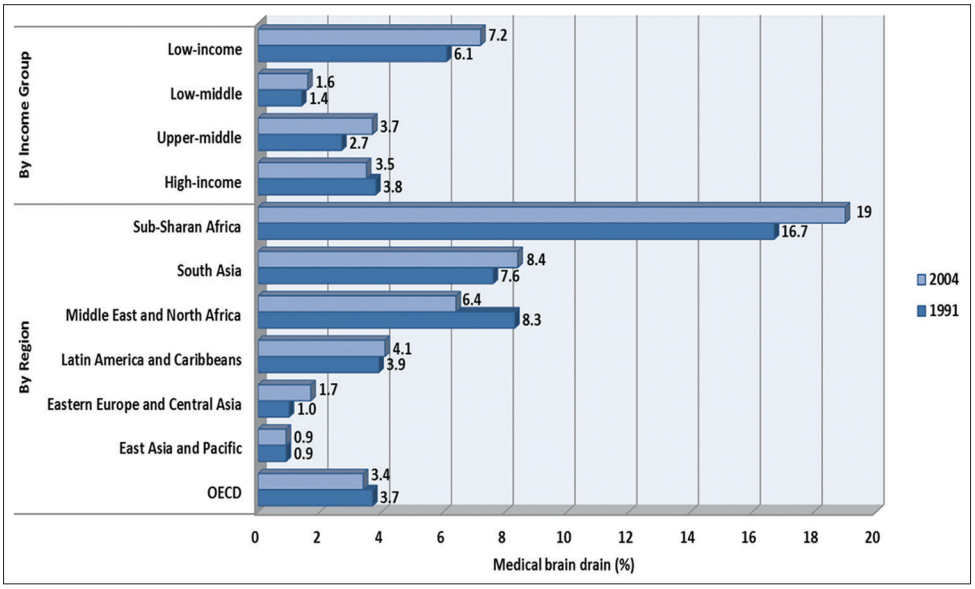

Figure 1: Medical brain drain by region and income group in 1991 and 2004, data source.[2] Note: Medical brain drain is defined as the proportion of physicians trained in their country but employed abroad

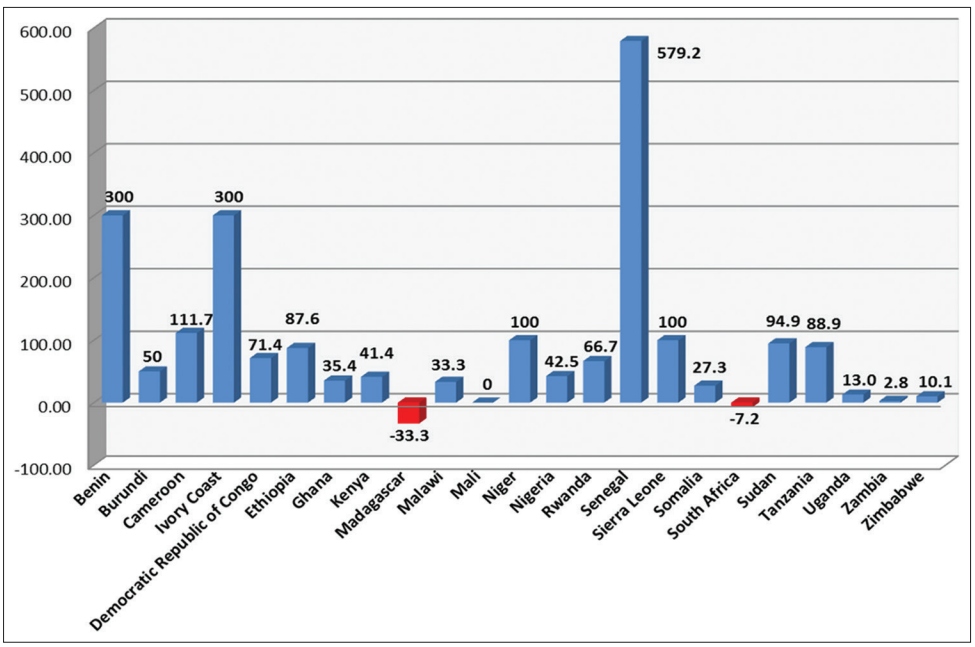

Figure 2: Percentage change in the number Sub-Saharan African educated international medical graduates in the United States of America between 2005 and 2015, data source.[3]

such as expanding scopes of practice of non-physician healthcare providers. The literature on international migration of health workers suggest financial (e.g. offer of higher remuneration) and non-

financial (paths for career/professional development) incentives to reduce the emigration of health workers, particularly from poor to rich nations.[12] Concerning financial incentives, two studies analyzed the role of earnings differentials between source and destination countries and report contrary results. While Vujicic et al. reported that no plausible increase in domestic earnings can reduce the out-flow of health professionals from source countries, Antwi and Philips found that increasing domestic earnings or giving rewards for staying and implementing salary supplements were effective policy options that can mitigate emigration of health professionals.[13,14]

Managed migration such as WHO's Global Code of Practice has also been proposed as part of the solution to mitigate the shortfall of healthcare workers in developing countries.[15,16] However, given that migration of health workers is inevitable and partly related to globalization and individual's rights to mobility, managing migration has proven to be a daunting task. Thus, leveraging existing human resources by means of inter-professional teams (team-based practice), as defined below, is warranted and more so in developing countries experiencing increased emigration and challenges in delivering maternal and infant healthcare. We argue that, if well-developed and implemented, inter-health professional team delivery presents a viable strategy to consolidate policies that are being utilized to mitigate the shortfall of maternal and child healthcare workers in developing countries.

2. Opportunities For Team-Based Care Delivery

2.1. Can inter-health professional team-based delivery improve MCH outcomes?

In an era of global emigration, we sought to answer if team-based healthcare delivery with expanded scopes of practice for non-physician care providers can improve maternal, newborn and child health in developing countries. The World Health Organization defines team-based practice in healthcare as occurring "when multiple health workers from different professional backgrounds work together with patients, families, caregivers and communities to deliver the highest quality of care" [17] This model makes use of inter-disciplinary teams such as pharmacists, midwives, nurses, community health workers and physicians to coordinate and improve health outcomes and patient satisfaction.

In certain jurisdictions of developed countries such as Canada, Nurse Practitioners (NP) are given an extended scope of practice. In Ontario, for example, operating on a team-based approach, NP-led clinics can provide primary healthcare in areas that include healthy living, health education, disease diagnosis and treatment, and injury management. In these NP-led clinics physicians assume more of a consultant role [18] Likewise, in order to improve quality and access of healthcare, community centered family health teams, that may consist of family physicians, registered nurses, registered dietitians, nurse practitioners, social and community workers, provide primary healthcare to remote communities with physician shortages, and patients with special health needs.[19] Similar inter-health professional delivery models are operational in countries such as Australia and the United Kingdom.[20,21]

There is growing evidence suggesting the usefulness of team-based healthcare delivery in improving health outcomes in various clinical settings [22,23,24,25] For example, compared to usual care, diabetes mellitus patients managed by a physician-pharmacist team were more likely to achieve their target low-density lipoprotein cholesterol (78% vs 50%; P = .003). [22] Similarly, patients randomized to hypertension team-based management achieved significantly lower systolic ($p = 0.007$) and diastolic ($p = 0.002$) blood pressures; compared to usual primary care, 62% of intervention group achieved the targeted blood pressure ($p = 0.003$).[23] More importantly, nurse-led team-based models have also proven to result in greater efficiency and cost-effectiveness in inpatient medical units, cardiovascular screening, rapid response teams, and fall prevention.[26,27,28,29] Given that midwives and registered nurses are key maternal and child primary healthcare providers within remote communities of most developing countries, benefits of implementing team-based maternal and child healthcare delivery, within the context of expanded scopes of practice, could include decreased workloads and

increase job satisfaction for physicians and nurses, respectively. Training more nurses and midwives to take on leading roles in team-based models could fill a vacuum created by the mass emigration of physicians. In which case, the few doctors remaining in source countries would be left to attend to more complex care. Furthermore, given that maternal and child healthcare needs can rarely be met by a single professional, integration of inter-health professional delivery team models in developing countries presents the possibility of increasing patient satisfaction and consequently continuity of maternal and child healthcare. Implementing team-based healthcare models could possibly also reduce hospitalization rates and cost of healthcare delivery.

2.2. Availability of supporting structures to implement team-based health care

Inter-professional healthcare models have demonstrated increased effective organizational and system outcomes such as improved access to care, improved quality indicators, reduced admission rates, length of stay and healthcare delivery costs in a variety of healthcare settings. Its usefulness has been demonstrated in the management of pregnant women with HIV/AIDS, diabetic, musculoskeletal and primary care.[30,31,32,33,34,35] Hence, team-based approach to care provision with expanded scopes of practice for health care professionals such as registered nurses, midwives, pharmacies, etc. could yield high quality, effective and sustainable maternal and infant care provision. Despite the obvious promise of team-based healthcare delivery models which include decreased workloads and increase job satisfaction for physicians and nurses, implementing such models in developing countries requires the necessary supporting structures. In light of examining supporting structures and potential barriers that need to be addressed in developing countries, we reference the best practice guidelines for inter-professional healthcare developed and published by the Registered Nurses' Association of Ontario (RNAO).[36] We briefly discuss three key supporting structures: culture of sharing, telecommunication, and inter-professional education. We examine supporting structures at system, organizational and individual levels.

2.3. System level determinants of team-based health care delivery

Team-based practice requires a good understanding of communities' culture and perceptions of collaborative practice.[37] Culture refers to a way of life, behavioral pattern, and values of a people. In order to maximize limited resources, communities in less-developed countries tend to live interdependently, developing a culture of sharing. The cultural context where people living in communities support each other in their daily living is advantageous for implementing team-based MCH delivery models. Favorable system level sociocultural determinants among system level stakeholders (e.g., government health regulators, funding bodies, regulatory colleges and professional associations) in resource strapped nations include empathy for one another, family esteem and respect for the elderly, easy approachability and adaptability etc.

Increased access to telecommunication and information technology, especially in remote areas, is very vital for implementing team-based MCH delivery models in developing countries. Although at infancy, telecommunication coverage in continents like Africa is fast growing. Between 2002 and 2007, Africa saw a 49 percent annual increase in mobile phone subscriptions.[38] In 2014 it was estimated that 70 out of every 100 persons in Sub-Saharan Africa (developing countries only) have mobile phone subscriptions.[39] Between 2004 and 2014 the number of internet users in Sub-Saharan Africa (developing countries only) went from 1.6 to 19.6 per 100 persons.[40] Current advances in telecommunication and health information systems can make access to vital individual (e.g., medical diagnosis and demography) and organizational (e.g., disease prevalence and practice guidelines) healthcare information instantaneous. Nonetheless, we note the need for organizational healthcare information systems to be more inter-operable in order to enhance exchange and processing of medical information. However, information privacy guidelines and legislations that allow safe exchange of medical information must first be implemented by necessary system level stakeholders. Legislations that govern the use and sharing of confidential

medical information are necessary requirements for developing and implementing team-based MCH delivery models in developing countries.

Mickan and colleagues also highlighted inter-professional education as being vital for implementing team-based healthcare delivery[37]. System level educational components necessary to implement collaborative practice in developing countries include institutional engagement between key stakeholders such as training colleges and ministries of health, to develop remuneration models and policies that promote inter-professional education and at local and national levels. Most developing countries are deficient in policies and remuneration models that support inter-professional education, e.g. funding for public training institutions to accommodate increased training for healthcare professionals other than physicians to expand their scopes of practice.

Other important system level considerations include legislations that grant expanded scopes of practice (e.g. prescribing powers) and migration policies [36] Furthermore, we note that many developing countries do not have universal healthcare systems that are financed through tax revenues such as in Canada and other developing nations, but depend on a "cash and carry system" (or pay as you go) for healthcare needs.

2.4. Organizational level determinants of team-based health care delivery

Consistent with a culture of sharing and maximizing limited resources, organizational (e.g., hospital, clinic, nursing home, training collages) sociocultural values in developing countries provide the right environment for fostering collaborative practice, e.g. sharing limited work space and little tolerance for selfishness etc.

Current advancements in information technology and telecommunication in developing countries can provide a supportive organizational platform for team-based care. For example, the recent invention and usage of technological equipment such as the CardioPad in Cameroonian hospitals is anticipated to revolutionize care delivery especially in rural areas. The CardioPad is a device that allows healthcare workers in remote areas to perform cardiac tests and share patients' cardiograms with cardiologists in urban cardiology centers via mobile connections.

Inter-professional education in the context of this commentary covers the availability of educational resources/guidelines for implementing collaborative patient-centered healthcare. Organizational level educational resources necessary for implementing team-based healthcare include the availability of evidence-based recommendations for: a) care expertise; b) shared power; c) collaborative leadership; d) optimizing profession role and scope; e) shared decision making; and f) effective group functioning. However, organizations would need to develop standards and performance indicators for inter-professional care and support it through enhanced communication.

2.5. Individual/ team level determinants of team-based health care delivery

At an individual/team level (e.g., health care professionals and family members), we hypothesize that a greater majority of healthcare workers and community members in developing countries have a correct perception (culture of sharing) of collaborative practice. As expected, a cross-sectional study conducted among randomly selected health professionals in Ethiopia found that 70.0% of all respondents showed a willingness to share their knowledge and experiences[41]. As previously mentioned, increased access to telecommunication and information technology in developing countries will facilitate exchange of medical information between patients and organizations e.g., hospital, clinic, nursing home and training collages.

In order to implement team-based maternal and child healthcare delivery in developing countries, healthcare workers ought to have a good mastery of effective communication, teamwork, their own professional identity and the roles of other professionals, negotiation and conflict resolution. In 2011, Tanzanian based Muhimbili University of Health and Allied Sciences (MUHAS) restructured its curriculum to include competencies for working collaboratively. One of the six competency modules shared by trainee dentists, doctors, environmental health officers, nurses, and pharmacists focused on

relationships with colleagues.[42] During a MUHAS pilot study exercise, four inter-professional teams interviewed and developed treatment plans for mothers and neonates in the Bagamoyo District Hospital.[42] Teams integrated and respected the knowledge and experience of team members and together formulated more comprehensive management plans. Their pilot study demonstrated good prospects for implementing team-based delivery models in developing countries such as Tanzania with shortages of maternal and child healthcare workers. Although most developing countries may have little to no inter-professional educational structure necessary to equip individual health care professionals with inter-professional skills, Sunguya and colleagues found that, compared to 38 developed countries, there were fewer barriers to implementing inter-professional education in Egypt and Namibia.[43] Limited barriers to implementing inter-professional education could be vital for the actualization of team-based maternal and child healthcare delivery in developing countries.

3.Conclusion and Global Health Implications

From the onset we asked whether team-based healthcare delivery with non-physicians having expanded scopes of practice, could possibly mitigate the shortfall of health professionals in developing countries. We highlight negative maternal and child health outcomes associated with emigration. Team-based maternal and child health delivery offers a novel approach to mitigate shortage of health workers in developing countries with long-established emigration of health workers. Living interdependently in a social context is not new to most resource poor countries since that is part of their daily living. Building on "sharing cultures" and increasing access to telecommunication, will be advantageous to team-based healthcare delivery in developing countries. Despite first steps taken towards inter-professional education, [37,42,43] the majority of developing countries have little to no inter-professional education. Although most developing countries may have notable supporting structures to implement team-based healthcare delivery, the effectiveness of such models in terms of cost, time and infrastructure in resource limited settings is still to be evaluated. Hence, we recommend the following in order to develop and implementation team-based models in developing countries. First, in regards to the extent of medical brain drain, we call on local governments to record and make available data on the shares of the active healthcare workforce that emigrate yearly. Additionally, randomized controlled trials should be used to evaluate the efficiency and cost-effectiveness of team-based MCH delivery. Evidence based guidelines for implementing collaborative patient-centered healthcare should be developed. Lastly, we call on government, regulatory colleges and professional associations to implemented remuneration models and policies that promote inter-professional education and exchange of confidential medical information.

Compliance with Ethical Standards

Conflict of Interest: *All the authors declare that they have no significant competing financial, professional or personal interests.* ***Ethics Approval:*** *Study is based on an analysis of existing data.* ***Funding:*** *Authors did not receive any funding or sponsorship for this analysis.* ***Disclaimer:*** *Views expressed in this paper are the views of the authors and should not be taken to represent the views of the Global Health and Education Projects, Inc., Registered Nurses Association of Ontario, GlaxoSmithKline, or York University.* ***Acknowledgement:*** *This publication was fully supported by the Global Health and Education Projects, Inc. (GHEP) under the Emerging Scholar's Grant Program (ESGP) research publication award to Eta E. Ashu, PhD. This information or content and conclusions are those of the authors and should not be construed as the official position or policy of, nor should any endorsements be inferred by ESGP or GHEP.*

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