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THE NUTRITIONAL STATUS OF YOUNG CHILDREN 0-24 MONTHS ATTENDING CLINICS IN TSHWANE HEALTH SUB-DISTRICT 1, GAUTENG PROVINCE, SOUTH AFRICA

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ABSTRACT

Children between the ages 0 - 24 months are at high nutritional risk, which affects their growth and development, cognitive capacity, and productivity in adulthood. Therefore, this study aimed to determine the nutritional status of young children 0 - 24 months attending clinics in Tshwane Health Sub-District 1, Gauteng province, South Africa. A clinic-based cross-sectional quantitative descriptive study design was applied in this study. Anthropometric data were collected from 270 young children (107 aged 0 – 6 months, 91 aged 6.1 – 12 months, 47 aged 12.1 – 18 months, and 25 aged 18.1 – 24 months) in 10 clinics in Tshwane Health Sub-District 1 using a questionnaire. Data was captured on a Microsoft Excel 2016 spreadsheet and analysed using SAS (SAS Institute Inc, Carey, NC, USA), Release 9.4. A Pearson chi-square test was used to test for correlation between the socio-economic, demographic and the nutritional status of young children, where a P-value ≤0.05 was considered significant. The results of the study showed that 160 (59.3%) had normal weight for length, 18 (6.7%) were wasted, 22 (8.2%) were severely wasted, 24 (8.9%) were overweight and 46 (17.0%) were obese. One hundred and fifty-six (57.8%) had normal weight for age, 47 (17.4%) were underweight, 17 (6.3%) were severely underweight, 39(14.4%) had weight for age >+2SD and 11(4.1%) had weight for age >+3SD. 204 (75.6%) had normal length for age, 26 (9.6%) were stunted, 40 (14.8%) were severely stunted. For overweight young children, there was a significant association between weight and the number of people in the households, at P<0.038 and mothers weekly spend on food, at P<0.027. There was a significant association between length and the number of persons in the households at P<0.047, mothers' income at P<0.047, and mothers weekly spend on food at P<0.051. For underweight young children, there was a significant association between weight and weekly spend on food at P<0.037. There was a significant association between length and mothers' education at P<0.007. Although, the majority of young children had normal weight for length, normal weight for age and normal length for age. In this study, a significant number of young children were malnourished. The young child's weight for length and weight for age were influenced by the mother's weekly expenditure on food. Since the mother's employment status influences the child's weight and length, the implementation of alternative nutrition intervention strategies to monitor and improve the nutritional status of young children is necessary.

Key words: Underweight, wasting, stunting, undernutrition, overweight, obesity, malnutrition, nutritional status, young children, mothers

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INTRODUCTION

Globally in 2019, it was reported that among children under five years of age, 21.3% were stunted, 6.9% were wasted, and 5.6% were overweight [1]. 1n Africa, it was reported that 40% of children under five years were stunted, 27% were wasted, and 24% were overweight [2]. According to the South Africa Demographic Survey (SADHS) conducted in 2016 among children under five years of age, it was reported that 27% of children were stunted, 3% wasted, 13% overweight, and 6% underweight. In Gauteng Province, it was found that among the children under five years, 46.8% were stunted, 1.5% were wasted, 6% were underweight, and 11.2% were overweight [3]. Based on the studies cited above, there was a high prevalence of stunting globally and in South Africa, especially in Gauteng province. A high prevalence of wasting was reported in Africa, and incidences of overweight were found in Africa and Gauteng province, South Africa. This means that there is still a high prevalence of stunting, wasting, and overweight globally and in African countries. Consequently, this may result in further global childhood mortality rate increases if not addressed.
The nutritional status of young children can be classified as stunting, wasting, being underweight, and being overweight (Table 1). Malnutrition, which indicates an unhealthy nutritional status in young children, is associated with an increased risk of degenerative diseases later in life, affects learning capacity and physical development, with negative consequences for adult productivity and economic development. Therefore, malnutrition is not only an urgent global health issue but also an impediment to productivity, economic growth, poverty eradication, and a cause of ongoing poverty [4].

The findings of a study conducted in Tanzania among children between 6 and 23 months of age showed that optimal nutritional status was achieved when children had access to affordable, diverse, nutrient-rich foods, appropriate maternal and child-care practices, adequate health services, and a healthy environment including safe water, sanitation, and good hygiene practices [5]. However, in 2011, stunting rates, micronutrient deficiencies, hunger, and food insecurity were higher in young children [6]. Undernutrition mainly affected young children living in rural areas of South Africa and whose parents had low educational status, low or no income, and lived under poor environmental conditions [6]. Iverser *et al*. [6] further alluded that undernutrition placed children at higher risk of dying from common infections, increased the rate and seriousness of such infections, and slowed recovery. Consequently, the body's immune system becomes unable to mount adequate immune responses to an invading microorganism, resulting in most deaths associated with undernutrition in young children [6]. Growth retardation occurs when young children are malnourished, and studies done two decades ago in South Africa reported poor growth among children. For example, the nationwide 1994 South African Vitamin A Consultative Group (SAVACG) survey found that most children below six years were stunted (height for age <-2 standard deviations (SD) from median reference values) [7]. Simultaneously, severe wasting (Weight for height <-3 SD from median reference values) was observed in few children, with growth deficits observed to be more prevalent in rural compared to urban communities [7]. However, in a study conducted in central rural areas in

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Limpopo Province in 2005, it was found that most children aged three years were stunted [8], with higher stunting rates reported in more urbanised Western Cape areas [9]. The findings of the studies conducted in Limpopo and Western Cape provinces signify that although the forms of malnutrition may differ among young children under five years, malnutrition prevalence exists in both rural and urban areas.

The Tshwane declaration of support for breastfeeding in South Africa, which helps promote, protect, and support breastfeeding that will reduce child mortality and improve young children's health and development, was introduced and implemented in most hospitals in South Africa in 2011. In 2012, the South Africa Social Security Agency (SASSA's) zero hunger program was introduced as a strategy to ensure that by the year 2030, no South African will suffer from hunger. Also, in efforts to fight malnutrition in young children, the South African Government introduced monthly child social grants to assist children from low-income households with their basic needs, such as food. However, studies show that malnutrition is still prevalent globally, including in Sub-Saharan Africa and Southern Africa [2]. Since 1994, a significant challenge has been to monitor the nutritional status of all South Africans since data reported during the apartheid years often excluded the majority of the population, that is, mainly black South Africans, Coloureds, and those of Asian/Indian descent. The causes of nutritional problems and their effects are well known. However, their prevalence and influence on nutritional status differ from one area to another. Most studies conducted on the nutritional status of young children were done among children under five years of age [3, 10- 25]. There is also a dearth of current literature on the nutritional status of children aged 0-24 months in South Africa. Therefore, the aim of the study was to assess the nutritional status of young children aged 0-24 months in Tshwane Health Sub-District 1, Gauteng Province, South Africa.

MATERIALS AND METHODS

Study design and study setting

The study followed a descriptive clinic-based cross-sectional survey approach using a questionnaire to collect anthropometric data from young children in Tshwane Health Sub-District 1 - located in the north of Pretoria, Gauteng, South Africa. Health Sub-District 1 covers all the clinics situated at Ga-Rankuwa, Soshanguve, and Mabopane Township areas (township areas are semi-urban areas with informal settlement areas squatter camps). These clinics provide primary health care services, including nutritional care services to communities with different socio-economic backgrounds, all in the north of Pretoria, about 29km to 37 km from Pretoria city.

Target population, Sampling strategy, and sample size

A convenience sampling strategy was used to select the participants for the study. The average monthly inflow of young children 0-24 months who visited the Tshwane Health Sub-District 1 clinics between January and June 2017 was 57. As data were planned to be collected for six months, the target population was 344 (57 X 6) young children 0-24 months (Table 2).

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A Raosoft sample size calculator with a 5% margin of error, 95% confidence level, and 50% response distribution was used to calculate the sample size and 229 participants were sampled for the study [26]. In total, 18% was added to the sample size to compensate for uncontactable persons, that is, 270 young children (0-24 months) with their mothers participated from the ten clinics selected using a random sampling technique (Table 2).

Data collection tools and procedures

Before data collection, five research assistants fluent in English and the local language (Setswana) were recruited and trained by the researcher to collect data, take anthropometric (weight and length) measurements, and classify the young children's growth using the WHO classification [27]. The training ensured that consistency and adequacy were maintained during data collection. Data was collected from 270 mothers and young children over a period of six months (from February to August 2019). A questionnaire adapted from previous studies [28,29], was modified for this study and used to collect demographic data of young children, and writing the anthropometric data, and the nutritional status of young children. The three anthropometric parameters (weight-for-age, length/height-for-age, and weight-for-height/weight for length) were used to assess the nutritional status of young children. If a child has a low length/height-for-age, that is, a Z-score below negative two standard deviations of the reference population mean (-2 Z- score), such child was categorized as "stunted ". Similarly, a low weight-for-age was diagnostic of an "underweight" child, while a low weight- for- length/height was indicative of "wasting "[30]. The weight-for-age, weight-for-length, and length–for-age were calculated using WHO Anthro software (Anthropometric calculator). Clinics were visited randomly over the study period to collect demographic information and anthropometric data. Study participants were selected when they visited the clinic with their mothers for a postnatal check-up, immunisation, consultation, or growth monitoring at clinics selected for the study. The sampling period was for approximately six months, and it allowed as many young children as were needed to participate in the study.

A room was requested and allocated to do anthropometric measurements. On the days of data collection, young children were sampled as they came to the clinic using a "first come, first served" principle. The purpose of the study was explained to the mothers of young children while they were queueing for the clinic services, and questions were clarified before they completed the consent form. Only young children aged 0-24 months who attended any of the 10 study clinics with their mothers and whose mothers agreed and consented to participate in the study were considered for this study.

Anthropometric measurements

Weight measurement

The weight was measured in kilograms using the Seca scale with an accuracy of 0.1 kg. Before measuring, testing of the scale with known weight was also done. During the weight measurement, calibration was done by ensuring that the scale pointers were zero before measurements were taken. The young children were weighed twice with

minimum clothing. The mean of the two weights was recorded (so long as the difference between them was not more than 0.1 kg).

Length (Recumbent Height) measurement

The Length (Recumbent height) of the young children was measured in centimetres using a length mat with a headboard to the nearest 0.1 cm accuracy. The young children were measured lying on their backs. Before taking the reading, the researchers ensured that the children were barefooted and that the heels, buttocks, shoulders, and the back of the head touched the mat. The recumbent height (length) readings were taken twice, and the mean was computed to establish the child's recumbent height (length), which was recorded on the questionnaire.

Nutritional status indicators

Weight and length (recumbent height) were converted to the nutritional status indicators: Weight-for-Length (WLZ), Weight-for-Age (WAZ), and Length -for-age (LAZ), and is expressed as z-scores based on a standard reference of measurement by the WHO. The weight for length, weight for age and length for age were obtained using WHO Anthro software (anthropometric calculator) [27]. Children were classified as wasted (WLZ <-2 z-score), severely wasted (WLZ <-3 z-score), underweight (WAZ <–2 z-score), severely underweight (WAZ <–3 z-score), stunted (LAZ <–2 z-score), and severely stunted (LAZ <–3 z-score), overweight (WLZ >+2 z-score), and obese (WLZ >+3 z-score).

Ethical considerations

Ethical clearance was obtained from Sefako Makgatho University Research Ethics Committee (SMUREC) (certificate number SMUREC/H/166/2018:PG). Approval was obtained from Tshwane district, Department of Health Research Committee. Clinic managers from different clinics also granted permission. Participants were assured that participation was voluntary and that they could withdraw anytime and that all responses would be treated confidentially. The mothers of young children signed the consent form for their children to participate in this study. Part of the funding was covered from the research fund of Prof F. J. Veldman (co-author).

Data analysis

Data was captured on Microsoft Excel 2016. Data analysis was performed using SAS (SAS Institute Inc., Carey, NC, USA), Release 9.4. Frequencies and percentages were calculated. A Pearson chi-square was used to test for associations between socio-demographics of young children and the nutritional status of young children.

RESULTS AND DISCUSSION

This study was conducted on a group of young children aged 0-24 months. The demographic characteristics of young children are presented in Table 3. The nutritional status (Weight- for- length, Weight- for- age, and Length- for- age) of young children 0- 24 months are presented. The nutritional status according to gender is presented in figure 1.

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Weight- for- length of young children 0-24 months

Of 107 infants 0-6 months old, 63 (58.9%) had normal WLZ, 24 (22.4%) were obese, and 5 (4.7%) were severely wasted; from 91 infants 6.1-12 months old, 53 (58.2%) had normal WLZ, 12 (13.2%) were overweight, and 8 (8.8%) were wasted. From 47 children 12.1 - 18 months old, 30 (63.8%) had normal WLZ, 5 (10.6%) were obese, 8 (17.0%) were severely wasted, and 4 (8.5%) were wasted; and of the 25 children 18.1-24 months old, 14(56.0%) had normal WLZ, 6 (24.0%) were obese, and 2 (8.0%) were severely wasted.

This study showed that most young children aged 0-6 months, 6.1–12months, 12.1–18 months and 18.1-24 months had normal weight for length.

Weight for age for young children 0-24months

Out of 107 infants 0-6 months old, 70 (65.4%) had normal WAZ , 5 (4.7%) were severely underweight, 22 (20.6%) had WAZ >+2SD, 4 (3.7%) had WAZ >+3SD; of the 91 infants 6.1-12 months old, 49 (53.9%) had normal WAZ, 17 (18.7%) were underweight, 16 (17.6%) had WAZ >+2SD, 5 (5.5%) had WAZ >+3SD; out of 47 children 12.1 - 18 months old, 25 (53.2%) had normal WAZ, 17 (36.2%) were underweight, 1(2.1%) had WAZ >+2SD; and out of 25 children 18.1 - 24 months old, 12 (48.0%) had normal WAZ, 4 (16.0%) were severely underweight, 7 (28.0%) were underweight and 2 (8%) had WAZ >+3SD.

The majority of young children between ages 0-6 months, 6.1 - 12 months, and 12.1 - 18 months old had normal weight for age whereas some children 18.1 - 24 months old had weight for age below -2 z-score or -3 z-score.

Length for age for young children 0-24months

Out of 107 infants 0-6 months old, 89 (83.2%) had normal LAZ, 18 (17%) were stunted; of the 91 infants 6.1-12months old, 76 (83.5%) had normal LAZ, 15 (16%) were stunted; out of 47 children 12.1 - 18 months old, 27 (57.5%) had normal LAZ 20 (51.2%) were stunted; and out of 25 children 18.1 - 24 months old, 12 (48.0%) had normal LAZ, 8 11(37.0%) were stunted.

Most children between the ages 0-6 months old, 6.1 - 12 months old, and 12.1 - 18 months had normal length for age, while some children aged 18.1 - 24 months had length for age below -2 z-score or -3 z-score. Similarly, a study conducted in all South African provinces found that children between the ages 18 - 23 months had the highest percentages of weight for age and length for age below -2 z-score or -3 z-score [3]. According to Adhikar *et al.*, [31] children whose growth were monitored had low chances of being underweight. If having weight for age and length for age below -2 z-score or -3 z-score is not prevented during childhood, it could have long-term effects such as diminished cognitive and physical development, poor health, and increased risk of non-communicable diseases (NDCs) later in life [32].

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Nutritional status of young children according to gender

In this study, the prevalence of wasting was slightly higher in boys than their girl counterparts. Equally, a study conducted in Tanzania reported a high prevalence of wasting, which was observed among male children compared to female children [19]. Contrarily, a study conducted in Uganda found a high prevalence of wasting in girls when compared to boys [21]. The reason for boys being more wasted than girls could be attributed to the biological constitutions of the females, meaning that females naturally have a higher body fat percentage than males. In this study, male children had a higher prevalence of underweight as compared to female children. Equally, a study done in Tanzania and Uganda, reported a high prevalence of underweight among male children [19, 21]. The underweight in boys might be because boys are more likely to be engaged in playing, making them not eat or finish their meals because they would want to continue playing. It can also be that boys are allowed to range widely and girls kept close to or in the home. This subjects the boys to more parasitic infections which in turn can reduce appetite. In this study, stunting was found to be more prevalent in boys than in girls. These findings are consistent with studies conducted by Jemide *et al.* [10] and Tshiya and Mogoha [19], which reported that more males were stunted. Studies showed that stunting thrives in developing countries and is associated with poverty [13-15,17,18,23-25, 33]. In this study, more boys than girls were found to be overweight. These findings are consistent with the findings of a study conducted by the National Department of Health in 2016 in South Africa, which showed that more boys were overweight than girls [3]. Boys being more overweight than girls could be due to consumption of unhealthy meals, which predispose the individuals to non-communicable diseases (Figure 1).

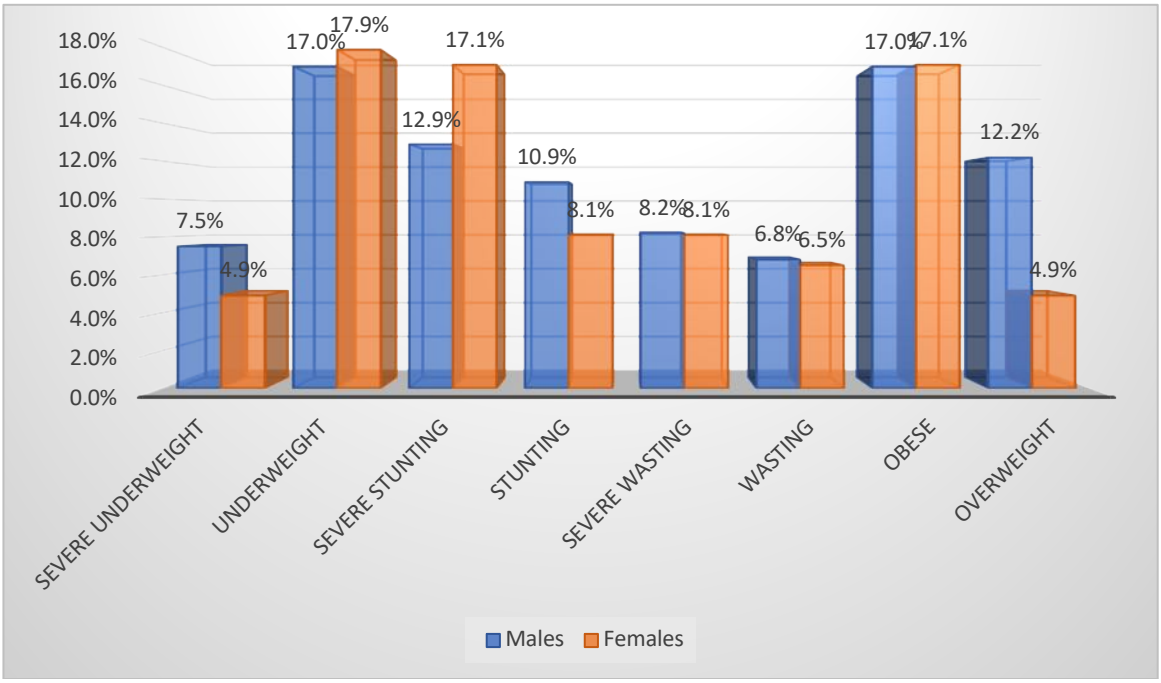

Figure 1: Nutritional status according to gender

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The young children's nutritional status is presented according to their age groups in Table 4. In this study, young children between the ages of 6.1-12 months were more wasted, whereas, young children between 12.1-18 months were severely wasted, Table 4. Similarly, studies conducted in Tanzania and Northern Uganda found that children between the age of 6-11 months were more often wasted [19, 21]. Imam *et al.* [20] showed that wasted children were predominately aged 12-23 months. Young children aged 6.1-12 months were wasted in this study, and this may be because during this period, complementary foods that may have been nutritionally inadequate were introduced to infants from 6 months of age, thus potentiating wasting. At 12.1-18.0 months old, young children would try to feed themselves, and when the mothers tried to feed them, they cried. This probably led to young children not consuming enough food to meet their daily recommended dietary needs to grow well.

Generally, this study showed a lower prevalence of wasting when compared to some studies conducted in other parts of the world and Africa [10-18, 33]. However, studies done in all South African provinces by the National Department of Health in 2016 and Tanzania found the prevalence of wasting being lower than in the current study [3, 19]. Wasting in this study was similar to the other studies because they were conducted in developing countries in a setting with participants' demographic characteristics similar to this study. These findings denote that malnutrition still exists in these developing countries and, if not addressed, might lead to increased rates of morbidity and mortality.

An equal percentage of underweight was found among young children 6.1-12 and 12.1-18 months, Table 4. The prevalence of underweight was found to be more among young children 6.1-12 months and 12.1-18 months. Conversely, a study conducted in South African provinces reported the highest proportion of children being underweight at 18 to 23 months old [3]. The underweight among young children 6.1–12 months may be due to the inadequate introduction of complementary foods from 6 months – where mothers may find it difficult/overwhelming to establish an appropriate eating pattern for their infants in this age group. Being underweight among young children between 12 to 18 months old may be because children in this age group started crawling, walking, and may handle and eat unsafe and contaminated food items. This practice may have exposed children to diarrheal diseases risks, resulting in weight loss, poor weight gain, and being underweight [34, 35].

Some children aged between 0-6 months old in this study were severely underweight. The underweight among young children 0-6 months could be that the young children were given low-calorie supplementary feeds like water, sugar water, teas, diluted juices, which in turn reduces the child's appetite and the reduced suckling reduces the mother's breast milk supply. It may also be because the mothers were not providing adequate breastfeeding to their young children, or the young children were born with low birth weight. These necessitated chronic disease screening such as hypertension among antenatal mothers and ensuring that mothers with hypertension were adequately managed to prevent pregnancy-induced hypertension. According to Getaneh *et al. [36],* pregnancy-induced hypertension is known to be a cause of low birth weight in infants.

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Furthermore, more time should be spent on educating mothers on the benefits of exclusive breastfeeding on every visit to the facility.

In this study, the prevalence of underweight was high as compared to the studies conducted in Kigoma, Tanzania, Northern Uganda, Lagos, Nigeria, Malawi and Limpopo, South Africa [19, 21, 22, 25,33], but low when compared to other studies done by [10, 11, 15, 17, 18, 23].

In the current study, the prevalence of stunting reported in Table 4 was lower than the recommended UNICEF and WHO indicators [2,40] in all young children age groups. Some young children aged 12.1 – 18 months were stunted, some young children aged 6.1–12 months and 12.1 – 18 months were severely stunted. Similarly, a study conducted in South Africa, showed that stunting increased with age from 8 months to 24 months – with the majority of children 18-23 months being stunted [3]. The SADH survey reported that a mother's education and wealth quintile influenced stunting levels [3]. Stunting in this study was low compared to other studies done in Africa and globally [10, 11, 13-20, 23, 24, 25,33], while severe stunting was similar to the study conducted in South Africa, Gauteng province [3], high as compared to studies done in Calabar, Cross Rivers State, Nigeria and Maharashtra, India [10,15], and low as compared to studies done in South Ethiopia and Kigoma, Tanzania [17,19].

Some young children aged 6.1–12 months were overweight, and some children aged between 0–6 months were obese, Table 4. In contrast, the prevalence of overweight in children in this study was low as compared to the African countries reported by UNICEF/WHO and World Bank Group [2]. The prevalence of combined overweight and obesity in young children 0-6 months was high with reference to the indicator in Table 1. The reason for obesity in young children 0-6 months may be because their mothers were mix feeding – successively resulting in overweight. The reason for overweight in infants between 6.1 to 24 months could be that their mothers introduced them to inappropriate complementary foods containing high sugar and fat with little or no vegetables and fruits [37, 38].

There were associations between the young children's nutritional status and gender in Table 5; and significant associations between children's gender and their weight and length at $p<0.003$ and $p<0.022$, respectively. There was a significant association between gender and WLZ at $p<0.030$ among young children between 6.1-12 months.

In this study, mothers' occupation, mothers' monthly income, households' weekly expenditure on food, and the number of persons in the household were associated with the young children's nutritional status. Overall, there is an association between nutritional status of young children and their demographic characteristics as shown in Table 6. There was a significant association between the mothers' monthly income and weekly food expenditure and the young children's weight and length.

For overweight young children, there was a significant association between weight and the number of people in the households, at $P<0.038$ and mothers weekly spend on food,

at P<0.027. There was a significant association between length and the number of persons in the households at P<0.047, mothers' income at P<0.047, and mother's weekly expenditure on food at P<0.051. For underweight young children, there was a significant association between weight, and weekly spend on food at P<0.037. There was a significant association between length and mothers' education at P<0.007.

Similarly, a South African study found that undernutrition more often affects young children whose parents have low or no income [6]. Additionally, a study conducted in Bangladesh reported that the nutritional status of young children was influenced by the family's monthly income [39]. This may be because families with low or insufficient income may not provide adequate diet or enough food for their households. Subsequently, these may result in children consuming inadequate diets, therefore, predisposing them to malnutrition.

CONCLUSION

This study revealed that a large proportion of young children had normal weight for length, weight for age and length for age. However, a significant number of young children were malnourished. A collective overweight and obesity prevalence in young children 0-6 months was also found to be high. Hence, the prevalence of wasting, underweight and stunting was low among young children of all age groups.

The malnutrition prevalence in different age categories show that malnutrition still exists among young children aged 0-24 months. These findings have an important message to all dietitians and nutritionists to develop and implement preventative nutrition intervention strategies (nutrition educational programmes) to empower mothers with helpful knowledge to improve their young child feeding practices as per their young children's age categories and nutritional needs.

Additionally, nutrition education personnel must first identify the income and food items available in the household, and how the available foods can be nutritionally enhanced to meet their young children's nutritional needs.

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Table 1: Classification for assessing the severity of malnutrition in children below five years of age

The severity of malnutrition based on ranges of prevalence

Malnutrition Indicator	Low (%)	Med (%)	High (%)	Very high (%)
Stunting	2.5 - <10	10 - <20	20 - <30	≥30
Wasting	2.5 – <5	5 - <10	10 - <15	≥15
Underweight	<10	10-19	20-29	≥30
Overweight	2.5 - <5	5 - <10	10 - <15	≥15

Source: [2,40]

Table 2: Target population and sample size

CLINIC	SAMPLE SIZE N (%)
Garankuwa View clinic	25 (9.3%)
Kgabo CHC	25 (9.3%)
K.T. Motubatse clinic	30 (11.1%)
Maria Rantho clinic	28 (10.4%)
Phedisong 1 clinic	26 (9.6%)
Phedisong 4 CHC	26 (9.6%)
Soshanguve 2 clinic	29 (10.7%)
Soshanguve block TT clinic	27 (10.0%)
Soshanguve CHC	28 (10.4%)
Tlamelong clinic	26 (9.6%)
Total	**270 (100%)**

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Table 3: Demographic information of young children aged 0-24 months

Variable	Ga-Rankuwa		Soshanguve		Mabopane		Total	
	n	%	n	%	n	%	n	%
Gender (n-270)								
Male	44	16.3	69	25.6	34	12.6	147	54.5
Female	33	12.2	73	27.0	17	6.3	123	45.5
Total	77	28.5	142	52.6	51	18.9	270	100
Age groups (months) (n-270)								
0-6.0	27	10	64	23.7	16	5.9	107	39.6
6.1-12.0	27	10	44	16.3	20	7.4	91	33.7
12.1-18.0	15	5.6	22	8.2	10	3.7	47	17.5
18.1-24.0	8	2.9	12	4.4	5	1.9	25	9.2
Total	77	28.5	142	52.6	51	18.9	270	100
Mother's employment status (n-270)								
Full time	14	5.1	21	7.8	7	2.6	42	15.5
Part-time	4	1.5	11	4.1	4	1.5	19	7.1
Domestic worker	0	0.0	0	0.0	0	0.0	0	0.0
Student	5	1.9	8	2.9	2	0.7	15	5.5
Unemployed	54	20	101	37.4	35	13.0	190	70.4
Self-employed	0	0.0	1	0.4	3	1.1	4	1.5
Total	77	28.5	142	52.6	51	18.9	270	100

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Mother's monthly income (n-265)								
≤R500	10	3.8	29	11.0	14	5.3	53	20.1
>R500–1000	21	7.9	52	19.6	20	7.6	93	35.1
>R1000–2000	16	6.0	22	8.3	13	4.9	51	19.2
>R2000–3000	10	3.8	12	4.5	3	1.1	25	9.4
>R3000	16	6.0	26	9.8	1	0.4	43	16.2
Total	73	27.5	141	53.2	51	19.3	265	100
Mother's weekly expenditure on food (n-267)								
<R50	5	1.9	4	1.5	3	1.1	12	4.5
R50–R100	25	9.4	78	29.2	24	9.0	127	47.6
R100–R500	37	13.8	44	16.5	18	6.7	99	37
R500–R1000	7	2.6	11	4.1	4	1.5	22	8.2
>R1000	1	0.4	4	1.5	2	0.8	7	2.7
Total	75	28.1	141	52.8	51	19.1	267	100
Number of persons living in a household (n-270)								
2–3 people	15	5.6	35	12.9	10	3.7	60	22.2
4 people	17	6.3	31	11.5	11	4.1	59	21.9
5 people	25	9.2	27	10.0	10	3.7	62	22.9
6–7 people	17	6.3	27	10.0	17	6.3	61	22.6
≥8 people	3	1.1	22	8.2	3	1.1	28	10.4
Total	77	28.5	142	52.6	51	18.9	270	100

*265 mothers reported their monthly income

*267 mothers reported their weekly spend on food

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Table 4: Nutritional status of young children aged 0-24 months old

Variables	0-6 months		6.1-12 months		12.1-18 months		18.1-24 months	
	n	%	n	%	n	%	N	%
Normal (WLZ)	63	23.3	53	19.6	30	11.1	14	5.2
Wasting (WLZ <-2)	4	1.5	8	3	4	1.5	2	0.7
Severe wasting (WLZ <-3)	5	1.9	7	2.6	8	3	2	0.7
Normal (WAZ)	70	25.9	49	18.5	25	9.3	12	4.4
Weight (WAZ >+2)	22	8.2	16	5.9	1	0.4	0	0.0
Weight (WAZ >+3)	4	1.5	5	1.9	0	0.0	2	0.7
Underweight (WAZ <-2)	6	2.2	17	6.3	17	6.3	7	2.6
Severe underweight (WAZ <-3)	5	1.9	4	1.5	4	1.5	4	1.5
Normal (LAZ)	89	33.0	76	28.2	27	10.0	12	4.4
Stunting (LAZ <-2)	7	2.6	5	1.9	9	3.3	5	1.9
Severe stunting (LAZ <-3)	11	4.1	10	3.7	11	4.1	8	2.9
Overweight (WLZ>+2	11	4.1	12	4.4	0	0.0	1	0.4
Obese (WLZ>+3)	24	8.9	11	4.1	5	1.9	6	2.2

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Table 5: Association between nutritional status and gender of young children

Variables	**Young children gender and nutritional status**								
	Boys				**Girls**				**P-Value**
	n		%		n		%		
Weight	147		54.44		123		45.56		***0.003**
Length	147		54.44		123		45.56		***0.022**
Age (months)	Boys n	%	Girls n	%	Total n	%	WLZ P-Value	WAZ P-Value	LAZ P-Value
0-6	57	53.3	50	46.7	107	100	0.852	0.445	0.492
6.1-12	53	58.2	38	41.8	91	100	*0.030	0.719	0.989
12.1-18	23	48.9	24	51.1	47	100	0.111	0.466	0.151
18.1-24	14	65	11	44	25	100	0.456	0.131	0.551

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Table 6: Association between nutritional status of young children and their demographic characteristics

Variables	**Young children mothers' employment status**										
	Full time		**Part-time**		**Domestic worker**		**Student**		**Unemployed**		**P-Value**
	N	%	n	%	N	%	n	%	n	%	
Young children's Weight	42	15.6	19	7.0	0	0.0	15	5.6	190	70.4	***0.040**
Young children's length	42	15.6	19	7.0	0	0.0	15	5.6	190	70.4	**0.201**
Variables	**Young children's mothers' monthly income**										
	≤500		**>500-1000**		**>1000-2000**		**>2000-3000**		**>3000**		**P-Value**
	N	%	n	%	N	%	n	%	n	%	
Young children's Weight	53	20	93	35.1	51	19.3	25	9.4	43	16.2	***0.028**
Young children's length	53	20	93	35.1	51	19.3	25	9.4	43	16.2	***0.015**
Variables	**Young children's mothers weekly spend on food.**										
	<50		**50-100**		**>100-500**		**>500-1000**		**>1000**		**P Value**
	N	%	n	%	N	%	n	%	n	%	
Young children's Weight	12	4.5	127	47.6	99	37.1	22	8.2	7	2.6	***0.033**

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Young children's length	12	4.5	127	47.6	99	37.1	22	8.2	7	2.6	***0.018**
Young children's WLZ	12	4.5	127	47.6	99	37.1	22	8.2	7	2.6	***0.043**
Variables	**Young children number of people in the household**										
	2-3 people		**4 people**		**5 people**		**6-7 people**		**≥ 8 people**		**P-Value**
	N	%	n	%	N	%	n	%	N	%	
Young children's Weight	60	22.2	59	21.9	62	22.9	61	22.6	28	10.4	***0.000**
Young children's length	60	22.2	59	21.9	62	22.9	61	22.6	28	10.4	***0.015**

*P value ≤ 0.05 implies significant difference

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