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Original Article

Determinants for Effective Nutritional Counselling on Prognosis of Moderate Acute Malnutrition in Paediatric HIV/AIDS Positive Patients Conducted at Hoima Regional Referral Hospital, Uganda

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Patients.

This study evaluated the determinants of effective nutritional counselling on the prognosis of moderate acute malnutrition in Paediatric HIV/AIDS patients at Hoima Regional Referral Hospital. This study used pre- and post-study design, which measured the occurrence of an outcome of interest using specific values in a group of participants before and after the intervention; it was conducted among 157 paediatric HIV/AIDS patients at Hoima RRH, western Uganda. Data were obtained from all the participants using a questionnaire, and focus group discussion was analysed using Stata 17. The findings reveal that of the 157 paediatric HIV/AIDS patients studied, 67.5% improved after nutritional counselling. Paediatric HIV/AIDS patients aged ≥ 60 months ($p = 0.009$), caretakers whose occupations other than peasantry ($p = 0.021$), and attendance to ≥ 3 nutritional counselling sessions ($p = 0.004$) were associated with a higher likelihood of improvement after nutritional counselling with a significant increase in Body Mass Index of ($p = 0.007$). Thus, the majority of Paediatric HIV/AIDS patients indicated a significant improvement in prognosis after nutritional counselling and being aged ≥ 60 months, having an attendance of ≥ 3 sessions and having a caretaker's occupation other than peasantry determined the effectiveness of nutritional counselling. The study concludes that there is a need to routinely refer Paediatric HIV/AIDS patients with moderate acute malnutrition for nutritional counselling.

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INTRODUCTION

According to the Global Nutrition Report (2018), malnutrition among children under five years is a major public health problem. About 52 million children under five years old were classified as having acute malnutrition. Of this number, 33 million had moderate acute malnutrition (MAM). 1 in 10 children under five years in the least developed countries had MAM as compared to 4 in 10 children in developing countries by the World Health Statistics Report (2012). Nearly half of all deaths in children under 5 were attributable to undernutrition. Undernutrition puts children at greater risk of dying from common infections like pneumonia and diarrhoea, which increases the frequency and severity of infections, thus delaying recovery (Jesson *et al.* (2015). Bhutta *et al.* (2013) noted that nutrition counselling needed to be heightened in managing malnutrition.

Historically, a study in India in 2013 showed that poor feeding practices associated with lack of awareness, lack of water, poor sanitation and hygiene contributed so much to wasting (Menon *et al.*, 2013). In 2013, there were regional variations in the prevalence of MAM, with South Asia at 46% and Sub Saharan-Africa at 44%, as noted by Mengistu *et al.* (2014). It was noted that MAM was almost 10% higher in over 80 countries with increased risk of mortality due to Paediatric HIV stage progression to Severe Acute Malnutrition. Benzekri *et al.* (2015) noted that chances of MAM were worsened by occurrences of communicable diseases, with roughly 11.5% of these children aged under 5 (Jesson *et al.*, 2015).

In sub-Saharan Africa, 30% of the newly admitted children had severe forms of malnutrition in HIV infection. This situation usually requires initiation of antiretroviral therapy (ART) to re-instance good health (Jesson *et al.*, 2015). The effects of ART on young age require intensive nutritional counselling and education for emergency treatment. This likely improved their nutritional status to avoid deterioration and death (Mwiru *et al.*, 2015). It was further noted that limited interventions with no knowledge transfer caused the situation to worsen malnutrition in Paediatric HIV infections.

In Ethiopia, a Demographic Health Survey 2011 showed moderate acute malnutrition at 33.2% in males and 26.7% in females, which was still considered relatively higher (The Ethiopian Demographic and Health Survey, 2011). This survey further revealed an average prevalence of MAM at 4.6% in food-insecure areas as a national burden. This called for a need to have sufficient food for energy and nutrient recovery for malnourished Paediatric HIV patients.

According to Benzekri *et al.* (2015), Sub-Saharan Africa had the highest prevalence of malnourished children, standing at 23.2% amongst its population and the highest burden of HIV infection in all age groups at 69%. This was determined by insufficient food intake and malabsorption, which affected an individual's nutrition status, especially children. Lodha *et al.* (2015) and Swetha *et al.* (2015) noted that although efforts to reverse MAM using nutritional counselling had been given in Paediatric HIV infection, progressive MAM would usually be

associated with other determinant factors. In Africa, by 2013, South Sudan ranked highest in the prevalence of moderate acute malnutrition in Paediatric HIV, standing at 23% (WHO, 2018). Therefore, intensified nutritional counselling sessions for caretakers of Paediatric HIV patients with MAM were done, and notable reductions were recorded in some areas.

According to Pragati and Rameshwar (2018), a study on the effectiveness of nutritional counselling in the management of moderate acute malnutrition in Paediatric HIV patients showed inconsistent findings among the caretakers. This prompted a growing interest in the search for evidence for determinants to effective action on the management of patients with MAM in Paediatric HIV AIDS patients.

Nutritional counselling has been used in several settings to treat MAM, given the circumstances that the caregivers had access to food and knowledge for its preparation (Gluning *et al.*, 2021). Although malnutrition had been identified as a problem, the Zimbabwe Ministry of Health and Child Care in 2014 noted that HIV prevalence remained high at 14.7%. This called for increased nutritional assessment activities to identify, categorise, and counsel whoever was legible. In 2016, a study in Zimbabwe revealed that following nutritional counselling and education, MAM reduced by 1% (Kudakwashe *et al.*, 2017).

In Cameroon, malnutrition in Paediatric HIV accounted for more deaths in the under 5s, especially in resource-limited settings due to limited information (Nicolas *et al.*, 2018). Sunguya *et al.* (2013) showed that although nutritional education was provided to all individuals in areas where food was available, in Tanzania, other determinant challenges came along with its preparation and consumption in diverse types. This was attributed to limited knowledge translations and utilisation by some caretakers, thus affecting the prognosis of MAM in Paediatric HIV patients.

Humphrey *et al.* (2018) noted that in Uganda, malnutrition was a public health concern, and a

national report estimated that 3.6% of the children suffered from MAM compared to SAM at 1.3%. The split for different regions showed the West Nile region having the highest (10.4%) for moderate malnutrition. This was above the WHO target prevalence of maintaining MAM below 5% by 2025, thus needing to emphasise nutritional counselling intervention as a priority to combat MAM.

The Ministry of Health (2011) noted that the quality of care provided to moderately malnourished patients in the health facilities was reported as substandard. This accounted for the poor prognosis and low cure rates of MAM due to irregular monitoring, thus calling for the integration of nutritional counselling with other activities. In Hoima RRH, nutritional counselling as an approach to managing nutritional problems had not been well defined and thus needed to design means of packaging and delivering the sessions to benefit the patient (Humphrey *et al.*, 2018). Therefore, the study, particularly in Hoima, was committed to reducing moderate acute malnutrition using a nutritional counselling strategy. UNICEF (2019). noted that NC was an easier way to combat the trends and patterns of moderate malnutrition in Hoima RRH amongst Paediatric HIV patients. However, HIV infection and MAM are known to have a vicious cycle of higher nutritional demands in the infected children than in the uninfected.

Conceptually, Nutritional counselling is an ongoing process in which health professionals (dieticians) work with an individual to assess the usual dietary intake and identify areas where change is needed. This is done by providing information and support for follow-up to help maintain the needed dietary changes, UNAIDS (2017). On the other hand, nutritional counselling is an interactive helping process through which a client and trained health worker/counsellor interpret the results of nutritional assessment outcomes, hence identifying individual nutrition needs focused on action to change (FANTA, 2016).

WHO (2016) defines malnutrition as deficiencies causing overnutrition and undernutrition concerning multiple conditions of acute and chronic origin. Nancy Nevin-Folino et al. (2015) describe moderate malnutrition as a weight for age between -3 and -2 z score below the median of WHO growth standards. This can be weight for height (wasting), height for age (stunting), or a combination of both. It is simply a condition in which the body does not receive enough nutrients for proper growth and functioning.

Calixte Ida Penda et al. (2018) described HIV/AIDS as the Human Immuno-Deficiency Virus/ Acquired Immuno Deficiency Syndrome. It's a chronic, life-threatening condition caused by the HIV virus, leading to the destruction of the immune system. This interferes with the body's ability to fight/resist infection and is highly known to be sexually transmitted but can also be acquired through other ways. WHO (2018) described HIV as a virus that infects the cells of the immune system, destroying and impairing their function, leading to progressive deterioration of the immune-deficiency. AIDS is the advancement of the disease in stages of infection with the occurrence of frequent opportunistic infections.

Contextually, this study anchored on the effectiveness of nutritional counselling on the prognosis of moderate acute malnutrition in Paediatric HIV/AIDS at Hoima Regional Referral Hospital. This required due attention that if no intervention were given, children would progressively advance to a severe form and die. WHO (2016) noted that several interventions have been made worldwide to reverse MAM, but limited information has been available. Julie *et al.* (2015) noted that in Sub-Saharan Africa, MAM was a leading cause of death, thus a primary Public Health concern. This was because low weight for age was the primary determinant of poor prognosis in HIV/AIDS patients (Delvarianzadeh *et al.* 2017). For those who had low weights for age with MAM, their mortality was three times higher compared to other malnourished children. Therefore, the study decided to examine the effectiveness of nutritional

counselling on the prognosis of MAM in Paediatric HIV/AIDS patients, as WHO recommended that nutritional care packages be provided for all children with malnutrition.

The Uganda Bureau of Statistics and ICF (2018) and USAID (2017) carried out a survey on nutrition that revealed Uganda as one of the countries with high rates of malnutrition, with national prevalence standing at 4% in (6-59 months) in Paediatric HIV/AIDS-patients; yet experiencing the fastest growing populations in the whole world at a rate of 3.2% per year (World Population Prospects, 2019). It was essential to carry out this study in Hoima RRH because of the increased number of referred MAM cases. There was a need to assess the prognosis of MAM in Paediatric HIV/AIDS and examine its determinants and impact following NC. Currently, other studies concerning the prognosis of moderate acute malnutrition in Paediatric HIV/AIDS patients include "how antiretroviral therapy affects Nutrition" and "socio-economic impact of moderate acute malnutrition in Paediatric HIV/AIDS patients (USAID, 2017).

All these called for a noble cause to study the effectiveness of nutritional counselling on the prognosis of moderate malnutrition in Paediatric HIV/AIDS patients. According to Sunguya *et al.* (2011), however much we try to prevent occurrences of moderate malnutrition in Paediatric HIV/AIDS patients through effective nutritional counselling, there is a need to improve their comprehensive health care routinely.

Statement of the Problem

At Hoima Regional Referral Hospital, there was a notable increase in the number of moderately acute malnourished Paediatric HIV/AIDS patients. The 2018 Hoima Hospital Report showed that cases of moderate acute malnutrition in Paediatric HIV/AIDS increased from 1.6% in 2017 to 3.4% in 2018. The national report on nutrition indicated cases of MAM in Paediatric HIV/AIDS patients in the Hoima district standing at 5.2% higher than the national prevalence rate of 4%. Some studies on malnutrition in HIV have

been done (Lodha & Kabra, 2015), focused on the health and nutritional status of HIV-infected children in severe forms, rarely highlighting the mild and moderate forms. Many guidelines have been put in place to manage malnutrition in Paediatric HIV patients, but with minimal intervention using nutritional counselling approaches (activities), yet these are critical attempts in reversing MAM.

The central research gap was that there had been limited information provided to influence the uptake and applicability of nutritional counselling on MAM in Paediatric HIV patients. This approach seemed to be a better strategy to influence the prognosis of MAM in Paediatric HIV/AIDS patients in Hoima Regional Referral Hospital as it is one of the significant suggested initiatives by the government to prevent the death of Paediatric HIV/AIDS patients.

Research Question

What are the determinants of effective nutritional counselling on the prognosis of moderate acute malnutrition in Paediatric HIV patients in Hoima Regional Referral Hospital?

LITERATURE REVIEW

Socio-demographic determinants for effective nutritional counselling on the prognosis of moderate acute malnutrition in paediatric HIV patients

Age

A study by Calixte Ida Penda *et al.* (2018) suggests that age is a significant factor in determining the prognosis of MAM in Paediatric HIV. The younger the child, the more the possibility of severe acute malnutrition among HIV paediatric patients. This is further suggested in a study in Swaziland by Leigh F. Johnson *et al.* (2020), who noted that MAM among younger Paediatric HIV-infected patients was among younger children 2.8%, which significantly affected the weight too. This concurred with Brandley *et al.* (2011) findings that age and weight negatively affected prognosis by 4.8% in Paediatric HIV patients.

Education Levels of the Caretakers

According to Johri *et al.* (2016), the caretakers' literacy levels significantly determined the positive outcome of the NC process on the prognosis of MAM in Paediatric HIV patients. This was because different NC sessions provided different information on recovery from MAM. Mukona *et al.* (2015) reported that an increase in the education level of the caretaker increased the knowledge skill ability to perform, thus reducing MAM.

A health survey by Ghislain *et al.* (2017) in Burkina Faso showed that an additional session of NC was advantageous to both the caretaker and the patient. It was noticed that Paediatric HIV patients whose caretakers were above college, secondary and primary had lower chances of developing MAM following NC by 0.1%, 0.37% and 0.66%, respectively. In Nepal, caretakers who lacked knowledge on the best use of the local foods valued more of the packed foods

(Nancy Nevin-Folino *et al.*, 2015). The World Food Program (2016) noted that these foods are expensive, and their nutrient value is already reduced by processing; thus, they are less healthy with a longer shelf life.

Sajama *et al.* (2019) study in Nepal on malnutrition trends found that MAM reduced impressively from 57.2% in 2001 to 35.8% in 2016 amongst patient-caretakers who received the NC. This reduction was attributed to the improved education status of the caretakers, thus a good indicator for the prognosis of MAM in Paediatric HIV. Nevertheless, Paediatric HIV patients whose caretakers had no formal education had a 2.7% - 5.2% chance of developing MAM compared to the 1.9% of those who had formal education, putting into consideration the socio-economic status of the caretakers.

Endris *et al.* (2015) carried out a study in Ethiopia using an NC package to address MAM with more emphasis on behavioural change of caregivers to address optimal infant/child feeding with varied nutrient requirements. It showed the prevalence of MAM in Ethiopia at 48.5% in 2014 was attributed

to short birth intervals and the education level of the mother. A study conducted in late 2015 by Endris *et al.* (2017) showed that MAM prevalence had reduced from 48.5% to 29%, noting that the NC package influenced the caretakers' behaviours in improving patients' prognosis.

A study carried out in Tanzania on NC on MAM by Sunguya *et al.* (2013) noted that caretakers' levels of education may not be adequate to improve feeding practices due to limited knowledge translation on nutrition. The findings revealed that 61.9% of patients with MAM in Paediatric HIV patients ($p=0.001$) were attributed to the caregiver's education status being low (having not received any formal education) compared to the 7.9% of those who had formal education. This was linked to nutritional knowledge transfer from health workers to caretakers through training. The training was key in improving caretakers' knowledge from 49% - 88.1% amongst counselled caregivers who acted as influencers of change in the prognosis of MAM.

Caretaker Status

Biological parents are known to care for their children better than non-biological parents. According to WHO (2016), an orphan or child whose mother is not doing well may seek help from a relative or close caregiver whose feeding practices may be different and risky.

A study carried out in Uganda by Pridmore & Carr-Hill (2010) showed that MAM in Paediatric HIV patients who are orphans or fostered have reduced chances of access to health care services and better nutrition than the non-orphans, hence a predictor for poor prognosis following NC. On the other hand, altered caregiving practices increase the risk of disease, as noted by Greenblott *et al.* (2012). The study further noted that feeding frequencies and nutrient diversity are affected if a patient is switched from one caregiver to another for a specific period. This affects NC on the prognosis of MAM patients due to altered information and care, hence the risk of morbidity and mortality.

Social Support

It is one of the other greatest determinants of NC on the prognosis of MAM in Paediatric HIV patients, where the need for social and economic support at all levels will cause improvements in nutrition. Although, the study by Kamiya (2011) associated prognosis with an individual's employment status. NC of permanently employed caretakers had a 2.7% risk of MAM compared to the 72.6% who depended on agriculture to support their families.

On the other hand, having a permanent job was constrained by other factors of sustainability, hence impacting the prognosis in Paediatric HIV/AIDS. Family and financial support are key determinants in patient follow-up during the NC process for recovery. A study carried out by UNAIDS (2017) showed that 21.8% of Paediatric HIV patients were lost to follow-up in West Africa due to a lack of family and financial support compared to 4.1% in Asia. Yet, these are the most vulnerable cases at risk of death if not well monitored. These patients relied on their caretakers for support, which was a constraint in offering quality NC on the prognosis of MAM.

In a study carried out in Lacor Hospital in Uganda in 2014 by Nyeko *et al.* (2016), out of the 402 cases of malnutrition reported (HIV negative and positive statuses), 251 cases were studied, with 27.9% having MAM in Paediatric HIV. On providing all the necessary care required, HIV-negative patients progressed well at a 76.9% recovery rate compared to the HIV-positive with MAM at 18.6%. This meant that despite the information and models used, MAM patients' prognosis would be slower than others due to other factors.

Another study done in Uganda by Batana *et al.* (2014) showed that families whose level of income was stable and had few members, Paediatric HIV patients with MAM, would progress well at 6.7% because they would be supported for care. This was compared to the 16.6% amongst the poorest families whose income levels are too low in consideration of big

numbers in the household, thus a determinant for poor recovery.

Availability And Utilisation (Micronutrients)

Aziiza *et al.* (2018) noted that following the NC process on the prognosis of MAM in Paediatric HIV patients, caretakers who critically took in and utilised the information were likely to provide a balanced diet containing different micro-nutrients to suit the patients' needs. Despite some challenges of inaccessibility to some basic micro-nutrient supplies, this affected their recovery process negatively.

A study done in China by Zhang *et al.* (2018) noted that the unavailability of micronutrients increased the risk for disease progression and thus required continuous NC management and support to mitigate MAM. Although nutrition support was ignored during the management of HIV/AIDS patients in the previous years, Zhang *et al.* (2018) emphasised that the improvements in nutritional counselling evaluation caused a great reduction in MAM cases from 37.2% to 18.7% in 2013 then to 8.4% in 2018 thus a determinant for prognosis.

In Toronto, it was noted that hospitalised malnourished Paediatric HIV patients' nutritional status improved on hospital food, as studied by Audian *et al.* (2015). This was related to high protein and calorie intake at 28% compared to 18% for those whose food was prepared at home after all had received NC. Therefore, adjusting to the hospital diet as part of the NC core activities led to a better prognosis from MAM.

However, a study carried out in rural Tanzania by Kissa *et al.* (2014) showed that the availability of food improved feeding frequency on nutrient-required foods, thus causing an effect on weight gain within the shortest possible time. It is important to note that food adequacy and utilisation both had an impact on NC and patient outcomes, with adequate dietary intake being a major positive determinant in NC on the prognosis of MAM in Paediatric HIV patients.

Dietary Diversity

A study carried out by Ickeset *et al.* (2017) on the role of dietary diversity showed that NC was applicable in the management of different nutritional conditions despite the degree of recovery. For patients who took up fruits and vegetables following NC, recovery was higher at 94.8% compared to 2.7% who took proteins only for 12 weeks.

Yasuoka *et al.* (2020) revealed that dietary diversity may not necessarily promote nutritional recovery following NC but a combination of other factors. According to Kissa *et al.* (2014), a study in Tanzania showed recovery from MAM was from 1.7% - 2.4% following food demonstration, which implied maximisation of NC as an intervention to better prognosis from MAM.

It was noted that some caretakers' ability to practice dietary diversity improved with a demonstration as an ongoing process, which caused changes in behaviours of food preparation, frequency, and quantity (Sunguya *et al.* 2013). The consumption and preparation of local foodstuffs rich in nutrients increased; for example, animal protein intake improved by 50% (eggs, fish, and Meat), foods of plant origin by 19%, vegetables by 16%, and 11% for nuts and seeds. All these processes reversed MAM by 75% compared to other interventions by 53 (Ersilia *et al.*, 2012). This was attributed to the frequency of NC sessions with demonstration, which improved caretakers' skills in food preparation, hence a determinant factor for the prognosis of MAM.

According to Moramroco *et al.* (2017), the need for re-evaluation of the food demonstration amongst caretakers was key in assessing MAM prognosis. It was also noted that the prevalence of MAM in Paediatric HIV patients' caretakers' who had a demonstration reduced from 32.4% to 12.2%, hence a good indicator for determining prognosis.

Food Insecurity

According to UNICEF (2019), Paediatric HIV patients may become wasted due to food insecurity/starvation. A study carried out in Campina Grande by Pedraza & Gama (2015) revealed that food insecurity is a top determinant

factor that causes malnutrition in both HIV-negative and positive patients. Mild food insecurity was 37.6%, and severe food insecurity was 31.6%. This was still high in the vulnerable groups that have socio-economic challenges, hence affecting the NC process on the prognosis of MAM in Paediatric HIV patients.

The prevalence of food insecurity in PLWHA in Ethiopia was reported to be 46.8%, thus causing undernutrition, as Delelegn *et al.* (2018) studied. This issue ranked highest with 48.9% in household food-insecure homes compared to 9.8% in food-secure homes. Unemployment levels worsened food insecurity at 40.2% and employment status at 20.8%. Therefore, food insecurity and unemployment greatly affected the prognosis of MAM in Paediatric HIV patients. NC strategy proved effective in changing the caregivers' feeding practices using a food diary (Ickeset *et al.*, 2017), which caused an increase in the consumption of both plant and animal origin by 25% compared to before.

A study conducted in an urban setting in Uganda on the impact of food insecurity in households of malnourished patients by Yikii *et al.* (2017) concluded that households in urban areas face food shortages (insecurity) due to high living standards with no productivity. Nalwoga *et al.* (2010) noted that MAM prevalence in Paediatric HIV patients in rural areas was higher at 52% compared to 30% in urban areas, thus linking it to maternal and other health factors.

Zhang *et al.* (2018) noted that despite the NC activities carried out, there were still cases progressing poorly with MAM due to food insecurity. Inadequate food intake of nutrients (energy) was high at 59.6% with unique dietary patterns/behaviours, and reduced appetite in different age groups worsened MAM in Paediatric HIV patients, leading to deterioration. In South Asia, 4 out of 5 children with Paediatric HIV are at risk of moderate acute malnutrition because of poverty, limited access to safe water and sanitation, and medical care, which are preventive services in the management of MAM in Paediatric HIV, unlike in developed countries where these

services are prioritised as noted by UNICEF (2019).

Medical Determinants for Effective Nutritional Counselling on Prognosis of Moderate Acute Malnutrition in Paediatric HIV-Patients

Opportunistic Infections

Krawinkel (2012) specified that the recurrences of OIs in such patients caused' exhaustion, destruction and damage to the body cells which limited utilisation of the food nutrients taken in. Lack of a single nutrient can destroy the functioning of the whole system, thus increasing the risk of OIs and then death, with case fatalities at 2.10%.

Ebissa *et al.* (2016) findings revealed Opportunistic Infections are greatly known to impair the immune system by causing alterations in appetite(decline), worsened by vulnerability in age and socio-economic status of the caretaker that even with NC process, it may not successfully reverse MAM hence HIV-stage progression. Edem *et al.* (2015) noted that 40.7% of the Paediatric HIV patients who had diarrhoea had MAM compared to the 23.3% who had MAM but with no major OIs. Therefore, OIs influenced MAM prognosis negatively.

Adherence to ART

A study carried out in South India on adherence to Antiretroviral treatment in Paediatric HIV patients by Mehta (2017) revealed that NC was an optimal tool for adherence success. Poor adherence increased chances for infection resistance, while good adherence rates at 50%-80% were an indicator for improving the nutritional status. Therefore, nutritional counselling acted as a reminder to manage adherence and reverse MAM, while children who were registered with poor adherence were attributed to adverse drug side effects and limited disclosure (Oumer *et al.* 2019). Nutritional counselling on a balanced diet helped initiate and adhere to ART, especially in situations where the immune system was already compromised.

In Kinshasha, DRC, a study done by Sasi et al. (2020) revealed that the survival probability in Paediatric HIV patients with MAM adhering to ART was 89.6% if supported with good nutrition. This differed with the 38.7% whose nutritional status following nutritional counselling would progress poorly due to poor adherence, hence death.

A study done in Kenya, Rwanda, and Uganda by Sera *et al.* (2014) revealed almost the same thing: NC on adequate nutrition intake improved adherence by almost 76%. This meant that increased appetite with no access to food worsened by medication side effects would not support adherence, hence poor prognosis.

Medication Side Effects

Guidelines on the Use of Antiretroviral Drugs for Treating and Preventing HIV Infection in Kenya (2018) noted that ART is widely known to have gross side effects that affect individuals differently. This interferes with their nutrient metabolism, thus contributing to MAM in Paediatric HIV patients. Inaya *et al.* (2020) and Oumer *et al.* (2019) realised that limited nutrient intake and medication metabolic processes would worsen malnutrition despite efforts to adhere to the NC process.

Negassie *et al.* (2013) noted that inadequate nutrient intake would negatively affect MAM prognosis; 42.5% of non-adherents suffered from disease progression compared to 8% of adherents. Therefore, David et al. (2016). reported that nutritional interventions (diet diversity) are greatly linked to improving optimal adherence to counteract its side effects. However, 1 in 4 ART users fail to meet optimal adherence (Negassie *et al.* (2013) due to the presence of nutritional-related conditions worsened by medication side effects, hence a determinant for poor prognosis.

Missed Appointments

The missed appointments were attributed to a lack of food in other areas of study. In a survey done in West Africa, Senegal, by Benzekri *et al.* (2015), it was noted that the prevalence of food insecurity

was at 59.6% in Dakar, 75.4% in Ziguinchor which increased the prevalence of MAM in Paediatric HIV to 19.2% in Dakar and 26.3% in Ziguinchor. This led to some caretakers' missed appointments, hence failure to track progress, leading to poor prognosis.

METHODS

Research Design

This study adopted a pre- and post-study design. This also is called a before-and-after study design, which measures the occurrence of an outcome using specific values in a certain group of participants before introducing a product or an intervention and then measures those same values after the intervention (Aggarwal et al., 2019). The moderately malnourished Paediatric HIV patient's initial baseline data of their nutritional assessment values of Mid Upper Arm Circumference (MUAC), weight, and height (computed as body mass index) was collected before giving a nutritional counselling intervention. Then, endline data (current) was collected after several sessions of nutritional counselling intervention to ascertain the patient's good or poor prognosis. This design effectively tested the efficacy of a given intervention as it was carried out across the selected group in a phased manner as individual patients were re-assessed in various aspects.

Population and Sample Size

A total of 157 people participated in the study. This was done in accordance with the total population estimates, putting into consideration the degree of error of 5%, which would be a deviation within the results positively or negatively. These were 50 Paediatric HIV/AIDS patients with MAM aged 5 – 9 years who were newly diagnosed with MAM, 50 Paediatric HIV/AIDS patients with MAM aged 5 – 9 who had relapsed after receiving at least 2 or fewer nutritional counselling sessions and 57 caretakers who had received nutritional counselling as an intervention for combating MAM. The inclusion criteria were all Paediatric HIV/AIDS patients with MAM aged 0 – 9 years who were diagnosed with

MAM at Hoima Regional Referral Hospital and some caretakers who had received nutritional counselling as an intervention for combating MAM with given consent and assent. The exclusion criteria were that all children whose caretakers did not provide consent were excluded from the study. Mentally or physically handicapped were excluded from taking part in the study.

Sampling Technique

This study used purposive sampling, which is a non-probability method that selected caretakers of Paediatric HIV patients with moderate acute malnutrition who received NC. This was because participants identified from the population had certain characteristics that were fitting and focusing on the study.

Data Collection Instruments

Structured and semi-structured questions comprising key elements of the study were given to both caretakers and children with Paediatric HIV. Focus group discussions were administered to caretakers of children with Paediatric HIV who received nutritional counselling as an intervention to combat moderate acute malnutrition.

Quality Control

The key indicators in data quality control are the validity and reliability of the tools used in collecting data. These reduce the chances of error and are more likely to be scrutinised for credibility. Triangulation of different tools was used to improve both validity and reliability, taking into consideration the consistency of nutritional counselling practices in these units where Paediatric HIV patients were seen (Yoshida *et al.*, 2017). The questionnaire tool was cross-examined by supervisors for the relevance of each item as per the objectives set. According to the

Health Institute for Work and Health (2016), to establish the reliability of the questionnaire, it was further pre-tested before being used for the final data collection. Both questionnaires and FGD questions were re-examined for appropriateness to suit the respondents and anticipated responses.

Research Procedure

Researchers obtained clearance from The Research Ethics Committee of Bishop Stuart University BSU-REC-2023-77. An introductory letter was obtained from the directorate of graduate studies of Bishop Stuart University and the head of Home RRH. Consent from caretakers and assent from paediatric HIV patients were put into consideration for ethical issues. Data was collected, and pseudonyms were used to protect the identity of participants.

Data Management and Analysis

Data from filled questionnaires was cleaned, coded, entered in MS Excel, and analysed using Stata version 17. Frequency and percentage were used to ascertain the socio-demographic characteristics of children and their caregivers. The researcher measured different determinant factors for the prognosis of MAM sequentially using the chi-square and logistic regressions. Factors with $p < 0.05$ were entered into a multivariate model to control for confounding. Factors with $p < 0.05$ were considered as determinants of effective NC.

FINDINGS

Effective Nutritional Counselling on Prognosis of Moderate Acute Malnutrition in Paediatric HIV-Patients

Table 3 shows the results of the multivariate analysis. All significant variables at p -value < 0.05 were considered for multivariate logistic regression.

Figure 1: Effective nutritional counselling on the prognosis of moderate acute malnutrition in paediatric HIV patients

Determinants		AOR (95% CI)	P-value
Sex	Female	1	0.316
	Male	0.6(0.25-1.57)	
Age (months)	<60	1	0.009***
	≥60	3.4(1.36-8.59)	
Age of caretaker	<20	1	0.333
	20-34	2.4(0.40-14.86)	
	≥35	1.9(0.30-11.45)	
Education	None	1	0.202
	Primary	1.8(0.72-4.67)	
	≥Secondary	1.7(0.29-9.30)	
Religion	Protestant	1	0.311
	Catholic	0.6(0.19-1.71)	
	Muslims	0.3(0.08-1.03)	
	Others	0.7(0.20-2.75)	
Occupation	Peasant	1	0.021*
	Business/Civil servant	3.1(1.19-8.23)	
	Others	5.7(0.93-35.23)	
Income	<100,000	1	0.902
	100,000-500,000	0.9(0.35-2.51)	
	>500,000	3.4(0.96-12.39)	
Residence	Rural	1	0.88
	Urban	1.1(0.37-3.15)	
	Peri-urban	1.4(0.35-5.94)	
HIV status of the caregiver	Positive	1	0.366
	Negative	1.5(0.61-3.86)	
	DK	2.3(0.22-24.48)	
NC sessions	<3	1	0.004***
	≥3	3.6(1.52-8.74)	

In the multivariate model, the patient's age, caregiver occupation, and number of NC sessions attended by the caretaker were the factors independently associated with improved prognosis after NC among Paediatric HIV/Aids patients attending HRRH at $p < 0.05$. Specifically, Paediatric HIV/AIDs patients aged ≥ 60 months (AOR = 3.4, 95% CI: 1.36-8.59, $p = 0.009$). Patients with occupation other than peasantry ([Business/civil servants; AOR = 3.1, 95% CI: 1.19-8.23, $p = 0.021$; others; AOR = 5.7, 0.93-35.23, $p = 0.060$). Patients who attended ≥ 3 NC sessions (AOR = 3.6, 95% CI: 1.52-8.74, $p = 0.004$) were more likely to improve after NC.

Qualitative data on determinants for effective nutritional counselling on prognosis of moderate acute malnutrition in Pediatric HIV/AIDs patients;

One caretaker said:

"... food insecurity and employment status influence so much the NC process on the prognosis of moderate acute malnutrition in Pediatric HIV-patients in this setting" (C-1)

Two caretakers were supportive. One said:

"... however, despite one being equipped with the knowledge and skills in food preparation and preservation of nutrients, I still felt we had to face challenges caused by food insecurity, unemployment thus poor prognosis of the HIV positive children" (C-2).

"... this is because as a single mother with no job, I still have to struggle to get the best yet accessibility to essential foodstuffs is not easy, thus affecting prognosis..." (A mother of a 5-year-old male on the Nutrition unit, C-3).

Another caretaker confirmed:

“Healthcare care workers do food demonstrations as an activity to improve food preparation and preservation of some nutrients.....” (A breastfeeding mother of 6 months in MBCP clinic, C-4)

“... under observation, we do return demonstrations to check for skill gained, this helped on how to prepare different kinds of foods rich in nutrient values (balanced diet) essential for recovery and child growth in Pediatric HIV/AIDS ...” (A caretaker in Nutrition unit. (C-5)

“... the other challenge was associated with reminders for appointments; some of us caretakers have no phones, health workers use a neighbour to get to us which is worth tasking... hence missing out on some appointments for assessment leading to poor prognosis of MAM (C-6)

DISCUSSION

This pre- and post-study design was used to assess determinants for effective nutritional counselling in the prognosis of moderate acute malnutrition in Paediatric HIV/AIDS patients attending Hoima Regional Referral Hospital. It was found that of the 157 Paediatric HIV/AIDS patients, 67.5 % improved after nutritional counselling. It was found out that Paediatric HIV/AIDS patients aged ≥ 60 months (AOR = 3.4, 95%CI: 1.36-8.59, $p = 0.009$), those with occupation other than peasantry (Business/civil servants; AOR = 3.1, 95%CI: 1.19-8.23, $p = 0.021$); and those that attended ≥ 3 NC sessions (AOR = 3.6, 95%CI: 1.52-8.74, $p = 0.004$) were associated with a higher likelihood of improvement after nutritional counselling.

Similarly, the findings concurred with Brandley *et al.* (2011), who noted that younger age was negatively affected by prognosis by 4.8% in Paediatric HIV patients. Regarding occupation, similar findings were found in a study by Kamiya (2011) that noted prognosis was associated with an individual's employment status. However,

permanently employed caretakers had a 2.7% risk of MAM compared to the 72.6% who depended on agriculture to support their families after nutritional counselling.

On the other hand, having a permanent job was constrained by other factors of sustainability, hence affecting prognosis in Paediatric HIV/AIDS. The study noted that those who attended ≥ 3 NC sessions (AOR = 3.6, 95%CI: 1.52-8.74, $p = 0.004$) had higher chances of better prognosis from MAM than those who received fewer sessions. This was noted by Sunguya *et al.* (2013) that some caretakers' ability to practice dietary diversity improved with ongoing counselling and demonstration processes, which are attributed to the frequency of nutritional counselling sessions. These sessions caused great changes in food preparation behaviours and in quantities of feeding the malnourished children. Ersilia *et al.* (2012) noted that all these processes reversed MAM by 75% compared to other interventions by 53%.

CONCLUSION

Moderate acute malnutrition in Pediatric HIV/AIDS is still a public health concern and needs to be addressed in all aspects of our communities. The nutritional counselling strategy has had a big impact and proved effective in the management of the majority of Pediatric HIV patients with MAM. Despite the fact that HIV and nutrition are in a vicious cycle, improved adherence and utilisation of NC sessions with behavioural change take the lead in supporting nutrient utilisation, thus reducing the risk of opportunistic infections and mortalities amongst Pediatric HIV patients.

Recommendations

Minimising exposure to malnutrition conditions in Pediatric HIV through nutritional counselling will contribute to improving the child's nutritional status, hence being able to resist some infections. This will likely improve the social and economic status of individuals and families as less time will be spent seeking health care services in line with malnutrition. Lack of consistency and regular

attendance as scheduled for these Pediatric HIV patients with MAM needs to be focused on. This is because it's assumed to be a driving factor to poor prognosis in that their nutritional assessment values are not taken regularly for better intervention, thus risking deterioration and, hence, HIV stage progression.

The community stakeholders should actively respond to health care programs that support their communities through health sensitisation on nutritional aspects. This will minimise the chances of developing malnutrition in Paediatric HIV through good health-seeking behaviours and food security.

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