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CHAPTER ONE

General Introduction

General Introduction

1.1 Introduction

Maternal health, which refers to the health of women during pregnancy, childbirth and the postpartum period, has become one of scientists' and policy makers' most discussed health concerns. This is because, pregnancy and childbirth have a huge impact on the physical, mental, emotional, and socio-economic health of women, children and their families. Investing in maternal health not only improves a mother's health and that of her family, but also increases the number of women in the workforce and promotes the economic, human and social well-being of communities and countries. Lack of sufficient quality maternal care, for instance, accounts for 60% of neonatal deaths globally (2.8 million babies every year), 2.6 million stillbirths every year, and 800 maternal deaths worldwide each day [1,2]. The large majority of these deaths occur in low- and middle-income countries (LMICs). In Kenya, the country in which this thesis research took place, Maternal Mortality Ratio (MMR) is high with 362 maternal deaths per 100,000 live births; maternal deaths account for 14% of all deaths of women aged 15–49 years [3].

Maternal deaths arise from the risks attributable to pregnancy and childbirth as well as to the poor quality of care from health services. One of the commonly reported direct causes of maternal deaths according to the World Health Organization (WHO) is haemorrhage, which is the leading cause of more than 30% of maternal deaths in Latin America and Asia. Hypertensive disorders are among the main cause of maternal deaths in Latin America and the Caribbean. Other causes include HIV and AIDS, anaemia, obstructed labour, sepsis and unsafe abortion, among others [1,4].

Studies have further established that unbalanced nutrition, including restrictions on or excessive calorie consumption, or a lack of adequate micronutrient intake, can negatively affect reproductive health and even cause maternal death. Adequate nutrition is vital during pregnancy. At that time, a woman experiences rapid growth and changes in several areas, such as maternal tissues, enlargement of the uterus and breasts, increase in red blood cell mass, growth of the placental tissues and of the foetus, hence requiring adequate nutrition [5]. Adequate nutrition is also necessary to maintain the immune system, prevent opportunistic infections, optimise the response to medical treatment and sustain healthy natural body capacities for normal tissue growth, development and physical activity [5]. Inadequate nutrition during pregnancy can cause impaired cellular growth, which in turn leads to suboptimal maturation and possibly malformation of the foetus. This means that if a woman's diet lacks essential nutrients during pregnancy, it will have serious repercussions not only on her own health but also that of the foetus.

Inadequate nutrition during pregnancy is associated with complicated delivery that may lead to maternal death. Maternal anaemia, for instance, is associated with increased risks of postpartum haemorrhage (PPH) [6], which is the leading cause of maternal mortality worldwide, as mentioned above [4]. Undernourished pregnant women also suffer a combination of chronic energy deficiency and poor weight gain during pregnancy, which lead to low-birthweight babies [7,8]. Study findings also reveal that maternal nutritional deficiency may cause impaired placental development leading to intrauterine growth retardation (IUGR) and small-for-gestation-age (SGA) [6,9,10]. Premature rupture of membranes and premature delivery are also the side-effects of a pregnant woman's poorly nourished state [11].

On the other hand, excessive weight gain during pregnancy is associated with an increased prevalence of caesarean section and neonatal mortality, due to an increased rate of cephalo-pelvic disproportion/failure to progress during labour [12–14]. The rate of caesarean delivery is positively associated with postpartum antibiotic treatment and severe maternal morbidity and mortality, even after adjustment for risk factors [13]. These studies have further indicated that increase in the rate of caesarean delivery is also associated with an increase in foetal mortality rates and a higher number of babies being admitted to intensive care for seven days or longer even after adjustment for pre-term delivery. Rates of pre-term delivery and neonatal mortality are higher in caesarean delivery compared to normal delivery [13].

Children with IUGR and SGA status at birth are at risk for increased perinatal mortality, birth adaptation complications, including perinatal acidosis, hypoglycaemia, hypothermia, coagulation abnormalities, and certain immunologic deficiencies [15,16]. Statistically, there is a higher mortality rate for these infants, which is estimated to be 2.6 million per year globally [2]. IUGR infants also appear to be at great risk of complications of prematurity, including chronic lung disease and necrotising enterocolitis [16]. Childhood implications for IUGR include an increased risk of short stature (stunted growth), cognitive delays resulting in with depressed academic achievement, and a small but significant increased risk of neurologic disorders, including cerebral palsy [17]. Low socio-economic status is correlated with the occurrence of IUGR and is significantly related to long-term disabilities [17]. This means that a foetus born to a malnourished woman will not have the opportunity to build a strong foundation for growth, resulting in a child who is physically or mentally handicapped throughout the rest of its life, leading to the inter-generational cycle of malnutrition problems as indicated in Figure 1.1.

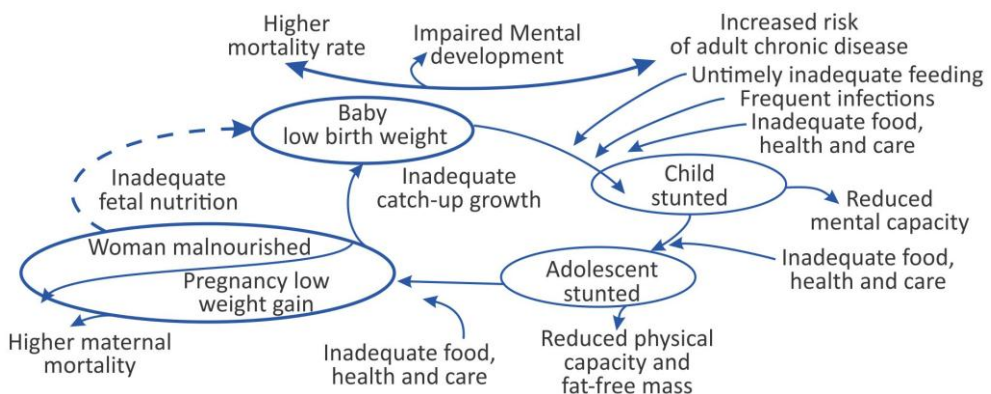


Figure 1.1 Consequences of Maternal Undernutrition (UNICEF 2014)

Malnutrition is a global challenge. Current estimates suggest that about 795 million people are undernourished globally [18]. This means that nearly one in nine individuals do not have enough to eat. The vast majority of them (780 million people) live in LMICs. In sub-Saharan Africa, projections for the period 2014–2016 indicate a rate of undernourishment of almost 23%. While the hunger rate has fallen, the number of undernourished people has increased by 44 million since 1990 [19]. The situation varies widely across the sub-regions. While Northern, Southern and Western Africa have witnessed significant reduction in numbers, in other countries high levels of under-nutrition, particularly stunting, have persisted for decades [19].

Kenya is also faced with high levels of undernutrition as indicated by 26% stunting and 4% wasting in 2014, rates that have hardly changed over the past two decades [4,5,6]. Available evidence further shows that iron deficiency among women is at 43%, of whom 70% are pregnant. Moderate to severe anaemia is high among pregnant women. In addition to the high levels of undernutrition, rapidly increasing levels of overweight/obesity have been observed, such that 25% of women of reproductive age are overweight or obese. The prevalence is even higher in urban areas where 40% of women are overweight or obese [22].

This situation means that investing in maternal nutrition is of utmost importance. This will not only improve maternal health but also improve the health of the next generation, and reduce economic challenges for families, communities, and health systems, hence breaking the inter-generational cycle of maternal malnutrition-associated problems.

1.2 Nutrition interventions aimed at pregnant women

Due to multiple long-term, inter-generational effects associated with maternal malnutrition, several interventions have been designed to improve the immediate (inadequate dietary intake as well as disease) and underlying (household food security, maternal and child care, health services and the environment) causes of malnutrition. *Nutrition education and counselling* is the most widely used strategy, approved by the WHO, to improve the nutritional status of women during pregnancy [23]. The strategy focuses primarily on: promoting a healthy diet by increasing the diversity and amount of foods consumed; promoting adequate weight gain through sufficient and balanced protein and energy intake; and promoting the consistent and continued use of micronutrient supplements, food supplements or fortified foods. Hence, counselling on healthy eating and keeping physically active during pregnancy is recommended for women, to stay healthy and to prevent excessive weight gain. In undernourished populations, nutrition education on increasing daily energy and protein intake is recommended for pregnant women to reduce the risk of low birth weight.

Studies have confirmed that with the effective implementation of and compliance with these interventions, maternal nutrition is improved. Available evidence suggests that nutrition

education and counselling may support optimal gestational weight gain (i.e. neither insufficient nor excessive), reduce the risk of anaemia in late pregnancy, increase birth weight, and lower the risk of pre-term delivery [24]. This will consequently reduce infant and child mortality, improve physical and mental growth and development, and improve maternal health and pregnancy outcomes [25–30].

Countries around the globe are therefore implementing the WHO-recommended interventions. In Kenya, the WHO-focused Antenatal Care (ANC) package was introduced as a pilot in 2001, as a component of the Safe Motherhood Initiative (SMI). The Kenyan model of Focused ANC (FANC) was developed using the WHO model and inputs from the Ministry of Health, especially the first Kenyan National Health Sector Strategic plan (1999–2004), and implemented within the framework of the Kenya National Reproductive Health Strategy (1997–2010) [31,32]. The programme goal was to provide a comprehensive and integrated system of reproductive health care that offers a full range of services by the government, Non-Government Organisations (NGOs) and the private sector. Among other functions offered by the FANC package, these include health education and counselling on nutrition and hydration, the detection of existing diseases and management of complications such as severe anaemia and diabetes, health promotion and disease prevention, and nutrition supplementation (the essential elements of this package are outlined in Table 2.1). In 2013, the Maternal Infant and Young Child Nutrition (MIYCN) programme was introduced, which is anchored in WHO's *Essential Nutrition Actions: Improving maternal, newborn, infant and young health and nutrition*. Most nutrition interventions aimed at pregnant women in Kenya are provided through health facilities. For this reason, the government has been exploring and implementing different strategies to increase access to health facilities for these intervention services in different ways including: building additional health facilities, improving rural road access and removal of user fees for pregnant mothers attending skilled ANC services [33].

However, despite the government's high-level commitment to maternal health and nutrition, and the proven efficacy of the WHO-recommended interventions, the intended outcomes and associated health indicators have been less successful than hoped in most LMICs, including Kenya. In Kenya, malnutrition indicators are not or are only slowly improving as indicated in Table 2.1 (see Chapter 2) and the country is currently among the 10 countries that account for the most neonatal deaths globally.

This is a clear indication that the government interventions are either barely effective or poorly provided in Kenya. Designing interventions that are effective under Randomized Controlled Intervention (RTI) conditions is only the first step towards improving the people's health and well-being. Translating effective programmes into real-world settings and sustaining them is a complicated, long-term process that requires dealing effectively with the successive, complex phases of programme diffusion and scaling up. Studies have shown that effective interventions, regardless of the success achieved during a demonstration period, typically yield diminishing returns, due to the failure to adhere faithfully to implementation

requirements [34–36]. Factors identified as affecting the implementation process in general, according to a systematic review by Durlak and DuPre [36], include community-level factors (e.g. politics, policy and funding), provider characteristics (efficacy, skill proficiency and perceived needs), characteristics of the innovation (compatibility with values and goals of the organisation and adaptability of the intervention to local needs), organisational capacity (work climate, practices and leadership), and factors related to the prevention support system (training and technical assistance to providers). In Kenya, many studies that evaluated the FANC package have blamed the lack of funding, equipment shortage and supplies, incompetent providers and unclear policy direction [31].

Therefore, when trying to implement health-promotion programmes on a wider scale, it is important to prepare the process thoroughly by studying and identifying the possible barriers, in order to develop and select strategies that can overcome such difficulties. This will not only lead to successful implementation but also outcome. Breitenstein et al., 2010, in their systematic review on adherence measures and outcomes, established that rigid adherence to the prescribed protocol might well lead to poorer outcomes and so suggested that practitioners need to have some level of flexibility and adaptability to meet local and individual needs depending on the population and different context. Adoption of new knowledge depends on how easily it can be integrated into existing knowledge systems [37]. A study by Olungah (2006) in western Kenya recommends that maternal health interventions should take into account the cultural arena in which pregnancy takes place rather than only concentrating on improvement of health facilities and the continued medicalisation of pregnancy and health care. Pregnancy, food and nutrition are cultural concepts and could be perceived differently based on a population's socio-cultural context and their everyday life experiences, and this undoubtedly can influence women's interpretation of and response to innovations [39,40]. Local knowledge is therefore an important consideration especially in rural communities where cultural beliefs are strongly entrenched.

Therefore, as programmes aim to promote various nutrition strategies, understanding local nutritional health knowledge systems and local conceptualizations of diet, illness and health is essential in order to formulate efficient and adoptable messages and implementation strategies. In the anthropological literature, knowledge of a culture or society is often referred to as *emic*, while outside or scientific knowledge is considered *etic*. In this study, *local knowledge* is defined as knowledge held by local people (this term is often used synonymous with *traditional knowledge*, which we have chosen not to use because of the implied dichotomy between *traditional* and *modern*)[41]. Although there are some studies in Kenya and other LMICs studying local knowledge regarding maternal nutrition and health, there is little focus on how local knowledge influences implementation fidelity of maternal nutrition intervention strategies [42–48].

1.3 Aim of the thesis

The aim of this thesis is to assess implementation fidelity of maternal nutrition intervention strategies aimed at pregnant women in rural Kenya as well as to understand local knowledge regarding maternal nutrition and health and its influence on health-seeking behaviour. This thesis brings in the analytical and integrative perspectives of constructivists and memetic theories in understanding the cognitive basis of the different emic explanatory models of maternal nutrition and health, and consequently adoption of interventions (see Chapter 2). These insights will inform recommendations to improve maternal nutrition intervention strategies.

The regional focus of this thesis is rural Kenya. The Kalenjin community of Uasin Gishu County, Kenya was the case for this study although illustrations are drawn from other countries in Africa and beyond. Detailed information on the study context and ethnographic information about the Kalenjin are presented in Chapter 2.

1.4 Outline of the thesis

Chapter 1 presents general introduction and aims of this thesis. **Chapter 2** describes the contextual and theoretical background of this study. **Chapter 3** introduces the main research questions addressed in this thesis and the research design that was adopted in answering the various research questions. **Chapter 4** presents implementation fidelity of biomedical nutrition interventions in Kenya. Barriers to implementation fidelity are also presented in this chapter. As the principal nutrition interventions are provided as part of ANC services, their success will depend on appropriate ANC services attendance. Hence, factors influencing early and differentials in frequency of access to ANC services are analysed and discussed in **Chapter 5**. **Chapter 6** presents an empirical study on how local cultures conceptualise adverse pregnancy outcomes associated with maternal malnutrition and how these cultural conceptualisations influence women's nutrition and health-seeking behaviours. **Chapter 7** outlines the frequency of the local foods that are culturally recommended or restricted for consumption by pregnant women. The various reasons for food restrictions or recommendations are also outlined and described in detail. **Chapter 8** offers an analytical interpretation of the underlying reasons for food restrictions and recommendations during pregnancy and how these are likely to influence the nutritional behaviour of pregnant women. Finally, **Chapter 9** presents the summary of the research results, discussions and recommendations for policy implementation and further research.

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