Infant Health: A community-based assessment and educational intervention in two rural communities in the Eastern Cape.

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Abstract

South Africa is on track to attaining the 2030 Agenda on reducing under-five deaths to 25 deaths per 1000 live births at its current momentum, however an unacceptable amount of infants are still at risk from preventable illnesses. Malnutrition is the major underlined cause of infant mortality rates in South Africa. Exclusive breastfeeding rates are low nationwide due to low exposure to breastfeeding information, some mothers having other commitments and others having breastfeeding difficulties. Implementation and expansion of simple, cost-effective interventions, such as exclusive breastfeeding for six months to reduce and/or prevent infant mortality rates, remains low in South Africa.

The aim of the study was to determine one infant health issue of major concern to participants in two rural villages in the Eastern Cape, namely Glenmore and Ndwayana. The identified infant health issue was used to design an educational intervention in the villages. This was the second phase of this study.

A community-based participatory approach was utilized in which the Angus Gillis Foundation, a non-profit organization that works in these communities, was one of the stakeholders. Stock status of WHO priority medicines for infants, semi-structured interviews and focus group discussions were carried out during the baseline study. The intervention phase contained pre-

intervention semi-structured interviews with ten pregnant women followed by an educational intervention with nine out of the ten; and finally, a post-intervention with seven out of the ten women. A questionnaire was completed by members of the Angus Gillis Foundation to provide feedback on the sustainability of the intervention.

Semi-structured interviews revealed that medicines stocked at the clinic parallel those indicated in the WHO priority medicines list for infants. The results from the focus group discussions indicated that mothers do not exclusively breastfeed their infants during the first six months. Pre- and post-intervention results on exclusive breastfeeding illustrated a positive change in participants' knowledge and intent to breastfeed exclusively for six months. They showed a better understanding of the importance of exclusive breastfeeding and indicated a more focussed intention and confidence to carry out optimal breastfeeding practices.

In the questionnaire the members of the Angus Gillis Foundation stated that the intervention is sustainable as it was linked with the existing networks. These include educational programs carried out in the villages by the foundation together with positive health champions, community health workers and women self-help groups; which will be able to build on the present knowledge base. Finally, the study also included the design of a booklet on the identified infant health issue.

In conclusion, participants highlighted lack of understanding regarding breastfeeding as an issue of concern during the baseline phase of the study. This community-based educational intervention improved the understanding of breastfeeding among the participants, resulting in a positive change in perception with regards to exclusive breastfeeding practices.

Dedication

I would like to dedicate this thesis to my beloved mother, Joey Helga Kuzeeko. Thank you for your unending support and unconditional love.

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List of acronyms

AGF- Angus Gillis Foundation

AIDS- Acquired immune deficiency syndrome

AIN-C – Honduras Integrated community child health program

ARV – Antiretroviral

BFHI- Baby-friendly hospital initiative

CARMMA – Campaign on accelerated reduction of maternal and child mortality in Africa

CBPR – Community-based participatory research

CHW – Community health worker

EMS – Emergency medical services

FGD – Focus group discussion

GAPPD – Global action plan for pneumonia and diarrhoea

GDP – Gross domestic product

HCP- Health care personnel

HDI –Human development index

HIV- Human Immunodeficiency virus

IMCI- Integrated management of childhood illnesses

IMR- Infant mortality rate

IYCF- Infant and young child feeding

LMIC- Low and middle income country

MDG- Millennium Development Goal

NGO- Non-Governmental Organization

NSDA- Negotiated service delivery agreement charter

ODA- Official development assistance

ORS- Oral rehydration solution

PATH- Program for appropriate technology in health

PHC- Primary health care

PIP- Child health care problem identification program

PMTCT- Prevention of mother-to-child transmission

PPIP- Perinatal problem identification program

SDG- Sustainable development goal

SSI- Semi-structured interview

UN- United nations

UNICEF- United nations international children's emergency fund

WHA- World health assembly

WHO- World health organization

WTO- World trade organization

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1 Introduction

1.1 Background and problem statement

South Africa featured among the "Countdown countries" with the highest under-five mortality rates in the world in 2010. This was due to the fact that under-five mortality rates had merely reduced from 60 deaths per 1000 live births in 1990 to 57 in 2010.[1] However the country gained traction in subsequent years as under-five mortality rates decreased drastically to 28,5 deaths per live births in 2019. Furthermore infant mortality rates (IMR) had reduced from 56,5 deaths per 1000 live births in 2002 to 22,1 in 2019.[2] Despite the immense strides the country has made towards reducing infant mortality, given all the advancements and initiatives in place, a large proportion of children are still left behind in health development strategies. A high proportion of infant deaths are due to malnutrition as it is the contributing factor to 60% of all deaths.[3] If the current status quo remains unchanged, health issues can negatively affect cognitive development which ultimately interrupts optimal growth in adolescents and adulthood. Furthermore IMR and under-five mortality is an important indicator of a country's development as it is a reflection of the health status, therefore investing in child health has the potential to not only reduce child illnesses but can promote economic development[2]

Interventions to reduce the incidence of infant morbidity and mortality incorporate preventative and curative measures for childhood illnesses and, in particular, promote and support exclusive breastfeeding or alternative appropriate feeding options. However, in South Africa exclusive breastfeeding remains low with only 12% of infants aged 0-3 months and 1.5% of children aged 4-6 months being exclusively breastfed.[5] This poses a threat, as malnourished infants have the potential of becoming underweight and paradoxically overweight as well, known as the "double burden of malnutrition". In later life, the impact of malnutrition can negatively affect the mental health and general wellbeing. [6]

In the face of the evident disparities in the socio-economic determinants of health in South Africa, compounded by the burden of unequal distribution of health personnel, health interventions are crucial. Evidence suggests that greater exposure of women in South African communities to the correct infant feeding practices, particularly appropriate information to help inform societal behaviours regarding breastfeeding, can significantly reduce the progression of

malnutrition which, in turn, will reduce IMR.[7,8] Early incorporation of appropriate feeding practices have been proven to have a great impact on child survival as it is the single most effective intervention for reducing infant mortality in low income settings.[9] Evidence also suggests that appropriate infant feeding practices can mitigate development of infectious diseases as well as reduce likelihood of developing non-communicable diseases later on in adulthood. Therefore, promoting and supporting optimal feeding practices may play a crucial role not only in lessening IMR, but possibly promoting a healthy society overall. Despite broad-based evidence, coverage of these interventions that have proven to lower infant health issues, implementation remains low in South Africa, particularly in marginalized communities.[10]

1.2 Rationale of research

Although under-five mortality rates have decreased sufficiently to keep South Africa on track to achieving the 2030 agenda, IMR however remains a challenge as the country still features among countries with high IMR globally, which indicates that progress to reduce IMR is not sufficient at the current momentum.[2,3] Success in reaching target infant health goals, is further undermined by lack of health care personnel. This is more pronounced in rural, marginalized communities. In addition, infant health issues are exacerbated by underlined issues such as poverty, and lack of education.[11-13] As a result these communities need to be more involved in matters pertaining to their health, in order to successfully target infant health issues. Health promotion is at the forefront of tackling infant health issues, as it channels communities to be more independent in developing schemes that strengthen health systems.[14]

This study makes use of health promotion strategies to identify and address infant health issues pertinent in two marginalised communities. Upon successful completion information disseminated in this research may contribute to not only future studies made in these communities, but also inform NGOs in projects that they implement within the two communities.

1.3 Field of research

Research indicates that health promotion is an effective tool to achieving greater equity and outcomes in health. Health professionals have a role to fulfil in health promotion, as they collaborate with community members to gather information pertaining to health needs.

Pharmacists are in a unique position to form partnerships in health promotion as they are more readily accessible to community members.[15] Typically pharmacists provide information and enable the community to make their own decisions based on a range of causes and variety of options for solutions to a particular issue.[16,17] This role is just as crucial when investigating and targeting health issues in marginalized communities.

Tertiary institutions are in a position to have a positive impact in the communities through contextualizing information to tackle local issues.[18] Community-based participatory research allows for collaboration with functional networks within the communities, such as Non-Governmental Organizations and community leaders, for sustainable development and continuation of intervention.[19] This research makes use of community-based participatory research to achieve its objectives.

1.4 Aim and objectives

1.4.1 Aim

The aim of this study was to identify one major infant health issue in two rural communities- Glenmore and Ndwayana; and to design and implement an appropriate educational intervention for the target group.

1.4.2 Objectives

<u>Baseline phase</u>

- To contact major stakeholders, i.e. the positive health champions, community health workers, health care personnel, village leaders and women self-help groups) from the two communities to introduce the project.
- To collect records on the stock status of World Health Organization priority medicines for infants at each of the clinics in Glenmore and Ndwayana.
- To conduct semi-structured interviews (SSIs) with the nurses from the two clinics to explore if there are issues that affect infant health.
- To determine the challenges in the communities that may contribute to infant health issues, through focus group discussions (FGDs).

- To determine the infant health issue of most concern to community members.

Intervention phase

- To introduce the educational intervention to the target group.
- To co-develop and implement an educational intervention with the participants on the identified infant health issue.
- To determine knowledge, attitudes and practices of participants pertaining to the identified infant health issue pre- and post-intervention.
- To determine perceived susceptibility and seriousness of the identified infant health issue pre- and post-intervention.
- To determine perceived benefits and disadvantages of adopting appropriate practices to tackle the identified infant health issue pre- and post-intervention.
- To determine perceived barriers to performing appropriate practices to tackle the identified infant health issue pre- and post-intervention.
- To determine the participants' self-efficacy regarding their ability to adopt appropriate practices to tackle the identified infant health issue pre- and post-intervention.
- To obtain feedback on the applicability and sustainability of the educational intervention from members of the Angus Gillis Foundation. To design a breastfeeding booklet based on the significant features of the educational intervention.

1.5 Theoretical framework

1.5.1 Knowledge, Attitudes and Practices Model

An important aspect regarding health issues is the participant's awareness, knowledge, attitudes and practices. Lack of knowledge as to how to improve health may lead to negligence, thus it is crucial to be aware of a participant's knowledge.[20] Although knowledge of certain health aspects is an important step in improving health, it cannot by itself stimulate behavioural change. Evaluating perceptions, attitudes, beliefs and expected outcomes of participants is also necessary in order to understand certain behaviours and to assist in changing them for the better. Moreover

awareness, knowledge and judgment on health can be affected by habits due to social, cultural and economic influence, which is the basis of the Knowledge-Attitude-Practice Model.[21-23] .

1.5.2 Health Belief Model

The Health Belief Model makes use of four variables to predict behaviour based on individuals' perceptions. The first is susceptibility; individuals are less likely to take the necessary precautions if they feel that they are not threatened by a certain condition.[24] If there is no perceived risk, an individual is less likely to take action. Secondly, if an individual feels that a certain unwanted outcome will not have a great impact on their lives, chances are they might not take actions to prevent that outcome from unfolding.[20,24] Both of these variables are concerned with how the individual perceives the threat. The third variable is the perceived benefit of a certain behaviour; if the individual feels that the target behaviour will serve no benefit to them, they are not likely to change their behaviour.[20] In other words, individuals need to believe that altering their behaviour towards a certain negative outcome will promote their well-being. Finally, the model postulates that if the barriers towards attaining the target behaviour are perceived to be strong by the individuals, they are less likely to adopt this behaviour .[20,24]

1.5.3 Empowerment Model

The final model is the empowerment model in which the process of empowerment seeks to promote a change in human behaviour. This change is initiated by awareness of a breach between what people want to accomplish and their ability to do so.[25] The empowerment process is initiated when an individual is motivated to change due to situations or conditions that undermine their self.[26] This is further advanced by forming supportive relationships and developing an understanding of social relations. Finally, the individual needs to display commitment in which a participatory approach is adopted in order to positively influence their lives.[25,26] It is also imperative that individuals have the power to define their own needs and act upon them accordingly.,[27] In the context of health, individuals need to gain information concerning their health needs and be willing to work with other members of their community to gain control over their health. Adoption of a new behaviour to improve practices that affect infant health requires an integrated communication and development strategy. This can be

achieved through the sustained collaborative participation of the communities and other key stakeholders to determine actions necessary for the promotion of infant health.

1.6 Choice of method

1.6.1 Community-based participatory research

There has been a significant shift in the role of communities in research that involves them. Communities are now recognized as beneficiaries and invaluable partners in research that involves change.[19,28] It is in this context that community-based participatory research (CBPR) is considered a key method to acquiring and disseminating information through collaborative efforts between the participants, stakeholders and researchers.[29,30] It has emerged as a paradigm which integrates knowledge and social action to advance health care and reduce health disparities.[19,28,30] This research is centred on forming relationships between academia and the community, incorporating ideologies of co-learning, mutual benefit and long-term commitment to health reforms.[31] The advantage of this method is that it engages the multiple stakeholders who are directly and indirectly affected by an issue of concern, and paves the way to addressing the issue in a manner that allows each party to bring forth their unique strengths. With the advent of this approach to research, investigators are partnering with stakeholders, especially the community members. In this way exemplifying the voice of society through participation and action which, in turn, encourages new initiatives that may lead to sustainable long term outcomes.[32]These partners contribute their expertise, lived experiences and shared responsibilities to improve understanding of a given trend to incorporate knowledge gained with action to enhance the well-being of the community members. CBPR recognizes the community as a social entity and builds on resources and relationships that exist within these communities.[33] CBPR serves to support or expand social structures and social processes that contribute to the ability of the community members to work together to an end that facilitates improved health outcomes. Collaborative partnerships formed provide a platform to focus on issues and concerns identified by community members, to effectively enable equitable participation and shared influence during the research and desired change efforts.[34]This approach is driven by the pursuit

to conduct research that is participatory, and is focused on the reality known to the marginalized groups, as seen in this research.

1.6.2 Exploratory mixed method research

Exploratory research serves to "explore" research questions and is not intended to offer conclusive solutions, enabling the researcher to determine the nature of the problem. Moreover this type of research facilitates the study to change direction as new insights come to life.[35] For most purposes exploratory research is designed to determine status quo or existing theory, or practices producing predominantly qualitative data. This generally involves conversations between the researcher and participants, which are mostly informal and semi-structured. Exploratory research makes use of techniques such as focus groups and in-depth interviews, utilized to elicit qualitative data needed to better understand a phenomenon. Advantages of FGDs is that the group demographics has the potential for a more dynamic conversation, and produces a sense of synergy among the participants. Typically FGDs should be small groups of homogenous participants. In-depth interviews occurs between the researcher and the participant only, providing for a more open and accessible platform for discussing sensitive topics.[36]

Mixed method research makes use of qualitative and quantitative methods in combination. The qualitative aspect of the research is used to identify previously unknown processes and explanations of why and how they occur, whereas quantitative methods measure the prevalence of a certain criteria.[37] The concept of using this method is to maximize on the strengths and minimize the shortcomings of each type of data collection tool. This approach allows the research to take on a more holistic understanding of a topic as it not only examines certain processes but also incorporates outcomes.[38] The advantage of using a mixed method approach in research is its use in multi-phase research designs. In this design one phase typically builds on another with the purpose of designing a second phase, such as an intervention.

1.7 Research questions

- What are the infant health issues in the two communities?

- What are the knowledge, attitudes and practices in the communities pertaining to the infant health issue of greatest concern?
- What are the perceived advantages and disadvantages of adopting appropriate behaviour to target the infant health issue of greatest concern?
- What are the perceived barriers to adopting appropriate behaviours to address the infant health issue of greatest concern?
- Do mothers in the community feel confident that they can successfully adopt appropriate behaviours to address the infant health issue of greatest concern?

Overview of Chapters

The subsequent chapter discusses the literature review, encapsulating child rights, causes and determinants of infant health issues worldwide and in South Africa. The chapter also addresses interventions that aim to reduce incidence of infant deaths. Health promotion pertaining to one of the essential interventions, i.e. exclusive breastfeeding, is discussed as well. The role of tertiary institutions in engaging communities in which research is done is highlighted. Chapter 3 introduces the study setting and the stakeholders of the research project. Chapter 4 describes the methodologies and processes used to achieve the aim and objectives of the research. The results are explained in chapter 5, which is divided in two sections, i.e. the baseline phase and the intervention phase. The results are subsequently discussed in chapter 6, which also includes the strength and limitations of the study. Chapter 7 concludes the study and also proposes some recommendations for stakeholders and for future studies in the field.

2 Literature review

Overview of the chapter

This chapter introduces the evolution of human rights, particularly child rights globally and in South Africa; how and when these rights were introduced and how they developed over time leading up to the incorporation of these rights in attempts to reduce infant mortality. Furthermore how the global development goals are interrelated and contribute to human development is discussed, particularly how the social-determinants influence child health reforms. The chapter also discusses the causes of child mortalities globally, including the availability and the ease of access to essential medicines pertinent for infant survival, and in South Africa and attempts to track the country's progress towards reducing child deaths. Moreover the significance of infant feeding, particularly breastfeeding, towards improving child survival is specified. The policies and guidelines that are in support of breastfeeding globally and in South Africa are stated. Lastly the chapter looks at the relevance of community engagement and tertiary institutions with regards to improving child survival.

2.1 Evolution of children's rights

2.1.1 Universal declaration of Human Rights and the Rights of the child

The year 1948 marked the commitment of United Nations (UN) member states to take on progressive measures to secure universal and effective recognition of human rights set out in the declaration of Human Rights, ratified by 48 member states. The Right to Health is enshrined in Article 25 of the Declaration, in which governments agreed to ensure that mothers and children have special protection and assistance.[39]All members are to recognize this declaration as the general standard of achievement for participant nations through which every individual will live by to promote respect for these rights. This declaration served as the first international proclamation to use the term "human rights".[40]

The United Nations General Assembly endorsed the Declaration of the Rights of the Child in 1959, originally drafted in 1924 in Geneva.[41,42] The declaration served to defend children's rights to health care, education and protection from discrimination.[42] The document drafted in 1924, in

part, stated that each child had to be given the means for his/her optimal development. Each child is to be fed when hungry and attended to when sickly.[41] The expanded version adopted by the UN included an additional ten principles that purported to strengthen initiatives set out in the former draft.[42] To affirm the rights of the child as stipulated in these treaties, the UN further sanctioned the Convention on the Rights of the Child in 1989 to which 193 states are party.[43] Governments that approved this declaration had an obligation to periodically account for progress with regards to advancement in the implementation of the Convention and the status of children within that state. The premise of the Convention is that all children have basic freedom and inherent rights which includes the right to health and health services. It is asserted that all children have the right to the highest quality of health care attainable. Each state is to provide primary and preventative health care, including health education to lessen infant mortality. No child is to be deprived of access to effective health care.[44]

2.1.2 The Alma Ata Declaration

In an effort to endorse the right of every human to attain the highest standard of health, global leaders expressed the need to strengthen the Right to Health Care at the International Conference on Primary Health Care, where the Alma Ata Declaration was endorsed in 1978. The purpose of the declaration was to promote PHC as the major component in achieving universal access to health by the year 2000.[45] PHC is defined as an "essential health care based on practical, scientifically sound and socially acceptable methods and technology made universally accessible to individuals and families in the community throughout their full participation and at a cost that the community and country can afford to maintain at every stage of their development in the spirit of self-reliance and self-determination".[45,46] All governments were to ensure that every person of state obtains a continuous means to health. By ratifying the declaration, global leaders were to guarantee availability, accessibility, safety and quality of health care services.[45,46]

The declaration specified that PHC strategies should address the main health issues in communities, with the provision of appropriate promotive, preventative and curative health services. This includes endorsing education concerning health issues, promotion of nutritious

food, an adequate supply of safe drinking water and basic sanitation. It also included the promotion of maternal and child health, immunizations against the major infectious diseases and appropriate treatment of common diseases and the provision of essential medicines.[45]A successful PHC system also requires total community and individual independence and active participation in all aspects relating to health.[47, 48]

2.1.3 Millennium development goals to sustainable development goals

Millennium development goals originated from the UN Millennium Declaration, which was pledged during the 2000 Millennium Summit. The Declaration stressed that each individual has the right to freedom, equality and a basic standard of living. The MDGs set targets for poverty reduction in order to achieve these rights. The Declaration also stated that member states were to pursue all avenues to realize priorities set out in order to attain development for all.[49] The MDGs encompassed the social determinants of health (i.e. eradicate poverty, promote education and gender equality, and a sustainable environment) and the health-related goals (i.e. maternal and infant health, HIV/AIDS, TB and malaria and global partnership for development).[49,50]

Efforts made in achieving MDGs were revitalised in 2015 during the endorsement of a new development agenda consisting of 17 sustainable development goals (SDGs). As with the preceding development goals, SDGs appreciate that targeting social determinants of health will ultimately have an impact on health outcomes. Health outcomes lie at the centre of the 2030 Agenda, a comprehensive goal SDG 3, which aims to "ensure healthy lives and promote well-being for all at all ages".[51,52] The 2030 Agenda has significant implications for health, and achieving outcomes heavily rely on the development of coherent, interconnected approaches and accentuating health equality.[51]

2.1.4 Children's Rights in South Africa

The Convention on the Rights of the Child was the first international treaty ratified by South Africa in 1995 after the country gained its democracy.[53] South Africa also endorsed the African Charter on the Rights and Welfare of the Child in 2000, which adopted the principles set out in the Convention applicable in the African context.[54,55] A National Programme of Action for children in

South Africa was launched to ensure that government policies were sensitive to the needs of children and that the rights of the child were prioritized.[53,55] The National Committee on the Rights of the Child was the first national organization in South Africa to promote the rights of children. The committee, alongside the United Nations International Children's Fund (UNICEF) realized the need for a situational analysis of women and children in South Africa in order to establish their needs. The government recognized that the extent to which international laws are able to improve the lives of children is dependent on the ability of South Africa to implement these laws and adopt measures to fulfil the relevant obligations.[53] This assertion is set out in the South African Constitution, Act 108 of 1996, which serves to protect, promote and respect the right of the child to basic health. The Bill of Rights, Section 28, states that each child in South Africa has the right to basic nutrition, shelter, basic health care services and social services.[56] The proclamation made in the Constitution resonates strongly with the principles of the Convention.[56,57]

2.2 Social determinants of children's health

Building on the UN global conferences on the Rights of the Child, member states marked a sturdy commitment to the right to development, peace and security, and gender equality, to eliminate the many facets of poverty and to sustainable human development.[58] With the end of the MDG era, the new development framework represents a renewed commitment in countries to reduce under-five mortality to at least 25 deaths per 1000 lives.[6,51] Infant mortality rates in these countries do not receive the warranted attention as major gaps are still evident between and within these countries.[59,60]

IMR is defined as "the number of infants dying before reaching the age of one year per 1 000 live births in a given year".[61] It reflects the social, economic and environmental conditions in which a child is raised; this includes the quality and availability of health care.[62] WHO has singled out these aspects as the underlying determinants of health.[63] Human development is the centre of attaining freedom to health, education and a good quality of life, and relies on sustenance of positive outcomes and reducing human impoverishment and oppression.[64] These basic entities are encapsulated in the Human Development Index (HDI), which is a broad assessment of human

development. The HDI measurement extends from 0-1, zero indicating a lack of development in one or more of the three basic entities of human development and one illustrating the contrary.[64,65] Human development is defined as "the expansion of people's freedoms to live long, healthy and creative lives; to advance other goals they have reason to value; and to engage actively in shaping development equitably and sustainably on a shared planet. People are both the beneficiaries and the drivers of human development, as individuals and in groups".[66]

The Human Development Report of 2011 also states that improvement to health care, education and a safe environment is undermined by the disparities in income distribution that is evident between different communities.[66] These inequalities can pertain to people living in rural areas compared to those living in urban areas, and/or the poor versus the rich living in urban areas. Children who are marginalized or living in the world's remotest areas seldom have adequate access to basic health care, and their poor living conditions further aggravate their situation.[67-69] Moreover, cities are becoming overcrowded as more people regard urbanization as a means to better living conditions and opportunities. As a result, most of these migrants are forced to live in almost uninhabitable environments and fundamentally struggle to survive. Children born into these families are raised in slums or greatly remote and overcrowded areas where they are denied their right to access health care and obtain education.[69]

Poverty has been proven to have a profound impact on child health and development along a number of dimensions.[70,71] Global poverty has been a predominant determinant of infant health outcomes as it continues to be the major cause of ill health among children and has significant public health implications. Poverty has many facets, these include the physical deprivation of adequate food, satisfactory shelter and access to proper sanitation and safe drinking water.[72] Poverty can also lead to social exclusion, a lack of education, unemployment and low income; these aspects reduce opportunities and as a result threaten health.[73] Two targets were set for reducing extreme poverty and hunger.[70]

Globally the target of cutting by half the proportion of people living below $1,25 a day in 1990 was reached in 2010, five years ahead of time. Poverty has been reduced as an estimated 700 million fewer people lived in conditions of extreme poverty in 2010 than in 1990. However, one

in eight people still go to bed hungry, despite major efforts made globally to alleviate poverty. Current trends, however, suggest the impetus of growth in developing countries may be enough to sustain progress required to attain global poverty reduction targets.[74] The success in reducing poverty has been linked with countries such as China and Brazil, where remarkable progress has been made.[60] In spite of the emerging positive trend in development also noted in African countries, poverty reduction has been irregular across developing countries.[71]

In as much as poverty is a determinant of health, it is also a key factor in access to education. The two are inseparable entities as having access to basic education decreases the likelihood of impoverishment. Educated people are more aware of ways to avoid health risks and to live fulfilled lives. Children born into families lacking primary education are at greater risks of health complications than those whose parents have a basic educational background. Female educational attainment has been steadily increasing globally; this progress has been linked to over half of the noted reductions in child mortality.[75]Globally, 123 million young people aged 15-24 lack basic reading and writing skills. Dishearteningly 61% of them are young women. Gender gaps in literacy among the youth are, however, narrowing.[76]

Women and children's rights have evolved significantly over the past decade to having an unquestionable and essential value in health reforms among other societal aspects. Simultaneously, policy makers realize the need to empower women as an integral element to improve quality of life in terms of the socioeconomic and physical environment.[77] Strengthening community participation and recognizing the essential role communities play in providing and acquiring information pertaining to health services is crucial. One of the most effective tools towards child health reforms is women empowerment, and health promotion, especially amongst marginalized women, may have an unprecedented effect on child health outcomes.[78]

More than 2.1 billion people have gained access to improved water sources over the past two decades. Notwithstanding the unprecedented development in access to safe drinking water, about 785 million people did not have access to safe drinking water in 2017. Approximately 80% of this population lives in rural areas. Moreover, the quality of improved water sources is still of great concern; as a result the number of people without access to safe drinking water may be

higher than official estimates.[77] Large proportions of people do not enjoy the convenience and associated health benefits of piped drinking water and adequate sanitation.[77,79] If this remains unchanged by 2030 700 million people's lives will be threatened by water scarcity.[77]

2.3 Under-five mortality

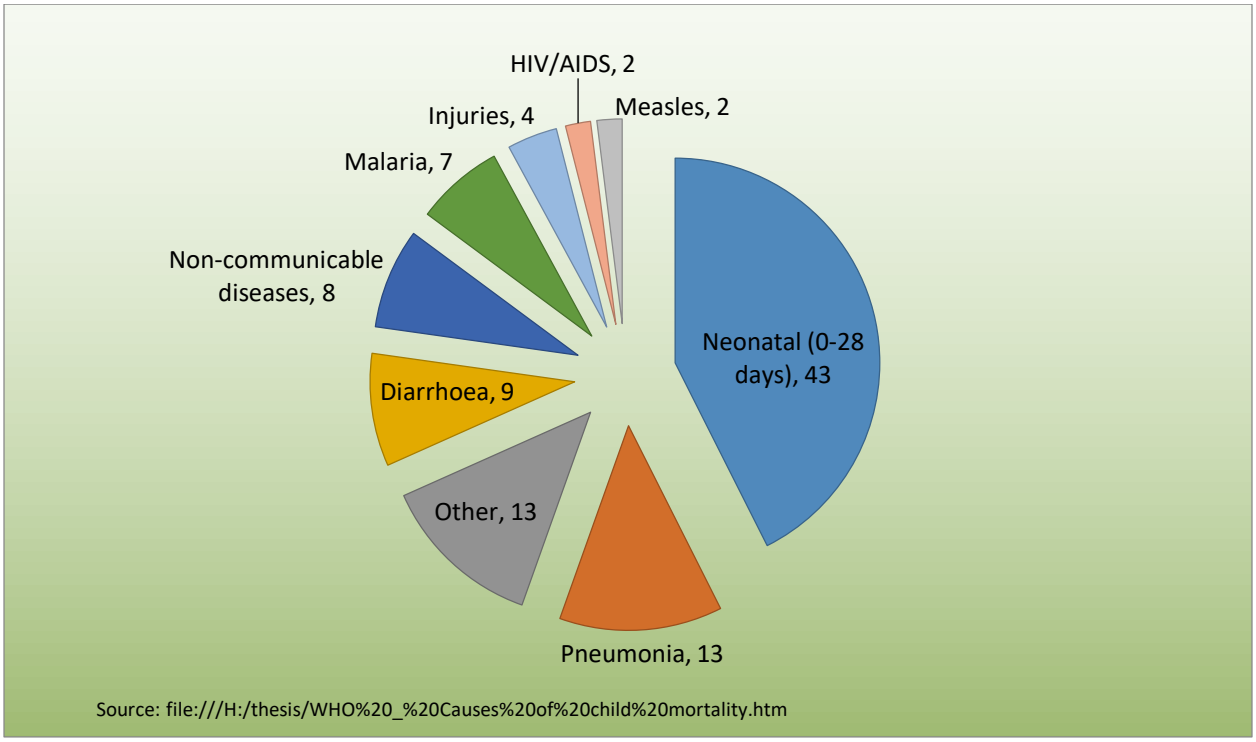
2.3.1 Global causes of under-five mortality

Considerable progress has been made in reducing child and maternal morbidity and mortality, improving nutrition, reducing morbidity and mortality due to Human Immunovirus (HIV) infection/Acquired Immunodeficiency Syndrome (AIDS), tuberculosis and malaria. Significant progress has been made in increasing access to improved drinking-water sources.[80,81] Globally under-five mortality has declined by from 76 deaths per 1000 live births in 2000 to 39 deaths per 1000 live births in 2018.[51] An overwhelming 80% of deaths of children under five occurred in sub-Saharan Africa and Southern Asia.[51,52]

Of the 195 UN countries 27 countries are expected to meet the SDG target on under-five mortality by 2030 ; these include countries that reported some of the highest under-five mortality rates in 1990.[82] This implies that it is very possible to accelerate improvements in reducing child mortality in a variety of settings that differ in terms of level of economic and social development, population size and epidemiological patterns.[60,81-84] These countries include Brazil, Bangladesh, China, etc. and offer models on simple and effective interventions.[60] In contrast, 52 countries are lagging behind as progress remains slow; many of these countries are in sub-Saharan Africa. In these countries under-five mortality rates were above 83.1 deaths per 1000 live births in 2015.[52] In sub-Saharan Africa, 1 in 9 children die before they reach the age of five. This statistic is over 16 times the average of developed regions (1 in 152) and almost twice that in South Asia (1 in 16).[77] These children live in the poorest regions and countries in the world, and in the most under-privileged areas within countries.[69]

Of the 6.9 million under-five deaths reported, most were caused by preventable diseases such as pneumonia, diarrhoea or malaria, Figure 1 on the next page.

Figure 1: Global causes of under-five mortality



Despite widespread advances in fighting childhood diseases, pneumonia and diarrhoea remain the primary causes of deaths among children under the age of five, killing an estimated 5 000 children under-five every day. The incidence of pneumonia and diarrhoea are predominant in poor regions, with about three-quarters occurring in just 15 countries. Approximately 1 200 children under the age of five die every day due to malaria alone; primarily in sub-Saharan Africa where it claims the lives of 14% of under-five deaths in that region. Leading communicable diseases (including pneumonia, diarrhoea, malaria, HIV/AIDS, pertussis, tetanus, measles, meningitis and sepsis) were the greatest cause of under-five mortality in low-income countries.[84]

South Asia has made significant progress in reducing preventable under-five deaths, as under-five deaths in this region have reduced by more than half since 1990. However, one in three under-five deaths still occurs in South Asia and no major acceleration has been noted in the rate of reduction. Sub-Saharan Africa faces an exceptional and dire challenge in accelerating progress. This region will be home to the biggest population of children under-five in the near future, and

will account for approximately 37% of the global total. Yet it is the region with the least growth in addressing under-five mortality to date.[81,84]

2.3.2 Access to essential medicines and the Global Partnership for Development

One of the most pressing concerns in many developing countries is the limited accessibility and availability of priority medicines for infants to the poorest and most remote areas of each state.[85] Many of these countries lack the infrastructure and the health care personnel to deliver and monitor correct use of essential medicines.[86] This deficiency in the delivery of essential medicines is a violation of the rights of the child, as WHO recognizes access to essential medicines as an integral element of every child's right to the highest attainable quality of health care. UNICEF states that 1 billion children worldwide are deprived of one or more services that are essential to their survival and development.[68] In some of the countries in sub- Saharan Africa and in South Asia, almost half of the population does not have regular access to essential medicines. [85,87]

Most of the developing countries facing the challenge of inaccessibility to essential medicines cannot afford these medicines. This, among other challenges, formed the basis on which the UN agreed to achieving a Global Partnership for Development by 2015 (MDG 8).[85,87] The aforementioned partnership was formed in an attempt to assist these countries to attain the development goals. The United Nation Member States and stakeholders aimed to advance aid to developing countries through direct assistance and by building a facilitative economic environment for growth. The direct assistance comprised of the Official Development Assistance, which is a percentage of the gross domestic income generated by the donor countries. Efforts made also included increasing the accessibility and availability of essential medicines, as their costs remained unaffordable in many developing countries.[85] Negotiations were carried out at the World Trade Organization Round to realize the Doha Development Agenda, whose objectives were to achieve development of the international trade system via lower trade barriers and revised trade rules.[88,89] Although many efforts have been made at the global level, about a third of the world's population do not have regular access to essential medicines. Therefore, the MDG gap task force challenged global leaders and stakeholders to increase efforts in recognizing the potential of the global partnership for development.[88] Goals set out in MDG 8 were revitalized in

the 2030 Agenda, target 3.8 sets out to achieve universal health coverage, which includes access to safe, effective, quality and affordable medicines for everyone.[51,52]

2.3.3 Preventative programmes for childhood illnesses

Renewing the promise of survival for the world's children heavily depends on tracking and attending to the leading causes of child mortality. Infectious diseases, under-nutrition and neonatal complications are responsible for a great majority of under-five deaths, most of which are avoidable given the correct measures. A vast number of under-five deaths brought on by these diseases occur in a handful of countries, which are among the poorest countries in the world. The Global Action Plan for Pneumonia and Diarrhoea (GAPPD) aims to eliminate preventable pneumonia and diarrhoea deaths by 2025 and to reduce related morbidity. The plan seeks to realize these goals by promoting practices that have been proven to protect children from diseases; and by ensuring that every child has access to proven and suitable pre-emptive and treatment measures, Table 1 on the next page .[60,71]

Determinants of childhood illnesses are very much inter-related. A clean home environment, including access to safe drinking water and adequate sanitation, can go a long way in reducing the incidence of diseases. Risk factors also include under-nutrition and sub-optimal breastfeeding practices among many others. The approach to protect children from the onset of childhood illnesses is to establish good health practices. These include, but are not limited to, exclusive breastfeeding for six months, adequate complementary feeding and sufficient vitamin supplementation.[71]

Table 1: Key interventions to improve child survival

Intervention	Health outcome
Skilled birth attendants and follow up after birth	Provision of quality health care
Prevention of mother-to-child transmission of HIV and paediatric treatment of AIDS	Prevention and/or treatment of HIV/AIDS
Adequate nutrition, especially exclusive breastfeeding for six months	Prevent malnutrition and boost immune system
Complementary feeding combined with continued breastfeeding for at least two years	Prevent malnutrition and boost immune system
Micronutrient Supplementation	Prevent malnutrition
Immunization	Boost immune system
Oral rehydration therapy plus zinc supplements	Treat diarrhoea
Antibiotics	Treat pneumonia, malaria and other infections
Insecticide-treated mosquito nets	Prevent transmission of malaria
Hygiene promotion	Prevent transmission of communicable diseases

2.3.4 Success stories of health achievements in developing countries

Many countries have adopted the approach of task-shifting to compensate for the lack of health care providers, to increase community mobilization and to reach the remotest communities.[90] Honduras implemented the Integrated Community Child Health Program (AIN-C), through which the Ministry of Health decentralized the provision of health care focusing on the marginalized communities to achieve greater equity in health provision and participation.[91] This program served to create an opportunity for the community to participate actively in improving the health of infants. The community is responsible for selecting the Community Health Workers (CHWs)

within their own community to form a liaison between the health centres and the community. The CHWs provide the public with a medium through which they can identify and address health issues affecting child survival in their community.[90] AIN-C increased the knowledge of mothers on factors impacting on their children's health. The percentage of children who received Oral Rehydration Therapy (ORS), vaccinations and supplements, among other interventions, increased significantly more in areas where AIN-C was in progress compared to those in which it was not.[92]

In India, house visits were performed regularly by trained local workers to reach mothers who could not access health facilities. These health workers worked with UNICEF towards reducing IMR in marginalized communities through implementing IMCI.[93]In an attempt to strengthen delivery of the PHC system in Iran, health houses were elected which were designed to reach remote areas. These health houses were run by one or two trained members of the community in which they served and covered approximately 85% of the rural population. The remaining 15% were covered by mobile teams of health professionals and trained local workers.[94] These health workers contributed to the sharp decline in IMR noted in Iran.[94, 95]

2.4 Undernutrition and young child feeding

2.4.1 Undernutrition and under-five mortality rates globally

Malnutrition is a dire global health concern, with undernutrition killing or disabling over tens of millions of children annually. Undernutrition, collectively with infectious diseases, contributes to almost half of IMR. Levels of stunting remain unacceptably high in all Countdown countries. Poor nutrition increases children's risk of affliction from diseases such as pneumonia, diarrhoea and consequent death.[60] Furthermore, it impedes healing and the frequency of re-infection is increased significantly.[84] The relationship between undernutrition and infection creates a lethal cycle of worsening illness and depreciating nutritional conditions. In addition to the increased risk of morbidity and mortality, poor nutrition, particularly in the first two years of life, can lead to irreversible stunted growth. Stunting is associated with an impaired cognitive capacity and reduced performance.[96,97]

Approximately 155 million deaths of children under the age of five years, were affected by chronic malnutrition. As a result these children may never reach their full potential and will remain underdeveloped. 52 million children suffered from wasting, of which 17 million were dangerously underweight, putting them at increased risk of illness and death. Furthermore a reported 41 million children were overweight, a burden that increases the risk of acquiring NCDs later in life.[77] A child who is severely undernourished is 9.5 times more likely to die due to diarrhoea than a child who is not. Stunted children are 4.6 times more at risk of dying than those who are not.[98] This is unfortunate for the millions of children under-five are affected by undernutrition in the world today. It is a clear violation of their health and developmental rights.

Recently, stunting has been highlighted as the primary indicator for assessing child undernutrition and its detrimental short-term and long-term consequences. Stunting reflects persistent exposure to inadequate nutrition and infections, particularly in the first two years of life.[98] Stunting in infants is described as "inadequate length or height for their age", and points to early exposure to chronic undernutrition.[71] Although it has decreased globally, in Africa stunting has continued to increase in the past decade, most likely due to the high population growth noted on the continent. Of the world's stunted children, 14 of the most underdeveloped countries are home to 80% of these children. Stunting is most prevalent among the poorest children and among those living in rural areas. Evidence from 54 low- and middle-income countries illustrate that undernutrition begins during pregnancy of the mother and throughout the first two years of an infant's life. Emphasis should thus be placed on programmes that support interventions that address maternal, infant and young child nutrition during this period.[98]

The interventions currently in progress that directly address stunting and other nutritional indicators need to be scaled up. These include the simple, cost-effective measures during the crucial two year window period that have proven to be effective.[71] Nutrition interventions that can improve child survival should concentrate on the prevention and management of severe malnutrition; protection, promotion and support of breastfeeding and complementary feeding. A community-based approach has been increasingly highlighted as being useful to treat children

with severe acute malnutrition.[84] Optimal breastfeeding and complimentary feeding practices have a significant impact on reducing child morbidity and mortality. The benefits of age-appropriate feeding practices for infants and young children are well documented, and these should be applied throughout the continuum of care, including timely initiation of breastfeeding.[71] Tackling undernutrition and expanding the impact of nutrition-specific interventions requires a multi-dimensional approach, incorporating women's empowerment initiatives .[60,97]

During the 2012 World Health Assembly (WHA), a 13-year comprehensive implementation plan to target maternal, infant and young child nutrition was sanctioned.[99] The objective of the plan was to alleviate the double burden of malnutrition in children, encapsulating the six targets of which exclusive breastfeeding is one, by 2025. The specific global target is to increase the rate of exclusive breastfeeding in the first six months by a minimum of half its current rate. For the period extending from 2006 to 2010, breastfeeding was estimated to be 37%; thus an increase of 50% would lead to approximately 10 million more children being exclusively breastfed until six months.[96]

2.4.2 Innocenti Declaration on the promotion, protection and support of breastfeeding

The Innocenti Declaration on the protection, promotion and support of breastfeeding places emphasis on the importance of building women's confidence in their ability to practice optimal breastfeeding practices through health information and access to appropriate health care facilities.[100,101] The declaration was endorsed in 1990, in Italy by 30 countries and was later adopted by the 45th World Health Assembly (WHA) and UNICEF.[100] Once these rights are met, women will be in a better position to provide a suitable environment for optimum breastfeeding practices.[78] The declaration further urges national authorities to integrate breastfeeding policies into their health and development policies. Heads of states are also advised to strengthen all measures that serve to protect, promote and support breastfeeding within corresponding programmes such as pre- and peri-natal care, nutrition, prevention and treatment of maternal and childhood illnesses. Furthermore, it is recommended for health care professionals to be trained in the necessary skills to implement breastfeeding strategies.[100] The baby-friendly

hospital initiative (BFHI) encapsulates strategies to fully protect, promote and support breastfeeding through which health service providers are urged to follow the ten steps to successful breastfeeding, listed below[102]:

1. Have a written breastfeeding policy that is routinely communicated to all health care staff.
2. Train all health care staff in skills necessary to implement this policy.
3. Inform all pregnant women about the benefits and management of breastfeeding.
4. Help mothers initiate breastfeeding within half an hour of birth.
5. Show mothers how to breastfeed, and how to maintain lactation even if they should be separated from their infants.
6. Give new born infants no food or drink other than breast milk, unless medically indicated.
7. Practise rooming-in, that is, allow mothers and infants to remain together 24 hours a day.
8. Encourage breastfeeding on demand.
9. Give no artificial teats or pacifiers (also called dummies or soothers) to breastfeeding infants.
10. Foster the establishment of breastfeeding support groups and refer mothers to them on discharge from the hospital or clinic.

It is reported that breastfeeding can prevent up to 800 000 deaths among children below the age of five years, given that these children are optimally breastfed from 0-23 months. In countries where stunting is highly widespread, promotion of breastfeeding and suitable complementary feeding can prevent about 220 000 deaths among children under five.[103,104] Early initiation of breastfeeding could avert a fifth of neonatal deaths, yet less than half of infants are put to the breast within one hour.[105] In 1981, the WHA endorsed the International Code of Marketing of Breast Milk Substitutes. The International code specified that if mothers do not practice the age-appropriate feeding of infants and young children it can lead to malnutrition and subsequent morbidity and mortality. In accordance with the International Code, breastfeeding is recognized as an unparalleled method of feeding that ensures the healthy growth and development of infants.[106] Furthermore, it stressed that the improper practice in the marketing of breast milk substitutes and related products can have serious health implications. The pledge made during the WHA reaffirms the importance of states protecting, promoting and supporting breastfeeding through appropriate legislation and policies that implement the minimum standards recommended by the International Code.[100]

The Code plays a significant role in reducing all forms of promotion of breast milk substitutes, including direct and indirect promotion to pregnant women and mothers of infants and young children. Evidence has shown that most mothers are able to breastfeed and will do so if they have access to the correct information and support.[107] However, external influences through advertisements, information packs and indirect pressure through the public health system overwhelm mothers with incorrect and often biased information. The Code is very valuable in helping governments reduce the threat that is associated with the inappropriate use and distribution of infant formula. In 2011, 37 countries out of 199 with available data have passed regulations based on the recommendations set out in the Code.[105] Execution of the Code can raise awareness within states and communities of the inherent and external risks of contamination of breast milk substitutes.[106]

2.4.3 Impact of breastfeeding practices on health outcomes

Global frequency of age-appropriate child feeding practices is low and there are discrepancies among regions. Less than half of infants born are put to the breast within an hour after birth and only 38% of infants are exclusively breastfed for six months.[71] Over 30 studies globally, in developing and developed countries, have demonstrated that breastfeeding can significantly reduce morbidity.[108] A collective analysis showed that breastfeeding can prevent over 75% of deaths in infancy and 37% of deaths during the second year of life.[109] A study conducted in Brazil revealed that children who are not breastfed are 14 times more likely to die from diarrhoea, 3.6 times more likely of dying from pneumonia and 2.5 times at greater risk of dying from other infections than children who are breastfed exclusively for six months. Studies carried out in Ghana, India and Peru have illustrated that children who are not breastfed are 10 times at a higher risk of dying than children breastfed exclusively or predominantly.[110] Furthermore, a study in Ghana revealed that infants who received breast milk within the first hour after birth were 9 times less likely to die than those who were initiated to a combination of formula milk and breast milk within the first 72 hours after birth.[111]

Current literature indicates that breastfeeding also has a protective effect against NCDs, such as hypertension, dyslipidaemia, obesity as well as Type-2 Diabetes Mellitus in adulthood. Although

major risk factors such as lifestyle, age and genetics play a role in acquiring NCDs, evidence suggests that appropriate nutrition in early life can mitigate likelihood of acquiring these illnesses.[112] As a result UNICEF and WHO have committed to integrate breastfeeding advocacy in strategies aimed at targeting health issue at a global level.[112,113] The Agenda on sustainable development places emphasis on breastfeeding as a key element to reduce infant and under-five morbidity and mortality but also to target the incidence of NCDs in adulthood, which in turn will increase productivity and development within societies.[51]

2.4.4 Exclusive breastfeeding guidelines

2.4.4.1 Initiation of breastfeeding

Exclusive breastfeeding means that an infant only receives breast milk from their mother or a wet nurse, or expressed milk and no other liquids or solids; not even water, with the exception of oral rehydration solution, drops or syrups containing vitamins, or medicines when necessary.[114,116] Enough nutrition during infancy is vital to ensure growth, health and full development of children.[115-117] Poor nutrition increases the likelihood of childhood illnesses. Exclusive breastfeeding should be initiated within the first hour after delivery and continued up to six months after birth.[118]

Colostrum is a form of milk secreted within 2-3 days after delivery that is yellowish in colour and comes in very small quantities. It provides infants with important protection from the bacteria in the surrounding environment, i.e. confers passive immunity. Colostrum also helps to prepare an infant's gut to be able to digest nutrients in the milk. It is crucial that an infant receives only this milk during this time, and nothing else.[115]

Once the initial days after delivery have passed, breast milk will come out in larger quantities making the breasts feel "full". This milk contains nutrients that help with an infant's development. Fats found in breast milk are important for the optimal development of an infant's brain and ability to move around, walk, talk and grow fully. Carbohydrates in breast milk also provide energy and protection against infection. Amino acids in breast milk are more suitable for infants; in animal milk they come in more complex forms that are indigestible for an infant's intestines. Antibodies, immunoglobulins and other anti-infectives factor found in breast milk ~~also~~

help protect infants from infection. Breast milk is vital to confer passive immunity to the infant, which cannot be done with animal milk or formula milk. This helps the infant's body to be able to recognize these bacteria and fight them faster than usual to prevent or lessen severity of an infection.[115-118]

If an infant is breastfed exclusively, frequently and when the baby requires to be fed, malnutrition can be prevented. Other illnesses that can be avoided are diarrhoea, pneumonia and other respiratory infections. The nutrients found in breast milk can also help enable a quicker recovery from an infection[116]. In later years, a well breastfed infant has a reduced risk of developing asthma, stomach viruses, diabetes, childhood blood cancer (leukaemia), a weak immune system causing repeated illnesses, obesity and many other illnesses.[117] Breast milk has been also shown to reduce an infant's risk of developing learning disabilities.[118]

2.4.4.2 Breastfeeding pattern

To ensure adequate milk production and flow, a baby needs to be fed as often as possible, and for as long as he/she needs both day and night; this is termed demand feeding. Infants who are fed on demand, according to their appetite, obtain what they need for optimal growth. Infants rarely empty the breast, and only take in about 70% of breast milk. Breasts seem to vary in their capacity to store milk. Therefore, infants of mothers with breasts of low-storing capacity may need to feed more frequently to ensure adequate daily intake and production. It is vital not to limit the duration or frequency of feeds, provided the baby is correctly attached to the breast. If a baby stays on the breast for a long time, over half an hour or if he/she wants to feed too frequently, more often than every hour; then the baby's attachment needs to be checked and improved. Prolonged feeds can be an indication of ineffective suckling and insufficient transfer of milk to the baby. This is mostly attributable to incorrect attachment of the baby to the breast, which can lead to sore nipples and, ultimately, engorgement if not rectified. If the baby's attachment is improved, the transfer of milk is more efficient and feeds become shorter and less frequent. This also minimizes nipple damage.[117-118]

2.4.4.3 Formula feeding and/or supplementary feeding

It is not recommended to give an infant anything other than breast milk during the first six months.[119] Animal milk and formula milk are not the same as breast milk as they do not contain antibodies and other anti-infective agents found in breast milk. Nutrients in formula milk and animal milk are difficult for an infant's intestines to digest and absorb; as a result he/she can get sick. Therefore, infants who are fed formula milk, animal milk, porridge and/or veggies during the first six months are more at risk of childhood illnesses than those who are breastfed only.[120, 121] Bottle feeds prepared with unsafe water and utensils that are not sterilized can lead to infection. Contamination is very likely with bottle feeds and thus it is best to avoid bottles, pacifiers and teats.[112-118, 120,]

2.4.4.4 HIV and infant feeding

The aim is to balance preventing transmission of HIV through breastfeeding with the need to support the best nutrition for infants through exclusive breastfeeding. The virus may be transmitted from a mother to her infant during breastfeeding. The risk of transmission is lower when the infant is exclusively breastfed for six months only than during mixed feeding, as the breast milk offers protection to the infant. If the mother chooses to exclusively breastfeed her infant, she should stop breastfeeding her infant completely after six months instead of mixed feeding; this is to minimize the risk of transmitting the virus to the infant.[116]

The factors that increase the risk of HIV transmission through breastfeeding includes the mother acquiring the virus during breastfeeding; this is due to the high initial viral load. The higher the viral load of the mother, the greater the risk of transmission of the virus from mother to child. Poor breast health, e.g. sore nipples, cracked nipples of the mother, and oral infection of the infant can all increase the risk of transmission. The mother needs to make sure her child is in good health at all times. Finally non-exclusive breastfeeding (e.g. bottle feeding and breastfeeding) and exclusive breastfeeding for longer than six months can also increase the risk of transmission of the virus.[122,123]

An HIV-positive mother should consult the nurse and get counselling on the options available to her and her infant. This is important to make sure of her health status and her individual

circumstance and discuss the best option for her. Unless replacement feeding is suitable, possible, affordable, safe for the infant and can be maintained, it is recommended that an HIV-positive mother exclusively breastfeeds her infant for six months.[117] All HIV-exposed infants should go for regular check-ups at the clinic. If after six months and adequate feeding from other sources cannot be achieved, an HIV-positive mother can continue breastfeeding and give complementary food in addition, but regular check-ups are crucial. All breastfeeding should stop once a satisfactory diet without breast milk can be achieved. It is crucial that a breastfeeding mother who is HIV positive is on antiretroviral agents (ARVs) to reduce the risk of transmission. As long as ARVs are available, HIV positive mothers can breastfeed their infants up until 12 months with appropriate complementary feeds starting at six months. When ARVs are not readily available, breastfeeding still provides infants with a greater chance of survival. Infants who are already HIV positive should be breastfed in conformity with the rest of the population, i.e. exclusive breastfeeding for six months followed by continued breastfeeding up until two years with complementary feeding.[122,123]

2.5 South Africa and under-five mortality

2.5.1 Under-five mortality in South Africa

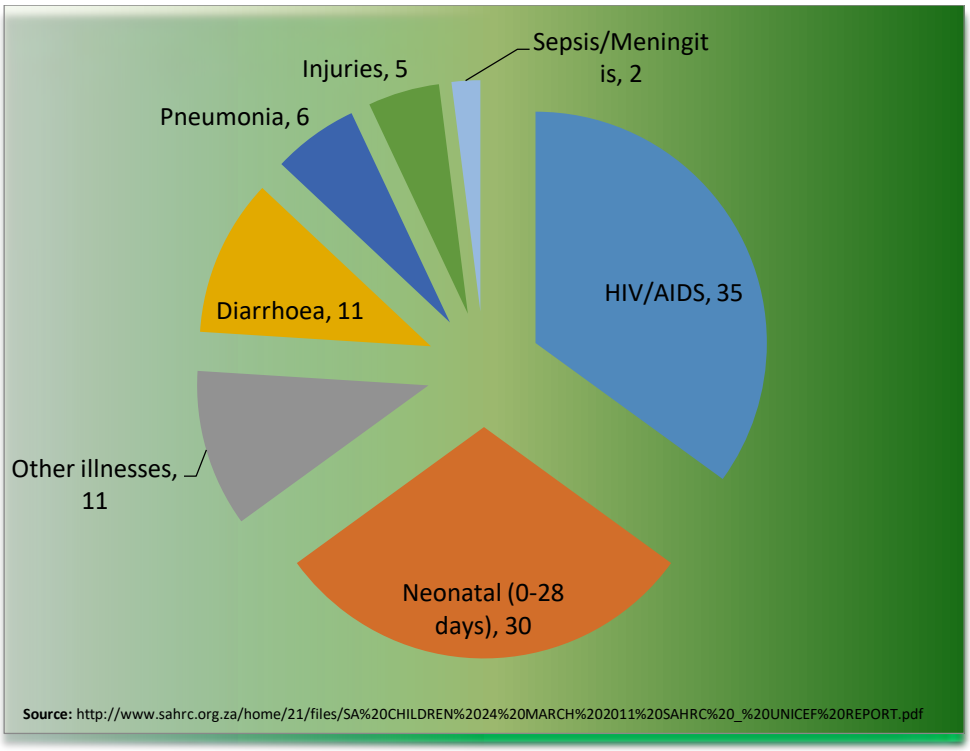
The Countdown to 2015 Report had placed South Africa amongst the 74 "Countdown countries" with the highest under-five mortality worldwide. These countries contributed to a staggering 95% of global under-five mortality rates.[58] However, under-five mortality in South Africa had reduced from 60 deaths per 1000 live births in 1990 to 28,5 deaths per 1000 live births in 2019. Also IMR has decreased from 56,5 in 2002 to 22,1 in 2019, demonstrating a need to revitalise momentum in IMR reduction strategies.[2] Nevertheless with the introduction of the Prevention of Mother-to-Child Transmission (PMTCT) programme and the Pneumococcus and Rotavirus vaccine, the likelihood of attaining infant health outcomes have significantly improved.[80]

The major causes of under-five mortality are depicted in Figure 2 on page 46, HIV/AIDS is the leading cause of under-five mortality in South Africa, causing approximately 35% of death among children under-five. Neonatal complications contribute to an estimated 30% of under-five deaths. Diarrhoea and pneumonia combined contribute to about 17% of under-five deaths.[3]A

rapid decline, however, has been observed in the incidence of diarrhoea and pneumonia among children under-five.[124,125] There has been steady progress in efforts made to immunize 100% of children under the age of one year, leading to immunization levels of over 90% in 2011. In the same year the proportion of children under one immunized against measles had also increased considerably from 72% noted in 2003 to 99%.[97] A high proportion of infant deaths are due to malnutrition as it is the contributing factor to 60% of all deaths of children under the age of five years.[124] Exclusive breastfeeding remains low in South Africa with only 12% of infants aged 0-3 months and 1.5% of children aged 4-6 months being exclusively breastfed.[5] These statistics are alarming despite the development of Primary Health Care programmes that aim to promote optimal peri-natal and neonatal care including infant feeding practices.[126] These programmes include the perinatal problem identification programme (PPIP) and the Child Healthcare problem identification programme (PIP) which were extended to 98 hospitals by 2009.[127, 128]

In addition, the Integrated Management of Childhood Illnesses (IMCI) handbook is used for early identification and appropriate treatment of childhood illnesses which encapsulates the PMTCT programme.[77] All three of the abovementioned programmes include preventative and treatment measures for childhood illnesses and, in particular, promotion of nutritious diets and support for exclusive breastfeeding or alternate appropriate feeding choices.[129]

Figure 2: Causes of under-five mortality in South Africa



2.5.2 Socio-economic impact on infant health

South Africa generated a Gross Domestic Product (GDP) of US$ 13 400 per capita in 2017 and is classified as an upper middle income country by the World Bank.[130, 131] In spite of its substantial economic produce, income is distributed very unevenly. If the income of the majority of its population were taken into account, South Africa would qualify as a low income generating country. The country owns refined infrastructure evident in the private health sector and a well-developed macroeconomy; however, it endures great inequalities in access to quality education and health care services.[5] Of South Africa's GDP, 8.8% is allocated to health expenditure, yet universal quality health care remains a challenge.[132] The country does not depend on foreign aid, thus reaching the 2030 Agendas will rely on the ability of the country and other stakeholders in putting domestic resources to good use.[2]

The economy of South Africa remains inefficient in terms of its ability to convert economic growth noted in the country into prosperity for its population. In spite of its economic strides, South Africa still battles with poverty, inequality, unemployment and hunger.[2] In response the South African government has developed a combination of policy interventions aimed to alleviate the burden of unemployment and inequality. One of the primary objectives of South Africa has been to reduce the level of poverty and improve the quality of life of its citizens.[12] Given the lengthy battle with inequality and poverty, delivery of essential services and the provision of basic employment has been a consistent challenge.[13]

The South African government has attempted to address poverty through the provision of a social package aimed at lessening the cost of living of the poor.[124] Social packages in South Africa are targeted at a number of levels. These include but are not limited to the following: no-fee paying schools, social grants for the vulnerable groups, free access to primary health care among other aspects. South Africa has successfully reduced the proportion of its population living below $1.25/day.[4] Significant progress has been made as the country has nearly achieved its goal in halving the number of children living below the food poverty line. To date 12 million children are receiving the Child Support Grant, however an estimated 18% of eligible children are not.[2]

While poverty levels and intensity of poverty are declining, inequality still remains a grave challenge in South Africa. The Gini-coefficient has remained more or less at about 0.7 since 2000, placing South Africa among the most disproportionate countries of the world. High and rising levels of unemployment are critical for alleviating poverty and inequality. Lessening these disparities is thus at the crux of poverty reduction strategies.[97]

2.5.3 Physical environmental factors

Major improvements have been made in South Africa with regards to addressing poverty and inequality by the introduction of service delivery programmes to realize improvements in access to safe drinking water and basic sanitation.[4] Environmental sustainability is essential for achieving continual development and poverty alleviation. In spite of the macroeconomic development noted in South Africa, the country faces challenges in achieving environmental sustainability and human development, as poverty, inequality and unemployment persist.[58]

Fortunately South Africa has improved on halving the proportion of people without continuous access to safe drinking water and basic sanitation. According to recent statistics, 90.8% of the South African population had access to an improved water source in 2011; in this regard the country had achieved its 2015 target well ahead of time. Moreover 66.5% of the population had access to an improved sanitation facility in the same year. Dishearteningly, living conditions of the population in terms of housing has not improved, as a large percentage of people were still living in informal settlements.[5]

2.5.4 Education and women empowerment

Women's decision-making power is limited by their ability to make choices to preserve the health, education and welfare of themselves and their children. An educated population, especially among women, was a major key component to meeting most of the MDGs.[133] A literate and educated woman is in a better position to acquire decent employment and iron out income disparities, and is more likely to bring about conditions for a more educated society. This can, in turn, increase the general living standard of the population which she represents.[77] Education is particularly essential for women, as it provides them with the means and the aptitude to boost more equitable participation in decision-making processes that affect their own lives and that of their children. Education also enables women to be able to make tactical choices concerning sexual and reproductive health as well as child health care.[97]

South Africa has nearly attained universal literacy for youth aged 15-24 with an overall literacy rate of 92.7%. Literacy rates were higher for female youth than the male youth for the period extending from 2002 to 2011. These statistics indicate a positive shift in the gender-based literacy levels over the past 20 years. The youth education rate for females increased from 88.4% in 2002 to 94.6% in 2011, whereas that of male youth increased from 83.3% in 2002 to 90.7% in 2011.[97]

Evidently South Africa had achieved the goal of universal primary education well ahead of the agenda. The country's educational system can be regarded as having attained near universal access to primary education. Nonetheless if this accomplishment is to be translated into an affirmative transformation, interventions are crucial to improve the quality and functionality of education. Education alone cannot obliterate poverty and inequality in society. It is evident that

quality education underscores income distribution and development of health outcomes, such as lower morbidity and mortality.[77] The South African government thus places focus on addressing special quality needs of women living in rural, peri-urban and urban areas. It recognizes the essence of mobilizing women (particularly young women) for participation in all spheres relating to their welfare and that of their children.[134]

2.5.5 Infant and young child feeding in South Africa

2.5.5.1 Breastfeeding practices in South Africa

Breastfeeding rates in South Africa, particularly exclusive breastfeeding for six months, remain low.[5,7] Some of the barriers that have been highlighted include the mother's perception that she has insufficient milk and thus resorts to formula feeding. Other obstacles that have been highlighted are fears of HIV transmission among mothers who are HIV positive, aggressive marketing of breast milk substitutes, misinformation provided to mothers from support systems regarding breastfeeding and breastfeeding difficulties.[106] Also mothers having to return to full time employment without accommodating structures in place, compounded by lack of guidance and support from health care personnel (HCPs) have a negative impact on breastfeeding rates.[135,136] Evidence suggests that infant and young child feeding is significantly improved when mothers acquire the necessary skilled support from HCPs during antenatal, postnatal and follow-up care. For this reason it is necessary that mothers and caregivers are given quality counselling and adequate support from HCPs. IMR reduction can only be accomplished if infant and young child feeding strategies are prioritised in national policies and at the frontline.[124]

2.5.5.2 Infant and Young Child Feeding Policy

The Infant and Young Child Feeding Policy of 2013 highlights key components that need to be implemented in each and every health facility at different stages of the continuum of care for infants and young children. These include the early initiation of breastfeeding, exclusive breastfeeding for the first six months followed by continued breastfeeding for two years. Furthermore, it places emphasis on equipping health facilities with the necessary skill to address feeding in the context of HIV and the appropriate use of formula.[135] The policy on infant and young child feeding is in line with one of the key outcomes set out by the Negotiated Service

Delivery Agreement Charter (NSDA). The NSDA reflects an agreement among key stakeholders linked to the delivery of outputs set out as key indicators for the government's programme of action from 2010-2014. For the Health sector, the priority is to improve the health status of each and every person in South Africa. One of the strategic outputs for realizing on "a long and healthy life for all South Africans" is to decrease maternal and child mortality. The charter accentuates the importance of re-engineering the PHC approach with a broader focus on promotive and preventive healthcare instead of taking on a curative approach to decrease mortality.[137] Assertions of the policy reflect those set out in the Convention of the Rights of the Child, recognizing the vital role of breastfeeding in the attainment of child health rights. In addition it is also aligned with the Global strategy for infant and young child feeding, the International Code of Marketing of Breastmilk substitutes and the Innocenti declaration.[135]

2.5.5.3 Health care resources

In spite of the 8.5% of GDP spent on health, South Africa's health care system is fragmented and inequitable due to the vast discrepancies that exist with regards to availability of financial and human resources, and accessibility and delivery of essential health services. The service system profoundly relies on a curative approach, despite the proven and effective preventive strategies that have been highlighted. This leads to a system that is too costly to maintain.[137] The health system is further weakened by the unequal distribution of human resources between the private and public sectors. One major contributing factor to the low exposure of proven cost effective interventions is the limited human resources to provide Infant and young child feeding (IYCF) counseling.[135] In 2018 there were only 31 doctors, 149 nurses and 11 pharmaceutical personnel per 100 000 people in the country.[138] The numbers of HCPs are even less in poor provinces such as the Eastern Cape, and is most pronounced in low income-settings such as in rural areas of the province.[124]

2.5.5.4 White paper on Public Service Transformation

South Africa drafted the White Paper on Public Service Transformation in 1997, which provides a guideline for health providers in public service delivery, which serves to improve the value of delivering services that meet the basic needs of all South Africans.[139] The proclamation of the White Paper is in accordance with the South African constitution which stipulates that public

service should be assumed through rendering services that are impartial and equitable and in which the public should be encouraged to participate in order to guarantee a development-orientated society.[140] The White Paper further calls upon policy makers to identify and make available services that redirect resources to communities that are underserved.[139]

2.5.5.5 The Batho Pele principles

In 1997 a set of transformation priorities were established which set to transform public service delivery to progress into a more community-orientated approach. These were termed the eight Batho Pele principles.[139, 140] The Batho Pele principles strongly echo the sentiments of the World Development Report,[141] in that services can be improved by empowering communities to increase their influence on services rendered to them.[139-141] Community participation has been the subject of somewhat controversial views, as some policy-makers hold that this approach is time-consuming and difficult to expand. As a result, in the past the South African public sectors relied on a centralized approach, where a more supply-driven approach was assumed focusing more on the delivery of outputs to secure better service delivery. This in turn took power away from the citizens, with a major consequence as citizens are now completely reliant on the government to undertake full responsibility for service delivery.[142,143] An example of how communities can take ownership of their health outcomes will be discussed further in the next paragraphs.

2.5.6 Tshwane declaration of support for breastfeeding

The Ministry of Health aims to accelerate interventions that attempt to improve infant and young child feeding, particularly exclusive breastfeeding, at a community level so as to ultimately increase infant survival, growth and development.[144] The Ministry maintains that it is necessary to introduce educational interventions to improve breastfeeding practices that reach marginalized groups, especially disadvantaged mothers in these communities through community involvement.[145] In the Tshwane declaration of support for breastfeeding in South Africa held in August 2011, members of the National Department of Health and stakeholders expressed the need to engineer exclusive breastfeeding strategies that can be upheld by forming community-based interventions as part of the continuum of care.[146] The South African Campaign

on Accelerated Reduction of Maternal and Child Mortality in Africa (CARMMA) further accentuates the important role that community participation plays in the acquisition and dissemination of health information pertaining to the benefits of breastfeeding.[147] Promotion of breastfeeding should be viewed in a broader context, recognizing its role in reducing the incidence of short-term illnesses, but also promoting long term health. Community health workers have a significant role in supporting mothers to exclusively breastfeed their infants.[137]

2.6 Community engagement and Health Promotion

2.6.1 Health promotion and community participation

The Ottawa Charter was endorsed by the WHO in 1986 at the First International Conference on Health Promotion.[148] The Charter served to reinforce PHC through health promotion due to emergent prospects for a new public health movement worldwide.[149] Health promotion provides a platform for enabling communities and individuals to be proactive in all aspects that directly and indirectly impact on their health and well-being. Examples of health promotion can be seen in the work that Non-Governmental Organizations (NGOs) do within communities in order to raise health awareness. Health promotion is reliant on effective community participation in setting priorities and implementing strategies to achieve health development. The essence of health promotion is the empowerment of communities so they can take ownership and control of their endeavours.[14] Community development utilizes existing resources within the community to enhance community independence, and to develop schemes that strengthen community participation with regard to health issues.[149-151] To strengthen the notion of health promotion the WHO held the Fourth International Conference on Health Promotion in Jakarta in 1997. The Jakarta Declaration on Health Promotion served to reiterate the importance of the covenant made in the Ottawa Charter and to emphasise certain features of health promotion.[152] Priorities for health promotion were set out to encourage social responsibilities for health through increased investments for health development, and consolidation and extension of partnerships for improved health.[153] The declaration further proclaimed the need to increase community capacity, to empower communities and to secure a platform to realize health promotion.[152] Improving the capacity of communities for health promotion entails health education, availability and access to resources.[154] The Conference on Health Promotion, held in Helsinki in June 2013,

served to promote a collaborative effort to review progress and achievements of Health Promotion to date. Member states expressed the importance of developing strategies in which action for health is retained in multiple sectors nationwide.[155]

Community participation and collaborations are the foundation of public health development.[156] The re-emerged paradigm of public health stresses the essence of engaging communities in making decisions that affect their health and improving community participation in health promotion and disease prevention.[157] It is crucial to understand the dimensions of a community before embarking on community engagement processes. In order for community engagement processes to succeed, such strategies should include members of the community and their leaders.[158] One definition of community engagement is that it is the process of working through collaborations that are mutually beneficial with people affiliated by similar situations and interests to address issues that impact on the well-being of that community.[159,160] Community-engaged research recognizes and builds on the resources within that community.[161,162]

2.6.2 Significance of community engagement with respect to child health

The evident lack of progress in attaining child health reforms with the existing strategies, particularly in developing countries, suggests a need to incorporate community-based health interventions.[163] The current era on development calls for a greater respect for the needs and perceptions of the poor and marginalized. Active community participation is a major key to fostering an empowered society and it is critical towards health development.[164] A community that is participatory in its own health needs, has a high probability of acquiring resources with more efficient use, yielding better outcomes. These communities tend to have citizen control over their government, and a more diverse board membership with a greater implementation of the empowerment approach.[165] Community mobilization means changing community behaviour and thus creating a platform for communities to take an active role to improve their well-being through initiatives brought about by themselves and/or stimulated by other stakeholders, with the ultimate goal of bringing about development.[166] Community mobilization is a notion that has not received much appeal due to controversial views on its significance in attaining health targets. Development pertains to the progress of members of a community in increasing their

capacities to activate and manage resources to ultimately produce sustainable and equal advances in their quality of life. Evidence from past research implies that community participation and ultimate empowerment is a cost-effective approach to reduce under-five mortality, particularly in remote underserved communities.[91,162,167,168]

2.6.3 The role of Tertiary institutions with regards to community engagement

Some universities worldwide have adopted the concept of community engagement as an integral role in the development of communities in which they are based. This entails a reciprocal and comprehensive relationship between a community and a higher education institution.[169] In South Africa, the mandate of higher education has introduced community engagement in universities as an integral element in addressing societal needs and producing students with the ability to apply their disciplines to local development affairs. Universities have identified the role of higher education to generate and disseminate knowledge, through which service-learning, community-based research and teaching provide a platform to enlighten and enrich both roles.[170] In an academic context, community engagement is defined by McDonald as "initiatives and processes through which the expertise of the institution in the areas of teaching and research are applied to address issues relevant to the community".[18] Community engagement is represented in various ways, ranging from informal activities to more formal structured programmes that tackle specific needs of the community; other forms may create an enabling environment for community engagement. Typically the community-engaged university is one that is committed to continuous engagement with the community through supportive, collaborative development with the intent of mutual gain.[171] Higher education also has a role to play in supporting gender equity and ultimately ensuring that the human rights of all citizens are met. Researchers have found that educating girls not only impacts positively on reducing poverty and promoting sustainable development, but also has its place in improving women's social and economic status, resulting in improved family planning and child survival.[172] Empowering women has significant implications in advancing community development, as these women can translate limited gains in knowledge and resources into positive substantial outcomes for communities.[173]

Evidence suggests that in order to advance development of community engagement there needs to be a clearly articulated framework. This framework would serve as a basis for addressing key issues that pertain to higher education as well as for the principles and practices of community engagement.[170] Universities have an obligation to the communities in which they exist as well as to the development of the country. Providing education to students to improve individual satisfaction and further growth of the economy is only one of the purposes that a tertiary institution serves.[174] Institutions and other health systems are recommended to customize their approach to accommodate the country's stage of development. Common goals should provide all stakeholders with a guide to expansion and transformation of higher education to ultimately develop a system that is attuned with societal goals.[172]

2.6.4 2.6.4. Endorsement of community engagement

2.6.4.1 Talloires Declaration

Article 2 of the Declaration on the Right to Development was sanctioned by the UN General Assembly in 1986. In accordance with the UN, every human being is the fundamental subject of development and should be the active participant and benefactor of the right to development.[175] To reinforce the right to development, the Talloires declaration serves to promote shared and universal human values through engagement of tertiary institutions within local and global communities. The declaration, which was pledged in 2005 by 29 signatories from tertiary institutions worldwide, further articulates that higher education institutions ought to serve and strengthen societies in which they exist.[176] This assertion parallels that which was made 15 years earlier at the *World Declaration on Education For All* held in Thailand in 1990. The World Declaration emphasized a broader approach to meeting the education needs for all, which encompasses universal and equal access to knowledge, with an enabling environment for learning through strengthened partnerships.[177] To accomplish equal access, universities should strive to cultivate graduates who are critical and conscious of building a more just and equitable society. Institutions that ratified the Talloires declaration have the obligation to expand public engagement and programmes that promote social responsibilities, through teaching, research and public service.[176] Additionally, universities should encourage partnerships between

universities and communities to increase opportunities, empower individuals within the community and strengthen the relevance, reach and openness of engagement.[176,177]

2.6.5 Impact of community engagement on child health

Many countries have adopted the approach of task-shifting to compensate for the lack of health care providers, to increase community mobilization and to reach the remotest communities.[90] Honduras implemented the Integrated Community Child Health Program (AIN-C), through which the Ministry of Health decentralized the provision of health care focusing on the marginalized communities to achieve greater equity in health provision and participation.[91] This programme serves to create an opportunity for the community to participate actively in improving the health of infants. Two examples of community engagement interventions conducted in South Africa have been selected to demonstrate the effect of these interventions on infant health outcomes. The first example is of an intervention which aimed to improve the quality of mother-infant relationship and infant attachment. In this intervention, which was carried out in Khayelitsha by Cooper *et al.*, local women from the community were trained to provide mothers of young infants with support, resulting in an improvement in the mothers' capacity to interact with their infants. The intervention was delivered in the mothers' homes by the women from the community who had been selected from the local community council for this purpose. Women in Khayelitsha who received the home-based intervention interacted with their infants with greater sensitivity after completion of the intervention six months later and at 12 months later. At 18 months, infants had a more secure attachment after the intervention than those in the control group. This research focused on the indirect impact of mother-infant interactions on childhood outcomes.[178]

The second example is that conducted by the USAID's infant and young child nutrition project, which aimed to integrate nutrition into existing community development programmes in South Africa. The focus was to improve the nutritional status, dietary intake and feeding practices of infants and young children below two years of age. In addition to helping mothers track the growth of their children, the project also aimed to help mothers understand the importance of proper nutrition on their children's improved growth. In order to carry out this project and extend it to marginalized communities, community volunteers were trained to lead nutritional

measurements of children and pregnant women at different time intervals. Volunteers were also responsible for furnishing important information to mothers on growth and nutrition of their children. In the Eastern Cape, the program for appropriate technology in health's (PATH) efforts helped develop training package for over 100 community health workers and local volunteers. The project also assisted the Department of Health to develop tools for assessing nutrition services rendered by the health facilities.[179]

2.7 Way forward for South Africa

In order for South Africa to scale-up public services and improve infant health, communities need to be consulted and their inputs echoed in national policies.[142] All stakeholders are to ensure that service delivery meets the demands, and that every person gets the service they need. Citizens need to take ownership of their health and social determinants of health; accountability should thus originate locally and amongst citizens, service providers and other stakeholders.[93,142] To improve service accountability, greater focus needs to be placed on outcomes while monitoring inputs and outputs within a given community.[142] The way forward for South Africa is to introduce a development approach that empowers all stakeholders and aligns the vision of decentralization, community empowerment and accountability to the general public. Strengthening community capacity to hold all members accountable for their health needs by managing and participating in health programmes is critical in the road to health development.[142,180] A report by the WHO Country Cooperation Strategy on South Africa states that all organizations, institutions and stakeholders are encouraged to recognize the community as a key component of the health system.[181] This calls for ensuring that mechanisms for effective community participation, involvement and control are set in place. In all regards, respect for human rights and accountability of recipients of health care and the general public must be maintained. In order for the PHC system to reach marginalized groups, each community has a key role in realizing the goals of PHC through community mobilization.[45,181]

Summary

With the progression of child rights and the eventual incorporation of these rights into MDGs followed by the SDGs, much effort is placed globally to reduce infant mortality particularly through the expansion of PHC system. The social determinants of health are very much relevant in reducing infant mortality and thus need to be addressed just as rigorously. The health related MDGs that include addressing HIV/AIDS, malaria and TB, improving maternal health as well as increasing accessibility and availability of essential medicines for children may have a noteworthy impact on child survival. South Africa has to place more efforts on addressing the social determinants of health, as in spite of the country's outstanding economic growth disparities in health, education and income persist. These social determinants negatively affect child survival and contribute to South Africa's lack of progress in reducing child deaths. HIV/AIDS, pneumonia and diarrhoea remain the major contributors to child mortality in South Africa, malnutrition indirectly and directly causing up to 60% of child deaths. Malnutrition has been linked to sub-optimal breastfeeding practices, among other causes, an ill practice that can be altered if addressed effectively. Policies are in place that support breastfeeding practices, but these need to be reinforced as full scale expansion of optimal breastfeeding practices remain a challenge. This could be due to lack of information, and limited health personnel. To compensate for the lack of health personnel, community engagement plays a vital role in improving access to information on ideal breastfeeding practices and how this can ultimately improve child health and longevity.

3 Study setting

3.1 The Eastern Cape

The Eastern Cape was home to 12.7% of South Africa's children, i.e. 2 514 000; 75% of whom were living in poverty in 2018. The province suffered from great impoverishment, and was ranked as the country's second poorest province. Although the province has significantly improved the amount of children living in households with adequate sanitation, only 39% of the children live in households with safe drinking water. [3] In addition district hospitals were mostly dysfunctional, inefficient and too costly to run. Health services were not of acceptable standards as the infrastructures were lacking in supplies and equipment. The majority of hospitals are in rural areas where the infrastructure, access roads, water and electricity were in very poor condition or simply non-existent. One quarter of the children have to travel far distances to reach the nearest health care facility.[138,182]

3.2 Glenmore and Ndwayana

This study was conducted in two communities which are situated in the rural areas of the former Ciskei in the Eastern Cape, Figure 3a and 3b. Poorly equipped health facilities, and inadequate emergency services greatly undermine the quality of health care services available to thee communities. Community members predominantly rely on grants, some depend upon relatives working in cities and others are employed by neighbouring farms. There is a clinic in each community led by one nurse and supported by five-six community health workers (CHWs). The population in Glenmore and Ndwayana is 4000 and 3200 respectively.[183]

Figure 3: Map of the South Africa and the Ciskei homelands

3a. Map of South Africa

3b. The map of the Ciskei homelands

3.3 The Angus Gillis Foundation

The Angus Gillis Foundation (AGF), a Non-Governmental Organization (NGO), serves these communities where they conduct community engagement projects on a regular basis. The AGF promotes positive health in terms of health, nutrition and empowerment by encouraging communities to take active responsibility on issues regarding their health outcomes. The organization recognizes the challenges pertaining to infant nutrition, particularly those that are pertinent in rural communities. The 'positive health champions' are members of the women self-help groups that existed within the communities and are recruited and trained by the AGF, with the intention of promoting positive health, through facilitating workshops between the PHCs and the communities. The NGO has been involved in numerous positive health promotion programmes, one of which include the strengthening of child health and wellbeing. Working with 12 positive health champions has enabled them to monitor and support the healthy development of children who attend community-based early childhood development (ECD) programmes. Furthermore they train these positive health champions to be able to identify signs that challenge optimal growth of the children, e.g. weight loss, recurring illnesses, etc. This programme also involves home visits to expand community-based ECD programmes to marginalized children. The programme is accompanied by continuous relationship-building activities between the positive health champions and the communities to enhance problem solving in a participatory manner.[184] The AGF formed the liaison between the researcher and the community during the course of the research.

4 Methodology

Overview of the chapter

This chapter focuses on the processes and structures utilized to carry out the two phases of the study, i.e. the baseline phase and the intervention phase. These processes include the ethical consideration, the various participants that were eligible to participate and how they were recruited. The chapter also explains how data was analysed.

4.1 Baseline phase

4.1.1 Research approach and design

The Community-based participatory research approach was used in this phase of the study in which the researcher made use of existing networks, partnering with the CHWs, village leaders, and women in the community. Out-of-stock status of WHO priority medicines for infants was carried out to determine stock status of medicines in the clinics. The researcher made use of FGDs and SSIs to explore infant health issues in the community. The KAP model was used as a guide to gather information from the participants pertaining to their perceptions of infant health issues in the communities.

4.1.2 Ethical consideration

When conducting research there are standards of conduct by which the researcher must abide to. In research involving human subjects there are four main principles that outline ethical considerations. These are namely *Autonomy* (uphold the rights of the individual)*, Beneficence* (intend to do good)*, Non-maleficence* (do no harm) and *Justice* (treat everyone equally).[185]

4.1.2.1 Ethical approval

In order to uphold the rights of participants, ethical approval is required from appropriate ethics boards. This is an indication that ethical standards have been maintained during the development of the method and its techniques.[186] The baseline phase was approved by the Faculty of Pharmacy Ethics Committee (Appendix 1). Approval to conduct the study was also granted by the Eastern Cape Department of Health in Bhisho (Appendix 2).

4.1.2.2 Informed consent

Respect for participants hinges on at least two concepts, i.e. individuals are autonomous and those with diminished autonomy are entitled to protection.[187] Marshall *et al* states that participants are informed when sufficient disclosure has been made and are therefore in a position to decide to voluntarily participate.[188] Participants are said to act voluntarily when such action is not under duress. Furthermore the participant should be able to give consent.[185] During this phase of the study participation was voluntary and participants were given the option to withdraw at any point should they feel the need, this was reiterated throughout the study, (Appendix 3)

4.1.2.3 Confidentiality

The advent of confidentiality in research is consistent with emphasis of protection from harm, or *Benificence,* which aims to protect and uphold the privacy of participants. It also serves to build trust and rapport between the researcher and participants as well to maintain ethical standards throughout the research process.[189] Names and consent forms were not disseminated to anyone outside the particular FGDs and SSIs to ensure confidentiality was maintained. FGDs were categorized per age group to minimize discomfort and influence based on different ages, also enabling for open and honest interactions.

4.1.3 Selection process

Sampling is concerned with selecting a subset of people from within a stastical population that is being studied. Theoretical sampling enables flexibility throughout initial stages of research, and this assists the researcher to make alterations as research progresses in order to reflect what is being observed. Emerging categories allow researchers to focus or readjust sample groups.[190] Due to a small population and vast areas between individual villages, the researcher relied on CHWs to inform village leaders of the study. The study sample was limited to participants who were able to meet with the researcher at communal areas that were conveniently located. Selection was thus based on participants from the two communities who were available to participate in the FGDs during the course of the baseline phase.

4.1.4 Eligibility criteria

Participants included CHWs, the nurses, village leaders and women who were mothers and/or pregnant. Participants had to be above 18 years of age and living in either Glenmore or Ndwayana.

4.1.5 Communicating with the participants

As the investigator did not speak IsiXhosa, and most of the participants could not speak English, an interpreter was required. Positive health champions were recruited for interpreting FGD questions from English to IsiXhosa for the benefit of the participants and their responses back to English for the benefit of the researcher. As far as it was possible the researcher used simple English terms and explained more complex terms. The researcher explained all terms used to the interpreter to ensure that she understood the context in which the questions were being asked. The interpreter was familiar with both English and IsiXhosa and could translate the terms in a manner that could be easily understood by the participants. During the individual interviews with the nurses, the interpreter was not required as the nurses were proficient in English.

4.1.6 Data collection

4.1.6.1 Duration of baseline phase

The baseline phase was carried out over a period of four months in 2012, during which stock status of WHO priority medicines for infants, SSIs and FGDs were conducted. Table 2 below depicts the timelines of the baseline phase.

Table 2: The timelines of the baseline phase

March 2012	All stakeholders were contacted to introduce the project.
April 2012	SSIs were carried out. Stock status of WHO priority medicines for infants was recorded. (With the nurses)
April- September 2012	Research instruments were pilot tested
May-June 2012	FGDs were conducted

4.1.6.2 Semi-structured Interview with the nurses

At the two clinics, stock status of WHO priority medicines for infants were collected. This was done to determine how much of the WHO priority medicines were available in each clinic. One SSI was conducted with the nurses from both clinics (Appendix 4). The interview also served to investigate child health rights and if these were met, and how nurses communicated with caregivers. Lastly the researcher attempted to identify the infant health issue in the villages which was of greatest concern to the nurses

4.1.6.3 Pilot testing of the focus group discussion question guide

Pilot testing was held with six participants from Ndlambe, a neighbouring village to Glenmore and Ndwayana. These participants included women of all age groups. When asked for feedback regarding the appropriateness of the questions, all participants agreed that the questions were culturally appropriate, easy to understand and not misleading, nor invasive.

4.1.6.4 Focus group discussions with the participants

An interpreter was used during all FGDs to translate from English to IsiXhosa and back to English. A tape recorder was used during all proceedings of the FGDs, and recorded data was sent to an expert at the Rhodes University School of African Languages for transcription and translation from IsiXhosa to English.

Participant information sheets (Appendix 3) were handed to volunteers to explain the purpose of the study. Subsequently, consent forms (Appendix 4a and 4b) were signed prior to commencing by those who wished to participate. Participants included young pregnant women/young mothers, older more experienced mothers and the elderly mothers from each village. Village leaders and community health workers (CHWs) also participated in the baseline study. Five FGDs were held in each village with the participants to identify one infant health issue of concern. The structure of the FGD question guide was as follows:

- Discussion on accessibility and availability of health care facilities to their children, particularly those under the age of five years.

- Knowledge, attitudes and practices of mothers pertaining to children below the age of five was discussed. This discussion included access to water and proper sanitation, feeding practices of mothers of infants below one year and also below six months.
- The FGD included questions on common childhood illnesses experienced in the two communities, i.e. HIV/AIDS, diarrhoea, pneumonia and malnutrition. These questions were included as probing questions as, during the pilot study, participants could not identify a specific infant health issue.
- Participants were also asked to discuss what they perceived as thethree most common ailments that infants in their community were exposed to and how they managed/treated the ailments identified.
- Lastly, participants were asked to identify one major infant health issue that concerned them the most, and for which an educational intervention would be most valuable.

One of the FGDs carried out with CHWs included similar questions as with the other four groups with the addition of a discussion on the role that CHWs play in the community pertaining to infant health. Table 3 on the next page illustrates the distribution of participants in the FGDs during the baseline phase phase.

Table 3: Details of volunteers participating in the focus group discussions

	Village	Men (number)	Women (number)	Total
Focus group discussions				
Pilot test	Ndlambe	0	6	6
Community health workers	Glenmore Ndwayana	0 0	6 10	6 10
Village leaders	Glenmore Ndwayana	3 6	4 1	7 7
Elderly women	Glenmore Ndwayana	0 0	5 6	5 6
Older more experienced mothers	Glenmore Ndwayana	0 0	8 6	8 6
Young pregnant women/ mothers	Glenmore Ndwayana	0 0	7 6	7 6
Total number of participants	Ndlambe Glenmore Ndwayana	0 3 6	6 30 29	6 33 35

4.1.7 Reliability and validity of the study

Reliability and validity in qualitative research refers to methods or tools use to determine trustworthiness though verification processes.[191] Strategies include ensuring congruence between the research question and the components of the method. Second, sampling should be appropriate, i.e. consisting of participants who best reflect or have knowledge of the topic being investigated.[192] The use of triangulation further strengthens study by combining different approaches.[193] The baseline phase made use of the triangulation method to ensure trustworthiness of the study, i.e. the use of SSIs, FGDs and conducting out-of-stock status of WHO essential medicines at the clinic to verify data collected. Another approach to ensuring credibility was the use of open-ended questions during the SSIs and FGDs to encourage meaningful responses stemming from the participants feelings/and or knowledge. The researcher also utilized an iterative manner of questioning during the interviews to maintain trustworthiness of information during the SSI. The researcher categorized the participants in each FGDs to minimize older participants from having an effect on the truthfulness of younger or less influential participants.

4.2 The Intervention phase

4.2.1 Research approach and design

The KAP model, the Health-Belief model and the Empowerment model were incorporated in this phase as a guide to design the SSIs for the pre- and post-intervention stages of the study. The researcher also made use of an open-ended approach in order to maximise trustworthiness of the participants' response. This paved the way for a more involved interaction between the researcher and the participants. The three models were also used to inform the design of the educational intervention. Furthermore the participatory approach was integrated in the intervention phase as the researcher encouraged participants to actively engage with the different components of the intervention. The researcher made use of a feedback mechanism during the intervention to ascertain that participants understood the different topics discussed. CBPR further draws on existing networks to ensure sustainability of educational interventions, an aspect the researcher pursued during this stage of the study through issuing self-administered questionnaires to members of the AGF.

4.2.2 Ethical consideration

Refer to Section 4.1.2

The intervention phase was approved by the Rhodes University's Higher Degrees Committee (Appendix 8). Ethical clearance was obtained from the Faculty of Pharmacy Ethics Committee (Appendix 9)[1].

4.2.3 Selection process

Refer to Section 4.1.3

Participants who attended the pre-natal clinic in the two communities were asked to participate in the intervention phase of the study. CHWs also requested principals at the different schools to inform pregnant students of the study.

4.2.4 Eligibility criteria

In order to participate in the study, participants had to be pregnant women and living in Glenmore or Ndwayana. Participants had to be above 18 years of age. However, in the event that volunteers were below 18 years, participants were asked to assent to participate along with their legal guardians' consent.

4.2.5 Communicating with the participants

An interpreter was recruited for interpreting SSIs questions from English to IsiXhosa and back to English. The researcher explained all terms used to the interpreter to ensure that she understood the context in which the questions were being asked. The interpreter was familiar with the language and could translate the terms in a manner that could be easily understood by the participants.

1. [1] Due to the participatory nature of this research, during the focus group discussions that were carried out after the initial title of the study was approved, participants identified infant feeding as the issue of most concern. The researcher had to make changes in the approach of the study after the first phase had commenced. The second phase, including the title was approved by both the Higher Degrees Committee and the Ethical Board.

SSIs were conducted with 10 participants in total from both villages. An interpreter was used during all SSIs and during the educational programme to translate from English to IsiXhosa and back to English. All proceedings of the SSIs and the educational sessions were recorded and sent to a transcriber to translate.

4.2.6 Data collection

4.2.6.1 Duration of the intervention phase

The intervention phase was carried out over three months in 2013 as depicted in Table 4 . This included the pre-intervention phase, four weekly educational sessions and the post-intervention.

Table 4: Timelines of the intervention phase

End August 2013	Pilot testing of the semi-structured interview question guide
September 2013	Pre-intervention semi-structured interviews were carried out
September- November 2013	Educational intervention was conducted over four weekly sessions
November 2013	Post-intervention semi-structured interviews were carried out
End November 2013	Questionnaire on sustainability of intervention completed by AGF.

4.2.6.2 Pilot testing of the semi-structured interview question guide

Pilot testing of the SSI question guide was held with four participants from Grahamstown during the intervention phase. Low literate young women volunteered to participate in the pilot test. This was done in Grahamstown due to the limited number of pregnant women available in Ndwayana and Glenmore. No women from Ndlambe could participate in the pilot study as they

had no transport to communal places. The purpose of the pilot test was to ascertain whether low literate women would understand the questions, and whether the questions were sensitive as the topic was of a delicate nature. For the rigor of research the questions were designed to extract data during the study to be able to identify the knowledge, attitudes and practices which were used to inform the design of the educational intervention. The researcher also discussed the questions with the interpreter before commencing with the research so that sensitive issues were taken into account.

4.2.6.3 Pre-intervention: in-depth semi-structured interviews with participants

From the baseline community-engaged study, breastfeeding practices was selected by the participants as the infant health issue that was to be addressed during the educational intervention. Liaising with the Angus Gillis Foundation and the positive health champions in the communities, volunteers were identified to participate in the study. Participant information sheets (Appendix 10) were handed to volunteers and once the study was explained to participants, consent forms were signed prior to commencing by those who wished to participate (Appendix 11). Participants included young first time pregnant women and older pregnant women who have been pregnant before. Participants volunteering for the educational intervention were encouraged to participate from the pre-intervention stage, throughout the educational intervention up until the post-intervention phase.

Ten SSIs were held with the participants to identify their knowledge, attitudes and practices pertaining to infant feeding practices during the first six months after birth in the village. The design of the SSI question guide was as follows (Appendix 12):

The researcher started off by asking participants about their level of education, form of income and if they were pregnant for the first time. This discussion included access to water and proper sanitation. Next the knowledge, attitudes and practices of mothers pertaining to infant feeding during the first six months was discussed. These questions included the use of formula feeds and supplementary feeds within the first six months after birth. The researcher also attempted to determine the understanding of the participants on how HIV-positive mothers can feed their infants. The interview included probing questions on exclusive breastfeeding during the first six

months, which also incorporated expressing breast milk. The interview guide included questions on the perceived susceptibility and seriousness if the mother chose not to exclusively breastfeed her infant during the first six months. These were followed by questions on benefits, barriers and disadvantages of exclusive breastfeeding. Finally the researcer inquired about the participants' support systems, encapsulating information on infant feeding, financial support and any other form of support valuable to the participants.

4.2.6.4 Educational intervention

Constructs of the intervention included the incorporation of elements of the three models, more particularly the HBM and the Empowerment model discussed during the pre-intervention stage. Publications from WHO, UNICEF, CARE, the South African Department of Health Guidelines and other resources were utilized as points of reference for the recommendations during the educational discussions .[106-123] A search was conducted in the WHO Database and the Cochrane Database of systematic reviews on designing appropriate educational intervention. [194-201] The researcher collected evidence from previous interventions on breastfeeding, materials used during these educational programmes were used as a guide to inform the structure of the intervention. Nine participants took part in the four educational sessions weekly. The tenth participant did not return after the pre-intervention interview. Four weekly sessions were held with the participants with the use of an interpreter.

The educational intervention consisted of the following objectives:

Session one (Initiation and continuation of exclusive breastfeeding):

- To discuss the importance of early initiation of exclusive breastfeeding, the correct breast attachment, baby positioning and continued exclusive breastfeeding for six months. This session will include videos and diagrams of breast attachment techniques and the different methods of baby positioning.
- To demonstrate the different baby positions, i.e. the cradle hold, the cross cradle hold and the football hold. This session was carried out using dummies to practice the different breastfeeding positions.

- To practice the different breastfeeding positions, this was done with the participants, using dummies to illustrate that they understood how they can position their infants while breastfeeding.

Session two (Nutrients and physiological importance of exclusive breastfeeding; brief discussion on infant formula feeding and supplementary feeding):

- To discuss the nutrients found in breast milk and why these are important for the healthy development of the baby.
- To talk about Illnesses that can occur as a result of not exclusively breastfeeding the infant for the first six months.
- To discuss infant formula feeding and supplementary feeding, and why this is not recommended during the first six months.

Session three (Breastfeeding difficulties and consequent alternative feeding mechanisms):

- To discuss breastfeeding difficulties that may arise and what a mother can do to overcome these difficulties (e.g. lactation issues, illnesses, having to work).
- To discuss who they can consult if they have breastfeeding issues.
- To discuss the recommendations regarding HIV and breastfeeding infants.
- To discuss working/school going mothers having to express milk and how to safely store expressed milk and administer this milk.

Session 4 (Health Belief Model and Empowerment Model)

- To discuss the risk to the infant's health and optimal development if exclusive breastfeeding for six months is not adopted.
- To discuss what the advantages of exclusive breastfeeding are.
- To discuss the perceived disadvantages and how the advantages outweigh them.
- To discuss the barriers that exist and how to overcome them.
- To discuss the different support systems that exist for a breastfeeding mother.
- To talk about where participants can go to find information on the different aspects of exclusive breastfeeding.

- To discuss how important adopting exclusive breastfeeding practices are for each participant, and whether they believe that their infants are at risk if the correct behaviour is not adopted.
- To have a discussion with the participants on how they will be able to perform exclusive breastfeeding for the first six months.

4.2.6.5 Post-intervention semi-structured interviews

Seven SSIs were held with the participants who had participated in the pre- and intervention phase of the study. This was done to identify knowledge, attitudes and practices, after the intervention, pertaining to infant feeding practices during the first six months of an infant's life in the village (Appendix 14).

Questions asked were similar to those in the pre-intervention question guide, with a few additional questions. Also questions on the demographics were excluded in the post-intervention. Additional questions included what participants learnt on the different topics covered during the intervention. These topics were comprised of exclusive breastfeeding, recommendations on HIV and infant feeding, formula feeding and supplementary feeding. The researcher also sought to investigate if there were any differences in infant feeding between older mothers and young mothers and why such differences existed. Then the researcher inquired about the confidence of the participants to perform optimal breastfeeding practices. Finally participants were asked if they intended to extend what they had learnt to other members of the community, and how they intended to do so.

4.2.6.6 Angus Gillis Foundation self-administered questionnaire

A self-administered questionnaire on applicability and sustainability was handed out to two stakeholders from the AGF (Appendix 15). The questionnaire was adopted from the Talloires Network and modified to incorporate elements of CBPR (http://talloiresnetwork.tufts.edu/about-the-macjannet-prize/selection-criteria). The questionnaire was based on the significance of engaging stakeholders to assess whether the intervention was reproducible. The HBM model together with the Empowerment model were used to guide the design of the questionnaire. The

different sections of the questionnaire were used as the basis to categorize raw data that emerged into themes for analysis.

4.2.7 Reliability and validity of the intervention phase

Refer to Section 4.1.7

4.3 Data analysis

In this study qualitative analysis involved a cyclical process of collecting and analysing data. This allowed the researcher to identify themes as they surfaced from the data as the data collection proceeded. NVivo 2010® was the data analysis software that was used during this study to simplify the process of managing data as it emerged, i.e. the researcher was able to generate themes as they emerged from the data through coding of the raw material, which also made it easier to form links between different themes and categories generated. These links arose from commonalities in meanings and any believed causal relationships within or between the different categories. The material from interviews were coded as the research proceeded and placed in different categories. The theoretical models were used to direct the analysis process, i.e. to construct concepts as building blocks for analysis and to categorize the qualitative data that emerged. The units of analysis that were utilized were knowledge, attitudes and practices (KAP model); perceived seriousness, perceived susceptibility, perceived barriers and perceived benefits (HB model), and cues to action and self-efficacy (Empowerment model).

4.4 Booklet on Exclusive Breastfeeding

A booklet on breastfeeding was compiled based on the educational sessions (Appendix 16). The researcher consulted the databases used for the intervention to collect important information on breastfeeding, thus informing the design and development of the booklet. The references used to compile the booklet are indicated at the end of the booklet.

Summary of the chapter

This section included a baseline phase that informed the intervention phase. The baseline phase included SSIs and out-of-stock status of WHO essential medicines for infants with two nurses at the clinics in each village. FGDs were held with CHWs, village leaders, elderly women and mothers from the two communities. Infant feeding practices were identified as an issue by community during the baseline phase which was used to inform the intervention phase of the study. The intervention phase consisted of a pre-intervention phase, an intervention and a post-intervention phase. SSIs were issued to young mothers during the intervention phase, using the KAP, HBM and Empowerment model as guides. A self-administered questionnaire on applicability and sustainability of the intervention was issued to AGF stakeholders. A breastfeeding booklet was compiled.

5 Results

Overview of the chapter

The availability of stock-status of WHO priority medicines in the two clinics are explained. Using the KAP model to guide emerging theory, information from the FGDs and SSIs are presented. These include issues participants perceive as having an impact on infant health issues and also direct causes that undermine infant health in the two communities. One infant health issue was identified and forms the basis of the development of educational intervention. Pre- and post-intervention results are presented following the constructs of the KAP model, the HBM and the Empowerment model. AGF stakeholders provided feedback on the applicability and sustainability of the educational intervention.

5.1 The baseline phase

Based on the data gathered during the SSIs and FGDs conducted with the nurses, young mothers/ pregnant women, older more experienced mothers, the elderly, village leaders and the community health workers, the following themes emerged:

5.1.1 Semi-structured interviews

5.1.1.1 Stock status of WHO priority medicines for infants

From the interviews conducted at the two clinics, it was found that the medicines stocked at both clinics parallel those outlined in the WHO priority medicines for infants (Appendix 7), excluding morphine and procaine benzylpenicillin. The former is reserved for hospital use only and, according to the nurses, the clinics are not equipped to handle any form of care for infants in which morphine would be used. The following were the nurses' answers when asked if they kept morphine:

"We don't keep morphine here, children who need special care we send them to the hospital in Grahamstown or in Peddie" (Nurse from Glenmore)

"There isn't morphine in our clinics because we do not use it here" (Nurse from Ndwayana)

Also instead of procaine benzylpenicillin, the clinic stocks benzathine penicillin which is used to treat the same strains of bacteria. When asked again if they are ever short of medicines, the nurse from Glenmore said the following:

"I have not had a time when a mother comes and I have to send her away because there is no medicine for her baby. In the past year, the medicines that we have here have not run out"

5.1.1.2 Standard Treatment guidelines and essential medicines

A copy of the South African Standard Treatment Guidelines was kept in the clinic and both nurses used it for reference on a daily basis during consultations.

The nurse in Glenmore stated that they were not required to keep the list of WHO priority medicines for infants, but they did have the medicines indicated on the Integrated Management of Childhood Illnesses (IMCI). She said the following when probed by the researcher:

"The sub district pharmacist is the one who determines the clinic code that we use. And also the Eastern Cape Department of Health. So they choose which medicines should be stocked in the clinic"

The nurse in Ndwayana stated that they were required to have a copy of the South African Essential Medicines List. Medicines on this list were similar to those of the WHO priority medicines list for infants, excluding morphine as this was not required at PHC level.

Both nurses asserted that they had not run out of medicines for infants in the past 12 months.

5.1.1.3 The use of bin cards

Both nurses made use of bin cards (or a stock card) and updated these when dispensing on a daily basis, during stock take monthly and when ordering every third week of the month. Both were trained by a pharmacist and followed a guideline on the correct use of the bin cards

Bin cards were stated to be useful by both nurses. One said the use of bin cards made their job simpler, as such use made it easier to foresee which medicines would soon be depleted in order to determine what to order and how much of it. The nurse from Ndwayana mentioned that the

use of bin cards is particularly useful with regards to data capturing and consulting patients which enable them to keep records of the different medicines required so that they don't fall short.

They both saw no drawbacks with the use of bin cards. Both nurses were confident in their management of bin cards as they both stated that they required no further training in the use of bin cards.

5.1.1.4 Expired medicines

Both clinics had no expired WHO priority medicines for infants in the past 12 months. One nurse stated that expired medicines were disposed of by the waste management truck that collected these weekly. The nurse from Ndwayana asserted that there was a guideline on medicine disposal that was to be followed. Expired medicines were to be recorded on a green card, and the waste management and campus waste collected all expired medicines.

5.1.1.5 Accessibility of medicines

Both nurses asserted that there were never any cases where they could not help caregivers of infants due to shortage of medicines. However, if this was to occur, both nurses stated that they would have to order these medicines and ask caregivers to come back when the medicines were available. The nurse from Ndwayana stated that in dire circumstances they would have to acquire these medicines from neighbouring clinics.

5.1.1.6 Correct use of medicines

Both nurses stated that they checked whether caregivers of infants understood how and when to administer medicines to their infants. The nurse from Ndwayana mentioned that she would give the first dose in the presence of the caregiver to allow him/her to see how to administer the medicines and the dosage so that they don't overdose the baby She also said the following:

"Many of the mothers, especially the young ones might not know how to give medicines, so we always make sure they understand"

Both nurses stated that they would ask for feedback to check if the caregiver understood the correct use of the medicine for their infants Furthermore there were no perceived significant barriers as they all spoke the same language.

5.1.1.7 Child health care

Both nurses made known that they knew of and had the Batho Pele principles up where all patients could see them. This was confirmed by observation of a poster of the aforementioned principles in both English and IsiXhosa in the waiting area. The nurses affirmed that they applied these principles daily with each of their patients by giving their patients information on their rights. In order to maintain these rights, children had a particular day, Wednesday, that is, set aside just for them; however if they fell sick on other days they were assisted first.

According to the nurse in Ndwayana, children were referred to hospitals if the nurse considered it necessary. There were also special days set aside for immunizations, health campaigns and programmes to limit childhood illnesses.

If there were complications that the nurses could not help with due to out of scope practice, caregivers of infants were referred to the nearest hospital in Peddie, approximately 45 km away.

5.1.1.8 Communicating with caregivers

Both nurses stated that they encouraged caregivers to get their children immunized and informed them of the importance of doing so. The caregivers were given tracer cards to enable them to recall when to take their infants for immunizations. These cards also assisted nurses to be able to identify the caregivers who had not brought their infants for immunizations. CHWs would carry out home visits to encourage the caregivers who had not brought their infants for immunizations. Each CHW had a zone within the community for which she was responsible. They would hold campaigns, particularly for pneumococcal vaccinations, to raise awareness as this was the new vaccination that people did not know about.

Nurses would liaise with community leaders and women self-help groups to furnish information on infant health, and to help caregivers identify illnesses before they progressed and the appropriate curative methods they could use and future preventative measures.

5.1.1.9 Infant health issues causing the highest number of infant deaths

According to both nurses, infant deaths rarely occurred in the two communities. Factors that afforded these villages this benefit was that *"mothers were responsible and young mothers like*

breastfeeding" as stated by the nurse from Ndwayana. Furthermore, the nurse from Glenmore asserted that access to the clinic has improved infant survival.

No registers were kept in the two clinics to record infant mortality rates. The nurse from Ndwayana stated that they made use of tracer cards for that purpose. However, no infant deaths had been reported in the 12 months prior to the interview. The nurse from Glenmore said the following:

" For the time that I have been here, I have not seen any baby dying in this community"

The infant health issue that concerned the nurse from Ndwayana clinic the most was that caregivers did not bring their infants for deworming and children with burns. The nurse from Glenmore was more concerned with prevention of mother-to-child transmission, among HIV-positive pregnant women. According to her, two children were already on ARVs. Her other concern was that children regularly acquired diarrhoea as well.

Both nurses accentuated that it would be both necessary and beneficial to raise awareness on the said infant health issues through awareness campaigns.

5.1.2 Focus group discussions

5.1.2.1 Service delivery

All groups expressed their frustration regarding service delivery, as both PHCs were ill-equipped and short-staffed. Each clinic is managed by one professional nurse and supported by five to six health care workers. A doctor visits once a month for a day and only patients referred to him by the nurse see him. The doctor does not speak IsiXhosa, therefore, the nurse would be required to translate. The clinic runs every day during working hours only, excluding weekends.

A participant from the FGDs from Ndwayana had the following to say when the researcher asked participants whether they were satisfied with health care service delivery:

"We have to wait up to a whole day for ambulance to arrive, at times they do not even come at all, then we have to use our own money to get a taxi to get to Peddie or Grahamstown[2] and we do not always have money"

This was observed by many of the participants as a cause of great concern. The issue of service delivery was of major concern because the ambulance would take up to 24 hours before it reached the villages, and sometimes would not arrive at all. In such cases the people would have to find their own means of transport for emergencies and referrals for which they had to pay out of pocket.

Access to clean tap water was limited as water ran out frequently, forcing community members to rely on tank water collected from rain water, or water from the dams.
" We use rain water collected in water tanks for drinking, cooking and bathing"

This was iterated by one of the young women in the FGDs.
Participants further added that tap water was communal, as there would be one municipal tap in the street to be shared between households. Toilet facilities with a flush were rare to non-existent. Most of the population relied on toilets that do not flush or, alternatively, pit toilets (long drops).

5.1.2.2 The role of the community health workers

During the FGDs held with the CHWs at the two clinics, all participants described their role as forming a liaison between the clinic and the community. They receive a stipend from the government and are responsible for running campaigns on immunization, and encouraging care givers to take infants for the necessary immunizations at the correct age. Each caregiver is given a monitoring card when registering the baby, which provides information on which immunizations are essential and at what age. Each CHW is allocated a division within the

[2] These communities are approximately 50km and 35km from Grahamstown and Peddie respectively. The roads leading to the communities are remote and primarily dirt roads.

community for which they are responsible for performing house visits to help improve and maintain infant health care at home. They also liaise with women self-help groups and village leaders to organize events that promote infant health care and, finally, they execute health programmes to raise awareness on infant health issues. One of the participants in the FGDs with the CHWs said the following:

"Yes, we think our role is very helpful for the communities, because we give them information about immunizations. We also do house visits where we check if babies have been immunized, we all have a location within our communities where we go to the different homes".

The CHWs stated that programmes are very effective, as mothers receive the information they need in order to make informed decisions pertaining to their infants' health. During the FGDs held with the other community members, they asserted that CHWs were particularly helpful with information regarding immunizations of their infants.

5.1.2.3 Community's perception of the infant health issues of most concern

5.1.2.3.1 Immunizations

One group of CHWs from Glenmore was concerned with the fact that many mothers within their community still do not take their infants for the necessary immunizations. In spite of their home visits and awareness programmes, they stated that there are still mothers to whom the importance of immunizations is not well understood.

5.1.2.3.2 Seizures

Data from one FGD with older mothers from Glenmore revealed a concern on infant seizures which they termed fits, and stressed a need for knowledge on causes of these fits and ways to prevent them.

5.1.2.3.3 Diarrhoea

The group of young mothers from Glenmore highlighted diarrhoea as a cause for concern; however, they stated that they knew the necessary treatment for diarrhoea and expressed that

they boiled water before administering it to their infants. The reason why this was a concern for them was because it occurred frequently, and they felt a need for information on how to prevent the occurrence of diarrhoea.

5.1.2.3.4 HIV/AIDS

The elderly mothers from Ndwayana indicated a lack of knowledge on HIV/AIDS as they were concerned about infant feeding practices of mothers with HIV. Also they stated that not much is known surrounding the issue of HIV/AIDS and feeding of infants below six months, as most mothers are secretive and do not disclose knowledge of or known practices regarding the issue. This is what an elderly women from one of the FGDs conducted in Ndwayana stated:

"Some mothers bottle-feed their infants only. This may be because they are 'ill' but we don't know because they are very secretive"

5.1.2.3.5 Asthma

The FGD held with young mothers and that held with CHWs both identified asthma as a major issue for infant health. Mothers have a lack of knowledge pertaining to how to deal with the onset of symptoms such as coughing and wheezing brought on by dust roads.

5.1.2.3.6 Infant feeding practices

Poor infant feeding practices were identified as major causes for concern by four out of ten focus groups; these were the two groups of elderly mothers and the two groups of village leaders from both villages. Poor infant feeding practices was the only issue named by four focus groups, i.e. the highest number per infant health issue identified. The four focus groups expressed concern over the fact that most mothers cannot stay at home for six months due to work obligations or having to attend school. They indicated that children seldom fell ill, but stressed that women do not exclusively breastfeed for six months as supplementary feeding is introduced as early as three months. Most mothers would introduce porridge (referred to as "pap") within the first six months whilst still breastfeeding. They specified a need for knowledge on exclusive breastfeeding so that

mothers can make informed decisions on feeding their infants. The following was stated by one of the participants in the elderly mothers:

"Many young mothers do not breastfeed for long."

Another participant had this to add to the above statement:

"Or they (the young mothers) will breastfeed and add pap when the baby is still very small"

5.1.2.3.7 Non-exclusive breastfeeding in the first six months

All groups stated that generally mothers do not exclusively breastfeed for six months as either bottle feeding or solid foods are introduced. However, six out of ten groups only conceded this fact after being probed. Some stated that within a month after birth some mothers introduce bottle feeding, and within three months porridge and vegetables are fed to the infant. At times complementary feeding accompanies breastfeeding; in other instances breastfeeding is ceased completely. One of the young mothers from the FGDs conducted in Glenmore said the following:

" Many of the young mothers do not take care of their babies and are more interested in their social lives. A lot of them do not have the correct information about only breastfeeding for six months"

One of the participants within the group of village leaders from Ndwayana stated the following when asked what the researcher should address during the educational intervention:

" I think a programme on the correct feeding of a baby would be of good use, so that mothers, especially the young ones can have information so that they can make better decisions when it comes to feeding their babies"

Participants in this group agreed that an intervention on infant feeding would be beneficial.

5.2 The Educational Intervention

5.2.1 Demographics of Intervention participants

There were ten participants who agreed to participate in the study, all of whom met the eligibility criteria. Their demographics are depicted in Table 5, which also illustrates the flow of participants throughout the study. Three participants dropped out by the post-intervention phase due to undetermined reasons.

Table 5: Demographic characteristics of the participants

Participant	Age	Marital status	Education Level	Income	Primiparous / Multiparous	Pre-intervention	Intervention	Post-intervention
G1	**23**	**Single**	**Grade 11**	**None**	**Primiparous**	✓	**X**	**X**
G2	**18**	**Single**	**Grade 12***	**Social grant**	**Primiparous**	✓	✓	✓
G3	**18**	**Single**	**Grade 10***	**Foster care grant**	**Primiparous**	✓	✓	✓
G4	**29**	**Single**	**Grade 12**	**None**	**Primiparous**	✓	✓	✓
G5	**22**	**Single**	**Grade 12**	**None**	**Primiparous**	✓	✓	✓
G6	**21**	**Single**	**Grade 11**	**None**	**Primiparous**	✓	✓	**X**
G7	**18**	**Single**	**Grade 9***	**None**	**Primiparous**	✓	✓	✓
G8	**40**	**Married**	**Grade 9**	**Social grant**	**Multiparous**	✓	✓	✓
N1	**27**	**Single**	**Grade 11**	**None**	**Primiparous**	✓	✓	✓
N2	**38**	**Single**	**Grade 11**	**None**	**Multiparous**	✓	✓	**X**
*** has been used for participants that are currently attending school**								

5.2.2 Pre-intervention results

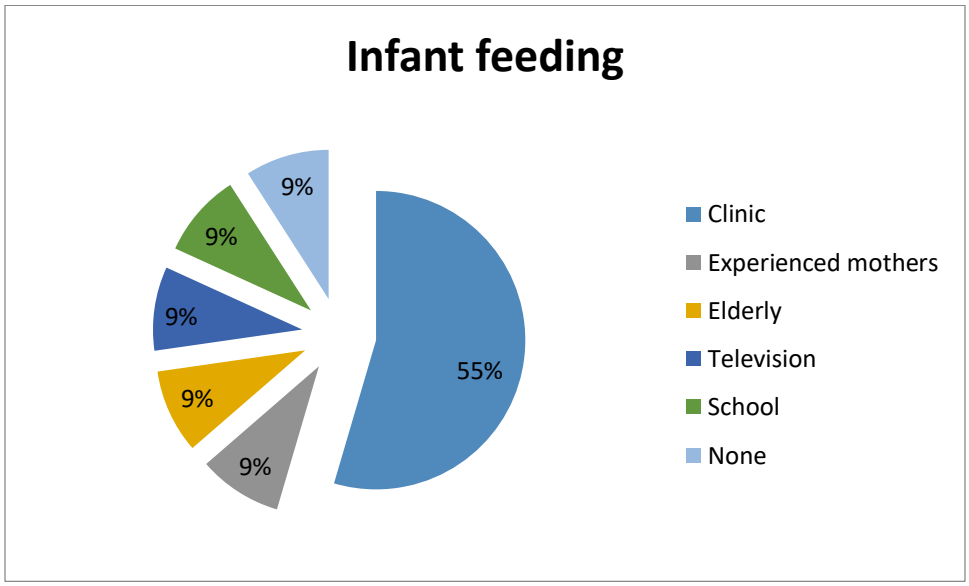
5.2.2.1 Knowledge, Attitudes and Practices Model

5.2.2.1.1 Information on infant feeding

Three out of ten of the participants stated that they did not receive information on infant feeding at the clinic; none of these participants had asked for information at the clinic, as they generally do not discuss infant feeding practices in their community. Nonetheless all participants mentioned that information is readily available at the clinics in their villages; if specific information is required, pregnant women can acquire information on infant feeding from the nurse and the "*volunteers*", a term the participants used to refer to the community health workers (CHWs). Pregnant women are advised to come to the clinic regularly to make sure that the baby is developing optimally. They are given advice on how to stay healthy to ensure that

their baby develops well. Participants also stated that the CHWs perform home visits on a regular basis to check on the development of the child after birth. During these visits CHWs also furnish information on age-appropriate feeding. Figure 4 depicts the proportion of sources from which participants received information on infant feeding.

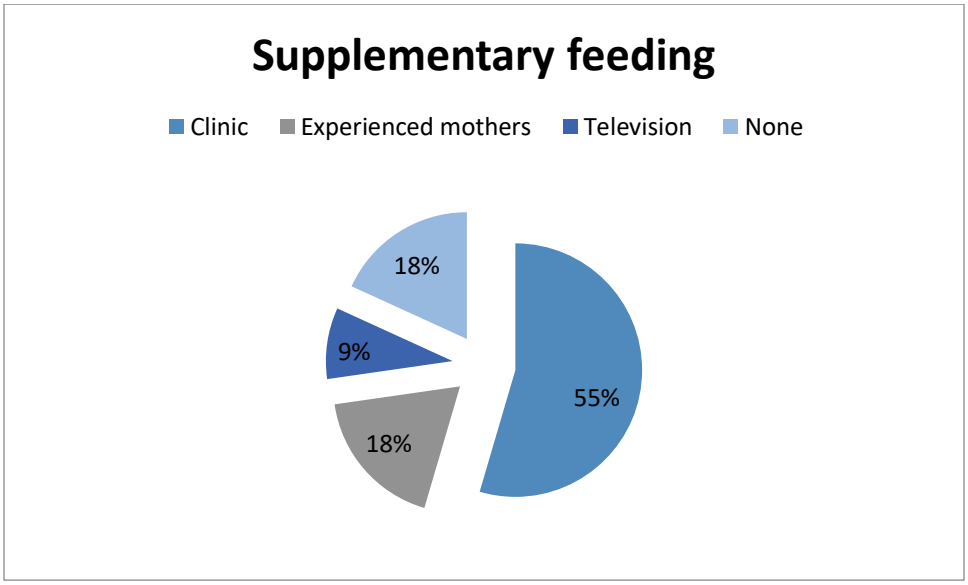
Figure 4: Source of information on infant feeding



When participants were asked where they received information on formula feeding,
60% stated the clinic as a source of information, 10% indicated relatives and 30% indicated that they had received no information on formula feeding.

Although participants cited the same sources of information for supplementary feeding, one participant stated the television as her source of information. The different sources of information on supplementary feeding are illustrated in Figure 5 on the next page.

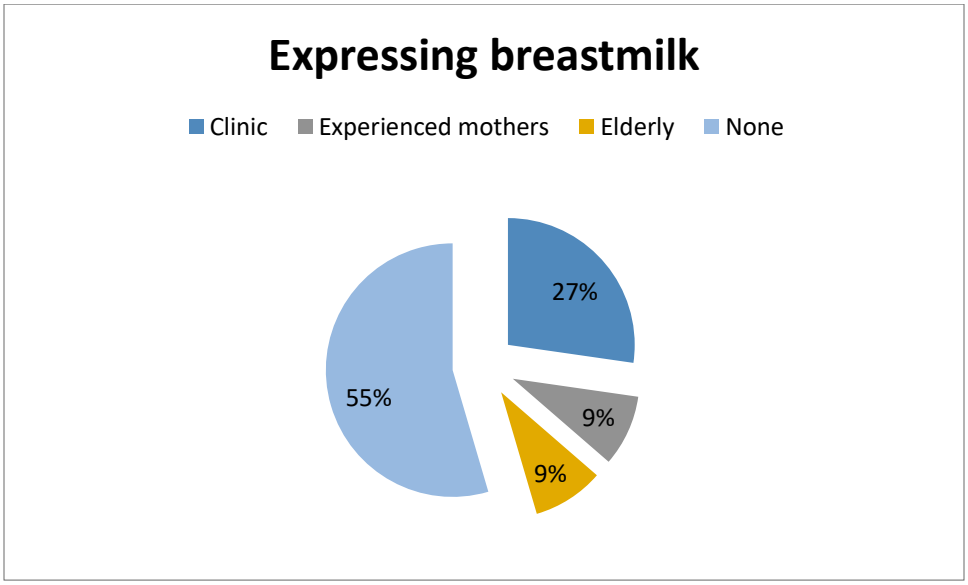
Figure 5: Sources of information on supplementary feeding of infants



Moreover, six participants mentioned the clinic as a source of information on exclusive breastfeeding. Three participants stated that they had not received any information on exclusive breastfeeding. One participant also stated that experienced mothers are a good source of information on exclusive breastfeeding.

Six out of ten participants did not receive any information on expressing milk and articulated that they did not know why mothers expressed their milk. Figure 6 on the next page depicts the proportion of sources of information on expressing milk.

Figure 6: Sources of information on expressing, administering and storing breast milk.



In some instances participants stated more than one source of information. The clinic was a source of most information, where all participants received information pertaining to exclusive breastfeeding. Where participants mentioned that they received no information (depicted in the pie charts as "none"), the information they had on that specific topic was, according to them, "*in my own opinion*". This meant that they had formed their own opinion on that specific topic. For example, when asked what she knew on infant feeding of infants below six months, participant G6 answered: "*Breastfeeding only is best for six months. No one has told me this, it is just my opinion."*

She also stated that she learnt from watching television programmes that supplementary feeding before six months is not good for one's infant. This was the only participant to name television as a source of information on infant feeding.

One participant stated that experienced mothers within her community had given her information regarding infant feeding. Almost all the information participant N1 knew, she had received from either the clinic or from experienced mothers in her community. She found that the clinic was a reliable source because the nurses were knowledgeable. She also trusted experienced mothers because they knew what to do.

The clinic not only represented nurses but also CHWs as participants would regularly refer to the CHWs when talking about the clinic as well. With regards to the elderly, they would only overhear them talking among themselves about infant feeding, and did not actively engage in dialogue with the elderly.

Only one participant listed school as one of the sources of information.

Participant G1:

"I know about breastfeeding, because we were taught at school"

5.2.2.1.2 Perceived correct and incorrect feeding practices

During the pre-intervention phase when participants were asked what the important aspects of breastfeeding are, six out of ten participants stated that it is important to breastfeed for six months. Two participants stated that they did not know what is important. One participant stated that a mother can breastfeed or formula feed depending on what is convenient for her. Another participant said the following (G5):

"You can breastfeed, give formula milk or even give pap during the first six months."

When asked if they were aware of any incorrect feeding practices in their community, six of the participants stated that there are mothers within their community who are drinking and smoking while breastfeeding. All of them stated this habit can have negative effects on the development of the child. Three of the risks highlighted by participants are below:

Participant G1:

"The child's mind will not be ok, as it will have trouble learning at school."

Participant G3:

"Drinking and smoking while breastfeeding is not healthy for your baby."

Participant G6:

"Drinking and smoking is not good when breastfeeding because it will affect the baby's growth."

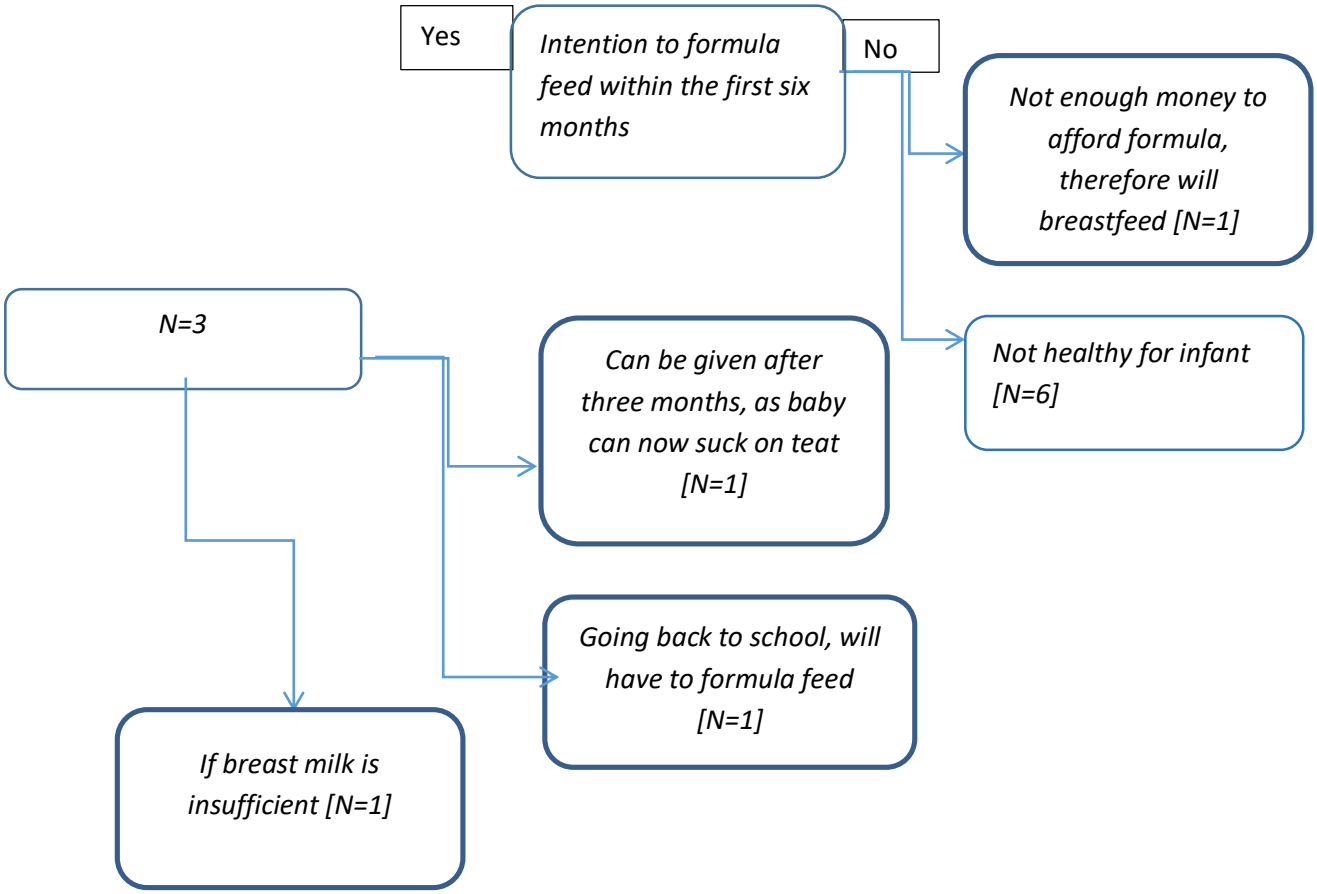
However, three participants did not know of any incorrect feeding practices within their community. One participant mentioned mothers give their infants porridge; she also added that new-borns cannot handle such foods as their intestines are still growing. Participant G1 said the following with regards to what she perceived as incorrect infant feeding practices:

"Giving formula milk to infant below six months can make a child to be thin and have constipation."

5.2.2.1.3 Formula feeding of infants below six months

Seven of the ten participants had no intention to formula feed within the first six months. Six stated that it was not healthy for the development of the infant. Figure 7 on the next page illustrates the participants' intentions to formula feed.

Figure 7: The participants' intention to formula feed and their reasons



Of the participants who had no intention to provide formula feeding to their infants within the first six months, one indicated that she could not afford formula milk and breastfeeding would be easier and six of them stated that it is not healthy for the infant. The reasons that participants listed as to why formula milk would not be healthy for the infants are as follows:

- Bottle used for formula feeding can easily be contaminated and can lead to diseases
- Not good because baby cannot suck on the bottle, and will not get enough milk
- Formula feeds do not have the vitamins that are present in breast milk, which are important to fight off diseases and that are necessary for growth of the infant.

Participants also pointed out that the only time the mother can formula feed is if she has an illness or some or other breastfeeding difficulties [N=2].

Of the remaining three participants who intended to formula feed within six months, one participant expressed that as much as breastfeeding is healthier than formula feeding she will have to provide formula feeds when she goes back to school which will be within a month. Participant G4 stated that formula feeds can be given after three months because the baby is grown and can now suckle on the bottle to get enough milk. Participant G5 stated that if the baby is not getting enough milk from breast milk, the mother should then give formula milk. This is not her preferred method, however, because she felt that the bottle can be easily contaminated.

5.2.2.1.4 Supplementary feeding of infants below six months

All participants had no intention of providing supplementary foods (i.e. porridge, vegetables, etc) within the first six months. However, according to Participant 1 porridge can be given to infants but it must be "*watery*", as the intestines are "*too weak for heavy foods*". Participant N2 expressed that the baby might develop sores in the mouth if given supplementary food. Also Participant G3 stated that giving one's infant supplementary foods within the first six months could cause the baby to have constipation.

Participant G5 mentioned that although providing one's infant with supplementary feeding is not healthy, if he/she is not getting enough from breast milk, the mother can give semi-solids. When asked how she will determine if the baby is not getting enough milk, she stated that she would most likely know when the baby is restless and crying even after a feed.

Participant G8:

"*Giving your infant semi-solids is not good because the intestines are not ready to hold that heavy food and the baby will have a big belly. But with porridge it depends on which one. If it is the Nestum® or the Purity®, it is fine"*.

5.2.2.1.5 HIV-positive mothers and infant feeding

When asked how HIV+ mothers should feed their infants, the answers and number of participants are as follows:

- Mothers must only formula feed their infants for six months. One participant also indicated that formula milk is available at the clinic for mothers who cannot breastfeed. [N=3]
- If the mother chooses to breastfeed, then she should do so exclusively for six months. She should not mix feed while breastfeeding. [N=2]
- Pills are administered to the mothers before breastfeeding. The participants did not know for how long mother must breastfeed. [N=2]
- Mother should breastfeed exclusively for three months, then bottle feed from then onwards. [N=1]
- If the mother chooses to breastfeed, she should do so exclusively for six months. If she chooses to formula feed, then she should do so exclusively for six months. [N=1]
- One participant had no idea how an HIV+ mother should feed her infant.

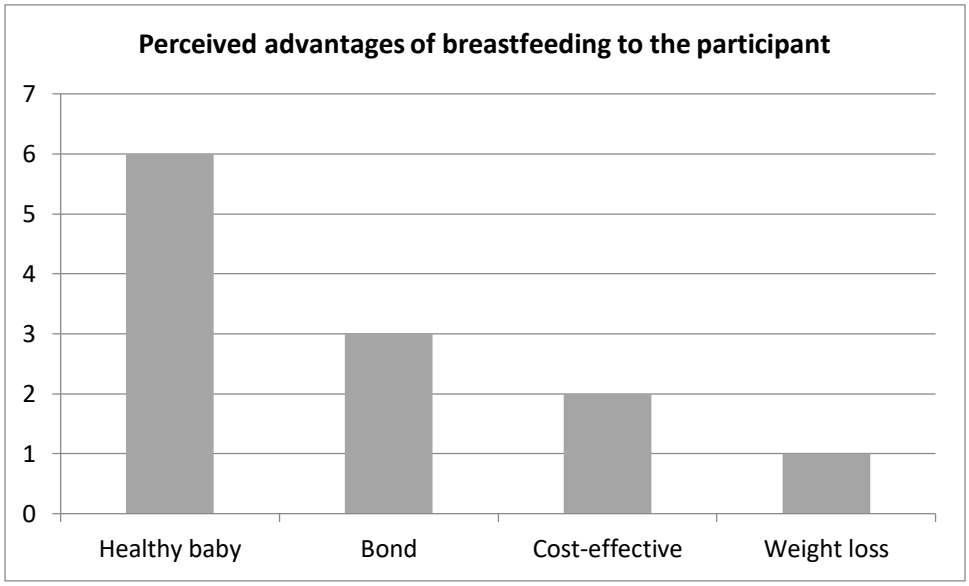
All participants specified that should an HIV+ mother want information on her options pertaining to feeding her infant, she can ask the CHWs or the nurse.

5.2.2.2 Health Belief Model

5.2.2.2.1 Exclusive breastfeeding for six months

All participants highlighted that exclusive breastfeeding is important and they will do so for six months, with the exception of one participant due to having to return to school. This illustrated that all participants perceived breastfeeding their infants as an important feeding method for their infants to grow to their full potential. This is depicted in Figure 8 on the next page, along with the other benefits of exclusive breastfeeding.

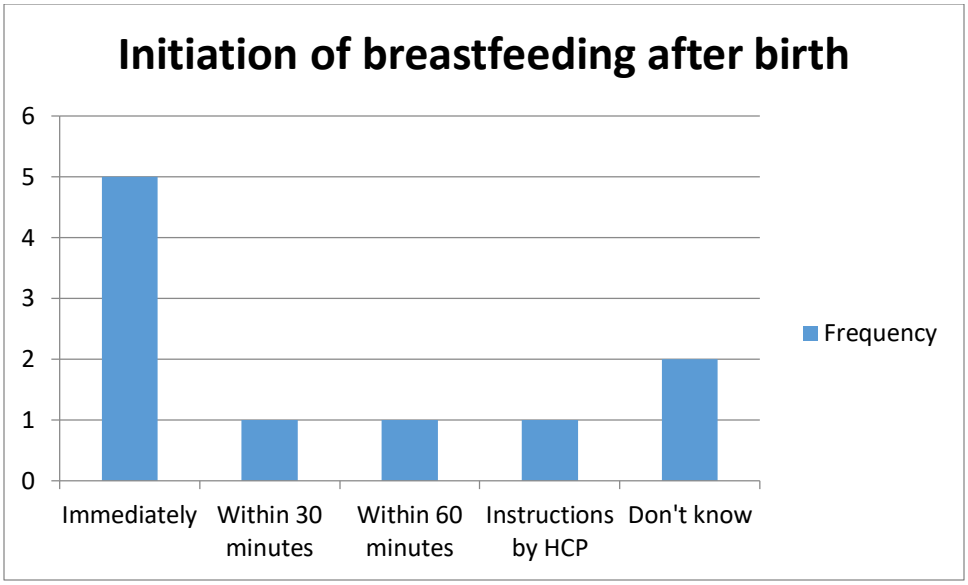
Figure 8: The perceived advantages of breastfeeding to the participant



Three participants highlighted that breastfeeding allows for the mother and the child to bond and get to know each other. Breastfeeding also relieves financial stress, as milk is always available. One participant also mentioned that it's good for the mother as she can lose the pregnancy weight. According to the participants, the community is in agreement with their highlighted benefit of breastfeeding, with the exception of weight loss as the community members do not regard this aspect of breastfeeding as a benefit.

Five out of ten participants stated that they intend to commence breastfeeding immediately after giving birth as this will help them to bond with their infants. However one participant indicated that if her baby is not growing well she will add formula feeds to her breastfeeding regime. Other responses are depicted in Figure 9 on the next page.

Figure 9: Frequency of responses given by participants regarding how soon after giving birth they intend to initiate breastfeeding



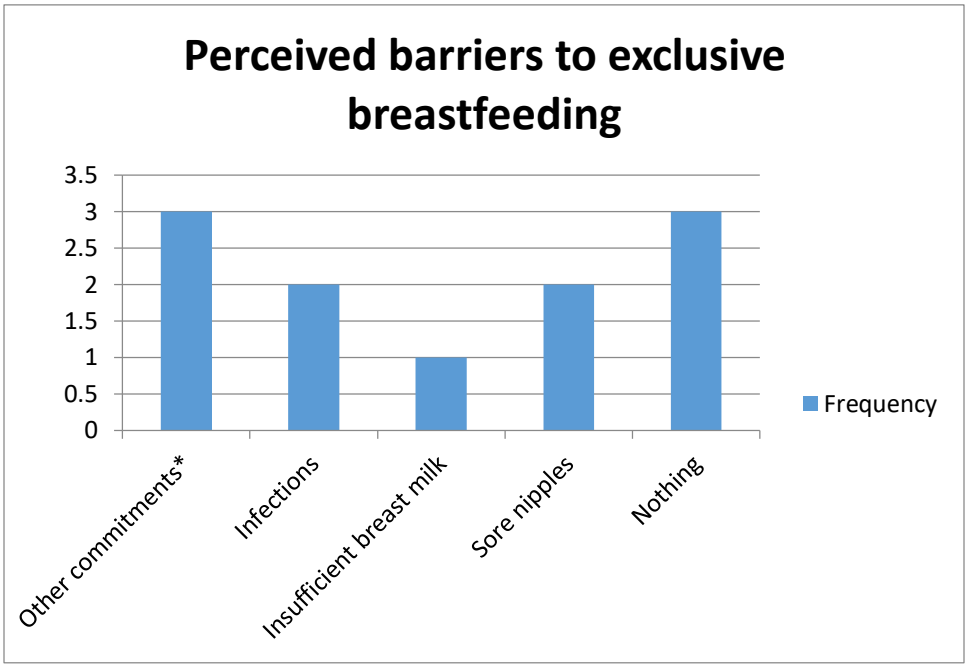
5.2.2.2.2 Health and risk status of infants

All participants stated that if they do not exclusively breastfeed their infants can fall sick and may not grow properly; however, some barriers may hinder them from being able to breastfeed exclusively.

5.2.2.2.3 Perceived barriers to exclusive breastfeeding for six months

All participants illustrated an aspiration to breastfeed their infants; however, they also indicated that certain barriers may hinder them from being able to perform exclusive breastfeeding for six months. Only three participants stated that there is nothing that can hinder them from being able to breastfeed exclusively for six months. The other seven participants could anticipate some barriers that may not allow them to exclusively breastfeed for six months, depicted in Figure 10 on the next page. Four participants stated that in the face of these difficulties they would be forced to provide formula feeds to their infants.

Figure 10: Frequency of perceived barriers to exclusive breastfeeding for six months



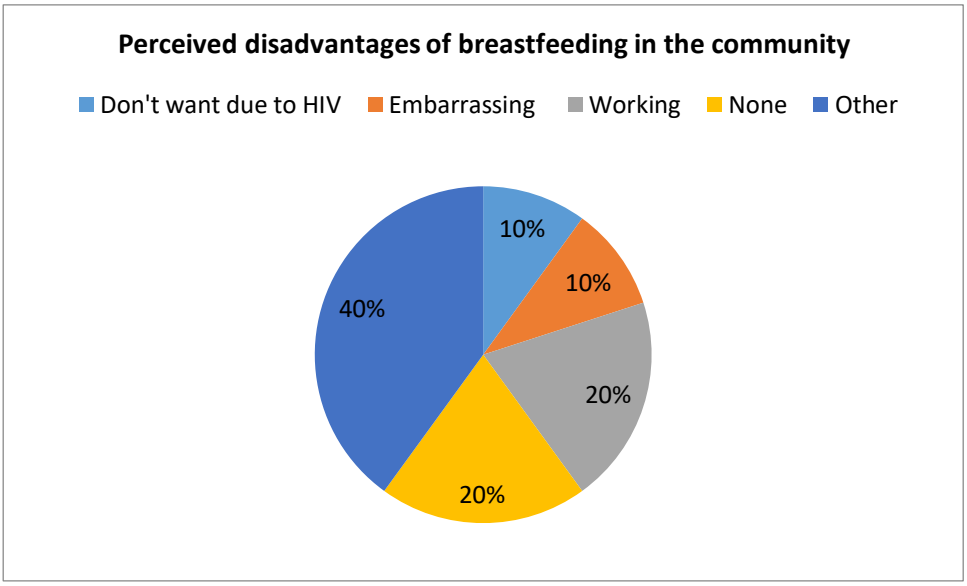
One participant indicated that if she falls sick, she would go to the clinic, obtain treatment, and inquire on alternative feeding methods for her infant. Another participant stated that if she was unavailable due to work or had to temporarily leave the village for any reason, she would take her infant with her. Participant G8 specified that if she had any breast difficulty that might hinder her ability to breastfeed, she would consult the nurse.

5.2.2.2.4 Perceived disadvantages of breastfeeding

Nine out of ten of the participants had no perceived disadvantages to breastfeeding. The one participant stated that having sore nipples from breastfeeding was a disadvantage for her. Four out of ten of the participants did not know what the community perceived as a disadvantage of breastfeeding, but mentioned that some members of the community might not like the fact that breastfeeding makes women lose weight. As depicted in Figure 11 on the next page, two participants stated that they did not think the community felt that there were any disadvantages of breastfeeding. Two of the participants indicated that when women are working, they may regard breastfeeding as a disadvantage. One pointed out that the members of the community

might perceive breastfeeding embarrassing, especially in public, although she did not think it is embarrassing. The last participant mentioned that some women felt that breastfeeding is a disadvantage when one is HIV-positive, and they generally do not want to breastfeed.

Figure 11: Perceived disadvantages of breastfeeding in the community



5.2.2.3 Empowerment model

5.2.2.3.1 Structural and social support (Cues to action)

5.2.2.3.1.1 Community's attitudes towards breastfeeding

Six out of ten participants stated that the people in their villages fully support breastfeeding. They felt that both men and women strongly encouraged breastfeeding. As stated by two of the six participants:

"*The men and the women in the village say that breastfeeding is the right thing to do for the growing child" and "it is the best option for babies".*

Participant G1 however said the following:

"*Some men say that breastfeeding is good for the baby, but others don't like it because the breast will lose its shape."*

Four of the participants had no clue as to whether or not other community members were in support of breastfeeding as people generally do not discuss infant feeding in their village.

5.2.2.3.1.2 Home and societal support

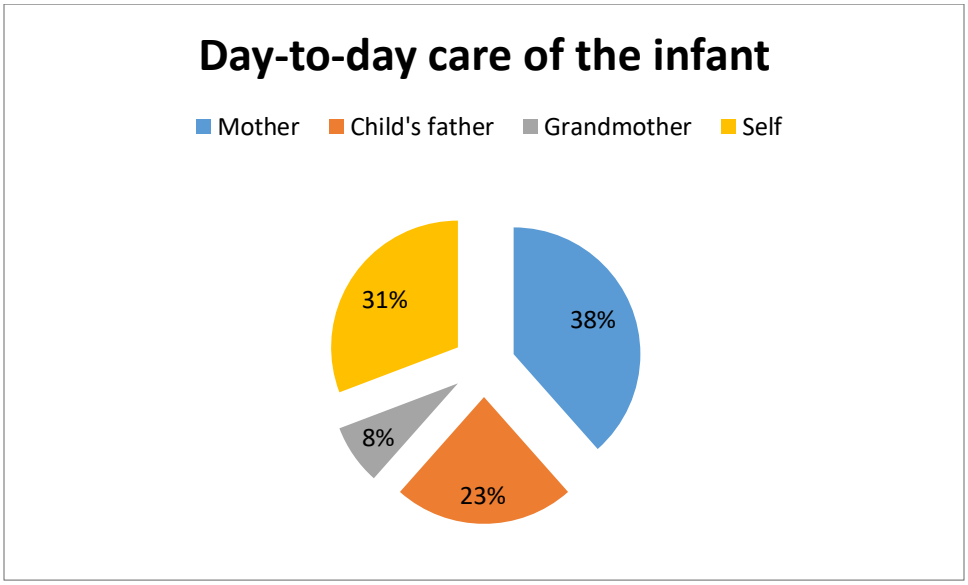
When asked whom the participants look to for advice on breastfeeding, table 6 depicts the different responses.

Table 6: The different people the participants rely on for guidance

Participant	Person to whom participants turn to for advice	Reason for choosing the person for guidance
G1	Grandmother and mother	Can get more information from them as they are experienced
G2	Guardian	Can get more information from her guardian
G3, G7, G8, N2	Nurse or "volunteer" at the clinic	They have more information because the nurses and 'volunteers' know better than her (G3, G8, N2) The nurses at the clinic have the correct information (G7)
G4, G5, N1	Experienced mothers	Can get more information from them as they are experienced (G4, N1)
		Trusts them as they are experienced (G5)
G6	Mother	Trusts her mother

When asked who supports them with the care of the child, the participants mostly mentioned their mothers and the fathers of their infants, Figure 12 depicts the different responses of the participants.

Figure 12: Percentage of people who will help participants with day-to-day care of their infants



Five out of ten participants stated that their mothers will provide them with the day-to-day care of the child after delivery. Regarding financial support, five out of ten participants cited their babies' fathers as a source. Participants also mentioned their mothers and grandmothers as providing financial support for their infants.

5.2.3 Post-intervention Results

Only seven out of the ten participants took part in the post-intervention.

5.2.3.1 Knowledge, Attitudes and Practices Model and Health Belief Model

5.2.3.1.1 Perceived correct and incorrect feeding practices for infants

When asked what they perceive as the correct feeding practices, all seven participants stated that infants should be exclusively breastfed for six months. Table 7 depicts the different additional responses given by five of the participants.

Table 7: The correct feeding practices as perceived by five of the participants

Participant	Correct feeding practice
G2	Formula feeding after six months
G3	Exclusive breastfeeding for six months; if mother cannot then she can give formula milk recommended at the clinic.
G4	Colostrum is important and should be given to infant immediately.
G8	If mother is HIV+ she must choose between formula feeding and exclusive breastfeeding for six months. She should not mix feed her infant. She should also take medication for HIV should she choose to breastfeed.
N1	Do not mix between breast milk and formula milk in the first six months. Breastfeed only for six months.

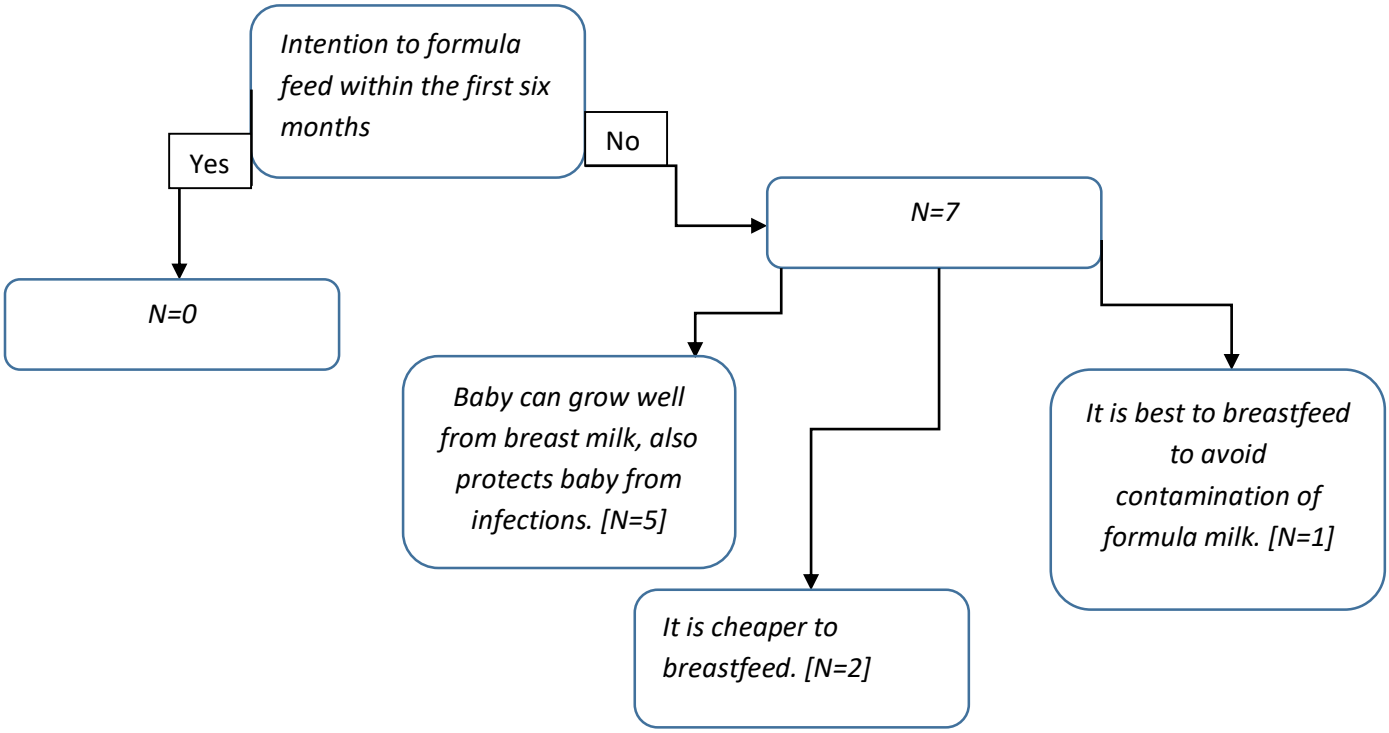
5.2.3.1.2 Importance of Colostrum

All seven participants stated that colostrum is important in providing the infant with the important nutrients to help fight infections. During the pre-intervention phase none of the participants had knowledge on the importance of colostrum.

5.2.3.1.3 Formula feeding of infants below six months

All participants stated that they had no intention of providing formula feeds to their infants during the first six months. Figure 13 on the next page represents the different responses given when participants were asked why they would not provide formula milk to their infants during the first six months.

Figure 13: The reasons why participants would not provide formula milk to their infants in the first six months



Participant G5 stated that not only is breastfeeding more cost-effective than formula feeding, but it is also safer to breastfeed one's infant because contamination is more likely to occur when providing formula feeds to one's infant. Participant G7 said the following:

"*Baby will get sick, can get skin rash, ear infections and asthma. If you choose to mix between breastfeeding and giving formula milk in the first six months or only give formula, the baby might not be able to concentrate at school in later years.*"

With the latter statement she is referring to causing learning disabilities later in the child's life should the mother choose to not exclusively breastfeed her infant for six months.

Participant G3 stated that she will not resort to infant feeding, a different response to her prior intention to provide formula milk when she returns to school. Instead, she will express milk and store it for the caregiver to offer the infant when she is unavailable.

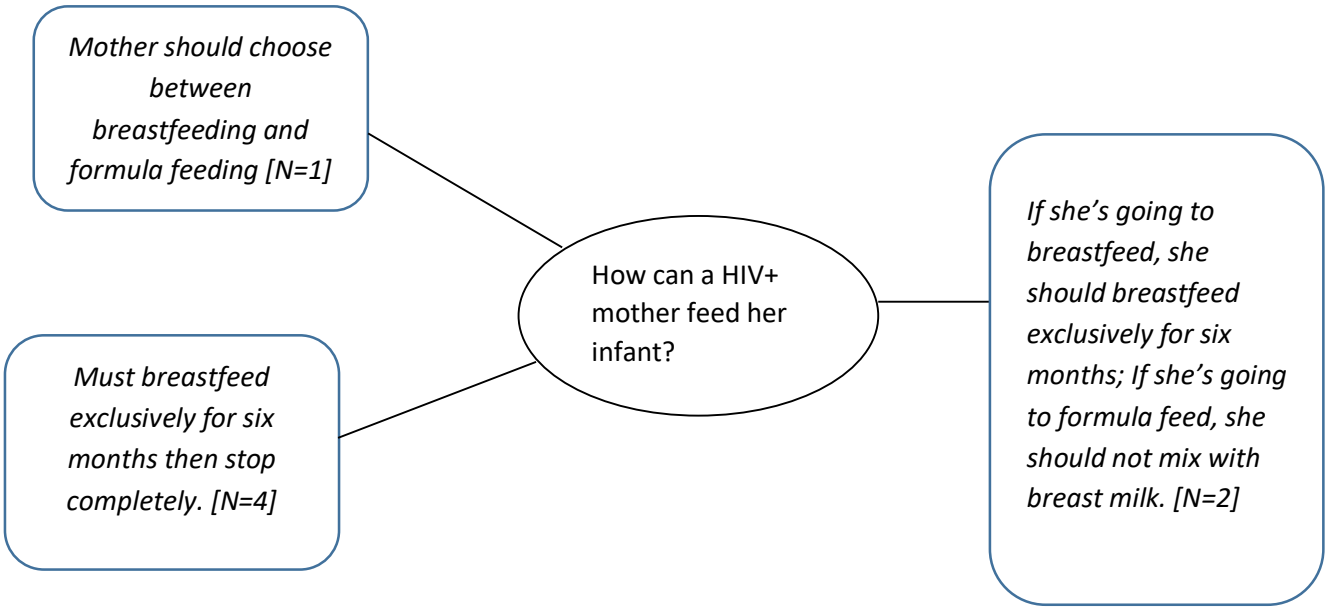
5.2.3.1.4 Supplementary feeding of infants below six months

All the participants maintained that they had no intention to provide supplementary feeding within the first six months, a finding that is similar to that during the pre-intervention phase. They stated that at this point semi solids are not important in the baby's diet, only breast milk is important.

5.2.3.1.5 HIV-positive mothers and infant feeding

When asked what the options available for a HIV-positive mother are regarding how to feed her infant, Figure 14 illustrates the different responses offered by the participants.

Figure 14: A HIV+ mother's different options regarding feeding of her infant in the first six months as perceived by the participants.



All participants highlighted the importance of going to the clinic if a mother is HIV-positive and wants advice on how to feed her infant. Three participants indicated that it is very important for a HIV-positive mother to make sure that should she choose to provide her infant with formula feeds, that she can maintain providing such feeds for her infant. Participant G4 said the following:

"*An HIV+ mother should be able to give that formula milk always. She must make sure that she can get the support to be able to afford that milk once she chooses to formula feed her infant.*"

Participant G5, particularly, who had said that an HIV positive mother can exclusively breastfeed her infant for three months then introduce formula milk during the pre-intervention phase, now stated that an HIV positive mother should exclusively breastfeed her infant for six months. She also stated that in the case that a mother chose not to breastfeed her infant, she should ensure that she can maintain replacement feeding options.

All participants also indicated that the mother should always check the condition of her breasts. This is to ensure that the nipples are not cracked as this can increase the risk of transmission of HIV from the mother to the baby should the mother choose to breastfeed her infant. The above two aspects were not mentioned during the pre-intervention phase. Participant G8 also stated that, as important as it is for the mother to check the condition of her breasts, she should also check the condition of her infant's mouth to make sure that he/she has no mouth ulcers or sores. She specified that the latter could also increase the risk of transmission of the virus. This statement was not mentioned during the pre-intervention phase.

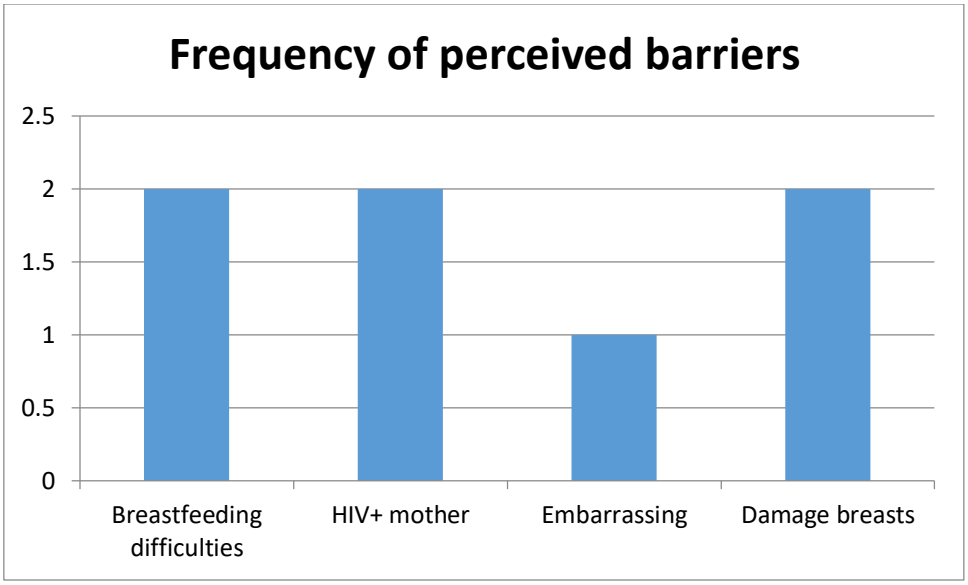
5.2.3.2 Health and risk status of infants

All participants stated that the risks of not exclusively breastfeeding their infants are that the infant can fall sick from diseases such as diarrhoea, and stunting (participants referred to stunting as " *when the child is too small for their age*") and learning disabilities.

5.2.3.3 Perceived barriers to exclusive breastfeeding for six months

All participants stated that they could not foresee any barriers that would be significant enough to hinder their ability to breastfeed. This was significantly different from the seven out of ten participants who had indicated foreseeable barriers during the pre-intervention phase. They did, however, list a few barriers that may be seen as a problem by other mothers. Figure 15 depicts the different barriers.

Figure 15 Frequency of perceived barriers to exclusive breastfeeding for six months



Participant G4 mentioned that some mothers may fall sick and will not be able to breastfeed. She further stated that in the case that mothers fall sick and cannot breastfeed they should go to the clinic and ask the nurse what her options are.

Of the two participants that indicated cracked nipples as a potential barrier, one of them stated that mothers should use cold water to ease the pain and go to the clinic to ask for advice from the nurse.

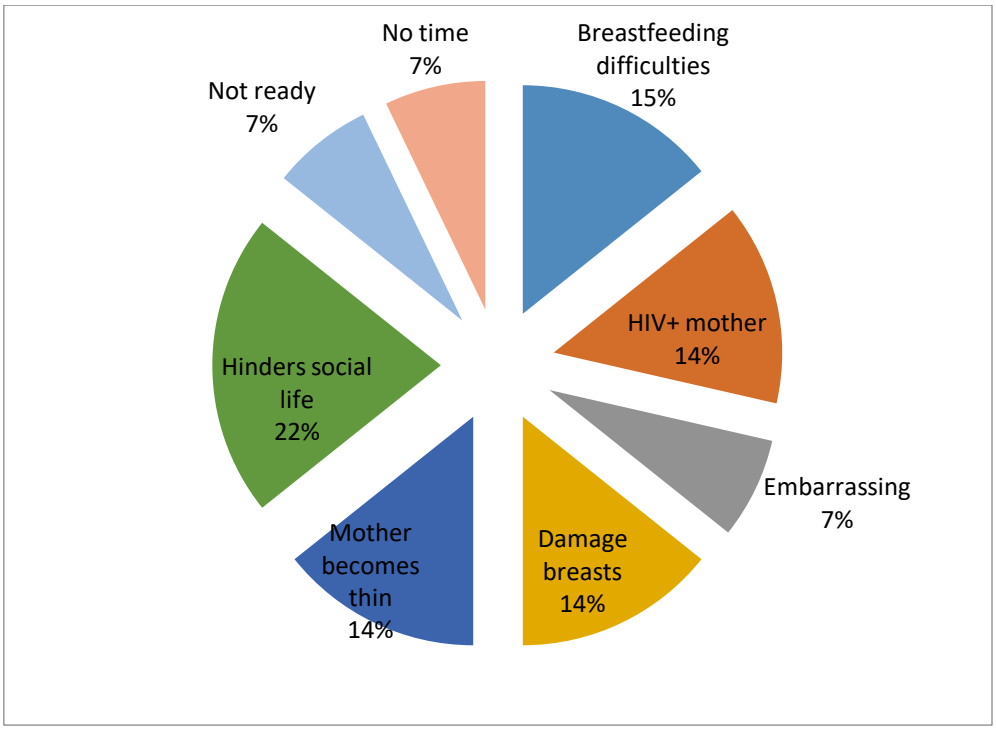
5.2.3.4 Perceived disadvantages of breastfeeding

All participants indicated that there are no disadvantages of breastfeeding.

5.2.3.5 Breastfeeding practices in the community

When asked why mothers in their communities do not breastfeed, participants had a variety of responses. These are shown in Figure 16 on the next page

Figure 16: The different reasons why mothers in the villages do not breastfeed their infants



Two participants mentioned breastfeeding problems, referring to the women who do not practice exclusive breastfeeding practices due to a belief that they are not producing enough milk and, therefore, add formula milk. One participant stated that some people might view breastfeeding as embarrassing and therefore prefer not to breastfeed, especially in public.

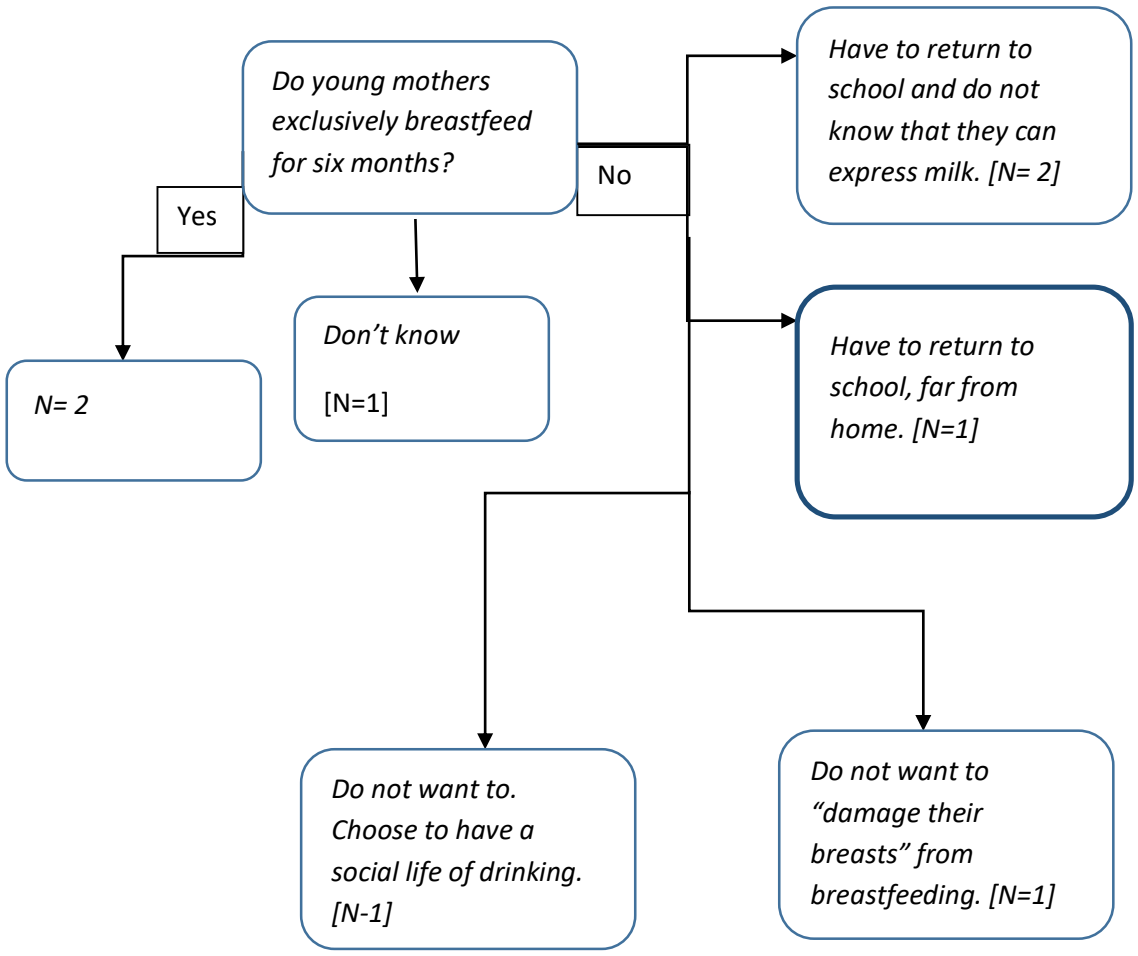
According to participants G2 and G3, the men in the village tend to dislike it when women breastfeed as it "damages the breasts". Furthermore women complain that they lose a lot of weight which they do not like; to this they only said that it does not look good when the woman becomes thin. Three participants stated that other women, especially those who like to drink and smoke, find that breastfeeding hinders them from being able to conduct these practices and thus resort to formula feeding their infants.

Participants specified that these mothers need to be educated as to the importance of breastfeeding for their infants. However, they stated that this will only be effective if the mother

cares, as some mothers' desire to drink supersedes that of providing their infants with the appropriate feeding method. According to the participants, in that case the child should be taken away from the mother, as no child should be raised by a mother who does not care about his/her healthy development.

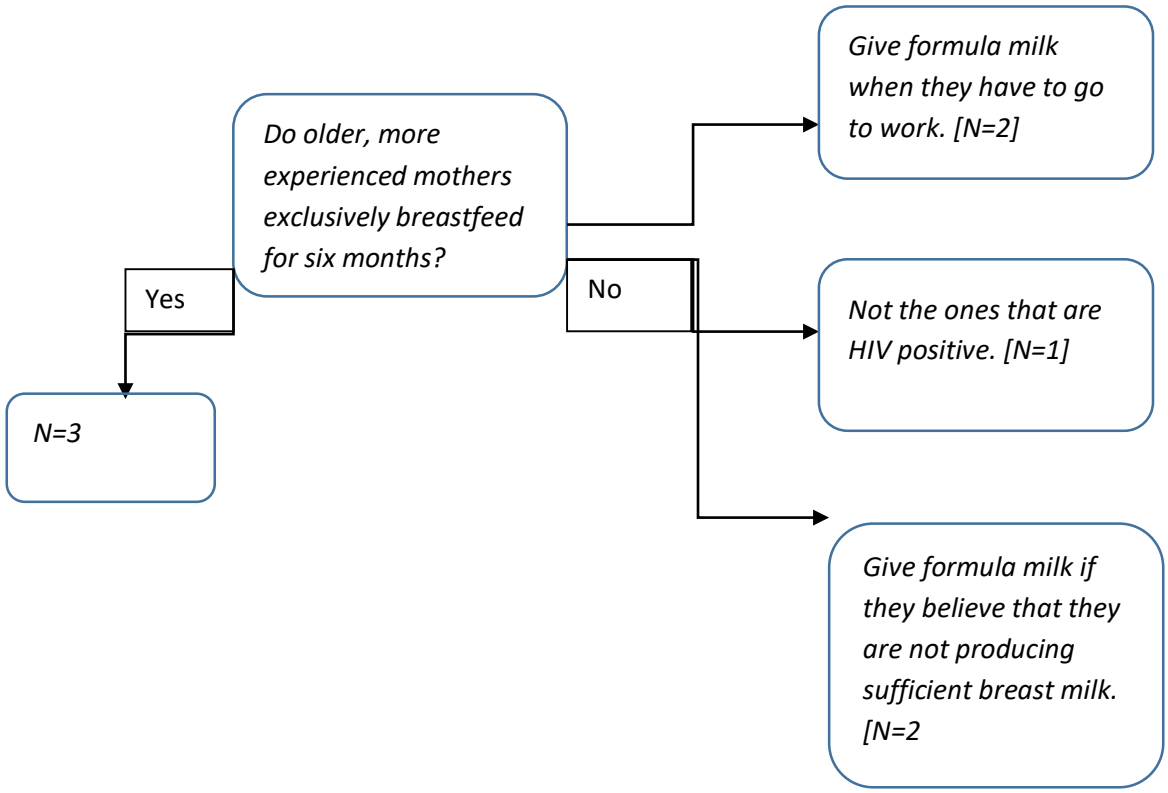
Furthermore all participants specified a difference in the way young mothers, especially those who are of school-going age, and older mothers feed their infants. As stated by the participants, Figure 17 on the next page shows the different responses by the participants regarding whether young mothers of school-going age breastfeed their infants exclusively within the first six months after giving birth. The different reasons are also shown in the same figure. Two of the participants indicated that some of the school-going girls who do not know that they can express milk, resort to giving their infants formula milk. One participant said that some of these mothers do not want to breastfeed due to their demanding social lives. Another participant indicated that some young mothers subject themselves to the community's opinions, particularly young boys who do not like nor understand breastfeeding.

Figure 17 Participants' perception as to whether young mothers exclusively breastfeed their infants and the reasons for not doing so.



Two participants out of seven pointed out that older mothers exclusively breastfeed their infants for six months. However, not all of them agreed to this, as they stated that some older mothers do mix. The different responses are represented in Figure 18 on the next page.

Figure 18: Participants' perception as to whether older mothers exclusively breastfeed their infants and the reasons for not doing so.



When asked why there is a difference between how young mothers and older mothers choose to feed their infants participant G5 stated the following:

"Older mothers do not care about their breasts as opposed to young mothers."

Indicating that the reason there is a difference between how older mothers and younger mothers feed their infants, the participants said that this is due to the fact that younger mothers are influenced by the other community members' perceptions of the so called negative effects of breastfeeding on the shape of the breasts. Furthermore participant G3 said the following:

"Older and more experienced mothers do not feel insecure about breastfeeding in public. Young mothers would not even attempt to take out their breast in public."

This shows that experienced mothers generally care less about the public opinion on breastfeeding in public than do the younger women. Generally the reason why older, more experience mothers do not exclusively breastfeed is due to work commitments or the belief that she is not producing enough milk for her infant and thus has to add formula milk.

5.2.3.6 Pre- and post-intervention results

Specific aspects of the pre- and post-intervention results are shown on the next page in Table 8. The second column indicates the number of participants during the pre-intervention phase that had the most appropriate responses. The third and fourth column shows how many of the seven participants that participated in the pre- and post-intervention phase provided the most appropriate responses.

Table 8: The number of participants who knew the most appropriate response to specific aspects of breastfeeding before and after the intervention

Aspect	Pre-intervention (N=10)	Pre-intervention of the participants that remained for the entire study (N=7)	Post-intervention (N=7)
Importance of colostrum	N=0	N=0	N=7
Expressing breast milk			
Importance of expressing milk	N=6	N=2	N=6
How to express breast milk			
Storage of expressed milk	N=2	N=1	N=7
Cleaning of container used for storing expressed milk	N=3	N=2	N=7
	N=2	N=1	N=5
Exclusive breastfeeding			
Importance of exclusive breastfeeding	N=8	N=6	N=7
Definition of exclusive breastfeeding	N=6	N=4	N=7
Initiation of exclusive breastfeeding	N=4	N=4	N=7
Duration of exclusive breastfeeding	N=7	N=5	N=7
On demand breastfeeding	N=6	N=5	N=7

5.2.3.7 Empowerment model

5.2.3.7.1 Self-efficacy

During the educational sessions, participants were asked to illustrate the different breastfeeding positions, i.e. the cradle hold, the cross-cradle hold and the football hold, using dummies. All participants expressed keenness to learning the different positions and after a few minutes, they were very relaxed and comfortable in demonstrating the different positions to the rest of the participants.

All participants stated that they were fully committed to perform exclusive breastfeeding practices for six months followed by continued breastfeeding with complementary feeding up to two years, excluding participant G5 who stated that she will need to stop breastfeeding after six months and will have to provide complementary feeding for her infant only from then onwards, as she stated she had a confidential problem and could thus not breastfeed for longer than six months.

All participants were of the belief that they were equipped with the knowledge and the skill to be able to perform exclusive breastfeeding practices for six months. They strongly felt that the advantages of breastfeeding for their infants and for themselves surpassed the disadvantages. In fact, no individual disadvantages were stated during the post-intervention interviews. Lastly the participants indicated that the community members' opinions and practices would not deter them from providing their infants with the age-appropriate optimal feeding practices.

5.2.3.7.2 Participants' learning points from the educational programme

All participants stated that they learnt that it is not recommended for formula milk to be given to infants during the first six months. This is due to fact that formula milk cannot protect infants from bacteria whereas breast milk can reduce the risk of infection. Four out of ten participants stated that formula milk lacks colostrum and thus the necessary nutrients that are found in breast milk that can help fight off infections. One participant stated that she learnt that the chances of contamination are also significantly higher when providing formula milk for one's infant. One participant stated that she now knew the difference between breast milk and formula milk. She did not know the difference before the educational intervention.

All participants stated that they learnt how a HIV-positive mother should feed her infant. They also added that they learnt what an HIV-positive mother should look out for to reduce the risk of transmission of the virus from the mother to the infant. Four participants stated that they learnt that should a HIV-positive mother choose to provide formula milk, she must make sure she can ensure its availability and can afford it.

All participants stated that they learnt that if they are unavailable they can express their breast milk into a sterilized container, store it in the fridge for the care-taker to give later. One participant stated that she would have otherwise given formula milk, and never understood why mothers express milk.

All participants learnt the different ways they could prevent or reduce breastfeeding difficulties during the intervention. They all learnt how to attach baby to the breast correctly and the importance of doing so for both the mother and the baby. They also stated that they learnt that the baby has to be initiated on breast milk to obtain the colostrum and to be fed on demand for six months.

5.2.3.7.3 Way forward

Six participants expressed that they would be willing to take what they learnt from the educational programme further. Participant G2 stated that she can organize groups and give advice on breastfeeding to pregnant women and women who have already given birth. This sentiment was shared by five other participants. Participant G3 indicated that it would be challenging to address older mothers but she would be willing to hold discussions with other mothers of her age group.

5.2.4 Self-administered questionnaire

5.2.4.1 Community partnership and involvement

Two respondents from the AGF stated that interviews with the AGF and networking with other stakeholders were done effectively.

Furthermore, stakeholders stressed that the community's ideas and contributions were valued throughout the study, as their input was vital and assisted with highlighting particular areas of

information that were described as "*being clarified since the intervention*". The following account represents thoughts on how the intervention met the needs of the community from Participant1:

"*There are particular points on exclusive breastfeeding that the participants and even some of their family members have stated they now understand better and feel empowered with this knowledge."*

Both stakeholders also stated that community members actively participated in the study and contributed to the intervention. Participant 1 elaborated on this as follows:

"*Community members contributed by providing information on local knowledge, challenges, myths and misinformation and are contributing still by giving unsolicited feedback."*

5.2.4.2 Demonstrated positive impact on the community

The intervention was said to have a positive impact on the community, as community members had given positive verbal feedback and particularly from mothers of some of the girls who had participated in the intervention. They further stated that this indicated that a dialogue was now established and that knowledge is being shared in the community, which will positively impact breastfeeding practices. The benefits reaped from the discussions stemming from the intervention were that "*in the past there has been little clear understanding of exclusive breastfeeding and community members are saying that they were unsure of the pros and cons of breastfeeding when HIV positive. Mothers say their children do not tell them when they are HIV positive and they thought that formula feeding was best. Now they feel empowered to give breastfeeding advice even when they do not know the (HIV) status of their children*." (Participant2)

5.2.4.3 Empowerment of pregnant women

Stakeholders indicated that the intervention has promoted empowerment of pregnant women in the community with respect to informed decision making regarding exclusive breastfeeding for the first six months. Moreover, the continued collaborative mentorship and education, through the AGF, the clinics, trained community champions and youth programmes, will have a significant effect on informed decision making. When asked of the significance of empowering women in order to perform optimal breastfeeding practices, Participant 1 cited the following:

"*A lot of information is misconstrued. Partly because there are many role players or 'advice givers' all of whom may come from different knowledge base and may be influenced by outdated beliefs and practices. With clear knowledge of their own, pregnant women will be able to make their own informed choices about optimum breastfeeding practices."*

Although breastfeeding is a natural choice of feeding infants, there is talk of empowering and or *'teaching'* mothers about breastfeeding, stakeholders stated that the instinct to breastfeed for human beings is undermined by environmental and circumstantial changes which obscure daily living and performing natural activities such as breastfeeding. Also with never-ending contagious outbreaks, medications and foodstuff that have been genetically altered and permeated with hormones, etc, *"the decision to breastfeed becomes complicated by many important external influences - including cultural beliefs and norms which constantly change*." According to Participant 2, this presents as a challenge for many young mothers particularly.

Participant 2 also indicated that a lack of breastfeeding information/education compounded by the fact that "*many rural families are fragmented and mother/guardian to daughter/child relationships are often not well developed*" lead to sub-optimal breastfeeding practices in these communities. Stakeholders pointed out that the short term and long term impact of the intervention would be that people will have knowledge with which to make informed decisions and there will be an observed increase in healthier babies respectively.

5.2.4.4 Sustainability of the intervention for pregnant women

Stakeholders maintained that the intervention is linked with existing networks in the community, such as the AGF and the CHWs, who will build and expand on the existing knowledge base. Lastly stakeholders stated that the community would be prepared to uphold the programme as it adds value to community assets and knowledge. This together with the community's positive attitudes towards sharing information that makes them "*feel empowered to take control of their own life decisions".*

Summary of Results

Participants in the baseline study indicated that there are no pertinent issues that affect infant health. However malnutrition is of concern and can affect infant health issues in future, thus an educational intervention on infant feeding practices will be helpful. Main study included a pre-intervention phase in which most of the participants understood the importance of breastfeeding, yet many could not identify the specific importance of exclusive breastfeeding during the initial six months after birth. A number of barriers were identified as having an impact on initiation and continuation of exclusive breastfeeding practices. An educational intervention was carried out that addressed issues raised by participants during the pre-intervention phase, general important issues/facts pertaining to breastfeeding as well as topics based on the three models used. A post-intervention indicated an improved appreciation among participants of the importance of exclusive breastfeeding for the initial six months. This phase also demonstrated an intention by all participants to initiate and continue with optimal feeding practices in spite of barriers identified during the pre-intervention phase.

Stakeholders from the AGF indicated that the educational intervention was a great tool to help women empower themselves in the two communities, as it is linked to existing networks and strengths in the community. Subsequently the intervention is a sustainable means of increasing knowledge in the communities.

6 Discussion

Overview of the chapter

In this chapter the results are interpreted, looking at service delivery and factors that influence access to infants' health care particularly in the Eastern Cape. Furthermore results of the baseline phase and intervention phase are analysed, compared and contrasted with literature and previous studies conducted on similar topics.

6.1 WHO Priority Medicines List for Infants

A study reporting on descriptive and logistic regression analyses on World Health Survey data in 70 countries reports that data from 51 low and middle income countries (LMIC), provides evidence that healthcare expenditures are increasing for the poor households in developing countries to the extent that between 41% and 56% of households in LMIC spent 100% of health care expenditure on procuring medicines.[202] When the public sector health care systems do not function optimally, the poorest and most vulnerable population have to incur health care expenses. It is encouraging that, in the current study, the bin cards in the two rural clinics showed that priority medicines for women and children were not out of stock in the two clinics during a twelve month period. Medicines stocked in the two clinics mimic those that are listed in the WHO priority medicines list for infants. However, in the event of such a health complication, the communities are ill-equipped as the clinic is not operational after hours and during weekends, and the closest hospital is not easily accessible to these communities. This reality poses a likely health hazard which could ultimately lead to health complications. Eastern Cape is the second poorest province in South Africa and has the highest level of unemployment,[138,203] so the effect of reduced access to health services impacts negatively on the vulnerable population.

Based on a review of publications on access to medicines, it is evident that it is important for more research and contributions to manuscripts in the field of access to medicines to be carried out by developing countries so that eventually it could result in increasing access to medicines in developing countries.[88] Complex and interconnected multi-layered factors in the health system influence access to medicines; hence a wider and more adaptive health system perspective is required to address barriers to access to medicines in developing countries. A number of health programmes have associated the insufficient supply, distribution and misuse of medicines with

the lack of pharmaceutical professionals, who represent the third largest health care professional group in the world.[68]

6.2 Service delivery

The communities under study stressed that infant health was greatly undermined by the challenges in health services delivery such as those observed in these communities. They expressed that if an emergency had to occur, they would be short of options to save their infants' lives. The clinics are also closed after hours and during weekends, which poses a further challenge to mothers when faced with an emergency. According to the Eastern Cape Annual Performance Plan of 2018, the Department of Health aims to prioritize improved response times of Emergency Medical Services (EMS) to communities. However, challenges such as poor conditions of the roads makes it difficult for EMS to meet national targets on the response times, particularly in the Transkei homelands. Furthermore, the report states that difficulties in recruiting and retaining qualified personnel prevail.[182]

6.3 Role of the community health worker

Community health workers in the two communities play a crucial role in reducing infant health issues. All participants during the FGDs stated that CHWs were the link between the clinic and the community. This finding upholds the emphasis that is placed on the community-based health workforce approach in strengthening existing health systems and providing resources in support of local action. By focusing on this approach, CHWs can play a significant role in improving the health outcomes of the communities which they serve.

Evidence suggests that community participation and the consequent community empowerment is a cost-effective approach to improve infant survival, especially in remote, under-served communities.[90, 91] CHWs are easily accessible to the community and can thus compensate for the lack of health care professionals, and increase community participation and accountability.[92] CHWs in the communities have a major role to play with regard to improving infant survival such as those in this study as they formed strong relationships with community members. They are the source of information on infant health issues for the community, particularly pertaining to immunizations. Evidence from studies conducted in Honduras suggests that efforts from CHWs significantly improved infant health outcomes within their communities.[91, 92] The efforts of CHWs

in Honduras were successful because they provided the community with a medium through which they could quickly identify and effectively tackle infant health issues. In this study efforts such as holding immunization campaigns and regular home visits made by the CHWs may have assisted in equipping the community with the ability to effectively prevent infant health complications. However these findings should be interpreted cautiously as communities without CHWs were not researched to verify the results.

6.4 Infant health issues

The major causes of under-five deaths in South Africa are HIV/AIDS, neonatal complications, pneumonia and diarrhoea in order of predominance. Malnutrition is stated to be the principal cause of over a third of these deaths.[3] However, based on FGDs and semi-structured interviews in this study, no infant health issue was noted to be of grave concern, not only because the participants did not convey any concern but, when probed, it generally seemed as though infant health issues were non-existent. The introduction of the pneumococcal and rota-virus vaccines alongside pre-existing vaccination programmes, may account for the infrequent infant health issues in these communities. Coverage of these vaccines have exceeded 90% in South Africa and, since their widespread implementation, incidences of diarrhoea and pneumonia have reduced significantly.[138,204]

All participants with the exception of the elderly and the village leaders only conceded breastfeeding as an issue after probing. This could be due to the fact that some mothers may view it as an uncomfortable topic that could potentially lead to embarrassment. Also with the stigma that accompanies HIV/AIDS, the participants may have been apprehensive discussing the topic, especially since many of the participants stated the topic is of a sensitive nature that people do not want to affiliate themselves with. In the end there was a general consensus that women in the two communities do not exclusively breastfeed their infants for six months.

A study conducted in a rural community in the Limpopo Province revealed that exclusive breastfeeding among mothers in that region declined from 44% of infants at one month old to 10% of infants at three months of age in 2004.[205] These findings also confirm other studies that have disclosed the low exposure rates of exclusive breastfeeding practices within the first six

months in South Africa.[9,205] Many mothers introduce supplementary feeding in the form of milk, porridge and/or vegetables at a very early age. This pattern is a result of many factors, including the mother's other obligations such as school or work. Another aspect may be a lack of adequate information from health workers regarding the importance of exclusive breastfeeding for six months.[144,205]

6.5 Educational Intervention

6.5.1 Sources of information on infant feeding

Before commencing on promotion and recommendations of breastfeeding through education, it is imperative to understand what factors influence each woman in order to successfully improve breastfeeding practices. Sources of information pertaining to breastfeeding are important to consider, as these can have a direct influence on initiation and duration of breastfeeding. In this study six out of ten women indicated the clinic as one of the sources of the information they had on infant feeding at the time of the interview. Of the three teenagers only one of them mentioned the clinic as one of her sources of information. Furthermore only three of the young adults stated the clinic as one of her sources of information on infant feeding. On the other hand, all four of the adult women indicated the clinic as one of their sources of information.

Research by Barona-Vilar indicates that women from lower socio-economic groups tend to value support from their more experienced community members.[206] This finding is congruent with that found in this study as the support from other experienced members of the community was mentioned numerous times pertaining to specific information, for example, with regards to expressing milk; six out of ten participants stated that one of the sources of information was from experienced mothers. This finding that women seek information from their relatives and friends is in agreement with that of Caruth *et al.*, Pridham *et al.*, Reece *et al.* and Baranowski *et al*.[207-210] Community members in our study, be it experienced mothers or relatives, were an important source of information stated for providing information on formula feeding, supplementary feeding, exclusive breastfeeding and expressing milk. Although all participants indicated an intention to breastfeed exclusively for six months, considering the barriers that may occur, particularly for school-going girls, they did mention that some mothers may be forced to formula feed within six months. This is most common among younger mothers. One study supports this

finding as young mothers in that group of women were more likely to ask information pertaining to infant feeding from family/community members rather than seek professional advice.[211] Moreover, a study by Brown *et al.* found that mothers who chose to feed their infants formula milk indicated family members as the source of information and advice, whereas mothers who predominantly breastfed sourced their information from HCPs. This is due to the fact that HCPs are in a better position to provide up-to-date and accurate information regarding infant feeding, thus sourcing them for information is linked with improved knowledge and understanding of breastfeeding.[212] The infant and young child feeding policy implemented in South Africa emphasizes the need for HCPs to receive up-to-date evidence-based knowledge and the skills on suitable infant and young feeding practices to enable them to provide quality counselling and support to mothers and caregivers.[135]

6.5.2 Knowledge, attitudes &practices; and Health Belief Model in infant feeding practices

6.5.2.1 Perceived correct infant feeding practices

During pre- and post-intervention all mothers stated that the correct feeding method for an infant is to breastfeed only for six months. This is in line with recommendations by the WHO on breastfeeding that have also been adopted in South Africa.[135] Seven out of ten mothers intended to breastfeed only for six months, six of them stating that breast milk is the best for their infants and the remaining participant indicating that it will save her money because it is a cost-effective method of feeding. What is interesting to note is that breastfeeding was highlighted as an issue in this community in the FGDs conducted, yet seven out of ten of the mothers in the study showed an inclination to breastfeed. The other three stated breastfeeding barriers that they perceive will hinder them from being able to breastfeed fully, but they would otherwise choose to breastfeed exclusively. This indicates that generally all the mothers in the study understood the benefits of breastfeeding. They also attended all antenatal clinics regularly. Whether this finding is limited to this group of mothers due to a predisposition towards breastfeeding, or if the fact that they all attended the antenatal clinic has influenced their decision to breastfeed is unclear. It is, however, evident that antenatal breastfeeding education influences a mother's decision to initiate and maintain breastfeeding practices.[213]

6.5.2.2 Perceived incorrect infant feeding practices

Furthermore, nine out of ten participants stated that mothers drink and smoke while breastfeeding. This practice they perceived as detrimental to the infant's health. In 2009 it was found that 8.43% of South African females 15 years and older smoke some form of tobacco.[214] The proportion of these women who were pregnant and/or already mothers was not specified. Smoking in pre-pregnancy is associated with continued bad habits postpartum, including maternal alcohol intake.[215] As stated by the participants in this study, smoking while breastfeeding poses direct and indirect threats to the infant. Participants also indicated that mothers who smoke and drink are of the opinion that breastfeeding is a disadvantage as it forces them to forfeit their social lives. These mothers either continue breastfeeding while smoking in spite of the dangers to their infants, or they cease breastfeeding and provide formula feeds prematurely. This result mimics that of Giglia *et al.*[215] who found that mothers who smoked before falling pregnant were most likely to breastfeed for less than four months. Furthermore, women who were pre-pregnant smokers were more prone to drink alcohol than non-smokers. Another study supports this notion and further argues that women exposed to other smokers were more likely to relapse than those who did not post-pregnancy. Women with low income and less education also had a greater chance of relapsing post-pregnancy.[216] The *status quo* portrayed by the participants in this study highlights a need to focus efforts to educate these mothers on the risks of not breastfeeding their infants. Just as vigorously, these mothers need to be informed on the potential hazards of smoking and drinking while breastfeeding. It is thus recommended for all pregnant women to attend antenatal clinics to receive appropriate information. However, another study highlighted that some HCPs are doubtful of their ability to influence patients to quit smoking while breastfeeding.[195] This pessimism is mislaid as the slightest intervention by HCPs can go a long way in motivating mothers to quit. It would be advisable to train HCPs so that they are better prepared to deal with addictions.

6.5.2.3 Perceived advantages of breastfeeding

Although all participants stated that it would be beneficial to breastfeed their infants, seven out of ten had no intention to provide artificial milk feeding within the first six months. Only two of the participants were multiparous and the other mothers were primiparous. However, this

difference had no evident impact on the response of the participants, as five of the primiparous mothers were equally as inclined to breastfeed as the two multiparous mothers. In the study conducted by Brown *et al.* it was discovered that mothers in that study that were breastfeeding successfully found breastfeeding to be more convenient and easier than formula feeding. Mothers stated that they enjoyed the experience and felt proud of their growing infant.[212] Participants in this study all anticipated breastfeeding their infants. Seven of these participants could foresee no significant barriers that would impede them from breastfeeding their infants effectively. Mothers with positive attitudes to breastfeeding were found to be more likely to adopt optimal breastfeeding practices. These mothers were also more likely to persist breastfeeding their infants even when confronted with barriers.[218,219]

6.5.2.4 Perceived disadvantages and barriers to breastfeeding

Nine out of ten participants stated that they could not conceive any disadvantages to breastfeeding. Conversely they all distinguished that members of their community have indicated breastfeeding as a disadvantage in a variety of dimensions. In this society, issues relating to breastfeeding and sexuality are frequently ignored and people choose not to discuss them. Participants indicated that young mothers frequently felt embarrassed about breastfeeding in public, and there was the general view among adolescents that breastfeeding adversely affected the way men viewed women's breasts. The sentiment among young women that breastfeeding is embarrassing is not a new concept, as it is a common theme in existing literature.[220,221] Some researchers have highlighted the issue on breastfeeding in public as a sign that these communities believe that breastfeeding is not a norm, and this is an essential barrier to overcome in order to improve breastfeeding practices.[221]

A study conducted in Turkey revealed that the majority of the men in that study, 68%, asserted that breastfeeding did not adversely affect the woman's appearance.[222] In their discussion Taspinar *et al.* further indicated that a large majority of the fathers in their study had a positive outlook on breastfeeding and wanted their babies to be breastfed, but only half of them had talked to mothers of their infants about it. In spite of the fact that some fathers view breastfeeding as beneficial to their infants, studies show that a large proportion of men still find it unacceptable for women to breastfeed in public. Another study by Pollock *et al.* revealed that

29% of fathers in their study believed that breastfeeding was unacceptable in public and 34% found it embarrassing. However, 98% of the men in that study further disclosed that breastfeeding would not adversely affect their sex lives. In their study 66% of the participants were of African-American descent.[223] Notwithstanding the lower score of men of African-American descent compared to other men in previous studies regarding their preference for breastfeeding, all of the African-American men indicated that they preferred their infants to be breastfed in the study by Pollock *et al*. Inconsistencies have been reported in the opinion of men regarding women and breastfeeding. Regardless, it's important to note that the community's attitude towards breastfeeding affects a mother's decision to initiate breastfeeding and the duration of breastfeeding. Creating an opportunity for mothers to relay their feelings and to provide continuous support for them to be able to consider other perspectives is imperative if breastfeeding advocates are to change the current bottle-feeding customs.[222,223]

The issue that many women in the community resort to artificial milk due to the belief that they have a low milk supply or that they experienced persistent pain, was stated by two out of seven participants during the post-intervention interviews. In fact, one participant also stated that she intended to provide formula milk if she felt her milk supply was low. This finding is synonymous with other studies in which mothers revealed that they would introduce formula feeds within six months due to decreased breast milk supply and also due to painful experiences whilst breastfeeding.[224,225] Fear of insufficient milk supply seems to be a universal reason for introducing formula feeds. Kools *et al.* convey that the reasons for introducing formula feeds due to "insufficient milk" or "breastfeeding is painful" are related to self-efficacy to resolve difficulties associated with breastfeeding.[224]

Moreover, a study by Scavenius *et al* illustrated that half of the women in their study stated inadequate milk as the primary reason for ceasing breastfeeding. Scavenius *et al* discussed that the majority of the women in their study had supplemented their infants with water during breastfeeding. They then assumed supplemental breastfeeding, leading to the disruption of the breastfeeding process. They further hypothesized that this would lead to a decreased milk supply, due to the low demand for breast milk from the infant. This, in turn, disturbs the positive

feedback process of breastfeeding eventually. They concluded that when the baby suckles and thus the amount of milk produced is no longer driven by thirst or hunger, mothers will eventually believe that their milk supply is low. It is at this point that the mother decides to supplement more frequently and eventually the breastfeeding process stops completely .[226] Two women in this study indicated that giving water was incorporated in "exclusive" breastfeeding practices. There was no indication as to who in the community had given them information on providing their infant water while breastfeeding. However, mothers need to be informed on the intrinsic and extrinsic risks of providing water or any supplemental feeding or drinks to their infants during the first six months, especially since mothers had indicated that they at times rely on tank water collected from rain.

A quarter of the women in the study by Scavenius *et al,* also mentioned that the infant simply did not want the breast anymore. Other mothers in the same study also specified sore nipples as a reason for giving up breastfeeding. Sore nipples occur naturally in the process of establishing breastfeeding, particularly for mothers with their first infants. In fact, sore nipples were reported by mothers in this study, who narrated the different advice they had received and the preventative measures in order to continue breastfeeding.[226] Although only one participant in this study mentioned sore nipples as a disadvantage of breastfeeding, it remains undetermined just how many mothers in the community share this view. In order to deter this notion in the community, HCPs need to re-examine their own role in the promotion of breastfeeding and to identify ways to work with mothers to improve their ability to understand issues related to their choice of infant feeding, as well as to manage breastfeeding difficulties to provide optimal breastfeeding practices.[227]

A study conducted by Forster *et al.* found that 41% of the women in their study who reported negative aspects of breastfeeding indicated having to give up lifestyle habits as a disadvantage of breastfeeding.[220] Murphy argues that the notion that "breast is best" dominates the context in which women decide how to feed their infants, and also how they exhibit and defend those decisions.[228] However, this is not always the case as evidence proves. It is vital to explore the broader context of breastfeeding and to search outside of the constricted contexts of health

education and promotion and the extensive benefits of breastfeeding. It is imperative to investigate cultural/social norms and how they affect outcomes of breastfeeding in that perhaps behaviours that lead to certain attitudes and practices can be well understood in order to effect change.[229]

6.5.2.5 Work and breastfeeding

None of the participants viewed having to return to work as a personal barrier for them towards breastfeeding. Nonetheless, two out of ten participants stated that community members perceive going to work as a barrier to breastfeeding. In concurrence with this finding, extensive studies have established that women perceive having to return to work as an insurmountable barrier to breastfeeding, leading them to resort to formula feeding.[221,230-232] Scavenius *et al.* argue that although returning to work breaks the process of breastfeeding, and mothers who had to return clearly had a legitimate reason to give up breastfeeding, a decision which they may have felt was beyond their control; the need to work does not unquestionably lead to this result.[226] For example, if a mother is given the opportunity to continue breastfeeding while working, then work does not constitute a barrier to breastfeeding.

In terms of the South African Labour Relations Act, 1995, it is unacceptable to terminate employment on account of a woman's pregnancy. It is further stipulated that a woman is allowed at least four consecutive months of maternity leave at any time from four weeks prior to her giving birth. The payment of maternity benefits will be determined subject to the provisions of the Unemployment Insurance Act, 1996, which provides for the payment of maternity leave.[233]

6.5.2.6 School and breastfeeding

One out of ten participants in the pre-intervention interviews in this study stated that she would be forced to formula feed when she returns to school. Moreover, three out of the seven participants in the post-intervention indicated that school-going mothers find it difficult to breastfeed due to the fact that they have to return to school. Additionally the perception that breastfeeding is embarrassing has featured numerous times in this study. These findings suggest that young South African women who parent while at school experience negative attitudes and a lack of support structures to guide them through their parenthood. In 2007, 55 000 learners were pregnant while at school, with the highest proportion observed in poorer provinces.[234] The

South African government has implemented an educational policy to ensure that all young people may attend school, as their fundamental right, enacted through the South African Schools Act 108, 1996. However a study by Shefer *et al.* found that educators and peers of young mothers respond negatively towards school-going women who commence parenthood.[235] Notwithstanding the negative attitudes of schools and communities towards pregnant/parenting young women, the National Department of Education also implemented guidelines on managing pregnant/parenting young women through the publication of *Measures for the prevention and management of learner pregnancy*. One of the key guidelines stipulated specifies that learners may:

"request or be required to take leave of absence to address post-natal concerns. No predetermined period is specified for this purpose since it will depend entirely on the circumstances … learners as parents should exercise full responsibility for parenting and that a period of absence of two years may be necessary for this purpose ... learners should not return in the same year."[236]

The options that are suggested in the guidelines may present teenagers with a dilemma. Either they take the time needed to take care of their infants and return after such a period or they risk providing sub-optimal breastfeeding practices, some forfeiting their parental duties altogether to continue their education. The underlined risk of taking two years off school is noted by Ngabaza and Shefer in that once a young mother has been out of school long enough, the prospects of her returning to school are limited.[237] This situation may be exacerbated by a lack of support structures at home to take care of the infant and support from the school to encourage continued learning. Conversely, if a young mother returns to school within two years, she may expose her infant to sub-optimal breastfeeding practices. This is mostly true for mothers who attend schools that are far from home, rendering expressing milk on a daily basis an unfeasible task.[235]

6.5.3 Social and structural support

6.5.3.1 Guidance and support to mothers and caregivers

Nine out of ten of the women in this study stated that they had someone to whom they can turn to for advice. One participant said she did not, however, have anyone; if need be she would turn to the nurse. They also had invaluable support from their mothers/grandmothers (all) and their partner (nine out of ten). Pregnant women in a study by Barona-Vilar indicated that they valued the emotional and tangible support they received with regards to their impending infant; this in turn had positive effects on the decision and duration of breastfeeding. Women in the same research highlighted that fathers' support of breastfeeding was vital, and associated with shared parenting.[206] With the fathers' support, women were better able to assume their tasks with regards to caring for their infants; this also made it easier to commence and continue breastfeeding.[206] In a study by Brown *et al* it was found that an increased breastfeeding duration was associated with having a partner who was supportive of breastfeeding. The study also indicated that being part of an environment where breastfeeding was accepted as a norm, being encouraged by others in the community and seeking advice from HCPs led to increased breastfeeding duration. All women who expressed a positive attitude toward breastfeeding, felt that their family and peers supported their decisions to breastfeed, which helped to reinforce their belief that they were making the right choice.[212] The participants in this study felt that with the support of their community and that of their partners they would be willing and able to provide optimal breastfeeding practices for their infants. This finding clearly confirms the importance of being in an environment where breastfeeding is supported and accepted as the natural method of feeding an infant. This will influence attitudes and beliefs directly and have an impact on experiences through providing a platform for support of breastfeeding. In the long run, increasing the prevalence and visibility of breastfeeding would guarantee that future generations would enjoy and appreciate breastfeeding as the cultural norm.[238] Support of HCPs have also been associated with a general positive influence on breastfeeding experiences, particularly among adolescent mothers.[225] This finding is aligned with the participants recognizing that they can turn to the nurse for help with regards to all aspects of breastfeeding, which in turn persuades their fortitude to breastfeed.

Although legislative support exists for breastfeeding mothers in South Africa, the expansion of which is limited, particularly in remote, under-served areas. The importance of BFHI has also been recognized in South Africa through the incorporation of the initiative in all nutritional policies for HCPs and health facilities. The government, however, still needs to expand this initiative to all hospitals in the country and accept the *Ten Steps to Successful Breastfeeding* as the minimum criteria for attaining BFHI status.[102,135]

6.5.4 Self-efficacy with regards to breastfeeding

Throughout the pre-intervention phase of this study, participants viewed insufficient milk supply or painful breastfeeding experiences as valid reasons to introduce formula feeds. Kools *et al* found that "decreased milk supply" and "painful breastfeeding" were related to self-efficacy and indicated that interventions should also focus on building self-efficacy and professional support to decrease the occurrence of such problems.[224] According to Dennis, breastfeeding self-efficacy is defined as a "mother's perceived ability to breastfeed her newborn, and is a salient variable in breastfeeding duration as it predicts a) whether a mother chooses to breastfeed or not, b) how much effort she will expend, c) whether she will have self-enhancing thought patterns and d) how she will respond emotionally to breastfeeding difficulties".[218] Accordingly, efficacious mothers are more likely to choose breastfeeding and persist amidst breastfeeding difficulties due to their self-encouraging thoughts. A study by Blyth *et al.* revealed that high breastfeeding self-efficacy was related to breastfeeding initiation and exclusivity, whereas low self-efficacy was related to the early introduction of bottle-feeding, i.e. as early as one week *postpartum*.[219] Dennis concluded from that study that mothers with prior breastfeeding experience had significantly higher breastfeeding self-efficacy than *primiparous* women.[218] In this study, however, all participants showed confidence with regards to their intention to breastfeed for six months, followed by continued breastfeeding and complementary feeding.

6.5.5 Peer support groups

Six out of seven participants were enthusiastic about taking what they learnt from the educational intervention in this study further into their community. The idea of forming self-help groups has been stated in other studies, for example, Barona-Vilar *et al.*, found that women self-help groups valued the information that other mothers had to share, particularly what they

would do when faced with a dire situation.[206] The findings in this study have important implications for improving exposure of women in remote areas to appropriate breastfeeding information, and in turn improving breastfeeding rates. Brown *et al.* found that increasing avenues of support for mothers, particularly young mothers with no experience, where they are able to experience breastfeeding as the norm may positively influence breastfeeding duration. They further discussed that providing peer support to these mothers may enable them to have access to breastfeeding support groups and breastfeeding counsellors to facilitate them to tackle breastfeeding difficulties, and this can thus enable them to feel part of the environment where breastfeeding is accepted, despite their own familial and social backgrounds.[212] The enthusiasm portrayed by the participants in this study regarding forming peer support groups can only improve breastfeeding rates in their community. Their impact may have unprecedented outcomes that can only be to their own advantage as mothers, as support groups and as a community.

6.6 The impact of the intervention

Interventions on breastfeeding are aimed at changing mothers' knowledge and attitudes, and specifically are intended to change women's perception about breastfeeding so that they can identify breastfeeding as significant, beneficial and desirable, and can thus aspire to initiate appropriate and timely breastfeeding practices.[194] New mothers are usually vulnerable and feel isolated, and are thus likely to benefit from interventions that include increasing knowledge and providing practical skills. Fairbank expressed that health interventions are those that provide factual information about breastfeeding .[229] She further states that interventions on breastfeeding can include technical training such as breastfeeding positions and latch-on techniques. Green indicated that interventions that address the benefits of breastfeeding, principles of lactation, myths, common problems together with solutions and skills training have the greatest impact on breastfeeding initiation and duration.[239] De Oliviera pointed out that interventions resulting in increased breastfeeding duration also incorporated guidance for mothers on positioning and attachment, expression and storage of breast milk, combining breastfeeding and work and overcoming breastfeeding problems.[240] Additionally Fairbank found that the many successful breastfeeding interventions were delivered to small groups of women

at a time in an informal environment.[229] In the past interventions that included formal prenatal breastfeeding education, together with printed information, culturally appropriate videos and visual aids, or group educational sessions had more impact on retention of breastfeeding interventions.[198,241,242] In the this study, the use of visual aids proved useful in helping the participants remember how to correctly attach the baby to the breast, as they all mentioned that it was a new aspect they learnt from the educational intervention. Furthermore the use of hands-on activities in the intervention also helped with the participants' confidence in holding the dummies in preparation for their future babies.

Emphasis is placed on implementing breastfeeding interventions, as evidence suggests that it plays a significant role in reducing infant morbidity and mortality. The protective effects of breastfeeding against infectious illnesses have been well documented. This theme also arose within the study, as participants indicated the relevance of breastfeeding in reducing infectious diseases. Duijts *et al* found that infants who were exclusively breastfed for six months had fewer incidences of gastrointestinal infections to those who were breastfed for a shorter period or not breastfed at all.[243] This finding was supported by that conducted by Frank *et al* who found that breastfeeding reduces the occurrence of gastrointestinal infections, respiratory illnesses and acute otitis media[244] As a result of the undisputable evidence, The 2030 Agenda aims to strengthen breastfeeding advocacy across the board to reduce infant morbidity and mortality, ultimately leading to economic development and social cohesion.[52]

6.7 Evaluation and sustainability of the intervention

Stakeholders from the AGF cited that factors contributing to the success of the intervention included community involvement in the decision-making process as well as making use of existing networks to strengthen the study. This phenomenon is highlighted in previous studies, in which observational and experimental data provided compelling evidence to prove that community-based interventions on breastfeeding had resulted in significant improvement of optimal breastfeeding practices. Furthermore previous research demonstrates that involving community members and social support networks in breastfeeding promotion and support provides a platform for the development of cultural knowledge and norms.[245-248] Wandersman et al claim that community level change involves attention to community capacity as well as specific

interventions to change behaviour.[249] Community-based breastfeeding promotion and support is dependent on behaviour change leading to increased child survival and more importantly on women empowerment and community development.

One vital issue raised by one of the stakeholders, was that information can be misconstrued due to different external forces with varied opinions and practices. A study conducted by Shah et al demonstrated large gaps in the knowledge of CHWs in rural Kwa-Zulu Natal. In this study they included health workers in breastfeeding interventions to improve exclusive breastfeeding practices. This is greatly due to poorly developed health systems and low education levels. As a result interventions that incorporate community members together with health workers, improve breastfeeding practices significantly.[250] A review done by Haroon et al also indicated a significant improvement in the community knowledge, attitude and practices due to combined health system and community-based intervention.[246]

Stakeholders maintained that the intervention is sustainable in that, not only did the research include the community in the decision making process but also made use of existing networks such as the AGF, the CHWs and community members. In their study, Butterfoss et al found that formation of intersectoral partnerships paved the way for effective and sustainable community-based behaviour change.[251] These partnerships, included community health staff, opinion leaders within the community, NGOs (such as the AGF) and women self-help groups. Based on these findings and evidence from previous studies, involving the community in every aspect of interventions combined with making use of existing networks form the foundation of improvement in public health reforms.

Through its development of the Innov8 Strategy, the WHO places emphasis on realizing health for all as a core principle of attaining the SDGs which calls for a need to strengthen health systems through increased collaborations. All members of a community have a role to play in realizing these goals. The approach aims to reduce disparities through redistribution of power, ultimately resulting in a shared accountability of health outcomes.[252] The communities in this study are in rural, disadvantaged areas with poor access to quality health care, thus interventions that target health concerns are critical. Mothers in the two communities play a vital role in effecting change

in health outcomes within their communities. Optimal breastfeeding practices are unlikely to be observed throughout these communities without an effective strategy that utilizes social participation in the dissemination of information. The WHO framework of action on the social determinants of health highlights social participation as a pillar in sustained health transformation.[253] The incorporation of the intervention of this study into existing programmes may assist in improving the overall breastfeeding practices of mothers within these communities. Mothers will have a platform to address and improve breastfeeding programmes pertaining to how information is distributed, based on their own experiences. This may allow for an improved intervention that is more accessible, pragmatic and culturally sensitive and ultimately influence the number of mothers that are included in these programmes.

6.8 Strengths and limitations

This study made use of a community-based participatory approach which included a first time collaboration with the Angus Gillis Foundation, the Rhodes Faculty of Pharmacy and Community Engagement office and the positive health champions in the two rural communities. The use of qualitative tools to conduct the research allowed the researcher to explore the opinions and perceptions of the study group. This can be invaluable to decision makers during implementation of programmes and policies within these communities as it can be used to assess the extent to which the potential advantages or barriers of an intervention are important to people.

The small sample size in the intervention phase restricts the study's generalizability and the weight that can be given to any significance in differences between responses. However, comprehensive data was obtained from the exploratory nature of this research strengthening the value of the data collected. The small sample size further paved way for a more holistic, in-depth insight of the participants' thoughts experiences involving breastfeeding, this can be the foundation on which future research can be done.

Finally, transport to the villages (about 45km from Grahamstown) was a challenge as the research had to be incorporated in the already existing programme of the AGF, i.e. the investigator could only go to the villages when the AGF had programs planned at the research

site. Availability of transport was also dependant on the number of people from the AGF planning to go to the research site, thus limiting the flexibility of carrying out the study.

Summary of discussion

Service delivery in the Eastern Cape is challenged by poor facilities and a lack of HCPS, which is further marked in marginalized communities such as the two villages. In the face of these challenges CHWs play a significant role in reaching these communities that are “left out”. CHWs have been proven to compensate for these deficiencies, albeit to a small degree, thus increasing participation and accountability in these villages. Preventative measures, such as immunization campaigns, mainly advocated by CHWs may have an impact on reducing incidences of infant health issues.

Challenges that undermine health prevail in these communities, however inconsistencies in infant feeding practices remain a high concern. There are a plethora of factors that influence mothers’ decisions with respect to infant feeding, such as lack of information and/or informal sources of information. Support systems also affect a mother’s infant feeding practices, generally the more support structures in place the more likely mothers will be willing and able to adopt appropriate feeding practices.

Studies indicate that interventions on breastfeeding not only successfully raise awareness but also influence participants’ ability and intention to adopt correct infant feeding practices. Furthermore interventions that incorporate existing networks, such as the AGF in this study, and community members have been proven to be successful and sustainable. Incorporation of breastfeeding interventions into established programmes in the communities may have a positive impact on the overall breastfeeding practices of mothers within these communities.

7 Conclusion and recommendations

Overview of the chapter

This chapter concludes the study based on the objectives and the results obtained. Recommendations are also made for stakeholders as well as future studies in this field.

7.1 Conclusion

The target group indicated a lack of knowledge regarding exclusive breastfeeding during the first six months in their community. Exclusive breastfeeding informed the design of the educational intervention. The study participants illustrated enthusiasm when learning the different breastfeeding positions. All participants understood the importance of the correct baby-to-breast attachment when breastfeeding during the educational intervention. All participants could correctly define exclusive breastfeeding and understood its importance after the intervention, whereas most of them could not during the pre-intervention.

This study illustrated that educational programmes can assist in increasing understanding the importance of exclusive breastfeeding practices among low-literate mothers. Whether mothers choose to breastfeed or formula feed, they face a variety of challenges when dealing with the multifacets of infant feeding. Therefore, the education of mothers, caregivers, families and HCPs regarding the benefits of breastfeeding as well as how to overcome barriers has significant implications towards an increase in the number of mothers choosing to breastfeed over providing formula feeds. Health education can go a long way in providing the knowledge and skills required to perform optimal breastfeeding, but societies need to actively participate in such programmes to be able to provide supportive environments for breastfeeding women. All participants who had stated barriers to breastfeeding, were highly motivated to continue breastfeeding in spite of the barriers. They all mentioned that there were no disadvantages to breastfeeding. They were willing to share information they had learnt from the intervention with their friends and families in their communities.

It is also evident from this study that being part of a society where breastfeeding is supported and viewed as the natural and normal method of feeding may help young and older mothers develop the confidence and the conviction they need in order to breastfeed their infants.

Participants in this study indicated that support given to them during breastfeeding from their relatives and from the community will be very valuable, especially as none of them are working.

On the basis of scientific evidence, the established benefits of breastfeeding and the findings of this study, it would be beneficial for health promotion strategies to take account of women's different characteristics. HCPs have the remarkable opportunity of providing breastfeeding education and support to pregnant women pre- and postnatal. Continuous focus on breastfeeding education throughout the prenatal phase as well as emphasis on addressing modifiable obstacles of maternal self-efficacy regarding breastfeeding are important ways through which HCPs can positively influence breastfeeding knowledge, confidence and intent. Through constant programme sustainability, long term effects of breastfeeding initiation, duration and exclusivity can be further evaluated.

7.2 Recommendations for stakeholders

1. Notwithstanding the obligation of employers to provide maternity leave, consideration needs to be made with respect to supportive environments at the workplace for returning mothers who are breastfeeding.
2. Although policies that serve to protect school-going mothers are in place, they are subject to different interpretations. School-going mothers require extra support from the authorities at school and the rest of the community to ensure that these mothers are able to provide age-appropriate feeding practices their infants and can return to school as soon as possible.
3. CHWs and Positive Health Champions can incorporate Motivational interviewing to discourage mothers from engaging in unfavourable habits while breastfeeding.

7.3 Recommendations for future research

1. Future researchers who will focus on breastfeeding interventions can include the evaluation of a breastfeeding educational programme over longer periods of time to ensure its sustainability and replicability.
2. It would be of great benefit if CHWs are trained to carry out educational programmes; because they are usually part of the community in which they serve. Therefore

educational programme would have greater sustainability and more community involvement.

3. The designed booklet can be used by other health researchers as a supplementary source to train CHWs and positive health champions.
4. In future, researchers or HCPs who conduct an intervention on breastfeeding can include the fathers in the intervention or have a separate intervention for them to increase their understanding of the importance of breastfeeding. This could influence their perception regarding breastfeeding and may have an impact in the mother's decision to breastfeed.
5. Future studies can also address the following: diarrhoea, HIV/AIDS and asthma as these were also indicated as being infant health issues in the two communities.
    - how to prevent the incidence of diarrhoea
    - HIV/AIDS education
    - how to deal with the onset of asthma
6. Future researchers can also liaise with NGOs that have formed relationships in the communities, this can foster a systemic alliance between the researcher and the community and potentially diminish any perceived power gradients.
7. The concept of co-creation of knowledge can also be incorporated in undergraduate programs in order for students to acquire the necessary skills to create synergistic partnerships with community members. Training programs can include a directive that monitors sustainability of alliances formed with the community to ensure that community needs are prioritized over research goals. Undergraduates can be trained to build on these partnerships, not only as potential researchers but as future health community mobilizers.

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Appendix 1: Ethical Approval from the Rhodes University Faculty of Pharmacy

RHODES UNIVERSITY
Grahamstown • 6140 • South Africa

FACULTY OF PHARMACY
Tel: +27 (0)46 603 8381 • Fax: +27 (0)46 603 7506 • E-mail: dean.pharmacy@ru.ac.za • PO Box 94, Grahamstown, 6140, South Africa

15 March 2012

Dear Faith Kuzeeko

RE: Ethical approval by the Faculty of Pharmacy's Ethics Committee

(Tracking number PHARM 2012 - 8)

As a registered MPharm student in the Faculty of Pharmacy, with student number 08K2216, I am pleased to inform you that the Faculty of Pharmacy's Ethics Committee grants you ethical approval for your research entitled:

Infant Health Assessment, Community Educational Intervention and Evaluation

Please ensure that the Faculty of Pharmacy's Ethics Committee is notified should any substantive change(s) be made, for whatever reason.

Sincerely

C. Oltmann

Carmen Oltmann, PhD
Chairperson

Appendix 2: Ethical Approval from the Eastern Cape Department of Health

Eastern Cape Department of Health

Enquiries:	Zonwabele Merile	Tel No:	040 608 0830
Date:	22nd March 2012	Fax No:	043 642 1409
e-mail address:	zonwabele.merile@impilo.ecprov.gov.za		

Dear Ms Faith Kuzeeko

Re: Infant Health Assessment, Community Educational intervention and Evaluation

The Department of Health would like to inform you that your application for conducting a research on the abovementioned topic has been approved based on the following conditions:

1. During your study, you will follow the submitted protocol with ethical approval and can only deviate from it after having a written approval from the Department of Health.
2. You are advised to ensure, observe and respect the rights and culture of your research participants and maintain confidentiality of their identities and shall remove or not collect any information which can be used to link the participants.
3. The Department of Health expects you to provide a progress on your study every 3 months (from date you received this letter) in writing.
4. At the end of your study, you will be expected to send a full written report with your findings and implementable recommendations to the Epidemiological Research & Surveillance Management. You may be invited to the department to come and present your research findings with your implementable recommendations.
5. Your results on the Eastern Cape will not be presented anywhere unless you have shared them with the Department of Health as indicated above.

Your compliance in this regard will be highly appreciated.

DEPUTY DIRECTOR: EPIDEMIOLOGICAL RESEARCH & SURVEILLANCE MANAGEMENT

Ikamva elisagambileyo!

Appendix 3:
Participant information sheet for Baseline Study

Title: Infant Health: Assessment, Community Educational Intervention and Evaluation

Date: **/ /2012**

NOTE: The details of the participant information sheet will be explained in IsiXhosa. Please feel free to ask any questions

Invitation to participate in research about community beliefs and attitudes on infant health issues that lead to the death of babies.

We are looking for participants to take part in focus group discussions in which we will be talking about the infant health issues that lead to the death of babies in this village/community. Focus group discussions are a form of collecting information in which participants discuss and share views on a certain topic. In this discussion you may share your views and opinions on reasons of why these infant health issues are leading to baby deaths. This information will be used to address one infant (baby) health issue, to design an educational program for mothers in Glenmore

Can you participate?
Yes, if you are:

- 18 years and above
- Living in Glenmore
- A mother and/or expecting to be a mother
- Able to give consent voluntarily

What is expected of you?

Once the consent form has been explained to you and has been signed, you can participate in this focus group discussion concerning the deaths of babies. There will be a moderator during the discussion and it will be conducted in isiXhosa. A voice recorder will be used during all the talks. If at any point you would like to withdraw from the focus group discussion you may do so. Information on when and where the discussions will be held will be confirmed and if you would like to participate you will be contacted by the researcher.

Why should you participate and what are the benefits?

This discussion is meant to gain understanding of the knowledge, attitudes and practices of the community regarding the infant health issues causing the highest number of infant deaths. Based on the information gathered in these discussions an educational program will be created in the next phase. This educational program will help in identifying how to positively influence the knowledge, attitudes and

practices of the community regarding these infant health issues in order to reduce the number of infant deaths in the future.

Is your participation compulsory?

Your participation is entirely voluntary. Once the purpose of the research project has been explained to you, and if you wish to participate, you will be given a consent form that you will be required to sign. If at any point you wish to withdraw from the study, you are free to do so. Not participating in this discussion will not have any negative influence on the quality of health care given to you in the clinic.

Will your role in this study be kept confidential?

Your details such as name and identity will be kept confidential and will not be available to anyone outside the group discussion. The results of this project will be used for research purposes only.

What is the way forward?

Once the Baseline study is completed, information collected will be analysed and feedback will be provided to the participants (and interested members in this community). This information will be used to introduce an educational program to improve the health of babies in this community.

What are the risks involved?

During the discussions there may be differences of opinion among participants. However this will be minimized by giving everyone a chance to speak and clarify their views. There will be a moderator to conduct the discussion to reduce any language barriers. All discussions will be conducted with women in a similar age group, please feel free to express your opinions.

Who else will be present during the discussions?

A translator will also be present during the discussion. The role of the translator is to translate the discussion to the investigator. The translator will not be actively participating in the discussion.

Thank you for your time

Investigator name: Faith Kuzeeko

Contact details: 07875786596

Faculty of Pharmacy

Rhodes University

Appendix 4a: Baseline Study consent form for the focus group discussions

NOTE: ***The consent form will be explained in IsiXhosa. Please feel free to ask any questions***

Participant Identification:

Title of Project: Infant Health: Assessment, Community Educational Intervention and Evaluation

Name of Researcher: Faith Kuzeeko

1. I confirm that Ms Kuzeeko has explained the contents of the Participant Information Sheet and I understand that the research is on knowledge, attitudes and practices regarding infant health issues that lead to the death of babies. I will have the opportunity to consider the information given to me about the research project, ask questions and have these answered satisfactorily.

2. I understand that my participation is voluntary and that I am free to withdraw at any time without giving any reason and without it affecting the quality of healthcare I will receive.

3. I understand that data collected during the study will be used by the researcher but all details gathered during this research, especially my name and identity, will be kept private. I give permission to Ms. Kuzeeko and the moderator …….. (name) to ask relevant questions when I participate in this group discussion.

4. I understand that a voice recorder will be used during the discussions and I give my permission for such use.

5. I agree to take part in this research project

Name of Participant	Date	Signature
_____	_____	_____
Name of Witness	Date	Signature
_____	_____	_____

Name of Researcher	Date	Signature
_____	_____	_____

Declaration

I, **Faith Kuzeeko** (the researcher) and ..... (the moderator), swear that any personal details obtained during this research study will remain strictly confidential.

Signature: …….. (Researcher)

Signature: …… (Moderator)

Appendix 4b: Baseline Study consent form for the health care personnel

Participant Identification:

Title of Project: Infant Health: Assessment, Community Educational Intervention and Evaluation

Name of Researcher: Faith Kuzeeko

1. I confirm that Ms Kuzeeko has explained the contents of the Participant Information Sheet and I understand that the research is on knowledge, attitudes and practices regarding infant health issues that lead to the death of babies. I will have the opportunity to consider the information given to me about the research project, ask questions and have these answered satisfactorily.

2. I understand that my participation is voluntary and that I am free to withdraw at any time without giving any reason and without it affecting my legal rights.

3. I understand that data collected during the study will be used by the researcher but all details gathered during this research, especially my name and identity, will be kept private. I give permission to Ms. Kuzeeko and the moderator …….. (name) to ask relevant questions when I participate in this interview.

4. I understand that a voice recorder will be used during the interview and I give my permission for such use.

5. I agree to take part in this research project

Name of Participant	Date	Signature
_____	_____	_____

Name of Witness	Date	Signature
_____	_____	_____

Name of Researcher	Date	Signature
_____	_____	_____

Declaration

I, **Faith Kuzeeko** (the researcher) and ..... (the moderator), swear that any personal details obtained during this research study will remain strictly confidential.

Signature: …….. (Researcher)

Signature: …… (Moderator)

Appendix 5:Focus group discussion question guide for the Baseline Study

Date / /2012

Researcher

(Note: Has each consent form been explained and signed?)

A. Introduction

We will be talking about infant health issues in your community. In this discussion you may share your views and opinions on reasons of why these infant health issues are leading to baby deaths. This information will be used to identify one infant (baby) health issue, to design an educational program for mothers in Glenmore/Ndwayana.

B. Access and availability of health care facilities

1. What are the clinics available to you?
2. Do you take your child to this clinic?
3. Where do people prefer to go to when they have an infant with a health problem?
4. Why do people prefer to go there for their problem?
5. When you visit the health facility, does a nurse attend to your child immediately?
6. Does the person who attends to you explain your child's condition to you clearly?
7. Are you satisfied with the general health services available to your child/children?
8. If yes to Q.7, please explain.
9. If no to Q.7, please explain what changes you would like to suggest to improve health services

C. Knowledge and practice on child health issues

1. a) Do you think the infant health issues causing baby deaths are high in your community?
   b)Please explain why you think the infant health issues causing death of babies is/is not high in your community.
2. a) Do you have access to municipal water?
   b) If no, where do you get your water from?
   c) Do you boil the water before drinking?
   d) Is water for drinking boiled for everyone in the family or only for some people in the family. (Probe: If only for some, then for whom?)

3. For babies under one year old, do you breastfeed, bottle-feed, both or neither? Please explain if neither (Note: Rephrase question based on maternal status of participants)
4. Do you have anyone who helps you with the child/children at home?
5. How often have/has your child(ren) fallen sick in the past six months?
6 a) What are the three main infant health issues causing the death of babies in this community?

   b) What procedures do you take for the top three infant health issues causing the highest number of baby deaths?
7. a) What is your understanding of immunisations?

   b) What immunisations are available for your child/children?

   c) Do you think these immunisations are important? Please explain your answer

   d) What facilities offer immunisations?

   e) Have your children been immunized? Please
8. *NOTE: similar questions will be asked for other identified infant health issues*

   a) Do the children in this community frequently have diarrhoea?

   b)How often have they had diarrhoea in the past six months

   b) What did you do to reduce the diarrhoea?

   c) What home remedies do you try before going to the clinic?(including traditional medicines and herbal medicines)

   d) Do these remedies work?
9. What is the main cause of infant mortality in your community? (*Note: Write down on a board (visible to all participants) the top three and the main cause identified*)
10. Of the three main causes of deaths of children identified, do all of you agree to the three listed infant health issues?
11. In your opinion, how would an educational program for young mothers/ mothers in this community regarding the identified infant health issue be of benefit?
12. Would you be prepared to participate voluntarily in that educational program?

Appendix 6: Semi-structured interview question guide for the Baseline Study

(Note: Nurses will be asked all the questions. Relevant questions will be reserved for doctors and Community health workers)

Demographic data

Home language ☐

Age ☐

Gender

Female ☐

Male ☐

Education

≤ Primary level ☐

≥ Secondary level ☐

≥University level ☐

Highest Qualification .....

Years of experience as a Health Care Provider ☐

Number of years at this Primary Health Facility ☐

Stock status

1 a) Is there a copy of the South African Standard Treatment Guidelines (STG) at this clinic?

b) Is the STG used by all Health Care Providers in this Primary Health Care Facility (PHC). Please explain how and when it is used

c) Is your PHC required to have a list of WHO priority medicines for infant health?

2a) Has the PHC where you work run out of the WHO priority medicines for infant health in the past 12 months?

b). How often have you run out of these essential medicines in the last 12 months?

3a) What were the various reasons for the out of stock status?

b) What procedures did you follow when medicines for infant health are out of stock?

Use of bin cards

4a) Do you make use of bin cards in this health care facility?

b) If yes, please explain how you use the bin cards

5a) Are the bin cards updated regularly? If yes, how often?

b) Who is responsible for the updating of bin cards?

c) When do you reorder medicines and how soon are the medicines delivered to you? (Probe for 'safety stock' and its calculation, if required and with the person in charge of bin cards)

6. Who trained you/person in charge of bin cards to place orders for these essential medicines and the use of bin cards?

7. In your opinion what facilitates using the bin card appropriately in this PHC? Please explain.

8. What are advantages you have seen with regard to using bin cards?

9. In your opinion are there any disadvantages in using the bin cards? Please explain.

10. In your opinion would you/person in charge of reordering medicines require further training in managing bin cards? If yes, please explain.

Expired medicines

11a) In the past 12 months did you have expired WHO priority medicines for infant health?

b) How often do you have to dispose of expired WHO priority medicines useful for infant health? Please explain how you dispose of these essential medicines.

Accessibility of medicines

11a) Do you ever have cases where you are unable to help care givers with infant health issues?

11b) What are the reasons for not being able to help these infants?

12. If the reason is due to unavailability of WHO priority medicines for infants, do the care givers come back to enquire about the availability of these medicines or do you inform them when these medicines are available?

Correct use of medication

13a) Do you check that the care givers know how and when to administer medicines for their baby's health?

13b) If yes, what kind of questions do you ask to make sure that your care givers know how to administer medicines for their baby's health?

13c) If no, can you explain any form of barriers that hinder you from counseling the care givers?

Child Health Rights

14. Do you know and apply the principles of Batho Pele? (Interviewer to observe whether there are any Batho Pele posters that are visible to the public)

15. How do you apply the principles of Batho Pele?

16. What is the language used on the poster?

17. What interventions are in place when care givers come in with infant health issues?

Communication

18a).What are three common barriers when seeing care givers with their infants?

b). What do you do to overcome the three common barriers identified?

19a) Do you encourage your care givers to get their children immunised?

b) How do you encourage them to get their children immunised?

20a) How do you reach out to care givers who do not come for immunisations for their infants?

b) Are there any immunization campaigns in place or procedures in this community to increase awareness and accessibility of immunisations? If yes, please explain

21a) Do you liaise with community leaders and women self-help groups to encourage them to access the health care facility for infant health issues?

b) How often do you liaise with community leader and women self-help groups?

c) What do you do or say to encourage them?

Referrals

22a) If there is a complication that needs referral, where do you refer care givers to get the appropriate medical assistance?

b) How far are these medical centers?

Infant health issues causing the highest number of infant deaths

22a). Do you think the infant mortality rate is high in this village?

b) If yes, what do you think are the reasons for this high rate

23a) What documents or registers are used to keep record of infant mortality rate?

b) According to the 2011/2012 register, what are the three most prevalent infant health issues causing the highest number of infant deaths in this community?

24a) In your opinion what is the major infant health issue that urgently needs to be addressed in the community?

b) How should the identified infant health issue be addressed?

Appendix 7: Stock status sheet for World Health Organization for priority medicines for infants

Name of PHC: **Both**				Date of survey:			
Name of condition	WHO Priority medicines[1]	STG medicines[2]	Strength	Dosage	Availability in Public Health Facility (On the day of data collection)	Availability in Health facility (last 12 months)	Comments
Neonatal sepsis	Ceftriaxone	Ceftriaxone	250mg 500mg 1g 2g	IM IV	**Yes**	**Yes**	
	Gentamicin	Gentamicin	40mg/ml 10mg/ml 80mg/50ml	IM IV	**Yes**	**Yes**	
	Procaine benzyl penicillin	----	300mg	IM	**No**	**No**	**Use Benzathine Penicillin instead**
HIV/AIDS	Zidovudine	Zidovudine	100mg 250mg 300mg 50mg/5ml	Capsules Tablets IV	**Yes**	**Yes**	
	Lamivudine	Lamivudine	150mg 300mg 10mg/ml 50mg/ml	Tablets Oral solution	**Yes**	**Yes**	
	Stavudine	Stavudine*	15mg 20mg 30mg 40mg	Capsules Powder for solution	**Yes**	**Yes**	

	Lopinavir/ ritonavir	Lopinivir/ ritonavir	200/50mg 80/20mg per ml	Tablets Capsules Oral solution	**Yes**	**Yes**	
	Efavirenz	Efavirenz	200mg 250mg 300mg 350mg 400mg 600mg	Capsules Tablets	**Yes**	**Yes**	
	Nevirapine	Nevirapine	50mg/5ml	Suspension	**Yes**	**Yes**	
Vitamin A deficiency	Vitamin A	Vitamin A	10000IU 100000IU	Capsules	**Yes**	**Yes**	
Palliative care	Morphine	Morphine	10mg/ml 15mg/ml 10mg 30mg 60mg 100mg	IM IV	**No**	**No**	**Not on nurse code. Reserved for hospital use**
	Paracetamol	Paracetamol	120mg 250mg 500mg 60mg/0.6ml 120mg/5ml 1g/100ml	Infant drops Syrup	**Yes**	**Yes**	
Tuberculosis	Rifampicin	Rifampicin	150mg 450mg 600mg	Capsules Tablets IV	**Yes**	**Yes**	
	Isoniazid	Isoniazid	100mg	Tablets	**Yes**	**Yes**	
	Pyrazinamide	Pyrazinamide	500mg	Tablets	**Yes**	**Yes**	
	Ethambutol	Ethambutol	400mg	Tablets	**Yes**	**Yes**	
Neonatal apnoea	Aminophylline	Aminophylline	250mg/10ml 500mg/2ml 100mg	IV IM Tablets	**Yes**	**Yes**	

			200mg				
Pneumonia	Amoxicillin	Amoxicillin	125mg/5ml 250mg/5ml	Syrup Paediatric drops suspension	**Yes**	**Yes**	
	Ampicillin	Ampicillin	250mg 500mg	IM IV Capsules Suspension	**Yes**	**Yes**	
	Ceftriaxone	Ceftriaxone	250mg 500mg 1g 2g	IM IV	**Yes**	**Yes**	
	Gentamycin	Gentamicin	40mg/ml 10mg/ml 80mg/50ml	IM IV	**Yes**	**Yes**	
	Procaine benzylpenicilin	------	300mg	IM	**No**	**No**	**Use Benzathine Penicillin instead**
Diarrhoea 1.	Oral rehydration solution	Oral rehydration solution			**Yes**	**Yes**	
	Zinc	Zinc acetate	10mg 20mg		**Yes**	**Yes**	
	*Stavudine may no longer be used as 1st line treatment due to significant increase in morbidity associated with its use[3]						

1. Priority medicines for mothers and children. WHO. 2011. Available from http://www.who.int/medicines/publications/A4prioritymedicines.pdf Accessed on 06/02/2012

2. South African Paediatric Standard Treatment Guidelines. 2008

3. Menezes.CN, Maskew.M, Sanne.I. Crowther.NJ &Raal.FJ. a longitudinal study of stavudine-associated toxicities in a large cohort of South African HIV infected subjects. 2011. Infectious Disease Unit. Witwatersrand University.

Appendix 8: Rhodes University Faculty of Pharmacy Higher Degrees Approval letter

RHODES UNIVERSITY
Grahamstown • 6140 • South Africa

FACULTY OF PHARMACY
Tel: +27 (0)46 603 8381 • Fax: +27 (0)46 603 7506 • E-mail: dean.pharmacy@ru.ac.za • PO Box 94, Grahamstown, 6140, South Africa

12 August 2013

Dear Faith Kuzeeko

RE: Acceptance by the Faculty of Pharmacy's Higher Degrees Committee (HDC)

The Faculty of Pharmacy's Higher Degrees Committee (HDC) has accepted your proposal for your Master of Pharmacy research project titled "Breastfeeding: A community participatory approach to developing and evaluating an educational intervention in two rural communities in the Eastern Cape".

Sincerely

C. Oltmann

Carmen Oltmann, PhD
On behalf of the Faculty of Pharmacy's Higher Degrees Committee

Appendix 9: Ethical Approval from the Rhodes University Faculty of Pharmacy

RHODES UNIVERSITY
Grahamstown • 6140 • South Africa

FACULTY OF PHARMACY
Tel: +27 (0)46 603 8381 • Fax: +27 (0)46 603 7506 • E-mail: dean.pharmacy@ru.ac.za • PO Box 94, Grahamstown, 6140, South Africa

3 September 2013

Dear Faith Kuzeeko

RE: Ethical approval by the Faculty of Pharmacy's Ethics Committee

(Tracking number PHARM 2013 - 25)

As a registered student in the Faculty of Pharmacy, with student number 08K2216, I am pleased to inform you that the Faculty of Pharmacy's Ethics Committee grants you ethical approval for your research entitled:

Breastfeeding: A community participatory approach to developing and evaluating an educational intervention in two rural communities in the Eastern Cape.

Please ensure that the Faculty of Pharmacy's Ethics Committee is notified should any substantive change(s) be made, for whatever reason, during the research process.

Sincerely

C. Oltmann

Carmen Oltmann, PhD

Chairperson of the Faculty of Pharmacy's Ethics Committee

Appendix 10: Participant information sheet on the educational intervention

Title: Breastfeeding: A community participatory approach to developing and evaluating an educational intervention in two rural communities in the Eastern Cape

Date: **/ /2013**

Community **Glenmore/ Ndwayana**

NOTE: The details of the participant information sheet will be explained in IsiXhosa. Please feel free to ask any questions

Invitation to participate in research about community beliefs and attitudes on breastfeeding of infants below six months.

We are looking for participants to take part in interviews in which we will be talking about breastfeeding practices during the first 6 months of infants after birth in this community. This information will be used to design an educational program for pregnant women in this community. The understand the topic is of a sensitive nature, we will have a discussion on the topic in which you may speak freely. If at any point you feel overwhelmed and need a break, please do not hesitate to inform us.

A signed copy of both the information sheet and consent form will be given to all participants. The other copy will be kept by the researcher.

What is expected of you?

Once the consent form has been explained to you and has been signed, you can participate in the interview concerning breastfeeding practices of young mothers during the first 6 months of infant life. There will be an interpreter during the interview and it will be conducted in isiXhosa. A voice recorder will be used during all the talks. If at any point you would like to withdraw you may do so. Information on when and where the interview will be held will be confirmed and if you would like to participate, you will be contacted by the researcher.

What are the benefits of participating?

This interview is meant to gain understanding of the knowledge, attitudes and practices of the community regarding breastfeeding of infants up to 6 months. Based on the information gathered in these interviews an educational program will be designed soon afterwards. This educational program will help in identifying how to improve breastfeeding practices amongst young mothers.

Is your participation compulsory?

Your participation is entirely voluntary. Once the purpose of the research project has been explained to you, and if you wish to participate, you will be given a consent form that you will be required to sign. If at any point you wish to withdraw from the study, you are free to do so.

Will your role in this study be kept confidential?

Your details such as name and identity will be kept confidential and will not be available to anyone. The results of this project will be used for research purposes only.

What is the way forward?

Once the study is completed, information collected will be ~~analysed~~analyzed and feedback will be provided to the participants (and interested members in this community).

Who else will be present during the interview?

An interpreter will also be present during the interview. The role of the interpreter is to translate the interview.

Thank you for your time

Investigator name: Faith Kuzeeko

Contact details: 07875786596

Faculty of Pharmacy

Rhodes University

Signature: …….. (Participant)

Signature: …… (Interpreter)

Signature: …….. (Researcher)

Appendix 11:
Consent form for the educational intervention

NOTE: ***The consent form will be explained in IsiXhosa. Please feel free to ask any questions***

Participant Identification:

Title of Project: Breastfeeding: A community participatory approach to developing and evaluating an educational intervention in two rural communities in the Eastern Cape

Name of Researcher: Faith Kuzeeko

1. I confirm that Ms Kuzeeko and the interpreter have explained the purpose of the interview and I understand that the research is on knowledge, attitudes and practices regarding breastfeeding practices up to 6 months.

2. I understand that the topic is of a sensitive nature, and the researcher and interpreter have taken extra care to be sensitive throughout the study. I accept that the interpreter has explained the participant information sheet to me and I understand that the interview will not be an interrogation.

3. I understand that my participation is voluntary and that I am free to withdraw at any time without giving any reason .

4. I understand that data collected during the study will be used by the researcher but all details gathered during this research, especially my name and identity, will be kept confidential. I give permission to Ms Kuzeeko and the interpreter …….. (name) to ask relevant questions when I participate in this interview.

5. I understand that a voice recorder will be used during the interview and again during the educational program and I give my permission for such use.

6. I agree to take part in this research project

7. I have received a copy of the consent form and the participant information sheet

Name of Participant	Date	Signature
_____	_____	_____
Name of Witness	Date	Signature
_____	_____	_____

Name of Researcher	Date	Signature
_____	_____	_____

Declaration

I, **Faith Kuzeeko** (the researcher) and ..... (the interpreter), swear that any personal details obtained during this research study will remain strictly confidential.

Signature: ……..... (Researcher)

Signature: …… (Interpreter)

Appendix 12: Pre-intervention semi-structured interview question guide

Participant number ☐

Notes for the researcher:

Confirm with the participant to make sure that the participant fits the inclusion criteria. If not, kindly explain that you are looking for a certain criteria and thank them for their time.

Make sure consent form has been explained and signed.

If participants illustrate incorrect knowledge of infant feeding practices that may have detrimental effects, inform the health champion immediately after the interview. Pay particular attention to answers participants give to the highlighted questions.

In-depth Semi-structured Interview question guide on infant feeding practices

This interview is about your knowledge on infant feeding practices, which is feeding practices of newborns up to 6 months. I will also be asking about the practices performed in your community regarding infant feeding practices in general. Information gathered from this interview will be used for an educational program.

Date

Village

Demographics

1. Age (years) ☐
2. Marital status ☐
3. Highest education obtained ☐
4. Source of income ☐

5. Do you have access to municipal water

If no, please explain where you obtain water for drinking

6. Do you have access to a flush toilet?

Yes	No

If no, please explain what you use instead of a flush toilet

Knowledge, Attitudes and Practices (KAP) of infant feeding practices

In the following sets of questions, I will be asking about your knowledge on breastfeeding and any other infant feeding practices that are carried out in your village. Please feel free to voice your thoughts and opinion

7. A) Do you discuss what happens in your village regarding feeding of infants during the first six months? Please explain

   B) If yes, what do you talk about?

8. In your opinion, what are the **three most important aspects** regarding infant feeding practices during the first six months?

9. A) Are you aware of any incorrect feeding practices in this community?

   B) If yes, what are they?
   C) What are the risks of these practices?

10. What information is available to you on infant feeding practices during the first six months?

11. Where is information on infant feeding provided?

12. Who provides this information?

13. A) There is a yellowish substance produced from the nipples after giving birth, please tell me what you know about it?

B) Do you think this substance **is important**? Please explain your answer.

14. A) What is your understanding of formula bottle feeding?

B) When you have your baby, is it your plan to formula bottle feed your infant? Please explain your answer.

C) If yes, when do you intend to formula bottle feed? Please explain.

D) What **information** has been given to you on formula bottle feeding your infant during the first six months?

E) Who is the person who helps you by providing information on formula feeding for you?

F) Do you think this information on infant formula bottle feeding is helpful? Please explain.

15. A) What do you understand about supplementary feeding (semi-solid foods, e.g. porridge, vegetables, etc.)?

B) **When you have your baby, is it your plan to provide supplementary feeding to your infant? Please explain your answer.**

C) If yes, when do you plan to provide supplementary feeding to your infant? Please explain.

D) What information has been given to you on supplementary feeding during the first six months*?*

E) Who is the person who helps you by providing you with information on supplementary feeding?

F) Do you think this information on supplementary feeding is helpful? Please explain.

16. A) In your understanding, how should an HIV-positive mother feed her infant?

B) What information is available for HIV-positive mothers in the village on feeding their infants?

C) If HIV-positive mothers want information on how they should breastfeed their infants, where or who can help them?

17. A) Please tell me what you think of **exclusively breastfeeding** your infant during the first six months?

    B) Have you received any information about exclusive breastfeeding during the first six months?

    C) Please tell me what information is available to you on exclusively breastfeeding your infant for the first six months

    D) If mothers want information on exclusively breastfeeding their infants, where or who can help them?

    E) Is this information important to you? Please explain.

    F) How long after giving birth do you intend to start breastfeeding? Please explain.

    G) For how long do you intend only breastfeeding your infant before introducing supplementary food?

    H) Please share why you intend to breastfeed your infant for the duration indicated?

    I) What do you think is the importance of only breastfeeding your infant for the first six months?

    J) How often do you think you will need to breastfeed your infant within one day? Please explain.

    K) Please tell me what you think about taking medication for yourself during breastfeeding? (e.g. headache tablets)

    L) Please tell me what you think about taking herbal remedies for yourself during breastfeeding?

18. A) What is your **understanding of expressing breast milk**?*?*

    B) Do you think you will express breast milk?

    C) If yes, what will be the reason for doing so?

    D) How would you give expressed milk to your infant?

    E) How would you safely store expressed milk? Please explain.

F) Who helps you by providing you with information on how to store expressed milk safely?

G) What would you use to store expressed milk? Please explain.

H) Please explain to us how often would you clean the container used for storing expressed milk?

I) What would you use to clean the container used for storing expressed milk? Please explain.

19. A) How do you intend on feeding your infant during the first six months?

    B) Why is this method of feeding your preferred method of feeding?

Health Belief Model

20. Please tell me what the people in your village think about breastfeeding?
   A) What do the men say?
   B) What do they women say?

21. In your opinion, what is the best method of feeding your infant during the first six months? Please explain.

22. Is it important to you to practice the correct feeding method for your infant during the first six months? (Probing question*)*

23. What are the difficulties that might stop you from exclusively breastfeeding your infant during the first six months?
24. What do you think could be done about these difficulties to enable you to exclusively breastfeed your infant during the first six months?

25. A) What do you think are the disadvantages of exclusively breastfeeding your infant during the first six months?

    C) What do the people in your village think are the disadvantages of exclusively breastfeeding during the first six months?

26. A) What do you think are the benefits of exclusive breastfeeding during the first six months?

    B) What do the people in your village think are the benefits of exclusively breastfeeding during the first six months?

27. In your opinion, how can you improve feeding practices during the first six months of your infant's life in order to improve infant health?

Empowerment model

28. A) Who do you ask for guidance and help in your community regarding infant feeding?

    B) Is there a reason why you ask this person?

    C) If this person had to give you advice on exclusive breastfeeding would you be willing to follow this advice?

29. A) Who will support you regarding the care of your infant?

    B) What kind of support will this person provide for the care of your infant? (e.g. financial, caring, etc)

    C) Why is this support valuable to you?

30. What kind of changes do you think you can make in order to improve the feeding practices you provide for your infant?

31. If you have a problem, where would you go for information regarding the correct feeding practices? Please explain

32. Is there any other information regarding feeding practices that you would like for me to address during the educational program?

Acceptability of SSI

Note: the following questions are for the feedback session from the AGF personnel, positive health champions and participants in the pilot study, and will not be included in the interviews/main study.

1. Were the questions easy to understand? Please explain your answer.

2. Were the questions culturally sensitive? Please explain your answer.

3. Were the questions misleading in any way? Please explain your answer.

4. Any other comments?

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Appendix 13: Educational intervention overview on exclusive breastfeeding

Session one (Initiation and continuation of exclusive breastfeeding)

- Discussion on the importance of early initiation of exclusive breastfeeding, the correct breast attachment, baby positioning and continued exclusive breastfeeding for six months
- This will include videos and diagrams of breast attachment techniques and the different methods of baby positioning.
- Also demonstrations of the different baby positions using dummies will be carried out

Reflection: What have we learned from this session?

Session two (Nutrients and physiological importance of exclusive breastfeeding. Brief discussion on infant formula feeding and supplementary feeding.)

- Discussion on the nutrients found in breast milk and why these are important for the healthy development of your baby
- Illnesses that can occur as a result of not exclusively breastfeeding your infant for the first six months
- Discussion on infant formula feeding and supplementary feeding, why this is not recommended during the first six months

Reflection: What have we learned from this session?

Session three (Breastfeeding difficulties and consequent alternative feeding mechanisms)

- Discussion on breastfeeding difficulties that may arise and what a mother can do to overcome these difficulties (e.g. lactation issues, illnesses, having to work)
- What mothers can do to induce lactation, the different methods that have been tried. Who they can consult if they have these issues
- HIV and breastfeeding infants: What are the recommendations?

Working/ school going mothers having to express milk. How to safely store expressed milk, and administer this milk.
Reflection: What have we learned from this session?

Session 4 (HBM and Empowerment model)

- Discussion on the risk to the infant's health and optimal development if exclusive breastfeeding for six months is not adopted.
- Discussion on what the advantages of exclusive breastfeeding are. The perceived disadvantages and how the advantages outweigh them.
- Discussion on the barriers that exist and how to overcome them. Identification of the different support systems that exist for a breastfeeding mother.
- Discussion on where participants can go to find information on the different aspects of exclusive breastfeeding.
- Discussion on how important adopting exclusive breastfeeding practices is for each participant, and whether they believe that their infants are at risk if the correct behaviour is not adopted.
- Check for ability of participants to perform exclusive breastfeeding practices, and how they will be able to perform exclusive breastfeeding for the first six months.

Reflection: What have we learned from this session?

Participant number | |

Appendix 14: Post-intervention semi-structured interview question guide

Notes for the researcher:

Confirm with the participant to make sure that the participant fits the inclusion criteria. If not, kindly explain that you are looking for a certain criteria and thank them for their time.

Make sure consent form has been explained and signed.

If participants illustrate incorrect knowledge of infant feeding practices that may have detrimental effects, inform the health champion immediately after the interview. Pay particular attention to answers participants give to the highlighted questions.

In-depth Semi-structured Interview question guide on infant feeding practices

This interview is about your knowledge on infant feeding practices, which is feeding practices of newborns up to 6 months. I will also be asking about the practices performed in your community regarding infant feeding practices in general. Information gathered from this interview will be used for an educational program.

Date

Village

Knowledge, Attitudes and Practices (KAP) of infant feeding practices

In the following sets of questions, I will be asking about your knowledge on breastfeeding and any other infant feeding practices that are carried out in your village. Please feel free to voice your thoughts and opinion

1. In your opinion, what are the **three most important aspects** regarding infant feeding practices during the first six months?

2. A) Are you aware of any incorrect feeding practices in this community?

   B) If yes, what are they?
   C) What are the risks of these practices?

3. What information is available to you on infant feeding practices during the first six months?

4. A) There is a yellowish substance produced from the nipples after giving birth, please tell me what you know about it?

   B) Do you think this substance **is important**? Please explain your answer.

5. A) What is your understanding of formula bottle feeding?*?*

   B) When you have your baby, is it your plan to formula bottle feed your infant? Please explain your answer.

   C) If yes, when do you intend to formula bottle feed? Please explain.

   D) What have you learned from the educational program regarding formula feeding of infants below six months?

   E) Do you think this information on infant formula bottle feeding is helpful? Please explain.

6. A) What do you understand about supplementary feeding (semi-solid foods, e.g. porridge, vegetables, etc.)?

   B) **When you have your baby, is it your plan to provide supplementary feeding to your infant? Please explain your answer.**

   C) If yes, when do you plan to provide supplementary feeding to your infant? Please explain.

   D) What have you learned during the educational program regarding providing your infant with supplementary foods within the first six months?

   F) Do you think this information on supplementary feeding was helpful? Please explain.

7. A) In your understanding, how should an HIV-positive mother feed her infant?

   B) What information is available for HIV-positive mothers in the village on feeding their infants?

C) If HIV-positive mothers want information on how they should breastfeed their infants, where or who can help them?

D) Can you tell me what the recommendations are for an HIV+ positive mother on how to feed her infant?

E) Can you tell me what her options are with regards to feeding?

F) What are the factors that can increase the risk of transmission should a mother choose to breastfeed?
G) What have you learned from the educational program regarding how an HIV positive mother should feed her infant?

8. A) Please tell me what you think of **exclusively breastfeeding** your infant during the first six months?

   B) Have you received any information about exclusive breastfeeding during the first six months?

   C) Please tell me what information is available to you on exclusively breastfeeding your infant for the first six months

   D) If mothers want information on exclusively breastfeeding their infants, where or who can help them?
   E) What have you learned from the educational program regarding exclusive breastfeeding your infant for six months?

   F Is this information important to you? Please explain.

   G) How long after giving birth do you intend to start breastfeeding? Please explain.

   H) For how long do you intend only breastfeeding your infant before introducing supplementary food?

   I) Please share why you intend to breastfeed your infant for the duration indicated?

   J) What do you think is the importance of only breastfeeding your infant for the first six months?

K) How often do you think you will need to breastfeed your infant within one day? Please explain.

L) Please tell me what you think about taking medication for yourself during breastfeeding? (e.g. headache tablets)

M) Please tell me what you think about taking herbal remedies for yourself during breastfeeding?

9. A) What is your **understanding of expressing breast milk**?

B) Do you think you will express breast milk?

C) If yes, what will be the reason for doing so?

D) How would you give expressed milk to your infant?

E) How would you safely store expressed milk? Please explain.

F) What would you use to store expressed milk? Please explain.

G) Please explain to us how often would you clean the container used for storing expressed milk?

H)What would you use to clean the container used for storing expressed milk? Please explain.

I)What have you learned during the educational program regarding expressing breast milk?

Health Belief Model

10. In your opinion, what is the best method of feeding your infant during the first six months? Please explain.
11. Is it important to you to practice the correct feeding method for your infant during the first six months? (Probing question)

12. What are the difficulties that might stop you from exclusively breastfeeding your infant during the first six months?

13. What do you think could be done about these difficulties to enable you to exclusively breastfeed your infant during the first six months?

14. A)What do you think are the disadvantages of exclusively breastfeeding your infant during the first six months?

    B) What do the people in your village think are the disadvantages of exclusively breastfeeding during the first six months?

15. A) What do you think are the benefits of exclusive breastfeeding during the first six months?

    B) What do the people in your village think are the benefits of exclusively breastfeeding during the first six months?

16. In your opinion, how can you improve feeding practices during the first six months of your infant's life in order to improve infant health in the community?

17. Since breastfeeding will enable you to save money and it is a natural choice, why is it that some mothers still do not want to breastfeed?

18. A) In your opinion do young girls exclusively breastfeed their infants for six months in your community?

    B)If no, what do you think are their reasons for choosing not to breastfeed?

19. A) In your opinion do older mothers exclusively breastfeed their infants for six months in your community?
    B)If no, what do you think are their reasons for choosing not to breastfeed?

20. A) Is there a difference between how older mothers feed their infants and how younger mothers feed their infants?

    B) If yes, why is there a difference?

<u>Empowerment model</u>

21. A) Are you prepared to make a commitment to perform exclusive breastfeeding practices for six months and continued breastfeeding for two years together with complementary feeding?
    B) How will you achieve this (*asked if participant stated more disadvantages vs. advantages of breastfeeding)

22. Do you feel that you have the knowledge and the skill to perform exclusive breastfeeding practices for six months and continued breastfeeding for two years together with complementary feeding?(Please explain)

23. Do you believe the advantages of breastfeeding are greater than the disadvantages?

24. Is there any pressure in your community that makes you want to breastfeed?Please explain

25. Is there any pressure in your community that makes you not want to breastfeed?Please explain

26. Are you confident that you can perform exclusive breastfeeding practices for six months?

27. What kind of changes do you think you can make in order to improve the feeding practices you provide for your infant?

28. If you have a problem, where would you go for information regarding the correct feeding practices? Please explain

29. Do you have any questions?

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Appendix 15: Questionnaire on the sustainability of the educational intervention

Community Partnership and Involvement

1. Did the researcher consult this community in program design?

Please explain your answer

2. The participants in the baseline study highlighted breastfeeding as a problem that needs to be addressed in the community, do you agree?

If no, please explain

3. The participants also highlighted that there is a lot of teenage pregnancies occurring in the community, do you agree?

If no, please explain

4. If this is the case, why do you think the number of pregnant women who participated were so limited?

5. Are there any constraints that may have hindered more mothers from participating? If yes, what are they?

6. Were the community's ideas and contributions valued in the project design?

Please explain your answer

7. Did the aims of this program meet the needs of the community?

Please explain your answer

8. Were the community members able to contribute to this program? How so?

Please explain your answer

Demonstrated Positive Impact on the Community

9. To what extent has this program positively affected this community?

10. Do you think community members have benefited from this program? If yes, to what degree?

Please explain your answer

11. Has this project promoted pregnant women's empowerment in this community with respect to informed decision making regarding exclusive breastfeeding for the first 6 months? If yes, please explain how

12. Do you think mothers need to be empowered in order to perform optimal breastfeeding practices? Please explain your answer

13. Breastfeeding is a natural mammalian activity, why do you think mothers need to be "taught" about breastfeeding?

Please explain your answer

14. In your opinion why is breastfeeding practices sub-optimal in these communities?

15. What short term impact do you think this educational intervention will have on improving breastfeeding practices in these communities?

16. What long term impact do you think this educational intervention will have on improving breastfeeding practices in these communities?

Sustainability/ self- sustained development

17. How will this program find the needed resources to continue running in to the future?

18. What policies or mechanisms support the ongoing success of the program?

19. Is this community prepared to sustain this program for the long-term? Please explain

Adopted from: http://talloiresnetwork.tufts.edu/about-the-macjannet-prize/selection-criteria

NOTE: All material used during the intervention will be given to the AGF, this includes the dummies, the visual aids and the booklet.

breastfeeding

YOUR BABY

breastfeeding

YOUR

BABY

Page

CONTENTS

1. When is it best to start breastfeeding my baby?

- Start breastfeeding your baby immediately or as soon as it is possible after giving birth.
- It is best to start breastfeeding within the first hour.

2. What is exclusive breastfeeding?

- Exclusive breastfeeding means that your baby only receives breast milk and nothing else.
- No other liquids or solids are given, not even water.
- However your baby can still receive oral rehydration solution (ORS), drops/syrups containing vitamins, minerals or medicines as advised by your nurse.

3. For how long is it best to exclusively breastfeed my baby?

Breastfeed your baby exclusively for six months.

NOTE: that means, NO water, food, animal milk or formula milk for six months.

4. Why is it important to know if my baby is correctly attachd to my breast?

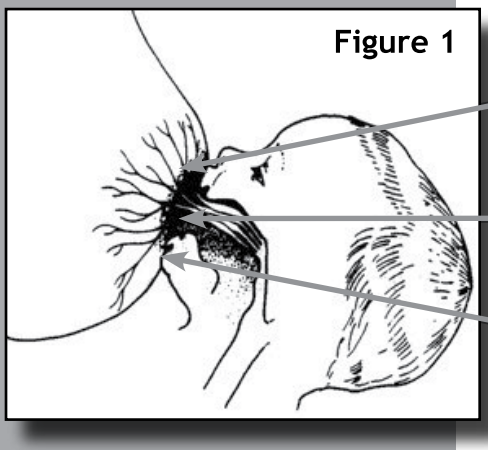
- Your baby will be able to get enough milk from your breast.
- The experience will be more comfortable and enjoyable for you and your baby.
- It will prevent you from having sore nipples, which are most frequently caused by an incorrect attachment.

5. How will I know if my baby is correctly attached to my breast?

Figure 1 shows a picture of a baby correctly attached to the breast.

Figure 2 is a picture of a baby not attached to the breast correctly.

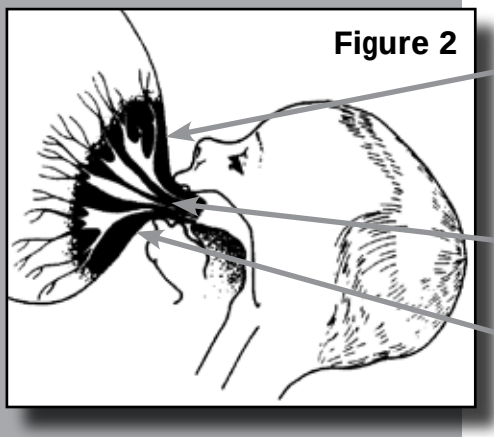
Note the differences.



More of the dark area above baby's lip than below

Nipple fully in baby's mouth.

Baby's chin is touching breast



All of the darker area around the nipple is out, above baby's upper lip and below baby's lower lip

Nipple not fully in baby's mouth

Baby's chin is far from the breast

6. What are the different positions that can be used during breastfeeding?

There are four different positions shown here, however you should choose the position that suits you and your baby best.

Football hold *Lying down hold* *Cross-cradle hold* *Cradle hold*

Football hold

- In this position you tuck your baby under your arm like a football.
- This position is best for mothers who have had a Cesarean section.
- Also for smaller babies and infants who have trouble attaching to your breast, as you can guide his/her head to the nipple.
- This position is also good for mothers with twins, mothers with large breasts or mothers with flat nipples.

Lying down hold

- This position is best for night feeding as it is restful for you.

Cross-cradle position

- This position differs from the cradle hold, in that you don't use the crook of your arm to support

the baby, you use your arms instead.
- This position works for small babies and infants who have trouble attaching to your breast.
- You can use your thumb and fingers to support the baby's head and guide his/her mouth to your breast.

Cradle hold

- This is the position used most often for breastfeeding.
- This position works well for full-term babies.
- You might find it difficult to lead your baby to the nipple within the first month, so try using this position after a month when your baby's neck muscles are stronger.

7. Why is breast milk important for my baby?

Colostrum
- This substance is produced within 2-3 days after delivery.
- It is a yellowish milky substance and comes in small quantities.
- It provides your baby with protection from bacteria in the surrounding environment.
- It also prepares your baby's gut to be able to take in nutrients in the milk.

Normal breast milk
- After 2-3 days, normal breast milk starts coming out in larger amounts.
- This milk contains nutrients such as vitamins that help your baby's development.

- This is very important for your development of your baby's brain.
- Breast milk also enables your baby to be able to walk and talk properly
- Nutrients in breast milk also help fight off bacteria and viruses.
- If you are exposed to a certain bacteria, your body is able to recognize these bacteria in future and fight them off much faster
- If you breastfeed your baby, his/her body has a better chance of fighting off the same bacteria once exposed to them.

NOTE: If you feel that breastfeeding is not an option for you, consult the nurse at your nearest clinic.

8. What are the risks if my baby is not exclusively breastfed for six months?

Short term illnesses:
Malnutrition
(which is the major cause of infant deaths)
Diarrhoea
Pneumonia
(and other respiratory infections)

Long term illnesses:
Asthma
Diabetes
Cancer
Weak immune system
(can cause repeated illnesses)
Obesity
Learning disabilities

9. Is it safe to give my baby formula milk, animal milk and/or semi-solids (e.g. porridge, vegetables) during the first six months?

No food

No milk

- It is not recommended to give your baby anything other than breast milk during the first six months.
- Animal milk is not the same as breast milk, it does not protect your baby from infections.
- Nutrients in formula milk and animal milk are difficult for your baby's gut to break down and be able to take it in and he/she can get sick.
- babys who are fed formula milk, animal milk, porridge and/or veggies during the first six months are more at risk of childhood illnesses than those who are breastfed only.
- Bottlefeeds prepared with unsafe water and utensils that are not sterilized can lead to infection.

Figure 3: It is best for babys to be exclusively breastfed for SIX MONTHS

Breastfeed only

10. What are the different breastfeeding difficulties?

Problem	Condition
Overfilled breasts	Breast feels heavy, hard and painful
Blocked ducts (in the breast that carry milk)	Ducts in the breast containing milk are blocked; the milk forms a lump in the breast
Inflammation of the breast	Blocked ducts and overfilled breasts can lead to inflamed breasts
Sore/cracked nipples	Makes feeding very painful
Low milk supply	Baby loses weight due to not having enough milk

Cause	Solution
• Non regular feeds, • or when you haven't breastfed for a while; • milk accumulates in the breast	• Express milk and breastfeed regularly. • Make sure that the baby is attached to the breast correctly
• Tight clothing. • Not draining breast properly • or incorrect baby attachment to the breast	• Avoid tight bras and tight tops. • Express milk and breastfeed regularly • Make sure baby is attached correctly to the breast
• Blocked ducts or breast with too much milk not being drained	• Medication needed. Consult nurse. • Breastfeeding should continue.
Incorrect attachment of the baby to the breast	• Check that baby is attached correctly to the breast. • Apply ice in a wrapped cloth • For cracked nipple, apply lukewarm water containing salt.
• Stress • Incorrect attachment • Oral contraceptives • Hormonal changes (e.g. during menstruation)	• If possible get a good rest • Drink lots of water! • It is most important to eat healthy, well balanced, regular meals. • Breastfeed your baby as often as possible (This stimulates production of more milk) • You have the most milk production right after waking up, do not miss out on this feed.

11. Can I take medication/herbal remedies while breastfeeding?

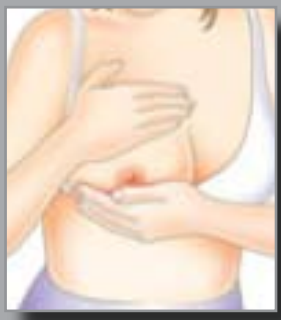
- Remember whatever you take will be in your breast milk and can affect your baby and his/her development.
- So it is important to make informed decisions when taking medication or traditional herbs.
- If you have an illness or other condition, it is important that you consider what your options are.
- You will need to consult your nurse..

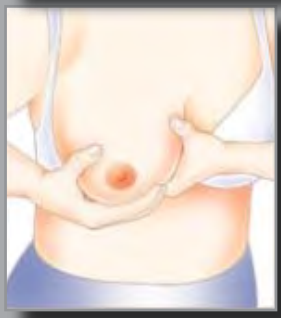
It is MOST IMPORTANT to consult your nurse if you are taking any of these medicines, to make sure the amount you are taking is not harmful to your baby.

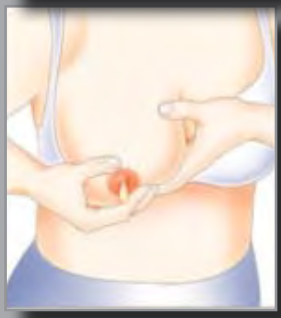
Any natural herbs you are taking, you will also need to make sure these are safe to take during breastfeeding.

Do not take any medication while breastfeeding unless you have consulted your nurse.

12. What can I do if I cannot be home during the day?







Express milk for the caregiver to give to your baby while you are away

Step 1: Before you start, wash your hands first.

Step 2: Collect a clean bottle to express your milk in.

To learn how to express milk is quite easy, all you need to do is massage your breast and make sure your index finger and thumb make a "C" shape in a motion towards your nipples.

- Store it in a clean tightly closed bottle.
- If you will be storing more than one bottle at a time, it's important to label these to remind you which was first.
- The oldest milk should be given first.
- If storing in a cupboard- at room temperature; Store for no longer than a 4-6 hours.
- If in a fridge; Store for no longer than five days.
- In the freezer; Can be stored for 6-12 months.

NOTE: It is not advisable to freeze breastmilk, it loses the nutrients that help fight off infections. BUT frozen milk is still preferable than animal milk or formula milk.

Do not try to microwave frozen milk, rather boil water and place the container in the water to melt the milk faster.

- Bottles can be sterilized with boiling hot water with soap, then make sure it is rinsed well with warm water after each time you feed.
- You can do this by soaking washed bottles in a container with warm water.
- Also remove the teat from the bottle, this also needs to be washed and rinsed properly
- Once done allow bottles and teats to air dry.

13. What are the advantages of breastfeeding?

- Breastfeeding allows your baby to develop well and healthy with less risk of illnesses.
- Breastfeeding allows you to bond with your baby.
- Breastfeeding will not cost you anything.
- Breastfeeding allows you to have breaks in between pregnancies, which is good for your health.
- Breastfeeding is a natural birth control. For up to six months chances are falling pregnant are lessened.
- Breastfeeding prevents swelling of breasts and blocked ducts.
- Breastfeeding also helps you lose pregnancy weight.
- Breastfeeding lowers the risk of breast and ovarian cancer.

14. What are the disadvantages of breastfeeding?

How can these be overcome?

Cannot be with baby all the time?

- Express milk and store for caregiver to give to the infant while you are away.

May be regarded as embarrassing to breastfeed in public?

- You have three options that you can try out when going with your baby in public.
- You can either express the milk and put it in a bottle if you know you will be out in public with your baby.
- You can find a space away from people and breastfeed your baby.
- Another option is to use a wrap/shawl/towel to cover yourself while breastfeeding, if you cannot find a space away from people.

NOTE: It is important to remember that breastfeeding is the MOST NATURAL way of feeding your baby, do not feel embarrassed to do it.

15. What are the recommendations for how an HIV+ mother can feed her baby?

Breastfeed only for six months
(THEN STOP)
OR
Find a replacement feeding that is Appropriate, Possible, Affordable, Able to be maintained and Safe.

DO NOT MIX FEED (for example do not mix bottle feed with breastfeeding. Choose one and stick to it)

NOTE: It is important that you always consult a nurse before you start feeding your baby anything.

16. What is replacement feeding?

The process of feeding a baby who is not breastfed with a diet that provides all the nutrients the baby needs, until the baby is of age to be fully fed on a family meal.

17. When can a mother choose replacement feeding over breastfeeding?

If it is **Appropriate**, which means the mother sees no significant barrier to choosing a feeding option such as cultural or social reasons or for fear of stigma and discrimination.

If it is **Possible**, which means the mother has enough time, knowledge, skills and resources to feed the baby.

If it is **Affordable**, which means the mother and family with the available community support and/or health system support, can pay for the cost of replacement feed; including all ingredients, fuel and clean water without compromising the family's health and nutrition budget.

If it can be **Maintained**, which means the mother has access to a continuous supply of all ingredients and resources needed to follow through with replacement feeding for as long as the infant needs it.

If it is **Safe**, which means replacement feeds are correctly and hygienically prepared, stored and fed in nutritionally adequate amounts; with clean hands and using clean bottles/utensils.

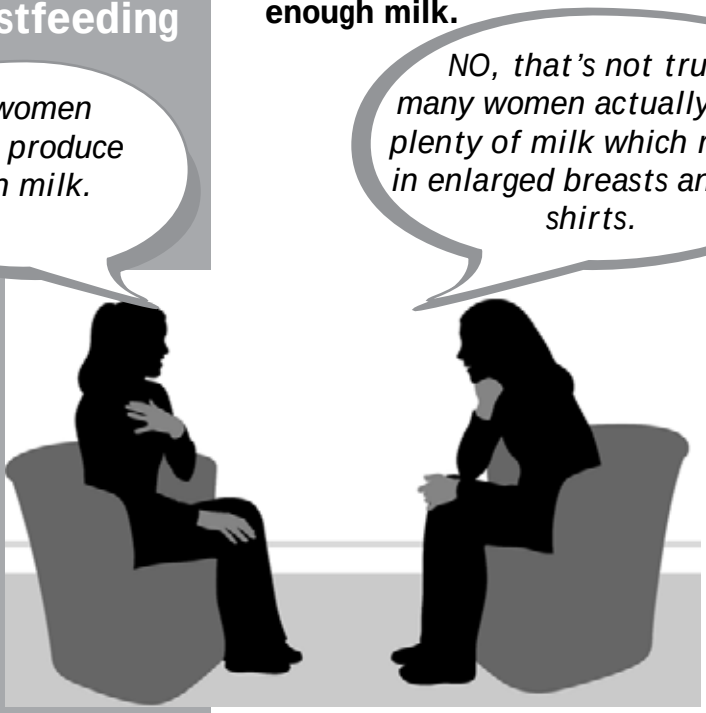
18. When is a baby at greatest risk of acquiring HIV from his/her mother, if a mother chooses to breastfeed?

- If the mother acquires the HIV during breastfeeding the risk of Mother-to-Child-Transmission is high, this is due to the high initial viral load.
- If the mother has a high viral load she can also transmit the virus to her infant via breast milk, the higher the viral load the higher the risk.
- If the mother's breasts are in poor condition, e.g. sore nipples, cracked nipples; she can transmit the virus to her infant during breastfeeding.
- If the baby has an oral infection, this can increase the risk of transmission. The mother needs to make sure her child is in good health at all times.
- Non-exclusive breastfeeding (e.g. bottle feeding and breastfeeding) also increases the risk of Mother-to-Child-Transmission; this is mixing bottle feeding and breastfeeding.
- Breastfeeding for longer than six months can lead to transmission. Breastfeeding needs to be stopped completely after six month, it is best to now only provide the baby with alternative feeding (Infant formula/ Animal milk and supplementary feeding)

REMEMBER An HIV-positive mother should consult the nurse and get counselling on the options available to her and her baby. This is important to make sure of her health status and her individual circumstance and discuss the best option for her and her baby.

Myths about breastfeeding

1. Many women do not produce enough milk.



2. Its normal for breastfeeding to hurt

3. It's easier to bottle feed than to breastfeed

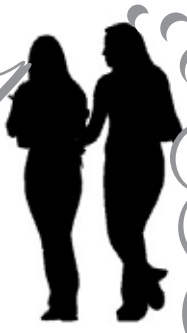
False
sitting down and nursing a baby is faster than having to clean bottles, mix formula and heat it up.

4. Formula milk is the same as breast milk

False,
unlike breast milk, formula milk lacks nutrients that fight off bacteria

5. A breastfed baby needs extra water

A breastfed baby needs extra water



False,
breast milk has all the water the baby will need for the first six months.

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