

Maternal Influences Contributing to under 5 Years Child Malnutrition in Insiza District, Matebeleland South, Zimbabwe

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Authors' contributions

This work was carried out in collaboration among all authors. Authors BN and JAC designed and wrote the research protocol, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Author GAM performed the statistical analysis, designed and wrote the first draft of the manuscript. All authors read and approved the final manuscript.

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ABSTRACT

Introduction: Malnutrition remains a childhood scourge in Sub Saharan Africa, Southern Africa, Zimbabwe and in the Insiza District, in particular. With its rich mineral (gold) deposits, robust animal husbandry agricultural industry, varied ecosystems and tourist attraction sites, the district has great potential support self-sufficiency of its population. However, there is a cause of concern as <5-year-olds malnutrition and stunting remain a threat to their lives. The maternal contributions to malnutrition was investigated to explicate underlying attributes of the condition.

Materials and Methods: A mixed method approach, where both qualitative and quantitative research methods were used to prompt and describe in-depth caregivers' involvement in elements associated with malnutrition and stunting among the <5-year-olds. The quantitative data collection

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allowed for the quantification of certain maternal attributes on malnutrition on <5-year-olds. Both probability and purposive sampling were used in the study.

Results: Maternal associated factors were observed to contribute towards malnutrition amongst infants in Insiza District. Majority respondents with malnourished <5-year-olds attended FANC (95%), however, late at 7-9 months (38%), at 4-6 months (37%) while 25% were early at 1-3 months of pregnancy. For post-natal care, majority of women (77%) visited the health facility as per the stated dates while most male partners (83%) did not accompany their partners to FANC visits. The majority of children were breastfed (97%) with majority initiating the process within the hour of birth 93.1% and 86% not exclusively breastfed. Knowledge of two breastfeeding benefits was 53% prevalent, 27% knew more than two and 20% knew one. The respondents travelled 5-10 km (50%), 15% >10 km and 13% stayed within 2 km. Most children did not receive immunization (56.7%).

Conclusion: The respondents cited that the healthy facility is too far from the furthest village, religious practices, less milk produced by the mother as reasons on maternal factors which contribute to malnutrition. The community knows benefits of breastfeeding but are not practicing exclusive breastfeeding with complementary feeding within six months of birth due to lack of dietary diversity. Immunization was not practiced by the majority respondents.

Keywords: Malnutrition; under-five-olds; exclusive breastfeeding; infant and young children feeding; focused antenatal care.

ABBREVIATIONS

IYCF : Infant and young children feeding
EBF : Exclusive breastfeeding
FANC : Focused antenatal care

1. INTRODUCTION

A prominent reflection of a nation's economic development and public welfare policies' effectiveness is best described by the nutritional status of children <5-years old. Healthy growth, proper organ formation and function, a strong immune system, and neurological and cognitive development is assured by adequate nutrition in early childhood [1,2]. Nevertheless, over 30% of Zimbabwean 5-year-olds malnourished and the continuing economic recession seem to worsen issues even further [3]. The infant mortality rate remain short of the desired MDG target of 22/1000 births [4]. The Transitional Stabilization Programme (STP) is an intention to recover the economy, after years of stagnation, which runs from October 2018 to December 2020 with the aim of operationalizing Vision 2030 which seeks to transmute Zimbabwe into a middle-income country with a per capita income of USD 3 500 per person [5] and hopefully reduce <5-year-olds malnutrition and stunting.

Anthropometric measurements monitor adequate growth and nutritional status of children. Height and weight, in combination with child's age, form the anthropometric guides. Classifications also use weight-for-age, length/height-for-age, weight-

for-length/height and body mass index (BMI)-for-age (BAZ) and can be interpreted using the z-score classification system [6]. Accordingly, a child with weight-for-age (WAZ) or weight-for-height (WHZ) less than -2.0 Standard Deviation (SD) is classified as being underweight or wasted, respectively. Similarly, a height-for-age (HAZ) < -2.0 SD indicates stunting or chronic under nutrition. On the other hand, a BMI-for-age (BAZ) less than -2.0 SD and one greater than 2.0 SD indicates underweight and overweight, respectively [7-9].

Apart from the use of anthropometric measurements, the nutritional status of a child is also reflected by the haemoglobin level, designating the presence or absence of iron-deficiency anaemia. Malnutrition in its several forms of under nutrition (wasting, stunting and underweight), is inaudibly becoming an emergency associated with compromising women and children health. Child malnutrition is life-threatening beyond boundaries of childhood persevering into adulthood and silently extinguishing the future national productivity [10].

1.1 Background

Globally, 162 million <5 year-olds were stunted, 99 million were underweight, 51 million were wasted and 17 million were severely wasted [11]. Malnutrition contributes to between 3.5 and 5 million annual deaths among under five-year children with the principal burden borne by the Sub Saharan Africa [12]. Most of the impairment caused by malnutrition occurs before the second

birthday, a time when the quality of a child's diet has a profound impact on physical and mental development, a period of transiting from breastfeeding to solid food which require deliberate interventions avoiding under nourishment and stunting [13].

Malnutrition affects the children's intelligence levels, behaviour and school performance and the complete developmental process and milestones. Mental impaired development is the most serious long-term handicap associated with <5-year-olds malnutrition [14].

New dimensions have been introduced by the advent of the HIV infection into the matrix of the malnutrition dilemma in developing countries, which fateful have comparatively advanced <5-year-olds incidences and prevalence of both diseases and parasitic infections as well [15].

In Zimbabwe 27% of children aged 0 to 59 months are chronically malnourished giving rise to children who are too short for their age or stunted [16]. One in every three children suffers from chronic malnutrition or stunting in Zimbabwe and most likely contribute to more than twelve thousand child deaths yearly [17,18].

In Bulawayo, as in other Zimbabwean cities and provinces, the incidence of underweight among children is increasing [19]. A rather disturbing aspect is the somewhat high mortality obtaining in the < 5-year-olds of 46.2 deaths per 1,000 live births in 2018, down from 49.3 deaths per 1,000 live births previous year showing that approximately 5% of children born will die before their fifth birthday most possibly from all cause malnutrition [20]. However, both under-five and infant mortality rates are improving but very slowly over the years from 1999 to 2018 (102-46.2/1000 births [21].

Insiza has a medium prevalence stunting rate of 29,7% below 21 other districts with 30% rate [3,18]. Insiza District is in Matebeleland South Province sandwiched between the Matebeleland North and Midlands Provinces. There is an admixture of stunting profiles in districts surrounding Insiza mainly Gwanda (15.8% stunting), uMzingwane (21.5% stunting), Umguza (28.3% stunting), Bubi (31.6% stunting), Gweru (26.7% stunting), Shurugwi (28.9% stunting), Zvishavane (29.0% stunting) and Mberengwa (31.2% stunting) inherently driven by varying determinants [3].

Insiza District falls within the <5% acceptable Global Acute Malnutrition (GAM) threshold which

is unenviably exceeded by Makoni (7.4%), Mutare (5%), Seke (5.7%), Mhondoro-Ngezi (5.8%), Sanyathi (5.5%), Binga (6.1%), Lupane (5.2%), Masvingo (7.4%) and Goromonzi (19.3%) [3].

In general, there was an increase in the proportion of households with at least one member living with HIV/AIDS from 12% (2018) to 27% (2019) with high possibilities of maternal influences on <5-year-olds malnutrition increasing Caregiver attention on FANC, postnatal care, breastfeeding and complementary feeding habits tend to be attenuated when competing needs arise that may lead to malnutrition for <5-year-olds [22]. The presence of a member living with a chronic condition is likely to increase the household's financial burden with < 5-year-olds most likely to be affected more than other family members leading to stunting [23].

Information on malnutrition and concentrated efforts to mitigate its effects in Insiza District has steadily increased over the years. However, the maternal influence on the continued presence of malnutrition among <5-year-olds remains unclear in a community with a plethora of resources and reinforced support and high potential to eradicate it remains unclear. In other words, why malnutrition in Insiza District is proving difficult to exterminate requires to be elucidated to allow for targeted interventions to be made. As a result, a broad objective of the study was to examine the maternal related determinants of malnutrition among < 5-year-olds in the Insiza District.

2. MATERIALS AND METHODS

This work is a portion of a three-part study comprising of three different set of results and findings, discussions and conclusion and recommendations as appropriate necessitated by the volume of work generated. Similarities in materials and methods could not be avoided in places. Data was collected on different occasions, times, periods and collation of data was carried out as per time and date of collection to come up with data sets from which means were calculated, compared and summary column statistics were obtained and used in describe different facets of the findings.

2.1 Materials

2.1.1 Research design

The study used a mixed method approach. Both qualitative and quantitative research methods

were used as popular methods to better opportunities to answer the research questions. The quantitative data collection allowed for the quantification of certain characteristics of the sample and its environment.

2.1.2 Research archetype

Triangulation [24], the use of several means, e.g., using multiple sources of data, research methods and researchers to understand phenomena, to examine the determinants of malnutrition in 5-year-olds brought in the quantitative and qualitative paradigms. This enabled advantageous characterization of the phenomena surrounding the research questions to be unraveled.

2.1.3 Research approach

A descriptive approach was used defining the characteristics of mothers and caregivers malnourished 5-year-olds from Insiza District research sites. Simple random sampling was necessary as a probability sampling technique to pick up the caregivers of malnourished <5-year-olds used as respondents. Purposive sampling was used to select the Health Facilities, KI and the male FDGs members due to limited numbers available to select from. The descriptive research data was qualitative or quantitative. Quantitative data presentations were in the form of frequency distributions and summary. Statistical visual aids such as graphs and charts, to aid in understanding the comparisons of data distributions. Large mass of raw data was reduced to manageable form yielding detail that led to important recommendations.

2.1.4 Study population

Insiza District has 15 health centres including a hospital. The furthest client or patient is about 25 km from the clinic. The total number of units from which data was collected was Insiza District Ward 9 community with a population 6264 and 436 household in 7 villages. Ward 9 is approximately 60 km East of Filabusicentre. The ward is communal made of villages Ukuthula, Mpumelelo, Gwenyimo, Vukuzenzele, Sibambene, Bambanani and Nyezi. One clinic serves 3 wards.

The data collection centre was Sanale Rural Health Centre which handled has a total of 140 malnourished children during the data collection period.

2.1.5 Sample

A proportion of the Insiza District population from Sanale Health Clinic in Ward 9 was used to infer characteristics of the population. The sample size was 83 respondents comprising of 60 mothers or caregivers of any child < 5years of age, 10 pregnant and lactating mothers, 10 male partners and 3 technical experts on malnutrition. The < 5-year-olds, whose mother or caregiver were selected were chronically malnourished, registered in the malnutrition register at the health facility and or stunted. The technical experts selected were the Clinic Sister in Charge, Environmental Health Technician and Clinic Nutritionist.

2.1.6 Data collection instruments

Face to face interviews with key informants, mothers and caregivers were used to capture the quantitative aspect of the study. Focus Group Discussions (FGDs) were used to capture qualitative aspect of the study.

2.2 Methods

2.2.1 Sample size estimation

The research used the Raosoft sample size calculator where margin of error was 5%, confidence level was 95%, population size was N, sample size was n, r was the fraction of responses that were selected, $Z(c/100)$ was the critical value for the confidence level c such that:

$$x = Z(c/100)2r(100-r); n = N x / ((N-1) E^2 + x); E = \text{Sqrt} [(N - n) x / n(N-1)]$$

2.2.2 Sampling design and procedure

The study used probability sampling also known as 'random sampling' or 'chance sampling'. Under this sampling design, every item of the universe had an equal chance of inclusion in the sample. simple random sampling and systematic sampling were used. A non-probability sampling (deliberate sampling, purposive sampling and judgmental sampling) was used as well.

2.2.3 Simple random sampling technique

Simple random sampling was used to select 10 males during the Focused Ante Natal Clinic (FANC) visit days, 60 caregivers and mothers of malnourished children as they came to get their food supplements from the clinic. In this

technique, Gold fish bowl procedure was used where all individuals in the population were numbered. These numbers were written on cards, put in a bowl and then mixed. Articles were then drawn one at a time until the desired number of individuals to constitute the sample was obtained. Drawing was without replacement and probability of each remaining items being picked increased because the total number of items was reducing.

2.2.4 Systematic sampling

This sampling method was used to select ten pregnant and lactating mothers during ANC days from the clinic register and ten lactating mothers during Post Natal Clinic review. The method made it easier to draw a sample and was easier to execute without mistakes. The cost was low and the selection of units was simple.

2.2.5 Convenience sampling

Ward 9 was selected using this technique because of its location in Insiza District and being the Health Centre in Ward 9. Ward 9 was selected due its accessibility and also the lower resources and costs that were used in conducting the study as compared to other wards.

2.2.6 Purposive sampling

The sampling method was used on the basis of the knowledge of the population, its elements, and the nature of the research aims. Key informants, (the Nutritionist, the Nurse in Charge, the Environmental Health Technician) operating in the district were purposively selected.

2.2.7 Face to face interviews

Structured interviews were used to extract information through a conversation from mothers and caregiver of the malnourished children. All the respondents were asked the same questions in the same way increasing data reliability. Creating codes and interpreting data was made easier by the consistent and standardized nature of the interviews.

2.2.8 Focus group discussions (FGGs)

The study used two focus group discussions to capture the qualitative aspect of the study. The FGGs composed of 10 pregnant lactating mothers and a group of 10 male partners who

had come for ANC visits. Rich data emerged through interaction within the groups. People developed and expressed ideas they would not have thought about on their own or outside the group.

2.2.9 Key informant interviews

Key informant interviews were qualitative in-depth interviews with people who know what is going on in the community on malnutrition among the <5-year-olds. The conversation was loosely structured as the people had specialized knowledge about the topic explored on malnutrition in the 5-year-olds. Technical data from key stakeholders was gathered from the Nurse in Charge, Environmental Health Technician (EHT) and the Nutritionist who provided insight on the nature of the problem with regards to determinants of malnutrition.

2.2.10 Data collection procedures

Pregnant mothers and lactating women were interviewed at the clinic when they came for FANC visits and Post Natal Care, respectively. Key Informant Interviews were hand delivered to the Nurse in Charge, EHT and the Nutritionist to ensure receipt. The food distribution point for the health and nutrition program were used to conduct the face to face interviews to the mothers and caregivers of malnourished children.

2.2.11 Data presentation techniques/analysis

The data collected from this study was cleaned, coded and analyzed using SPSS version 21(SPSS, Inc., Chicago, IL, United States). Statistical comparisons were performed by one-way analysis of variance (ANOVA), followed by Tukey-Kramer multiple comparison post hoc test using GraphPad InStat Software (version 5, Graph Pad Software, San Diego, California USA). Percentage means of groups were compared for relative differences and were considered to be statistically varied when $P < 0.05$.

3. RESULTS

3.1 Focused Antenatal Care Visits as a Factor on Malnutrition

Majority of mothers for <5-year-olds reported that they had visited focused antenatal clinic (FANC) for care during pregnancy (95% n = 57) while the rest had not done so.

During FDGs a woman who had not attended FANC and had a malnourished under five years child intoned that *“going for FANC visits calls for long walks. Coming to clinic once and for all for giving birth is more convenient. Moreover, there is no one in whose care to leave the other children when attending FANC”* showing challenges associated with antenatal care reception by sizable number of women in Insiza District. *“I have given birth several times before. I do not the reason of coming for FANC each time I am pregnant”*, said one woman when asked for the reasons why they had not attended FANC.

Key Informants revealed that religion influenced, to a meaningful extent, mothers’ attending FANC. *“There is huge following of women believers in the Apostolic Faith and some Orthodox churches, whose influence on FANC attendance by mothers is large, in Matebeland South in general. We believe in their ability to stop their congregants from presenting for FANC and post-natal care which may have a strong bearing on aetiology of <5-year-olds malnutrition.”* was the opinion of some health care workers on association of religion and malnutrition.

3.2 Timing of First FANC Visit by Malnourished Children’s Mothers

First FANC visit by mothers with <5-year-olds who were malnourished or stunted occurred within the 1-3 (8%), 4-6 (45%) and 7-9 (47%)

months of pregnancy. The % distribution of mothers’ first FANC visit was in the formation of 7-9 months > 4-6 months > 1-3 months. The 7-9months first visits were relatively much higher (5.9 times higher) than the 1-3 months first visits among mothers who had malnourished children ($***P < 0.05$, 7-9months vs 1-3 months). Also, the 4-6 months first visits were relatively much more represented (5.6 times higher) when compared to those who had reported for FANC for the first time at 1-3 months ($**P < 0.05$, 4-6 months vs 1-3 months). The majority of women (75%) who had <5-years-olds presenting with malnutrition and or stunting reported late for their first FANC visit ($*P < 0.05$, [4-6 months + 7-9months] vs 1-3 months). (Fig. 1).

3.3 Frequency of FANC Visits per Pregnancy

Mothers of malnourished of <5-year-olds showed a relatively higher propensity for twice FANC visits per pregnancy when compared to once or thrice of four times ($***P < 0.05$, twice vs once or vs thrice or vs four times). One FANC visit per pregnancy featured much higher (18.64 times more) than four times per pregnancy ($**P < 0.05$, One visit vs four visits). Four visits per pregnancy was much lower (14.7 times lower) in frequency when compared to those who attended three visits ($*P < 0.05$, % Three visits > % four visits). The recommended four visits for FANC was least preferred amongst women who had children <5-years of age (Fig. 2).

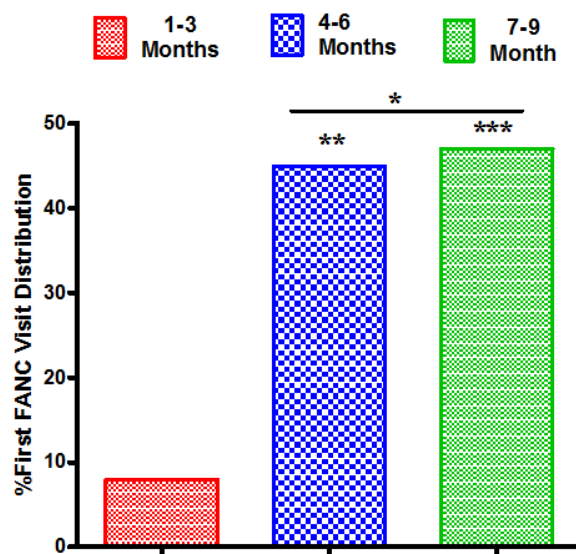


Fig. 1. % distribution of timing of the first antenatal visit

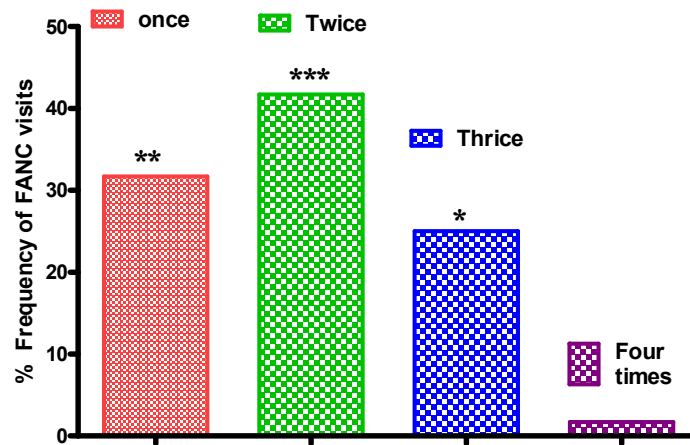


Fig. 2. Frequency of FANC visits per pregnancy

One of the key informants commented on the frequency of FANC visits by would be mother.” most mother come to the clinic for FANC when they are well into the second and third trimester of pregnancy. Especially second and third gravida mother rarely report during the first trimester unless it that there will be reporting for other causes not entirely associated with the pregnancy. Some will be coming for other children clinic visits and incidentally discover they are pregnant and subsequently referred to FANC. Preventive clinic visits are not common in the area”. during an interview.

FDGs for men who had reported for the FANC visits indicated that...” the distance travelled by would-be mother for FANC was too long for a pregnant woman to travel for the required four visits in a pregnancy and we are forced to accompany them for them visits. Moreover, mothers have other children to carter for who would have no one to take care of them during the visits which require a full day’s effort”.

3.4 Post Natal Care Visits

Post-delivery care visits as per scheduled dates at the clinic were reported at a higher rate (77%) when compared to the contrary amongst the 5-year-olds with malnutrition. The children had scars indicating Bacille Calmette-Guerin (BCG) immunization.

When asked why there was a discrepancy amongst mothers with children under five years old who were malnourished in reporting for post-natal care and thereby exposing the children to diseases, key informant said.” Normally after

delivery every mother are educated on the benefits of attending the post-natal care and the harm associated with not attending. Reasons why some are not reporting for post-natal are many but the biggest problem faced by the community is transportation to the clinic with the newly babies”.

The men’s FDG’s corroborated in the key informants’ opinions whilst adding...” other religions have an influence on postnatal attendance as they do not believe in medication and if conditions allowed even child birth need not occur at the clinic which could result in malnutrition”.

3.5 Male Partner Visit for FANC

Male partner visits for FANC indicated relatively lower participation by men who had <5-year-olds with malnutrition and or stunting with 83% not having attended even a single visit.

3.6 Male Partner Reason for Not Participating in the FANC and Postnatal Care Visits

Male partners who were not involved in postnatal care visits due to lack of interested and regarding the exercise as a female task were relatively higher as compared to those who feared being tested for HIV infection or felt the distance was too long or were never consulted (**P <0.05, not interested vs fear of HIV testing or vs long distance or vs never consulted). Absence of partner was more common than fear of HIV testing or long distance or never consulted for

the postnatal visit (**P <0.05, absent partner vs HIV testing fear or vs too long distance). Male partners consultation for postnatal care visits was very common with those not consulted making a small fraction. Male partners who denied responsibility for fathering the malnourished <5-year-old were relatively higher when compared to those who said distance to clinic was too long or those who were never consulted (*P <0.05, those denying fathering the infant >distance too long > never consulted), but relatively lower than those not interested or saw postnatal care for malnourished <5-year-old women tasks (**P <0.05, denying fathering infant < not interested in postnatal visit and leaving it to women). 50% of the men were not interested in postnatal care visits (combine those not interested + women's duty + denying fathering infant responsibility).

FDGs revealed unwillingness of male partners in doing tasks assumed to be maternal in nature...
do be seen carrying a baby and going to the clinic with the wife is a self-deprecating and shameful act. More so, one will be doing a

woman's task"said one man to a general applause by other men in the FDG. The mothers echoed their desperate need for male involvement....." I will be needing assistance and being accompanied to the clinic all the time, especially during pregnancy and post-delivery. But help does not come and the reasons are a dozen for a penny I get why he would not accompany me".

3.7 Child Breast Feeding Status

Breast feeding was carried out by a relatively higher majority of mothers (97%) when compared to those who did not breast in the group with <5-year-olds who suffered from malnutrition and or stunted growth.

3.8 Initiation of Breast Feeding after Birth

Among the children that had malnutrition and or stunting, 93% initiated breast feeding within the hour after birth and the rest after one hour.

Table 1. Reasons given by male partners for not attending postnatal care visits

Reason	Percentage of respondents
Not interested, seen as women issue	32% ***
Partner was absent or away	22%**
Partner denying responsibility of pregnancy	18%*
Partner fears being tested for HIV	14%
Partner felt the distance too long	12%
Partner never consulted	2%

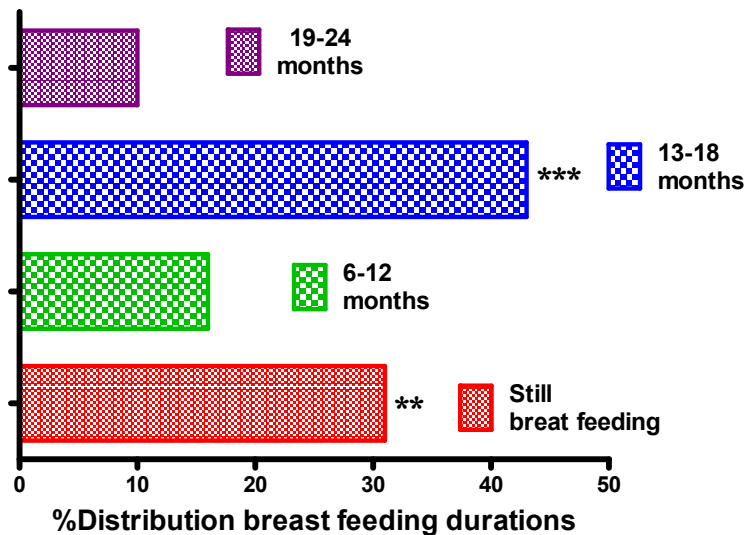


Fig. 3. Breast feeding duration

Amongst <5-year-olds who were malnourished and or stunted, those who had breast fed for 13-18 months were relatively highly represented when compared to those were still breast feeding (1.39 times more), or those who breast fed for 6-12 months (2.69 times more) or those who had breast fed for 19-24 months (4.3 times more), [***P < 0.05,13-18 months vs still breast feeding or vs 6-12 months or vs 19-24 hours].However, those who were still breast feeding had a higher percentage when compared to either the 6-12 months age group (3.1 times more) or the 19-24 months age mates (1.94 times more) [**P <0.05, still breast feeding > 6-12 age group > 19-24 age group].

During the FDGs it was unanimously echoed that hinger forced early weaning of infants by majority of mothers....." *I cannot stand the effect of breast feeding when I will be hungry. The best solution is to stop breastfeeding even though the baby would be preferring breast milk to complementary food*"said one of the mothers to which other mothers agreed.

The saying was corroborated by the KI who when asked why there was<2 years of breastfeeding practice in the area." *The question of hunger and limited food supplies drives most women from longer periods of exclusive breast feeding and feeding with complementary feeding. As a consequence, malnourishment will tend to affect the infant as well as the mother, if not the whole household*" .was the answer provided.

3.9 Practice of Exclusive Breast Feeding

Exclusive breastfeeding (EBF) was unpopularly practiced in Insiza District among mothers who had <5-year-olds with malnutrition with only 14% having professed to having done so. The greater majority of <5-year-olds with malnutrition and or stunting had not exclusively breastfed for the required time or duration of six months. Without EBF being practiced, 86% practiced mixed feeding practices among the malnourished infants.

3.10 Reasons for Not Exclusively Breastfeeding

Insufficiency of milk production by mother (52%) was cited as the most common cause of not EBF when compared to mother's sickness (17.2%: 3.02 times less), child's sickness (13.7%: 3.8 times less), deceased mother (7%: 7.4 times less), fear of baby losing body weight (5%: 10.4 times less), lack of interest to breastfeed by mother (3.4%: 15.3 times less) or vs mother absence (1.7%: 30.6 times more) [***P <0.05, milk insufficiency vs sick mother or vs sick child or vs late mother or vs fear of bah weight loss or vs lack of interest, or vs mother absence).The child-morbid-prone combinations of reasons against EBF removed mother or baby from breastfeeding or opportunity to do so (sick mother, late mother, sick child, absent mother, not interested mother), formed a comprehensive group at 43%.When coupled with the insufficient

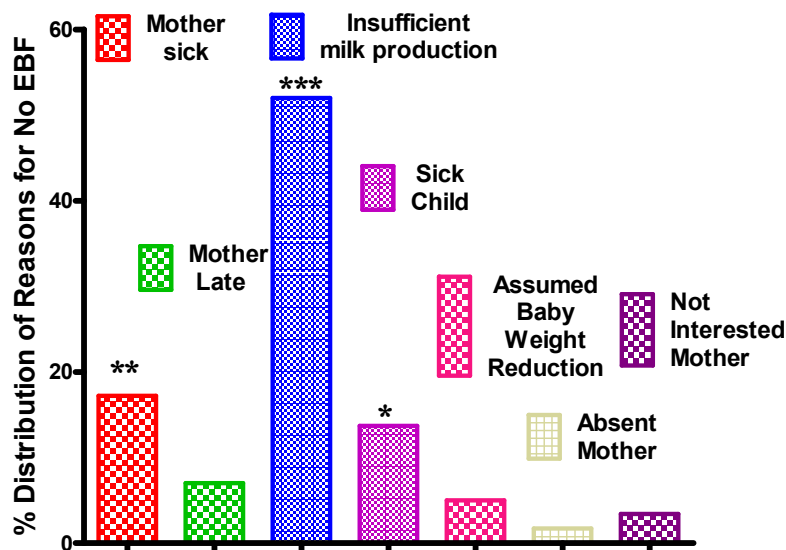


Fig. 4. Reasons for not exclusively breastfeeding

milk production of the mothers, it showed that 95% of the times, malnourished <5-year-olds had the stakes set against them for EBF and potential for healthy living, hence the malnutrition.

3.11 Nutritional Counselling in the Past 6 Months

Mothers and caregivers of <5-year-olds presenting with malnutrition and or stunting reported having received nutrition counselling (55%) with an equally relatively high corresponding proportion having not.

Asked for the reasons why they were not seeking nutritional counselling, mothers from the FDGs responded that the variety of food available to them and their children had not changed and as a result counselling received in FANC on the same staple food was adequate.....". our staple food has not changed. We were educated on nutritional value foods and feeding times suitable for baby feeding during FANC and that should be enough. The village health worker is always busy attending the HIV/AIDS infected community to have time for the anybody else" ... intoned one mother.

The KI informants indicated that. "Nutritional counselling and education is conducted in the morning before any work is started but caregivers are not always there as they arrive late for these meetings. We are informed by the

Environmental Health Technician (EHT) that the same people also do not attend Ward level meetings where the same education is given" ...showing a lot of concern by caregivers who eventually represent with <5-year-olds with malnutrition.

3.12 Knowledge of Breastfeeding Benefits

There were relatively higher respondents with knowledge of two breastfeeding benefits (53%) as compared to those who had knowledge of one benefit (27%) and those with knowledge of >two benefits (20%) [****P <0.05, 2 benefits >1 benefit > 2 benefits and above**].

On asked about the benefits of breastfeeding both females and males were conversant with these....." *breastfeeding has all the nutrients a baby needs to fight against infections and is readily available"* said one caregiver to the agreement of both males and females in the FDGs. "Also, family planning is made easy as a woman will not be pregnant when breastfeeding properly" ...one man added in the FDGs.

3.13 Symptoms of Diarrhoea in the Recent Past

Caregivers for 76.7% of the children <5 years reported that the children had experienced diarrheal episodes in the recent past (\pm 2 weeks period) [Fig. 5].

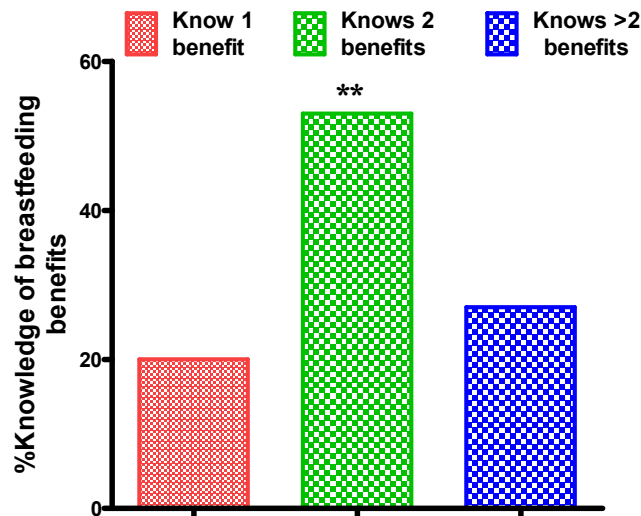


Fig. 5. Profile of breastfeeding benefits

The diarrheal cases were corroborated by the KI who reported that.” the past two weeks has shown a spate of diarrheal cases presenting at the clinic. Most of the children were <5-years old and the common problem they presented with was malnutrition associated diarrhea which responded well to management. We always expect these outbreaks in the district from time to time and fortunately fatalities have been minimal”.

3.14 Where Treatment of Diarrheal Cases Took Place

A relatively higher number of caregivers (76%) of malnourished children <5 years old who developed diarrheal symptoms were treated outside the household facility while the remainder were managed within the home. The number of caregivers who reported diarrheal incidences within the past two weeks of the study were equal to the percentage respondents who referred the <5-year-olds who had diarrhea for treatment outside the household.

When asked about the how the diarrheal cases were handled during the FGDs, the caregivers who did not seek treatment outside the home indicated their capacity to handle diarrheal episodes during lessons obtained from FANC and postnatal care visits...” We are able to

prevent diarrheal episodes and also to manage diarrheal cases using the salt and sugar solution as we were taught from the health center” ...one FDGs member responded. Of the 76%, other respondents indicated that they sought treatment for diarrheal cases from different places outside the household as well as outside the health facility.

Seeking treatment for diarrheal cases is critical and failure to do so may result in the child not getting proper management that is needed to retain the lost nutrients and maintain proper hydration. While some respondents reported that they could manage diarrhea through the homemade sugar and salt solution at home, some sought assistance from outside the home had various sources to refer to.

The government health facilities and or mobile clinics (48%) were the most frequently visited for diarrheal symptoms management as compared to other amenities and practices like traditional or religious healers (17%: 2.8 times less), seeking help from friends and relatives (13%: 3.7 times less), not seeking treatment (9%: 5.5 times less) or bought medication from pharmacies of medicine sellers (2%: 24 times less) [***P <0.05, Health facility/ clinic vs traditional/ religious healer or vs friends and relatives or vs pharmacies or vs not seeking medications].

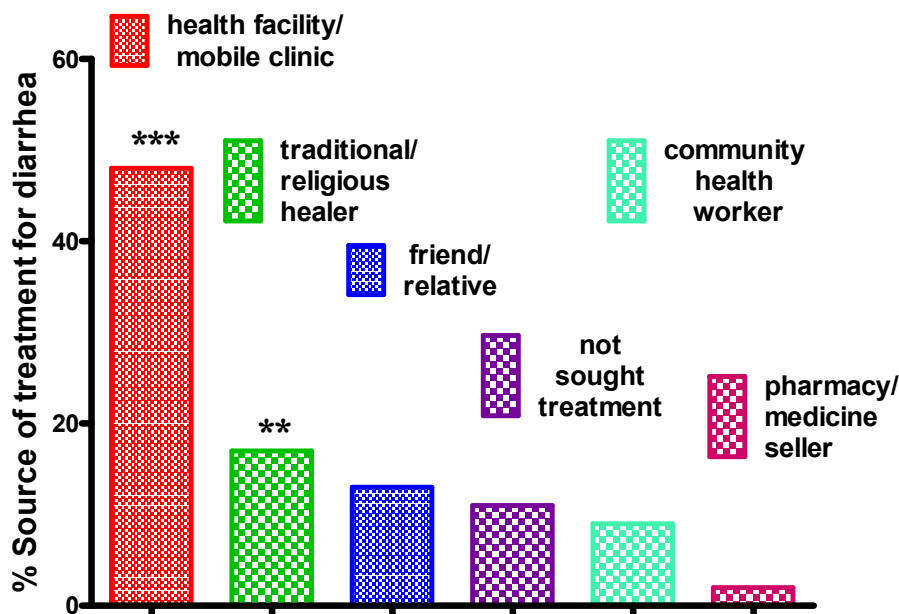


Fig. 6. Sources for treatment for diarrheal cases

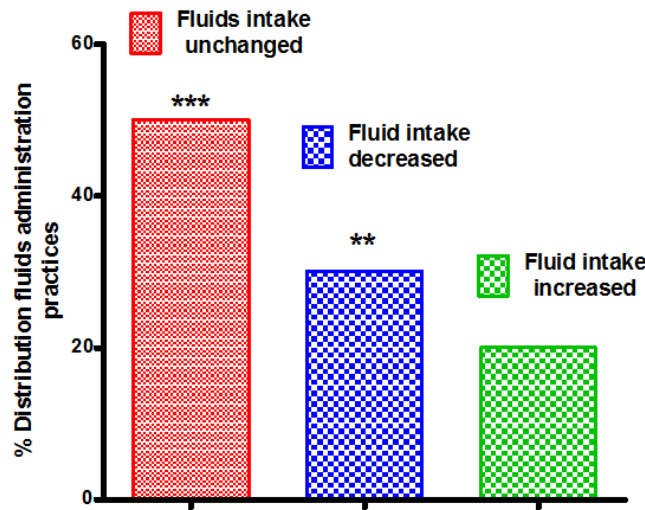


Fig. 7. Anti-diarrheal fluids administration practice as percentages

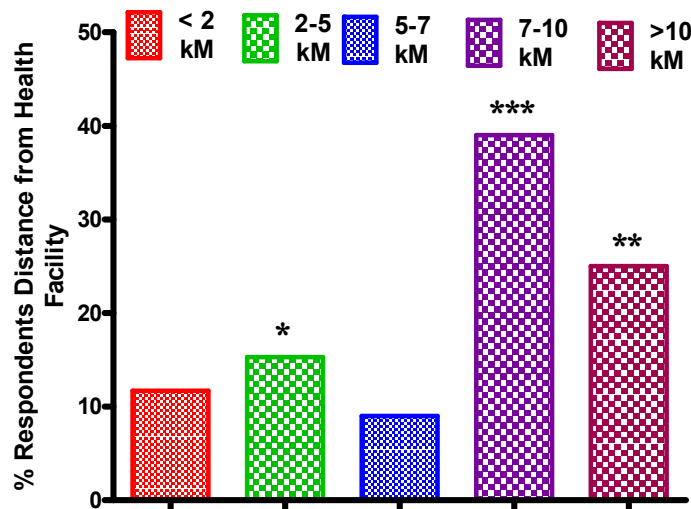


Fig. 8. Distance from the health facility

3.15 Anti-diarrheal Fluids Administration Practices during Illness

There was relatively higher representation of caregiver who did not change the fluid intake (50%) of the malnourished <5-year-olds as compared to those who decreased fluids intake (30%) and those who increased fluid intake (20%) [***P < 0.05, no fluid intake change vs fluid intake decrease vs increase fluid intake]. The risky fluid administration practices of no change in intake and decreased fluid intake (resultant in physiological fluid body content decrease

eventually) contributed a higher proportion of respondents (80%) when compared to the safety-prone practice of increasing fluid intake (*P < 0.05, risk fluid intake practice vs safe fluid intake practice). Respondents who indicated that they had decreased fluid intake (30%) during diarrheal episodes were relatively higher than those who has increased fluid intake (20%) [**P < 0.05, decreased vs increased fluid intake] (Fig. 7).

From the FDGs, participants said...." *fluid intake should not be increased as this make the child*

lose more fluids during diarrheal episode. Decreasing fluid intake altogether will reduce diarrhea"to mean that fluid intake need be maintained or even reduced to reduce diarrheal events.

3.16 Respondents Distance from Health Facility

The 7-10 kM distance from the health facility was over represented (39.0%) amongst the respondents as compared to those who were >10 kM (25%), 2-5 kM (15.3%), <2 kM (11.7%), 5-7 kM (9.0%) away (**P <0.05, 7-10 kM vs >10 kM or vs 2-5 kM or vs <2 kM or vs 5-7 kM). The respondents who resided >10 kM away from the health facility were more likely to be higher than those who resided either 2-5 kM or <2 kM or 5-7 kM away from the health facility (**P <0.05, >10 kM vs 2-5 kM or vs <2 kM or vs 5-7 kM). Respondents who lived within the recommended 8kM from the nearest health facility were 35.8%. (Fig. 8).

During FGDs one lady pointed out that....." *our home is too far from this clinic which is over 25kM away. Walking to and from the clinic is impossible. If the clinic had some lodging space one would prefer that than walking all through the day*" -----showing the distance to the health facility was a deterrent towards normal health seeking behaviors.

3.17 Child Immunization and Reasons Given for Not Being Up to Date with Immunization Schedule

The children who were immunized (43%) were relatively lower than those who were not immunized in the <5-year-olds who were malnourished. The immunization results were confirmed by the baby health cards which were presented during the study data gathering.

The FDGs confirmed the that indeed, children missed immunization date....." *it is difficult to reach the health facility on foot with the baby on the back even if I would be happy to attend the immunization programmes according to schedule. The distance is long*" ...commented one caregiver when asked the reasons why immunization for their infants were not up to date.

Also, the KI indicated that..." *religion was partially the reasons why the majority of the children are not immunized. Some beliefs do not encourage immunization as part of a child's health practices.*"

Drug shortages for immunization were not cited highly as the major causes of failure to complete immunization requirements with 92% of respondents indicating that they had not failed to receive immunization due to stock outs of the required drugs.

Distance from the health facility was rated highly (47%) as the cause of missed immunization schedules when compared to religious objectives (14%-3.4 times less), or postponement [3%: 15.7 times less), or ill caregiver (9%: 5.2 times less), or fear of side effects (9%: 5.2 times less), or child illness (9%: 5.2 times less), or unawareness (6%: 7.8 times less) or drugs shortages (3%: 15.2 times lower), [***P < 0.05, distance vs religion or vs procrastination or vs child illness or vs side effects fear, or vs unawareness or vs caregiver illness). The caregiver-related causes of incomplete immunizations schedules were 27% which were 1.7 times less when compared to distance to health facility responses. Religious reasons-based health facility abstinence and immunization schedule lapses were relatively higher than other causes besides long distance travelled to health facility (**P <0.05, Religion vs procrastination or vs child illness or vs side effects fear, or vs unawareness or vs caregiver illness).

3.18 Village Health Worker Service Sought

A relatively much higher % of the caregivers had access to the services of the Village Health Worker (VHW) at 72%. However, the 28% who did not seek the services of the VHW indicated that....." *I do not take my child to the VHW because they are not professionally qualified to do the job they want to do. They are mainly trained to look after the elderly and the people living with HIV/Aids only*"showing their skepticism on the work done by the community VHWs.

3.19 Health Service Satisfaction

The relative majority of the caregivers (57%) with <5 -year-olds with malnutrition did indicate that they were not satisfied with the health services they received. And the percentage of those who were satisfied with health service provision tallied well with the children who were immunized at 43% although this did not offer protection against magnetron or stunting.

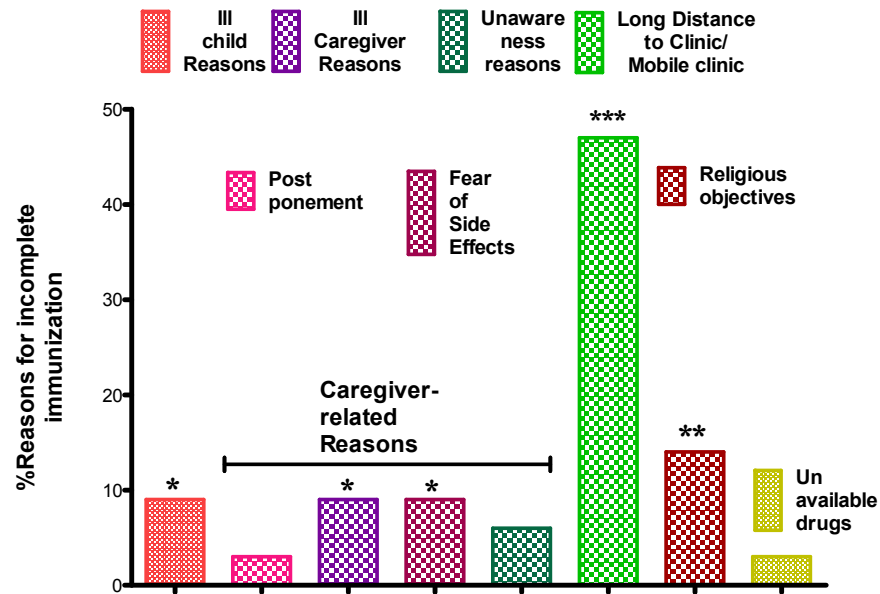


Fig. 9. % given causes for not completing immunization schedules

4. DISCUSSION

Focused antenatal care, postnatal care, breast feeding habits, male partner participation in child-maternal care, management of infant diarrheal cases by caregivers, distance of health facilities from community, immunization status, village health care relations with community and satisfaction with health services provided emerged as key components which were associated with malnutrition in <5-year-olds in Insiza District.

The FANC visit is crucial at the onset of the pregnancy as it prepares both the mother and the health centre on the resources required for safe, pregnancy, delivery and good post-natal health. Mother are also equipped with information on nutrition and health for her and the baby. A key objective of maternal health care programmes has been to ensure that women present for FANC early in pregnancy in order to allow enough time for essential diagnosis, treatment regimens such as treatment of sexually transmitted infections (STIs).

Elimination of mother-to-child-transmission (eMTCT), presentation of mother-to-child-transmission (pMTCT), identification and management of pregnancy-related anaemia (indicator of malnutrition) are important components crucial to FANC which preempts good maternal care. Childhood malnutrition may

be prevented through prenatal teaching of the mothers. With 95% of the respondents who had malnourished children under the age of five complying with FANC visits but without necessarily preventing the disease, it may show that other causes of malnutrition were at play. The 5% negative association of FANC with <5-year-olds malnutrition and stunting shows that a significant minority is yet to be reached and eliminate ignorance of malnutrition by mothers as a health concern for their children. Some women may claim that their previous experience during pregnancies and child birth was adequate for future pregnancies indicating the need for emphasis on each pregnancy being a unique experience requiring adequate individualized attention for both the mother and the child [25].

Results from key informant interviews and FDGs showed that some religious organization prohibited their members from FANC and post-natal care as well as immunization schedule because of their beliefs. This complication makes it difficult to differentiate the determinants of <5-year-olds malnutrition between maternal contributions and religion and how ultimately the condition may play out when both factors are involved or the influence, they have on each other.

The period of first FANC visit is imperative as it act as an educative, prevention time for both the mother at the child against complications,

therefore, early seeking behavior is key. The results show that the majority women delayed to go for ANC where most information is delivered on health and nutrition to minimize malnutrition occurrence. The issues of anthropometric measurement are done at this stage for the mother. Therefore, when a would-be mother does not attend FANC within the first trimester, problems of underweight and anaemia, which are associated with infant malnutrition, will not be diagnosed and no supplements will be given. Maternal underweight predisposes the foetus uterine and infant postpartum underdevelopment. Problems of malnutrition when discovered post first trimester are usually not resolvable until delivery [26].

The frequency to ANC is key to both the pregnant mother and the child as regular checkup are essential to diagnose and prevent some complications like high blood pressure which needs frequent monitoring and has tremendous benefits that will avert malnutrition development through supplementation of macro and micronutrients [27]. Antenatal care for the majority of normal pregnancies should consist of four visits during pregnancy and there should differ with the complications of the pregnancies which is not the case with the expecting mothers in Insiza District who only visit as per their need or desire to do so.

In the study, most women did not visit ANC as per standard of as this affects the examinations to be done during pregnancy and other health checkup for the child and mother which could have prevented malnutrition. Some women attended once which was inadequate. The Key Informant interview also supports this by saying only 30% come for FANC more than three times. The FGDs from men and women pointed that the distance is too long to the clinic and they have other roles to do at home. Men had to accompany their wives to the FANC leaving the home and other children unattended which put a lot of strain and halt on the household activities. Most families could not risk it all for the sake on a single pregnancy and unborn baby but by so doing potential for <5-year-old malnutrition was increased and in this case a reality. Maternal micronutrient supplementation is important for both mother and child as these two most important supplements Iron or Folate during pregnancy and Vitamin A within 8 weeks of delivering a child [28-30].

Postnatal visit as per schedule is a vital form of follow up after the baby has been born to

immunize and check up on the growth progress of both the mother and the child. Immunization against the six vaccine preventable diseases namely poliomyelitis, diphtheria, pertussis (whooping cough), tetanus, tuberculosis and measles has been recognized as one of the most cost-effective intervention strategies to reduce childhood morbidity and mortality, similar results were obtained for the Bacille Calmette-Guerin (BCG) immunization [31].

Religion was the most important factor contributing to irregular attendance for postnatal care as indicated during FGD's and KI where the apostolic sect was revealed as not taking their children to hospitals even if they were delivered there. Related work has shown that 38% of infant <5 years old who had malnutrition had mothers belonging this religious organization (Unpublished). The 23% reported here is within the ambit of this representation which may mean that some of the delays or absence on postnatal care attendance during scheduled times may be from the same organization. Some care givers who were old often forgot the stated dates and only come when the child was sick.

Partner visit to FANC is recommended by as the male/partner helps the pregnant mother on lessons and pregnancy related issues that are taught at the health to prevent the advent of malnutrition during and after pregnancy. Mother who did not have male partner or husband not accompanying them to FANC were the majority (83%) and rest were in attendance. While this may not be directly linked to malnutrition there are accrual benefits emanating from the simple gesture of the male partner accompanying the would be mother for FANC alleviates pressure and stress of pregnancy that may result in low birthweights and other problems [32-34]. What is obvious though is that male participation in both FANC and postnatal care visits is very low and need to be encouraged especially in Insiza District where women have to travel long distances for health care.

The African male has remained aloof in child care as has been seen in Insiza District [35]. The response from the FDGs showed, especially from the male group, that man culturally they are unwilling to accompany their wives for FANC or postnatal visits as they see the task as a women issue and they have to concentrate on manly tasks like fending for the family and this aspect is rarely discussed among spouses [36,37]. Women raised that they suffer alone during

pregnancy and lactating leading to stress and a little milk production during breastfeeding hence the malnutrition. Male participation in postnatal care involvement is critical in the elimination of <5-year-olds diseases including malnutrition. In desperation for male involvement in Sub Sharan Africa guidelines that coerce would be mothers to bring their spouses has gone as far as refusing them clinical attention unless if they are accompanied by their spouses [38].

Breastfeeding is an unequalled way of providing ideal food for the healthy growth and development of infants; it is also an integral part of the reproductive process with important implications for the health of the mothers and the practice is becoming uncommon with 3 in 5 children not being breast fed within the first hour of life [39]. Non-breastfed children should be fed milk or milk products, in addition to food from four or more food groups and should be fed these at least four times a day and the qualitative data showed these standards are not followed. The *Global Breastfeeding Scorecard*, when evaluating 194 nations, found that only 40% of children younger than six months were breastfed exclusively (given nothing but breastmilk) and only 23 countries have above 60% exclusive breastfeeding rates raising a need to support women in their breastfeeding efforts [40]. Evidence shows that breastfeeding has cognitive and health benefits for both infants and their mothers and is particularly critical during the first 6 months of life, helping prevent diarrhoea and pneumonia, two foremost sources of death in infants. Over more, women who breastfeed have a reduced risk of ovarian and breast cancer, two leading causes of death among women [40]. The study revealed that breastfeeding was commonly associated with 13-18 months age group with a smaller percentage breastfed for 19-24 months amongst the <5-year-olds who had malnutrition against a recommended minimum of 2 years plus [41]. Other researchers' findings indicate that in low- and middle-income countries, only 37% of children < 6 months of age are exclusively breastfed with benefits of protection against child infections and malocclusion [42], increases in intelligence [43,44] and probable reductions in overweight and diabetes [45]. For nursing mothers, breastfeeding gives protection against breast cancer and improved birth spacing [46] and it might also protect against ovarian cancer and type 2 diabetes [47-49]. It is envisaged that scaling up of breastfeeding to a near universal level could prevent 823 000 annual deaths in children younger <5 years and 20 000 annual

deaths from breast cancer whether they are rich or poor [47,50].

Early initiation of breastfeeding within half an hour of birth reduces the risk of neonatal mortality [51]. The early suckling by the infant starts the process of milk formation in the mother and helps in early secretion of breast milk. Colostrum provides essential nutrients as well as antibodies to boost the baby's immune system [52], thus reducing the likelihood of death in the neonatal period [53]. The fact that 93% of the newborns were breastfed within an hour after birth indicated that most of the children received colostrum with the possibility of immune system activation and subsequent protection from infectious diseases [54]. Support from the male partners could also be helpful in the breastfeeding aspect. However, their failure to attend FANC and postnatal care clinics as shown in this study put a barrier to this effort as they lack the necessary knowledge associated with breastfeeding of the newborn. While the period of initiation of breastfeeding is critical and should be commenced with the first hour after birth it also need to be observed withing the general time frame and duration of breastfeeding as a whole.

The human milk is inherent anti-infective properties containing immunoglobulins, lysozymes, lactoperoxidases, complement components, leukocytes and lipids [55] which no other milk has. The protective function of human milk against the unfavourable effects of neonatal immunodeficiency and its maintenance of the maternal-foetal immunological link after birth is particularly imperative in developing countries where there is much exposure to infection [56]. Therefore, to meet the evolving nutritional requirements, infants should receive adequate and safe complementary foods while breastfeeding continues for up to two years of age or beyond having been exclusively breast fed for at least 6 months as reported in 2001 [57] and confirmed in 2012 [58] with questions having been raised [59]. Findings from the current study reveal that in Insiza District the majority of <5-year-olds who were malnourished were weaned before two years which may explain their malnutrition status source. Timing of complementary feeding introduction [60] was absolutely obligatory to avert malnourishment which seem not have been adequately implemented in the study.

The FGDs and KI pointed that mothers wean their children before two years as they will be

hungry and the children will refuse other complementary food in favour of breast milk leading possibly to malnutrition. In a district where most income for purchasing no-cereal food was from donations, borrowing and remittances (non-labour related processes), it may be safe to conclude that <5-year-olds malnutrition was maternal in nature and feeding both the mother and the infant may avert future incidences (Unpublished but in press). Duration of breast feeding is critical but needs to be viewed together with exclusive and complementary breastfeeding.

As stated elsewhere, exclusive breastfeeding need be carried out for at least in the first six month after birth with breast feeding having been initiated within the hour after birth to achieve optimal growth, development and health [41,57]. From the results, most mothers and caregivers did practice mixed feeding which is a risk practice to the children hence malnutrition as it was practiced by 86% of the participants. The results have confirmed findings by other researchers who pointed out the perceptions and barriers to EBF in Manicaland Province [61] with others showing high knowledge of EBF, positive attitude towards the practice but low practice of EBF with complementary fluid intake of pure water being the most common. Determinants for EBF have been reported in the Gwanda District which showed low EBF was influenced by traditional family practices as a major barrier and economic dependence of the mother playing pivotal role [62]. When children receive complementary foods prior to 6 months there are negative implications for both growth from malnutrition. Reasons for such a situation need to be sought and rectified.

Reasons for non EBF prominently featured insufficient breast milk production by the mother to satisfy the baby followed by a combination or reasons that removed mother or baby from breastfeeding or opportunity to do so (sick mother, late mother, sick child, absent mother, not interested mother). Deficient milk production may be resultant from multifactorial causes from an anatomical or poor breast positioning [63], stressful conditions to mothers, household chores burden, swollen breasts or sore nipples, access to food and not emptying the breast before switching to next breast, which all contribute to EBF practice failure [64,65]. of note was the misconception by a sizable of mothers (5%) that EBF will result in baby losing body weight necessitating complementary feeding at

<6 months of birth. Nutritional counselling is required for such instances.

Nutrition counseling is very vital during FANC and should be a continuous process in postnatal care to allow for infant and young children feeding (IYCF), EBF and complementary feeding to be done at a proper time averting childhood malnutrition [66]. With a high percentage (45%) of malnourished children's caregivers having not received nutritional counselling in an environment where the food basket is continuously changing in quantity and quality, malnutrition may be attributable to such indiscretions by caregivers. Indeed, caregiver seemed oblivion of the changing food patterns when they stated that the staple food had not changed and FANC was sufficient for postnatal feeding. However, the non-discriminatory nature of the findings between those who did and did not receive nutritional counselling may indicate that indeed food types and usage had not changed significantly to influence malnutrition evasion in those who had received knowledge. Moreover, the KI indications that caregivers missed nutritional counselling meetings at both the ward and the clinic in Insiza District calls for concerted effort to rectify the discrepancies as this practice may fuel more malnutrition and stunting.

Coupled with nutritional counselling sessions is the subsequent knowledge levels gained for the meetings that will eventually translate into comprehensive fight against malnutrition. One area of the knowledge base needed is to know the benefits of breastfeeding amongst caregivers with knowing more than two benefits being the optimum.

The mother's milk is designed for easy digestion and assimilation, protein in mother's milk is more soluble form which is easily digested and absorbed by the baby, it provides all the nutrients the baby needs. The milk sugar-lactose in mother's milk provides ready energy. In addition, a part of it is converted into lactic acid in the intestines which destroys harmful bacteria present there and helps in absorption of calcium and other mineral, always available, make the child more intelligent, helps mother to shed extra weight gained during pregnancy. The study sought to find out if the Insiza community have a knowledge of breast feeding and results figure 26 shows that 53% know two benefits, while 27% know more than two and lastly 20% know one benefit of breastfeeding respectively. This shows

that people are aware of the benefits breastfeeding although they are not practicing it.

The respondents were also aware of lactational amenorrhea method (LAM) of birth control as a benefit of breastfeeding which occurs due to the suppression ovulation related hormones and the menstruation cycle and is essential for postpartum recovery of the mother [67-69].

The immune protection of breastfeeding combats against diarrheal diseases which are a common ailment that may result in malnutrition in <5-year-olds. How diarrheal cases are managed is critical in ascertaining protection against malnutrition [70-72].

The magnitude of diarrheal cases in children that are malnourished (76%) observed in this study is a cause of concern seeing that the possibility of malnutrition predisposing to infectious disease and worsening the malnutrition is very high. The frequency of the diarrheal cases, whilst not investigated, the within-the-two-weeks period reported rather shows a high incident rate in the district. Whereas 24% of the children may not have suffered diarrheal symptoms within the past two weeks, such episodes may have occurred within another set timeframe not captured in the study. Diarrheal cases have been shown to have a causal relationship with malnutrition where diarrheal cases may cause malnutrition and malnutrition in turn creates a conducive environment for infections that result in diarrhea forming a vicious cycle stemmed by the malnutrition elimination [70-72]. Also, the prevalence of diarrhea during infancy reflects heralds the increased risk of pathogen contamination associated with the early introduction of supplementary feeding such as water, other liquids, and solid foods. In addition, once infants begin to crawl and move around, they tend to put objects into their mouth, again increasing the risk of pathogen contamination if the immune system deficiency of infancy has not been overcome.

The KI indicated that diarrheal breakouts were an occasional disease that were expected in the district and a need often arose to be prepared all the time to respond and manage cases as they occur among <5-year-olds where malnutrition play a pivotal role. Some cases, however, were managed within the household settings which may limit referrals to the clinic.

Diarrhea remains one of the killer diseases in children <5-years of age in the developing world [73] and maternal health care seeking behavior for the condition has been report to vary by context bringing in important implications [74] as has been observed in rural Insiza Districts.

Health seeking behavior of caregivers with <5-year-olds in Insiza from various sources is an imperative eye opener as naturally one will think that the high literacy rate in the district (Unpublished) will translate into seeking diarrheal treatment from formal facilities with higher safety assurance outcomes. The healthcare seeking behavior should be an action taken by an individual in response to an internal (education and knowledge) and external stimulus (child sickness) to obtain a solution when a child develops a health problem [75] and is greatly need to be integrated in the Insiza community through continued education of the community through available channels. The type of intervention is also determined by facility the caregiver takes the infant to. Diarrheal cases require fluids administrations as the basis of treatment.

When an infant has diarrheal sickness, the common understanding is fluid intake increases to avert dehydration of fluid loss and associated electrolyte imbalance. The knowledge of the caregivers on methods to retain fluids balance is critical in ensuring that dehydration is prevented due to associated high infant mortality and morbidity. Oral rehydration therapy can be administered from home or health facility.

However, the results obtained showed that there were several institutions that were sought for diarrheal treatment and that majority of the respondents opted to maintain fluid intake volumes during diarrheal episodes or decreased in take altogether. Such adverse practices in antidiarrheal managements may emanate from advice obtained either from religious and traditional healers, relative and friends, pharmacies and medicine sellers or from self-treatment. These institutions formed a substantial number as referral places for diarrheal treatment in the study (41%). Participants with knowledge and practice of increasing fluid intake formed a minority as the rest (80%) reasoned out that diarrheal episodes were reduced by either reducing fluid intake or not altering fluid intake volume which holds true only when showing complete fluid depletion, a very dangerous

condition especially in malnourished <5-years-olds.

Surprisingly, so profound was the notion that fluid restriction helped that respondents who had resorted to different facilities for diarrheal treatment shared the same thought unanimously during the FDGs. This may give some credence to their thinking. Indeed, stemming of diarrheal episodes forms the thrust of indigenous plants treatment of diarrheal cases through intestinal inhibition of entero-pooling and delay in gastrointestinal transit by some phenolic constituents of medicinal plants [76-78] possibly with antibiotic and viricidal effects as well [79]. Friends and relatives often were the source to which diarrheal cases were referred to in the study and in other studies who would recommend *Psidium guajava* leaves and curcumin (turmeric) [80] against the backdrop of oral rehydration solution or home-made sugar and salt solution with occasional zinc supplements in conventional medicine [81]. Also, massage therapy tends to be used to treat acute diarrhea in children [82-84] which may show why the rural caregivers would not rush to the health facility for treatment choosing alternative therapies for their malnourished and diarrheal <5-year-olds.

The distance to the health clinic tends also to influence the first port of call for child illnesses by caregivers who will use the nearest facility selected by internal and external stimuli to mitigate against adverse outcomes of disease.

While clients may choose to bypass certain health facilities due to several reasons opting for ones >5.5 km away from their residency [85], the distance of a clinic need not be >8.0km from the furthest household served by that facility [86,87].

The service providers like the health facilities should be accessible and should not be more than 5 km from its catchment [88-90]. Health care facilities (rural clinics, health centres) should be within easy walking distance of the community, particularly for women and children.

The FDGs and KI reported that the health centre is too far from the furthest village which is 25 km away thus negatively affecting the uptake of both FANC, postnatal care and child health care. The health facility is no reachable for services.

One of the services provided at the health facilities is vaccination.

In this study, the proportion of those who had failed to receive drugs (8%) was far lower than those who had not completed the immunization programmes (57%) negating, possibly, drug shortages as the cause incomplete immunization schedules or missed dates.

Vaccines are available for some major infectious childhood diseases, including measles, poliomyelitis, tuberculosis, diphtheria, tetanus, whooping cough. (pertussis), mumps and rubella (German measles). Recommendations are that all children in a community should have the full immunization regimen against the childhood diseases. Complications of disease due to lack of immunization are vast and at time fatal and may include disease outbreaks within the community, blindness, infertility, partial paralysis and stunting. The results of baby immunization were verified from the baby health clinic cards showed that a relative majority had not yet completed (56.7 %) required programmes. Distance from the health facility and the mobile clinic were given as the reasons for missed immunization dates. The KI revealed that immunization was a challenge to the community as they are always behind the set date hence children are at risk especially from the different Apostolic Sects who discourages attendance of health facilities and happen to be prevalent in district.

The services provided by the Village Health Worker impact both the <5-year-olds and the caregivers ultimately affecting the malnutritional status of the former.

Referral and follow-up including home visiting. They support health promotion and education and mobilize communities for health action. They create a bridge between health, social and community services and the community, especially those who are hard to reach. Communities support CHWs through selecting them, through mobilizing resources to support their work, providing social support, attending meetings, giving information and advocating for their needs.

The FGI results revealed that some community members do not have a trust on the local volunteers. Poor confidentiality and conviction in VHWs have emerged as key barriers to community health workers (CHW) acceptability in bringing maternal and child health services in the home. Most community members have felt that CHWs could not be trusted because of their lack of professionalism and inability to maintain

confidentiality with familiarity and the complex relationships between household members and CHWs causing difficulties in developing and upholding a relationship of trust, predominantly in high HIV prevalence settings [91]. These results show that there is need to sensitize the community on the importance of VHWs [92]. The results show that not consulting the VHW and health facility on nutrition and health issues is related to the increase in malnutrition.

Health service satisfaction plays important roles in the attendance for health services with possible influence on malnutrition and stunting.

Community health workers or VHWs provide health services within the communities and help in case management.

The uptake of health services is importance for behavior change however the services provided in the health facilities The study indicated that of the caregivers who participated, 43% were satisfied with the services rendered at the health centers while the rest were not content with the services .The health center should be equipped in such a way that it satisfies its clients to reduce infant mortality rates and make an increase in services uptake.

5. CONCLUSIONS

Maternal factors contributed to malnutrition of <5-year-olds as they were dependent on the mother or caregiver's attitudes towards expected practice and being vulnerable, because of their high nutritional requirements for growth, to deviations that took place. Under 5-year-oldsmalnutrition was influenced by maternal behaviours with regard to specific breastfeeding patterns requirements (within the hour) after birth, duration (minimum 24 months) of breastfeeding, initiation of complementary feeding (6 months exclusive breastfeeding), full immunization profiles, distance of health facility residence, village health worker activities and attitudes, seeking regular nutritional counselling and the satisfaction level of caregiver to health services provision in the district.

Maternal factors of attitude to seek early treatment for them and their children, taking their children for immunization services against the childhood illnesses on the scheduled dates seemed to be a challenge and a cause for malnutrition to children as mothers gave different reasons for such acts. To eliminate malnutrition,

adequate food supplies alone is not the solution. Nutritional counseling to the mother and care givers must take into account all the variables influencing the physical and physiological make up of each individual.

Infant and young children feeding was also found to be a major contributing factor to malnutrition as the mothers and care givers did not practice express breastfeeding and most of the children were started on other types of food staffs during the first six months in which children are supposed to be exclusively breastfed.

CONSENT AND ETHICAL APPROVAL

Permission and authority were sought from the Ministry of Health and Child Care (MoHCC) and the local leadership to collect data from Sanali Health Clinic and Insiza District Ward 9 community.

Research ethics and principles of privacy, beneficence and rights of respondents were adhered to. This included on issues of doing no harm, getting informed consent, maintaining privacy and confidentiality of participant data before, during and after collection of data. The right of the respondents to non-participation and the right to withdraw from study at any point they felt like was assured to the participants. Voluntary involvement of the participants where no one was coerced into supplying data or information as verbal and written consent was obtained. The respondents were assured that the data they provided was to be treated in confidence and not divulged to anyone outside the scope of this study by keeping the information obtained under lock and key. No monetary incentives were extended, assumed or promised to the respondents while debriefing and supplying a copy of the study findings was pledged.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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