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Riang'a, R.M.

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CHAPTER TWO

Contextual and Theoretical Background

Contextual and Theoretical Background

In the previous chapter, it was established that despite the fact that biomedical maternal nutritional care is usually provided free of charge as part of routine ANC in health facilities, access to and compliance with these interventions have not been achieved globally, particularly in many LMICs, including Kenya. In this chapter, more detailed baseline information is given about the causes of maternal malnutrition, global and local interventions, from both the biomedical and ethno-medical perspectives. The chapter concludes with a theoretical framework and a summary of the literature review findings.

2.1 Maternal malnutrition and health implications: Biomedical perspectives and interventions

2.1.1 Malnutrition

According to the UNICEF conceptual framework of malnutrition [1], as modified by Black et al. [2], the immediate causes of undernutrition are a lack of dietary intake and disease (see Figure 2.1). This can be due to consuming too few or excess nutrients or an infection which can increase requirements and prevent the body from absorbing those consumed.

Whether or not an individual gets enough food to eat or whether s/he is at risk of infection is mainly the result of factors operating at the household and community level. Within the UNICEF framework, these are classified as underlying causes. They can be grouped into three broad categories: household food insecurity, inadequate care or unhealthy household environment, and lack of health services (poor public health). These are often referred to as “food”, “care” and “health” factors. Their causal factors include: poor public health, poor caring practices, income poverty, quantity and quality of food accessed, conflict, or sudden flooding, drought or an earthquake. Yet, even when there is abundant food available in the household, it may not be accessible to certain members if they are restricted due to gender and other inequalities or nutritional beliefs. In practice, there is a significant overlap in the three groups of underlying causes of malnutrition.

For women in sub-Saharan Africa, the environmental and economic conditions place an extra burden on their nutritional status. Pervasive poverty affects the quality of their diet, their heavy workload increases their nutritional requirements, frequent and short reproductive cycles often leave them moving from one pregnancy to the next without adequately replenishing the body’s nutrient stores [3]. It is estimated that 41.8% of pregnant women worldwide are anaemic [4], and that at least half of this anaemia burden is assumed to be due to iron deficiency, with the rest due to other conditions such as folate, vitamin B12 or vitamin A deficiencies, chronic inflammation, parasitic infections, inherited disorders and

short birth intervals [5]. A pregnant woman is considered to be anaemic if her haemoglobin concentration during the first and third trimester of gestation is lower than 11 g/dl¹, at sea level.

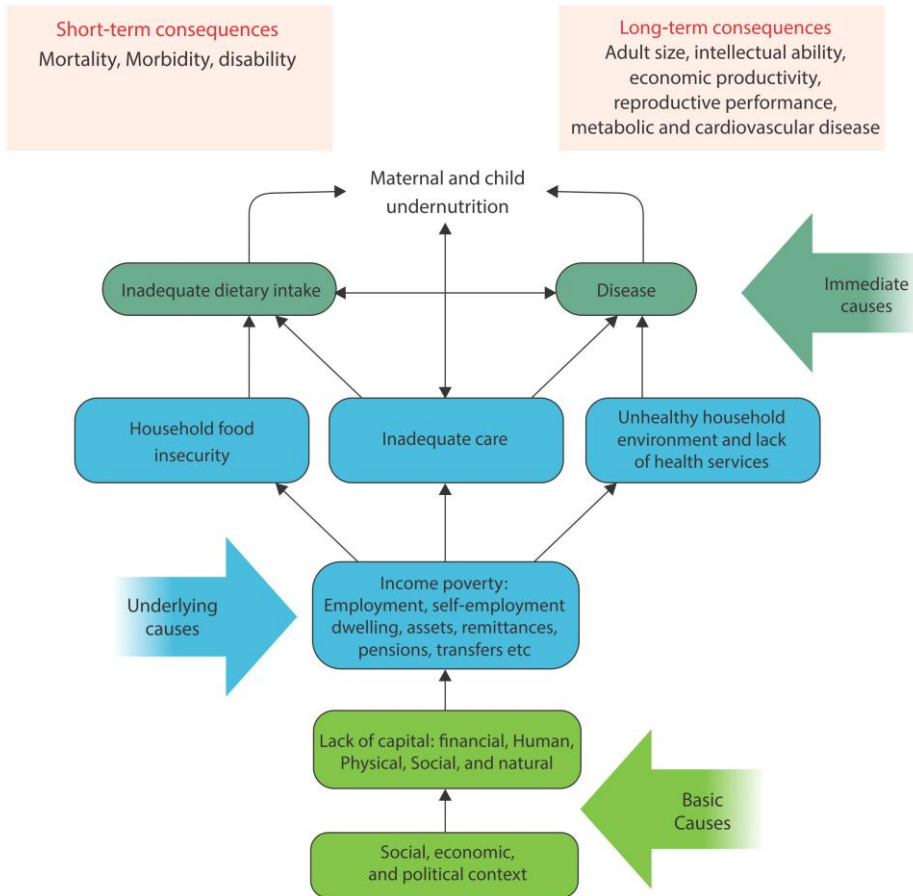


Figure 2.1 Framework of relations between poverty, food insecurity, and other underlying and immediate causes of maternal and child undernutrition and their consequences (Black et. al., 2008)

Food and nutrition security status in Kenya

Kenya, where the case for this study was selected, is home to more than 40 million people, 68% of whom live in rural areas and rely almost entirely on agriculture for their livelihood [6]. Agriculture is the backbone of Kenya's economy and a major contributor to the domestic food supply. Unfortunately, less than 20% of Kenya's land is suitable for agricultural production. Furthermore, agricultural production in Kenya heavily depends on rainfall, whose

¹ Gram per deciliter

patterns are unpredictable and heavier at times [7]. Due to persistent droughts and floods agricultural productivity has been stagnating [7]. Furthermore, the current trend of climate change will heavily impact Kenya's agricultural output and nutrition security in the future.

Kenya has one of the world's highest rates of population growth; the population has tripled in the past 35 years, straining the country's resources [12–13]. Similarly, since the legalization of multiparty politics in 1990, politically motivated ethnic conflicts have frequently been experienced in Kenya, mostly after the national elections [8]. The last and severest ethnic violence was witnessed in 2007–2008 following the contested presidential election result that was mainly divided between Kalenjin and Luo on one side and Kikuyu on the other. During this time, over 1,200 people were killed and 300,000 displaced, especially in Kenya's Great Rift region, where the case for this study was taken and where Kenya's farm produce mainly comes from [9]. These conflicts often increase food and nutrition insecurity in the country by affecting food availability as well as accessibility and utilization of food. Lack of good governance and political will, which is common in Kenya, has also hindered the government from providing basic social and health services and decent living conditions in some regions, especially rural and urban slum areas, thus worsening nutritional security [10]. All these factors have contributed to high costs of domestic food production and low purchasing power among families. As a result, Kenya continues to face severe food insecurity and overreliance on foreign food aid, leaving women and children in particular vulnerable to poverty and malnutrition.

On the other hand, Kenya has experienced a marked transition in dietary patterns over recent decades (e.g. shifts to energy-dense diets high in saturated fat, sugar, and refined foods, and away from plant-based diets) due to rapid economic development encompassing urbanization in the region and declining levels of physical activity [11]. This has resulted in a double burden of malnutrition. Worth noting is the counter-intuitive notion of widespread hunger and food insecurity in the presence of abundance [5]. Inequalities in food distribution combined with general and pervasive poverty and a lack of knowledge about food preferences and prohibitions can result in food insecurity.

2.1.2 Global biomedical nutrition interventions during pregnancy

Since maternal malnutrition has long-term, intergenerational effects, several interventions have been designed to improve the nutrition of pregnant women. These interventions are designed to address the immediate and underlying causes of malnutrition in women. The major focus of maternal nutritional interventions globally recommended by WHO [5] is to promote a healthy diet by increasing the diversity and amount of foods consumed; promote adequate weight gain through sufficient and balanced protein and energy intake; and promote consistent and continued use of micronutrient supplements, food supplements or fortified foods [5].

Maternal Nutrition Interventions in Kenya

Despite the clear indication that malnutrition in Kenya is not a new problem, little importance was attached to this aspect of healthcare until 1981 when the first Food Policy was developed [12]; it was reviewed in 1994 [13]. This policy aimed at maintaining broad self-sufficiency in major foodstuffs and ensuring the equitable distribution of food with nutritional value to all citizens. Maternal nutrition is an issue that is more generically linked to food and nutrition security policies with pregnant women as a specific vulnerable population in need of additional attention, and more specifically to maternal health policies that also address nutritional aspects. The relevant former policies are further specified in Box 2.1. Below I will elaborate on health policies focusing on maternal nutrition.

Since 2001, maternal nutrition interventions in Kenya have been implemented within the framework of the Kenya Reproductive Health Strategy (1997-2010) using the World Health Organization (WHO) Focused Antenatal Care (FANC) strategy. FANC put in place a National Reproductive Health Programme that sought to expand on the achievements of the Maternal Child Health/Family Planning (MCH/FP) programme that had been functioning since 1967. The goal of the programme was to provide a comprehensive and integrated system of reproductive health care that offers a full range of services by the government, NGOs and the private sector. The FANC package includes: Health education and counselling on nutrition and hydration; Detection of existing diseases and management of complications such as severe anaemia, diabetes; Health promotion and disease prevention and nutrition supplementation.

Box 2.1 Kenya's policies on food and nutrition security

In 2010 a new constitution was promulgated in Kenya. Under the economic and social bill of rights in this new constitution, every child has the right to basic nutrition, shelter and health care (section 53 (1c) of the Constitution of Kenya (2010)). Besides, every person has the right to be free from hunger, and to have adequate food of acceptable quality as well as clean and safe water in adequate quantities (section 43 (1c) of the Constitution of Kenya (2010)) [14].

As a strategy to meet the millennium development goals (MDGs), the National Food and Nutrition Security Policy (NFSP) [15] was developed in Kenya (as sessional paper no. 1 of 2012). This policy places nutrition central to human development in the country, emphasizes the need to ensure access to nutrition as a constitutional right, recognizes disparities in nutrition and provides relevant policy directions among others. The expected net effect of these interventions is reduced stunting, wasting, anaemia, obesity, underweight and, ultimately, infant mortality.

The Kenya National Nutrition Action Plan (KNNAP) 2012-2017 [16] was developed to provide a framework for the coordinated implementation of nutrition intervention activities by the government and nutrition stakeholders. Coordination of the implementation of KNNAP falls within the coordination mechanism of the agreed Food Security and Nutrition Strategy 2008. The KNNAP provides a national monitoring and evaluating (M&E) framework and presents targets to be achieved for each strategic objective's expected outcomes and outputs.

In Kenya, this was modified to incorporate the promotion of healthy behaviours in the home, including healthy lifestyle and diet, safety and injury prevention, and support and care in the home, such as advice and compliance support for preventive interventions like iron supplementation, condom use, and use of Insecticide Treated Nets (ITNs). See Table 2.1 for more details.

In 2013, the Kenya National Maternal, Infant and Young Child Nutrition (MIYCN) guidelines [17], which are anchored on the Kenya Food and Nutrition Security Policy (see Box 2.1) and WHO maternal nutrition strategies [5], were designed to provide policy guidance for nutrition interventions for mothers, infants and children from conception to 5 years of life (see Table 2.1). The guidelines also seek to support the implementation of appropriate MIYCN practices in emergency situations due to the experiences in recurring drought-related emergencies. These MIYCN policy guidelines are meant to be adopted by health care providers and other stakeholders to support nutritional care in pregnancy, childbirth, neonatal period, and for children under five. MIYCN is implemented at the national, county, facility and community levels, with the ultimate goal of improving the nutritional status, health, growth and development, and survival of infants and young children in Kenya, through optimal feeding practices and improved maternal nutrition.

Through these MIYCN policy guidelines, micronutrient supplementation has become central to maternal health and ANC, and is provided free of charge at all public health facilities. Pregnant women receive generic Iron and Folic Acid supplements (IFAs) at public antenatal clinics across the country. All mothers are encouraged to take iron tablets (60mg² of iron every day) during pregnancy irrespective of their haemoglobin levels to prevent anaemia. They are also encouraged to take 400 µg³ of folic acid daily around the time of conception (should be started in the first trimester of pregnancy) to prevent birth defects. Counselling on the consumption of an adequate diet rich in iron, provision of deworming tablets, Intermittent Presumptive Treatment (IPT) for malaria and sleeping under ITNs are also provided at the health facilities to prevent anaemia.

² milligrams

³ micrograms

Table 2.1 Essential elements of FANC and MIYCN programme (adapted from references [18]) and [19])

The essential elements of a focused approach to ANC	The essential elements of a MIYCN Programme
<p>-Identification and monitoring of the pregnant woman and her expected child</p> <p>-Recognition and management of pregnancy-related complications, particularly pre-eclampsia</p> <p>Recognition and treatment of underlying or concurrent illness</p> <p>-Screening for conditions and diseases such as anaemia, sexually transmitted infections (STIs), particularly syphilis, HIV infection, mental health problems, and/or symptoms of stress or domestic violence</p> <p>-Preventive measures, including tetanus toxoid immunisation, de-worming, iron and folic acid, intermittent preventive treatment of malaria in pregnancy (IPTp) insecticide-treated bed nets (ITN).</p> <p>-Advice and support to the woman and her family for developing healthy home behaviours and a birth and emergency preparedness plan to:</p> <ul style="list-style-type: none"> • Increase awareness of maternal and newborn health needs and self-care during pregnancy and the postnatal period, including the need for social support during and after pregnancy • Promote healthy behaviours in the home, including healthy lifestyle and diet, safety and injury prevention, and support and care in the home, such as advice and adherence support for preventive interventions like iron supplementation, condom use, and use of ITN • Support care-seeking behaviour, including recognition of danger signs for the woman and the newborn as well as transport and funding plans in case of emergencies • Help the pregnant woman and her partner prepare emotionally and physically for birth and care of their baby, particularly preparing for early and exclusive breastfeeding and essential newborn care and considering the role of a supportive companion at birth • Promote postnatal family planning/birth spacing <p>In Kenya, this was modified to include:</p> <ul style="list-style-type: none"> ▪ Screening for conditions and diseases such as anaemia, STIs (particularly syphilis), HIV infection, mental health problems, and/or symptoms of stress or domestic violence ▪ Preventive measures, including tetanus toxoid immunisation, de-worming, iron and folic acid, intermittent preventive treatment of malaria in pregnancy (IPTp), insecticide-treated bed nets (ITN) ▪ Promote healthy behaviours in the home, including healthy lifestyle and diet, safety and injury prevention, and support and care in the home, such as advice and compliance support for preventive interventions like iron supplementation, condom use, and use of ITN 	<p>The programme policy guidelines:</p> <p>Policy guideline 1: All pregnant women and lactating mothers should have access to and be knowledgeable about the need for an adequate and nutritious diet</p> <p>Policy guideline 2: Provide and promote intake of iron/folate through antenatal care services and support other strategies to address maternal anaemia</p> <p>Policy guideline 3: Support optimal maternal nutrition through healthy weight gain during pregnancy and lactation.</p> <p>Policy guideline 4: Pregnant and lactating women at risk, that is, adolescents, women with low weights, HIV-positive women, and women in emergency situations, should receive special attention to support optimal care.</p> <p>Policy guideline 5: Promote utilization of family planning and other health services for all women during antenatal and postnatal care to optimize MIYCN.</p> <p>Details on the recommendations and key messages for each Policy are highlighted in Annex 1</p> <p>Source: Adopted from reference ([17])</p>

Screening of haemoglobin levels, HIV and other infections is done at the first ANC appointment. Routine monitoring of weight gain, preeclampsia and hypertension of all mothers attending ANC is done at all pregnancy appointments. For women who face associated risks, that is, adolescents, women with inadequate or excess weight gain, hypertension, pre-eclampsia, diabetes and HIV, receive counselling and special attention to support optimal care. Diet restrictions and appropriate recommendations are advocated alongside micro-nutrient supplementation. In emergency situations, the women are normally referred to the bigger health facilities (level 5 and 6 hospitals) for specialised care.

Besides nutritional supplementation, MIYCN policy guidelines also recommend that all pregnant women and lactating mothers should have access to, and be knowledgeable about, the need for an adequate and nutritious diet. Thus, counselling and education on appropriate nutritional diet requirements based on locally available food should be provided by programme implementers to all pregnant and lactating women. They should also be advised on how to cope with food-related problems during pregnancy such as morning sickness, constipation and heartburn (as highlighted in Table 2.1).

2.1.3. Biomedical maternal nutrition intervention challenges

Despite the government of Kenya's long-term effort to eradicate hunger and malnutrition in the country, and the implementation of the ANC package that encompasses maternal nutrition interventions, in practice maternal malnutrition and the associated health indicators still persist in the country. In Kenya, high levels of undernutrition, particularly stunting, have persisted for decades. The levels of wasting and stunting have remained mostly unaltered for about 20 years, with other indicators showing some improvement (see Table 2.2). The Maternal Mortality Ratio (MMR) is still high (362 maternal deaths per 100,000 live births), but has reduced significantly over the past 15 years. Maternal deaths account for 14% of all deaths of women aged 15-49 years [20]. The available evidence shows that 43% of women are iron deficient, of whom 70% are pregnant. Although moderate to severe anaemia is high among pregnant women [20], only 8% of pregnant women took iron tablets for 90 or more days during their last pregnancy [20], as recommended by WHO [21]. The persistence of poor nutritional health indicators in Kenya is a call to investigate the possible impediments to the interventions so appropriate measures can be taken to address the problem.

As presented in the section above, the major focus of maternal nutritional interventions targeting pregnant women recommended by WHO [5] that has been adopted globally involves nutritional supplementation and counselling during pregnancy and lactation. This strategy assumes guaranteed access and adherence. However, in many developing countries, coverage and adherence remain major challenges to the effectiveness of supplementation strategies [22–25]. Adherence to iron and folic acid capsule recommendations has been studied in an array of contexts, and a number of personal, environmental and programmatic factors that cripple adherence have been established [22,25–29]. Although some factors

seem context-specific, some general themes have been consistently reported, including lack of knowledge or of counselling on proper explanations of iron-folate supplements [22,24–26,30–32], frustration from many tablets [30], history of anaemia or pregnancy complication during current or previous pregnancies [23–25], belief that too many tablets would harm the baby [24] and fear of side effects [23–25,30].

Table 2.2 Trends in undernourishment and maternal malnutrition indicators in Kenya

No.	Indicator	2000-2002	2005-2007	2009-2011	2012-2014	
		Kenya	Kenya	Kenya	Kenya	Uasin Gishu
1	Undernourished people (in millions)	10.3	10.3	10.1	10.8	
2	Stunted children	33%	30.3%	35.3%	26%	31.2%
3	Underweight children	20%	16%		11%	11.5%
4	Wasted children	6%	5.6%	5.8%	4%	3%
5	Children born smaller than average weight (<2500g)		13%		12%	
6	Under-five mortality ratio (per 1,000 live births)	112	115	74	85	
7	Maternal mortality ratio (per 100,000 live births) (MMR)	590	414	488	362	
9	Women of reproductive age having a BMI < 18.5 kg/m ²	12.3%	12.3%		9%	
10	Overweight or obese women with Body Mass Index (BMI) >25	23.4%	25%		33%	

Source: Kenya Demographic and Health Survey (KDHS) 2003, KDHS2008, KDHS 2014, undernourished people and rates of maternal mortality, under-five mortality and stunting (FAO, 2014; IFPRI, 2013).

Frequency of access to care and gestational age at booking the first ANC appointment have also been established as an impediment to the implementation of nutrition interventions in some regions [26,27]. In places where there was high adherence to supplements, most women were initiated on folic acid or iron after 12 and 16 weeks of gestation, respectively, well after the recommended time period affecting the efficacy of interventions [26]. Studies have established that micronutrient deficiency of iron, folate and other minerals in the first trimester of pregnancy results in significant decrements in foetal growth and is generally more damaging to the pregnancy outcome than deficiency in the second and third trimesters [33–35].

Another nutritional intervention targeting pregnant women recommended by WHO [5] is to improve dietary intake through nutrition education and counselling. This assumes that pregnant women lack knowledge, hence nutritional education will empower them to make rational informed decisions on their health by taking into account the perceived severity of malnutrition on pregnancy outcomes and hence adopt alternative dietary habits. However, studies have established that knowledge alone is not sufficient to change nutritional behaviour [36,37]. These studies therefore recommend that nutrition education interventions should also take into account the clients' psychosocial factors [37]. Further studies have identified the importance of involving parents and other community members in nutrition education interventions rather than targeting individual clients only [36]. Other studies established that women of childbearing age position themselves towards pluralistic

nutritional knowledge which dominate their practices, rather than just towards medical nutrition logic [38].

Studies that evaluate innovative practices and interventions show that many of the innovative practices (not particularly those concerning maternal nutrition) fail due to the lack of contextual embeddedness or cultural sensitivity (Allen, & Gillespie 2001; Mwangome, et al. 2010). In some studies, researchers have established that universal public health interventions are oversimplified, given the heterogeneity of their audiences and the complexity of eating behaviours, which is experienced as a major barrier by different partners during the implementation of healthy eating campaign programs [39,40]. Thompsons [37], for instance, demonstrated the dangers inherent in interventions that assume simplistic relations between psychosocial factors and nutritional behaviour. These studies propose that messages in national campaigns be tailored to different audiences by producing local programmes that target specific cultural groups.

This trend of access and utility of biomedical interventions is a clear indication that these interventions are either ineffective or poorly delivered. Hence, there is a need for appropriate interventions and innovative delivery strategies that will help in accelerating nutrition progress in the country. There is also a clear indication that pregnant women do not necessarily rely on the so-called “expert knowledge and interventions” regarding maternal nutrition but rather depend on local knowledge and practices, which are based on their daily lived experiences and *emic* advice for their survival. Therefore, there is a need to understand these emic beliefs and practices.

2.2 Maternal malnutrition and health implications: Ethno-medical perspectives and practices

Throughout the world, pregnancy is a period marked by different cultural beliefs and values. These beliefs and values give perspective to the meaning of food practices, norms, taboos and myths adhered to during pregnancy. Therefore, understanding the client’s culture is an important element in understanding the community’s perspective on maternal malnutrition outcomes and appropriate intervention measures adopted during pregnancy.

2.2.1 Understanding the concept of culture and ethno-medicine

Culture has been given different definitions by anthropologists. In this thesis, the definition created by Helman [41] will be adopted:

“Culture is a set of guidelines (both explicit and implicit) which individuals inherit as members of a particular society, and which tells them how to view the world, how to experience it emotionally, how to behave in it in relation to other people, to supernatural forces or gods, and to the natural environment. It also provides them with a way of transmitting these guidelines to the next generation – by use of symbols, language, art and rituals.” (Helman 2000:2-3)

From the above definition, it can be noted that culture has an important influence on many aspects of people's lives, including beliefs and perceptions about diet, pregnancy and pregnancy outcome, and illness. An accurate assessment of culture is therefore critical in understanding the interventions a community adopts in mitigating an adverse malnutrition pregnancy outcome.

Ethno-medicine, one of the central concepts of this thesis, refers to the study of traditional medical practices, is concerned with the cultural interpretation of health, disease and illness and also addresses the health care-seeking process and healing practices [41]. The practice of ethno-medicine is a complex, multi-disciplinary system constituting the use of plants, spirituality and the natural environment and has been the source of healing for people for millennia [42]. In this study, the definition proposed by Good (1987:23) will be adopted:

“Socially accepted designs for labelling and managing illness that are both adjustable and adaptable to changes occurring in other social and economic subsystems. They can selectively accommodate and borrow from exotic medical traditions without losing their underlying conceptual coherence and integrity.”

The terms “cultural practices”, “cultural beliefs” and “ethno-medical practices” will be used interchangeably throughout this thesis to refer to local beliefs and practices in relation to maternal health and nutrition. The interventions implemented through the formal health system by medical health providers will be referred to as “biomedical interventions” (drugs, messages and strategies).

2.2.2 Ethno-medical perspectives of maternal malnutrition-related health outcomes and practices

Pregnancy is a life stage associated with several cultural beliefs related to appropriate behavior and nutrition to achieve a positive outcome. For instance, in most societies the mother's eating habits are believed to impact the health and wellbeing of both the mother and the developing foetus. Some foods are believed to have a positive impact, while others may have a negative impact. As a result, many cultures observe nutritional do's and don'ts during pregnancy as a precaution to safeguard the health and wellbeing of the foetus and the pregnant woman.

Some food is believed to make delivery easier, and women are encouraged to eat plenty of it. A study by Liamputton [43] established that pregnant women in Northern Thailand are advised to eat *pak plang*, a vine-like green vegetable. This vegetable is slippery in texture, hence symbolically believed to make the baby slip out easily and fast during birth. In Ghana, pregnant women are also encouraged to consume green leafy vegetables because they are believed to “add blood” that is associated with an easy birth [38]. In contrast, in Zambia M'soka [44] established that pregnant women were discouraged from consuming okra (a slimy vegetable when cooked) because it is associated with excessive salivation of the child.

Some foods are discouraged during pregnancy because they are believed to cause abstracted or prolonged labour or post-partum complications. In Northern Thailand, for instance, pregnant women are told to consume only half a banana, as eating a whole banana may result in a birth obstruction [43]. Thai women are also discouraged from eating shellfish which is believed to prevent the perineum from drying up properly after birth and to avoid eggplants because they are believed to cause anal pain after birth. In Zambia, M'soka [44] established that it is believed that women who drink alcohol during pregnancy deliver large babies and experience prolonged labour. In The Gambia, eating bread, as well as banana, millet, or groundnut, is believed to potentially lead to problems in labour, and thus their consumption was discouraged [45].

Some food precautions are believed to safeguard the foetus from malformations. In Northern Thailand, pregnant women are warned against the consumption of spicy hot food as the baby may be born hairless, and are also warned against drinking coffee and tea because they are believed to make the child unintelligent [46]. Similarly, in Zambia, eating eggs during pregnancy is believed to make babies bald and that consuming salt will make the baby's skin rough, hence salt is discouraged [44]. Eating fish during pregnancy was also believed to cause infant abnormalities, such as a large anterior fontanelle [47]. Similarly, among the Fullas in the upper region of The Gambia, it is believed that if catfish are eaten during pregnancy, the mother would give birth to a flaccid, sloppy, dribbling child, eating eggs may result in a mute, dumb or stuttering child, while eating pepper or bitter tomato may give the newborn baby an irritable skin rash [45].

Other food taboos are based on gender. Some animal organs are reserved for men and must not be consumed by women, whether pregnant or not. Among the Luhya, a community in Kenya, the consumption of eggs is restricted in order to spare chickens, because chicken meat is a delicacy reserved for men and guests [29].

Pregnant women are also considered vulnerable to external attacks that can emanate from humans, nature or supernatural powers, and hence they must be protected from harm by observing certain taboos, rituals, and behaviour. Among the Nandi people of Kenya, for instance, Hollis [48] established that during pregnancy, a woman must undergo a purification ceremony, after which she is assured of a safe and easy birth. If a misfortune occurs after the ritual, the spirits of departed ancestors and adult relatives are appealed to with offerings of milk, beer and food to spare the woman. In some communities, it is also considered a taboo for a pregnant woman to view a corpse. Thus, a pregnant woman is not supposed to attend funerals, or if they do, they are not supposed to view the corpse. It is believed that if they view the corpse, the baby dies in utero or will be born with congenital abnormalities [49].

Certain persons in society are believed to have the power, called the "evil eye", of causing foetal malformation or intrauterine diseases which cause abortions. Therefore, pregnant women are protected by taking medicinal herbs or wearing special ornaments to guard them

from miscarriage [49–51]. Among the Marakwet of Kenya, when the woman starts experiencing labour pains, the ornament (in this case a necklace) is believed to cause obstruction if not removed, and the woman will not give birth [49]. In some communities, wearing ornaments around the neck and bands around the waist is believed to make the umbilical cord coil around the baby's neck, leading to a stillbirth.

Sex outside marriage is also considered to be harmful; it is believed to damage the unborn child and cause problems during labour, such as prolonged or obstructed labour and/or death of the mother and baby [44,47]. If something goes wrong during labour, the woman in labour is expected to confess her purported 'bad' behaviour. In other communities, rigorous activities such as lifting heavy objects or doing farm work during pregnancy are seen as harmful as this may lead to miscarriage or stillbirth [43].

Studies have shown that many pregnant women seek maternal care and interventions from traditional birth attendants (TBAs) in LMICs. A study by Maimbolwa et al. (2003) in Zambia established that TBAs advised women on the use of traditional medicine, to widen the birth canal and precipitate labour, and to examine the position of the baby. Consumption of traditional herbal medicine during pregnancy in some cultures is encouraged to make the mother and baby strong, as a way of preparing for an easy birth [43]. Other cultures consume herbs during birth to widen the birth canal and precipitate delivery [44,47]. Consumption of herbal medicine during pregnancy is also used against evil spirits and witchcraft that might cause abortion [50,52], for the treatment of pregnancy-related ailments, discomforts and complications including threatened abortion and postpartum haemorrhage [50,52,53].

2.2.3 Understanding the persistence of ethno-medical maternal care practices: Dawkin's Memetic Theory

Dawkin's theory of cultural evolution [54] is used in this thesis to understand why there is an extensive use and reliance on ethno-medical remedies, which persist for generations, even though some are detrimental to human health or based on scientifically incorrect notions. Understanding this persistence and mode of transmitting these beliefs is important in creating an entry point for an integrative intervention of the two systems of maternal nutrition (ethno-medical and biomedical). This theory has been linked to the research findings of this thesis in Chapter 9.

Memetic theory is a new face of the Darwinian theory of evolution which presents themes of recent evolutionary thought and offers a new world view. Evolutionary biologist Richard Dawkins [55] launched the concept 'meme' in his book *The Selfish Gene* where he relates "memes" to "genes"; he floats the term "meme" (short for Greek word "mimeme") for the cultural equivalent of "gene". Dawkins (2008:192) defines a meme as "A unit of cultural transmission or a unit of imitation."

A meme is an idea or an entity that is capable of being transmitted from one brain to another. In other words, a meme is an element of culture that may be considered to be passed on by non-genetic means. It can be equated for instance to cultural expressions such as tunes, ideas, catch-phrases, diet, clothes, fashions, hit songs, and ways of making pots or of building arches. In his memetic theory, Dawkins relates cultural evolution directly to genetic evolution processes, and he came up with the following principles to explain the evolution and transmission of memes.

Evolution and Transmission of memes: Dawkins argues that “meme transmission” is analogous to genetic transmission in that, although basically conservative, it can give rise to a form of evolution. However, “meme evolution” is non-genetic but can evolve in historical time in a way that resembles highly speeded-up genetic evolution. As in genetic evolution, though, the change may be progressive, so memes propagate themselves in the meme pool by leaping from brain to brain via a process which, in the broad sense, can be called imitation. Through imitation, memes are passed on from human to human, and from generation to generation.

Competition for survival and Survival value: But just as not all genes that can replicate do so successfully, so some memes are more successful in the meme pool than others. This leads to competition for survival in the meme pool. This is the analogue of natural selection. At the end, it is the fittest, or the one with highest “survival value”, that survives because not all can be more successful/fittest in the meme pool. Memes have survival value in a meme pool in the same way that genes have survival value in a gene pool. Survival value as used by Dawkins is an explanation of why or how certain memes spread better and last longer in the meme pool than others and thus change the content of a pool. The survival value of the memes is enhanced by the psychological appeal of the meme in the individual brain (unlike genes). Psychological appeal means an appeal to the brain, and brains are shaped by natural selection just like genes in gene pools. It is therefore important to understand why memes have “great psychological appeal” (the survival value). The survival value is enhanced by its longevity and fecundity qualities. Longevity is its ability to last in people’s brains for centuries, and fecundity is its acceptability in the population of individual minds. Longevity is measured by its ability to stand the test of time, whereas fecundity is measured by counting the number of people practicing them.

From the above, it can be concluded that people are not a “tabula rasa”. They have cultural beliefs and values about pregnancy, health and food, which give meaning to adverse pregnancy outcomes. These meanings direct women to the appropriate remedies and behaviours to adopt in order to safeguard their pregnancy and ensure a healthy outcome. Biomedical interventions do not automatically align with these cultural beliefs and practices. As convincingly argued by scholars from science and technology studies (e.g. Akrich 1997), an intervention has a “script” regarding its practical function, aesthetic expression, social significance and cultural identity [56]. The effectiveness of an intervention assumes certain

competences (knowledge, attitude, skills) in the user/recipient and certain resources in the wider context of application. In the vocabulary of Darwin, this implies that any intervention also has built in “memes”. The newly introduced intervention embodies memes that may agree or conflict with incumbent memes that have been in existence for centuries. In the latter case, competition for survival arises. Competing memes can to some extent co-exist. Analogous to social norms (see e.g. Toury 1995), three types may be distinguished: the ‘dominant’ or mainstream, the “remnants of the past” and the “rudiments of the new” [57]. New memes may have a hard time proving their survival value.

When interventions include limited and generalized nutritional strategies without taking into account the dominant memes, their effectiveness can easily be constrained or reduced. Therefore, it is crucial that local beliefs, norms and practices in relation to pregnancy, health and nutrition are understood and inform intervention design and implementation together with other relevant factors in the context of application.

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