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Factors Associated with Malnutrition among Children Aged Six Months to Five Years in a Semi-Rural Area of the Western Cape, South Africa

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ABSTRACT

Malnutrition is a global concern and it impacts negatively on mortality, morbidity, educability and productivity. Millions of children in South Africa are affected. This study examines the key factors associated with malnutrition among children aged six months to five years in a semi-rural area of the Western Cape, South Africa. A quantitative research approach was employed by using a descriptive and exploratory design. All parents and caregivers who accompanied the children (under the age of five years old), visiting the clinic, were given an opportunity to participate in the study on a voluntary basis. A self-administered questionnaire was distributed to parents and caregivers (n=100) for data collection. SPSS statistical software (V24) was used to analyse the data. The results indicated that the factors were grouped and the Cronbach's alpha coefficient was determined as greater than 0.7. The results revealed that these factors included obesity (26%), underweight (51%), stunting (14%), severe acute (4%) and moderate acute (5%) malnutrition. The results also revealed that the majority of households were single mothers with low income (51% have a monthly income of between R2 000 and R5 000, and 30% of families who earn a monthly salary of less than R2 000) and a poor educational background. This study concluded that more male children were diagnosed with malnutrition than females. The employment status of the mothers also affects the nutritional status of the child. More children from unemployed mothers and a few children from self-employed mothers had moderate acute malnutrition compared to employed mothers who had no children suffering from malnutrition.

KEYWORDS

Children; age; malnutrition; nursing practice; semi-rural area

Introduction

Malnutrition has a negative impact on the growth of young children worldwide and it affects millions of children in South Africa. The Sustainable Development Goals (SDG) was put in place to address and eradicate poverty, to protect the environment and to ensure prosperity for all children. Malnutrition can be categorised as over-

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nutrition and obesity, underweight, stunting, wasting, kwashiorkor, marasmus, severe acute malnutrition, and iron deficiency (UNICEF, 2006). Furthermore, Ewusie et al. (2017), stated that malnutrition is seen as one of the leading causes of mortality in children in developing countries. It is estimated to have contributed to more than half of childhood mortalities.

A large percentage of children from weaning age, within a semi-rural area in the Western Cape, are classified as malnourished. According to the Western Cape Government Provincial Treasury Annual Report 2012/13, the number of malnourished children under five years of age in the Western Cape was 2.8 per thousand population in 2012/2013. The City of Cape Town recorded a number of 2.9 malnourished children less than five years per thousand of the population in the Cape Winelands District. Despite all the policies and interventions put in place by the Department of Health and the City of Cape Town, the problem of malnutrition still exists (Western Cape Government Provincial Treasury, 2013).

As part of the Millennium Development Goals (MDG's) set by the Department of Health and World Health Organization (WHO, 2011), it is vital to combat malnutrition by eradicating extreme insufficiency and the lack of food shortages. The MDG's have expired in September 2015 and South Africa did not meet the outcomes of the MDG's, which were set by the World Health Assembly, to continue the fight against hunger. According to Musa et al. (2014), the most common causes of disease and death amongst children throughout the world are related to nutritional disorders. Furthermore, Musa et al. (2014) state that the most common associated factor worldwide is malnutrition, particularly in Third World countries. Child growth is internationally recognized as the best global indicator of physical well-being in children and a number of international goals, like the World Health Assembly global targets for 2025, include growth-related targets for stunting, wasting, and overweight among children below five years (De Onis, 2017). This is a considerable increase since the implementation of the MGDs in 2000. Obesity has increased dramatically since 1990. Therefore, this issue has become a major concern that the high prevalence of both overweight and stunting in the same cohort of mainly low socioeconomic groups of children in the South African context (Symington et al., 2016). Furthermore, De Onis et al. (2004) predict that this trend is expected to reach 9.1% (95% CI: 7.3%, 10.9%) or 60 million in 2020. De Onis and Blössner (2010) claim that a similar situation of obesity amongst children is found in Africa (95%) and is expected to reach higher levels in 2020. In South Africa, according to the National Food Consumption Survey (NFCS) (2005), in 1999, 21.6% children were stunted and in 2005, the survey further revealed that only 18% of children were stunted (Labadarios et al., 2005). This shows a decrease in stunted children within the South African context (Symington et al., 2016).

Malnutrition in South Africa constitutes marasmus, kwashiorkor, and similar causes of malnutrition. Children suffering from these effects of malnutrition are at higher risk of dying of malnutrition. Although these malnourished children have attended the clinics for services and treatment, the factors that are associated with malnutrition amongst children under five years living in this area, have not been examined yet. This lack of knowledge regarding the associated factors could pose a barrier to the local health care organisations in promoting nutritional education and empowering parents and caregivers with knowledge to improve the quality of life of children within this community.

According to the World Health Organization (WHO, 2019), in 2018, an estimated 6.2 million children and adolescents under the age of 15 years died, mostly from preventable causes. Of these deaths, 5.3 million occurred in the first five years, with almost half of these in the first month of life (WHO, 2019). The WHO (2019) has indicated that children in sub-Saharan Africa are more than 15 times more likely to die before the age of five than children in high income countries.

Similarly, malnutrition poses a major health problem in South Africa. This indicates that the children under six months to five years of age are categorised as vulnerable groups. In 1995, South Africa the National Department of Health (NDoH) has implemented the Nutritional Supplementation Plan (NSP) to target this vulnerable group (Grundlingh et al., 2013). However, malnutrition is still recognised as the key factor associated with poor health and death amongst children (Iversen et al., 2012).

The main objective of this study was to examine the factors associated with malnutrition amongst children six months to five years of age in a semi-rural area of the Western Cape, South Africa.

Methods

Study design and sample

A quantitative research method was employed by using a descriptive and exploratory design to determine the key factors associated with malnutrition amongst children under the age of five years old. The research site was at a small semi-rural area in Franschhoek in the Cape Wine-lands district in the Western Cape, South Africa. There are two health facilities in the area. The main clinic in the community is operational eight hours per day during the week and the other clinic is operational only on Mondays, Wednesdays and Fridays. This site is situated in town. On the other two days, the satellite clinic sister does the mobile clinic outreach to the surrounding farms in Franschhoek area. The mother, child and baby wellness clinic in the area has a clientele of 300 per month who make use of the service. Approximately, 3600 children were admitted in 2016 for malnutrition screening. However, at the time of data collection, there were 150 children of parents or caregivers who presented with signs and symptoms of malnutrition between the ages of six months and five years old at the startt of data collection over the month period. The following features of malnutrition were considered during data collection: *Stunting* is the impaired growth and development that children experience from poor nutrition, repeated infection, and inadequate psychosocial stimulation. *Severe acute malnutrition (SAM)* is *defined* in these guidelines as the presence of oedema of both feet or *severe* wasting (weight-for-height/length <−3SD or mid-upper arm circumference < 115 mm). No distinction is made between the clinical conditions of kwashiorkor or *severe* wasting because their treatment is similar. weighing less than the normal amount for one's age, height, and build *underweight* children *underweight* adults typically have a body mass index of less than 18.5. In children aged 6–59 months, *moderate* acute *malnutrition* is defined as *moderate* wasting (i.e. weight-for-height between –3 and –2 Z-scores of the WHO Child Growth Standards median) and/or mid-upper-arm circumference (MUAC) greater or equal to 115 mm and less than 125 mm (WHO, 11 February 2019). Obesity is considered as lifestyle issues—too

little activity and too many calories from food and *drinks*—are the main contributors to childhood obesity. But genetic and hormonal factors might play a role as well (WHO, February, 2019)

A purposive convenience sampling method was used in this study. Purposive sampling is the conscious selection of certain subjects, elements, events or incidents to include in a study (Brink et al., 2018, p. 124, 125). These participants accounted for 50% of the target population that was selected to participate in this study.

Data collection and analysis

Data collection commenced on 30 September 2016 until the 15 February 2017. A self-administered questionnaire was distributed to 150 parents/caregivers who had accompanied the children to the clinic during these five (5) months of data collection. Only 100 respondents completed and retuned the questionnaires. The associated factors from the questionnaire were developed aiming to achieve the objectives. These factors were grouped and the value of Cronbach's alpha coefficient was determined. These factors included socioeconomic and demographic data; child care practices; child characteristics; maternal caring and characteristics; and environmental health conditions.

A statistical software SPSS Version 24 was used to analyse the data. Caregivers or parents, whose children had a history or where there was an indication of malnutrition of their children, were approached to participate. This meant that the child had either had a history where one or more of the growth indicators displayed suspicious abnormalities, or where deviations were present on the normal growth patterns and curves. In addition, all parents and caregivers accompanying children with a mid-upper arm circumference of less than 13.5 cm, which indicated that there was an indication of malnourishment, were approached.

The findings have been presented in frequency, figures and tables. Demographic and socio-economic characteristics, health-related characteristics, complementary feeding indicators and the nutritional status of children six months to five years old were first analysed by using descriptive statistics. After this, a bivariate analysis was done, using Chi square (X^2) to examine the associations between independent and dependent categorical variables. Then a multivariate logistic regression, employing a forward step-wise method, was done to model a relationship between predictor variables and nutritional status indicators of the children. After controlling for confounders, statistical significance was determined at $p < 0.05$. Following traditional usage, a p value of less than .05 was binned as significant, whereas p values ranging from .10 to .05 were binned as marginally significant; any p values larger than .10 were binned as non-significant (Valentine et al., 2019).

The Head of the District Health Services of the Cape Winelands District and the Provincial Health Department were approached for support and permission to conduct the study. In addition, permission was also obtained from the clinic management to conduct the study at the site as well. Informed consent was obtained from the prospective participants of this study. The ethical principles such as anonymity, confidentiality, informed consent, justice and beneficence were applied in the study. An information letter, attached to the consent form, explaining the nature of this study, including the

purpose and intended data collection methods, was explained to all the participants before the study commenced. The respondents had the right to freely choose to participate and give consent for the study. They were also allowed to decline participating in the study and could withdraw from the study unconditionally at any stage. In this study, the selection of the sample was conducted according to eligible criteria (Polit & Beck, 2017). The information gathered was kept private and was ensured through anonymity and confidentiality.

Validity and reliability

The validity of an instrument is the degree to which the instrument measures what it is supposed to measure (Polit & Beck, 2017). It also refers to the accuracy and truthfulness of the findings (Brink et al., 2018). In this study, the quantitative approach was able to determine the malnutrition status of the children and the impact of the knowledge of the parent/caregiver on the level of malnutrition in the children.

The results of this method confirmed the reliability of the study. In addition, the application of Cronbach's alpha was used to determine the reliability of the dataset. This ensured the stability or consistency of the quantitative dataset. The coefficient values of all the factors were greater than 0.7 indicate high internal consistency which reflected on the reliability of the dataset. The application of this approach ensured that all variables and values were measured under the same conditions.

Findings

Sociodemographic data

Out of the 100 children included in the study, 54% were male and 46% were female. Of these 100 study participants, 28% were between six and 12 months old, followed by 32% between the ages of 13 and 25 months, with 28% between the ages of 26 and 48 months and finally, 12% were more than 49 months old. The mean age of all the children in the study was 3.54 [3.435723–3.650697] at a 95% confidence interval. The mean of items for child-caring practices was 3.525; the mean of items for immunisation was 3.269; the mean of items for health status during pregnancy was 2.578; and the mean of items for environmental health condition was 4.052.

The results showed that 23% of the 100 participants included in the study had a birth weight of less than 2500 g and 77% children had a birth weight of more than 2500 g. Figure 1 below presented the monthly income of the family. In indicates that a greater proportion of the families (51%) in the study had income levels of between R2000 and R5000 per month,[1] followed by 30% of families who had income levels of less than R2000 per month. While 11% of the families had income levels of between R5001 and R10,000 per month, only 8% of the families had income levels of R10,001 and R20,000 per month.

According to Figure 2, mothers who had completed their high school education constituted 68% of the mothers in the study, followed by 20% mothers who had primary education or less, and mothers who obtained a college certificate made up the remaining 12%.

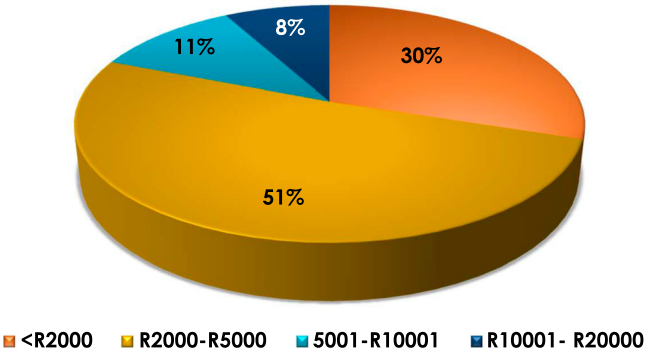

Figure 1. The monthly income of the households.

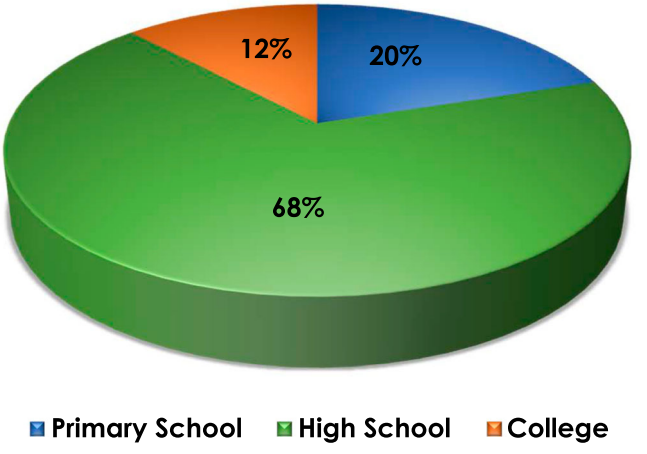

Figure 2. Level of maternal/parental education.

The results further showed in Figure 3 that, unemployed mothers made up 45% of the mothers in the study, followed by 28% of mothers whose employment status was not given, while 24% of mothers were employed and only 3% of mothers were self-employed.

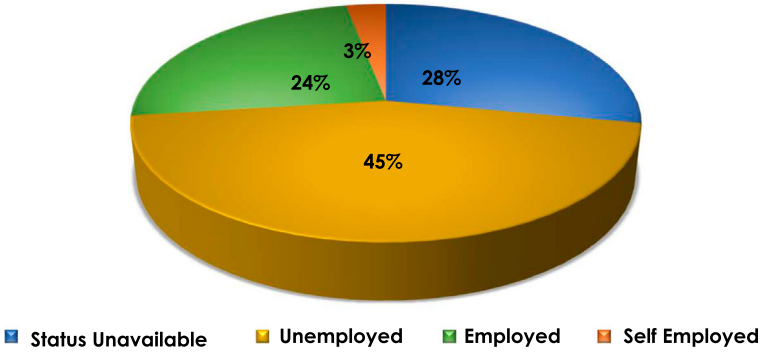

Figure 3. Maternal/parental employment status.

The results indicated that the majority of households were single mothers with low income in a small semi-rural area in Franschhoek in the Cape Wine-lands district in the Western Cape.

Factors associated with malnutrition under five-year-old children

Table 1 showed the age and nutritional diagnosis in accordance to the factors of the children aged from 6 months to 5 years.

Table 1. Age and nutritional diagnosis.

Age	Obesity	Stunting	SAM	MAM	Underweight	Total
6–12 months	12	2	1	1	13	29
13–25 months	8	3	2	0	18	31
26–48 months	5	7	0	2	14	28
Over 49 months	1	2	1	2	6	12
Total	26	14	4	5	51	100
Percentage	26%	14%	4%	5%	51%	100%

There was a 12% obesity rate in children aged 6–12 months, 8% in children aged 13–25 months, 5% in children aged 26–48 months and 1% for children over 49 months. Obesity decreased with an increase in the age of the children. As the children grew older, cases of obesity decreased. In the age group of 6–12 months, 2% of participants were stunted. A total of 3% of stunted children was observed in the age group 13–25 months, more than double in the age group 26–48 months 7% and finally, stunting dropped to 2% in the age group over 49 months.

One percent (1%) of severe acute malnutrition (SAM) was present in the age group 6–12 months, 2% in the age group 13–25 months, 0% in the age group 26–48 months and 1% in the age group over 49 months. Cases of moderate acute malnutrition (MAM) were present in 1% of the age group 6–12 months, 0% in the age group 13–25 months, with 2% in the age groups of 26–48 months and over 49 months old respectively.

Analysis showed that 12% of males and 14% of females were obese. Equal numbers of females and males 7% had stunting growth, while more males (29%) were underweight compared to females (22%). Severe acute malnutrition was also equal in both males and females with a 2%. However, moderate acute malnutrition was three times higher in males with 4% against only 1% in females. In both males and females there were no cases of kwashiorkor and marasmus and analysis also showed that there was no significant association between gender and malnutrition in the study, at (p=0.05) as shown in Table 2.

The results revealed that 13 of the children in the age group 6–12 months were underweight, followed by 18 in the age group 13–25 months, with 14 in the age group 26–48

Table 2. Gender and nutritional diagnosis.

Diagnosis		Obesity	Stunting	Underweight	Sever Acute nutrition	Moderate Acute nutrition	Total
Gender	Male	12	7	29	2	4	54%
	Female	14	7	22	2	1	46%
Total		26	14	51	4	5	100%

months and six in the age group over 49 months old. The results further indicated that 13 of the children in the age group 6–12 months were underweight, followed by 18 in the age group 13–25 months, with 14 in the age group 26–48 months and six in the age group over 49 months old. Generally, the age group of 13–25 months had the highest cases of malnutrition. All cases of malnutrition reviewed, and revealed as the children grew older, malnutrition is less prevalent, for instance, the age group of 13–25 months had the highest cases with 31, followed by the age group of 6 –12 months with 29 then the age group of 26–48 months with (28) and finally, the age group of over 49 months included 12 only.

Bivariate associations for obesity, stunting, SAM, MAM and underweight, which encompassed malnutrition, were done on relevant socio-demographic, maternal and children variables of the respondents. The variables, which were associated with a particular form of malnutrition, were then grouped and reported separately. The significant associations between the dependent and independent variables of the respondents for the different types of malnutrition were then reported at $p < 0.05$. The p-value is the probability of obtaining the observed results of a test. The p-value is used as an alternative to rejection points to provide the smallest level of significance would be determined.

In the multivariate associations, a forward stepwise logistic regression process was used to select independent variables that were combined in a model with obesity, stunting, severe acute malnutrition, moderate acute malnutrition and underweight respectively to determine factors that remained significant after controlling for confounding (see Table 3).

The following factors remained significantly associated with obesity in the adjusted model:

- Growth Pattern in RTHB remained significantly associated with obesity in the adjusted model (OR 0.005; 95% CI 0.000–0.126, $p = 0.001$).
- Smoking or using drugs during pregnancy, remained associated with obesity at OR 0.151; 95% CI 0.029–0.790, $p = 0.025$.

Table 3. Adjusted model for factors associated malnutrition categories.

	Obesity		
Predictor	Odd ratio	95% CI	*p*-value
Growth pattern in RTHB	0.0050146	0.0001985–.1266602	0.001
Drug and alcohol use	0.1515707	0.0290689–.7903186	0.025
Age	0.1586566	0.0308256–.8165915	0.028
EPI premature	0.1454337	0.0330681–.6396179	0.011
Family income	0.1364094	0.0261834–.7106623	0.018
Parental education	9.014274	0.9441554–86.06331	0.056
Stunting			
Alcohol use	1.823028	1.033364–3.216126	0.038
Severe Acute Malnutrition			
Number of children	4.965814	1.118699–22.04285	0.035
EPI premature	2.659017	0.9604464–7.361548	0.060
Day caregiver	1.816976	0.9234405–3.57511	0.084
Moderate Acute Malnutrition			
EPI iron intake	4.745064	1.328379–16.94971	0.017
Family size	16.7841	1.478579–190.5249	0.023
Underweight			
Growth path	2.911036	1.706845–4.964789	0.000
Number of children	0.5612432	0.3758242–.8381417	0.005

- Age was the next factor that was significantly associated with obesity in the multivariate analysis but it was not associated in the bivariate analysis (OR 0.158; 95% CI 0.030–0.816, $p = 0.028$).
- Not having given birth prematurely equally remained associated with obesity (OR 0.145; 95% CI 0.033–0.639, $p = 0.011$).
- Although family income was not associated with obesity in the bivariate analysis, it was found to be associated with obesity in the multivariate analysis (OR 0.136; 95% CI 0.026–0.710, $p = 0.018$).
- Parental education remained associated with obesity (OR 9.014; 95% CI 0.944–86.063, $p = 0.056$).

The following factors remained significantly associated with other forms of malnutrition in the adjusted model

- Drinking alcohol during pregnancy remained significantly associated with stunting (OR 1.823; 95% CI 1.033–3.216, $p = 0.038$).
- The number of children in a family remained significantly associated with severe acute malnutrition (OR 4.965; 95% CI 1.118–22.042, $p = 0.035$) as well as not having given birth prematurely (OR 2.659; 95% CI 0.960–7.361, $p = 0.060$).
- The type of day caregiver stood at OR 1.816; 95% CI. 0.923–3.575, $p = 0.084$.
- Not updating the iron intake of children equally remained significantly associated with moderate acute malnutrition (OR 4.745; 95% CI. 1.328–16.949, $p = 0.005$) as well as the family size (OR 16.784; 95% CI. 1.478–190.524, $p = 0.023$).
- Finally, for underweight factors, growth pattern in RTHB remained significantly associated with underweight (OR 2.911; 95% CI. 1.706–4.964, $p = 0.000$) as well as the number of children in the family (OR 0.561; 95% CI 0.375–0.838, $p = 0.005$).

Discussion

Based on the research results, the discussion section focused on the research objectives. The first objective of the study was to identify the associated factors of malnutrition among children six months to five years of age. It was also indicated that out of the hundred participants who were surveyed, more boys were diagnosed with malnutrition than girls. According to Steenkamp and Lategan (2016), boys appear more likely to be stunted in sub-Saharan Africa. Poda et al. (2017) agree with Steenkamp and Lategan (2016). Based on our empirical results, this was also the case in this current study, that boys are more prone to malnutrition in relation to the main forms of malnutrition (e.g. factors associated with obesity, stunting, severe acute malnutrition, underweight, etc.). In addition, Moran (2020) explored the factors that influenced caregivers of preschool-age children living in low-income, urban neighbourhoods to undertake between two and seven different childcare arrangement changes. The author highlights the importance caregivers place on finding the most appropriate care arrangements for their children in terms of enhanced educational and socialization opportunities in spite of challenges faced (Moran, 2020).

The employment status of the mothers also affects the nutritional status of the child. The theoretical framework applied to this study refers to this as an economical approach,

focusing on various determinants that contribute to malnutrition (Yusuke, 2009). In this study, the employment status of the mothers was associated with MAM ($p = 0.026$). More children from unemployed mothers and a few children from self-employed mothers, had MAM compared to employed mothers who had no children suffering from malnutrition. Together with MAM, this study has revealed that children who do not eat enough vegetables and fruit, suffer from MAM.

According to Steenkamp and Lategan (2016), more than half of households in South Africa experience hunger on a daily basis. According to the poverty trends in South Africa, specifically between the year 2011 and 2015, the worsening financial status of households and individuals under the current situation of economic pressures, have intensified in the rise in poverty levels. This is evident in the report released by Statistics South Africa in 2017 (Stats SA, 2017). The report cites rising unemployment levels, low commodity prices, higher consumer prices, lower investment levels, household dependency on credit and policy uncertainty, as the key contributors to the economic decline in recent times.

These findings indicate that the semi-rural area in the Western Cape, where this study was conducted, revealed that a greater proportion of families (51%) have a monthly income of between R2 000 and R5 000, followed by 30% of families who earn a monthly salary of less than R2 000. However, mothers who are employed and are able to provide their children with fresh fruit and vegetables daily, agree that it improves their children's nutritional status.

This study revealed that mothers who did not supplement iron in their children's diet, did not believe that it contributed to malnutrition. However, mothers who gave children iron supplements agreed that it had nutritional value. This study also revealed that not keeping up to date with children's iron intake, was associated with MAM ($p = 0.026$). A systematic review done by Ojukwu et al. (2009) on iron supplementation in children, demonstrated that iron supplementation improved mental development and intelligence.

In the current study, obesity was also found to be a factor in malnutrition. More girls than boys were found to be overweight. In all the children who were involved in this study, their Road-to-Health Booklet indicated that they were obese. The growth pattern in this booklet showed obesity at $p = 0.000$. Smoking or using drugs during pregnancy also remained associated with obesity ($p = 0.002$). Not being born prematurely, equally remained associated with obesity ($p = 0.015$). Although family income was not associated with obesity in the bivariate analysis, it was evident in the multivariate analysis.

In contrast with the study done by Ogden et al. (2014) in the U.S.A. regarding obesity and malnutrition, the results revealed that there was a significant decrease in malnutrition in children between the ages of two and five years old. However, the authors concluded that obesity still remained a problem in the U.S.A., not only among children, but more so among adults. Inadequate dietary intake, insufficient access to food, and poor water and sanitation are contributing factors to MAM in their study. This was also recognised by the State of the World's Children (1998) report to overcome malnutrition (Bellamy, 1998).

Furthermore, maternal and childcare practices also contributed to MAM (Yusuke, 2009), as indeed was the case in this study. Mothers agreed that visiting the clinic on a regular basis would allow the health staff to detect any signs of malnutrition in

their children at an early stage. Vitamin A, deworming medication and iron supplements are given free at the clinics. Another advantage of regular clinic attendance with any malnourished child, is that the child could be enrolled in the nutritional supplementation programme or the Protein-Energy Malnutrition (PEM) scheme. In this study, it was revealed that children who were enrolled in these schemes/programmes put on weight ($p = 0.002$).

A study conducted by Tette et al. (2015) concurred that the promotion of breastfeeding, suitable complementary feeding, deworming and vitamin A supplementation at regular intervals, as well the case management of malnutrition, were very effective to combat malnutrition. However, they found little evidence of the effectiveness of interventions such as growth monitoring. Their findings indicated that other interventions such as immunisations, health education and nutritional counselling at postnatal centres and child health services could prevent childhood malnutrition.

In this study, substance and alcohol abuse during pregnancy have also proven to be contributing factors to stunting children's growth. Most mothers in this study agree that they have had some form of substance or alcohol abuse during their pregnancy. They are also the caregivers of the children. Only one child who was stunted in this study, was cared for by a father (as a primary care-giver). The majority were mothers who cared for the children who suffered from MAM.

Polanska et al. (2015) agree with this study that alcohol intake and smoking during pregnancy are associated with mental health challenges and cognitive development of children four (4) years and younger, which then stunts the growth of these children. Another study done by Tomasz et al. (2015) confirms that alcohol addiction is a severe problem and it involves high costs for people, families and societies. In turn, the abuse then contributes to the emotional suffering of addicted persons as well members of their families, and children are the ones mainly affected. Children who are exposed to such an environment are prone to become malnourished as a result of the adverse effects of substance and recreational drug abuse of the parents or caregivers.

Conclusion

Overall, this study concluded that mothers who did not supplement iron in their children's diet did not believe that it contributed to malnutrition. However, mothers who gave children iron supplements agreed that it had nutritional value. Obesity was also found to be a factor in malnutrition. More girls than boys were found to be overweight. Although family income was not associated with obesity in the bivariate analysis, it was evident in the multivariate analysis. Furthermore, maternal and childcare practices also contributed to MAM as indicated in this study. Mothers agreed that visiting the clinic on a regular basis would allow the health staff to detect any signs of malnutrition in their children at an early stage. Vitamin A, deworming medication and iron supplements are given free at the clinics. It was also revealed that children who were enrolled in these schemes/programmes put on weight. In this study, substance and alcohol abuse during pregnancy have also proven to be contributing factors to stunting children's growth. Most mothers in this study agree that they have had some form of substance or alcohol abuse during their pregnancy. They are also the caregivers of the children. The majority were mothers who cared for the children who suffered from MAM.

The current study indicated that most mothers were single parents, and the majority of households had access to electricity supply. In addition, most of the households had fridges and electrical stoves that assisted the families to store and prepare their food to ensure the food was fresh and safe for human consumption. These were seen as good food service practices. Furthermore, most of the mothers included in the study, had at least obtained a high school education.

Limitations of the study

Collective limitations make it more difficult to obtain a sample size that is sufficient enough and representative of the target population. Conducting a true randomised controlled trial is expensive and time consuming. Since the study population was limited to a small semi-rural area in Franschhoek in the Cape Winelands district in the Western Cape, it only included children aged six months to five years affected by malnutrition and who needed the clinic's services. Therefore, the sample population was small and homogenous.

Recommendations

Based on the research findings, this study recommends that, parents/communities should be encouraged and motivated to engage in planting their own vegetable gardens. Educate parents on iron supplementation and the reasons why it improves children's mental development and intelligence. Education to all adults and children on a balanced diet within the constraints of their socio-economic circumstances, is vital. This can be done via health promotion sessions in the clinics and also in conjunction with the school nurses in the area. It can be done in the surrounding schools and crèches with the learners. Valuable inputs could be given at crèches regarding the preparation and types of food the children need. Health promotion in the clinic on the dangers of the use of substances and other recreational drugs, smoking and alcohol should be done on a daily basis.

In addition, due to time and other constraints, we could not consider the factors in relation to food habits and dietary intake of these specified children living in semi-rural area. Thus, we recommend these research areas can be remarkable aspects for further studies.

Making clients aware of the referral systems for assistance at faith-based organisations or the local Department of Social Development, will assist in preventing malnutrition in children. The PEM scheme has to be advertised broadly in the clinics on a daily basis. Home visits should be done to explain the advantages of this programme to all households with children under five years old.

Note

1. 1 Rand = 0.07868 USD (Source: https://www.xe.com/currencycharts/?from=ZAR&to=USD)

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