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Food and nutrition security of adolescents and young adults NEETs and non-NEETs in two low socioeconomic urban settlements in South Africa

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Abstract

Introduction Adolescents and young adults not yet in employment, education, or training (NEETs) account for a sizable fraction of the global population. In South Africa, 34.3% of young individuals aged 15 to 24 were classified as NEETs in 2022. Lack of work in low-income areas may lead to poverty and food insecurity, negatively impacting diet quality.

Objective This cross-sectional study aimed to evaluate and compare the anthropometric status, dietary intake, and food security of NEET and non-NEET adolescents and young adults (aged 18–24 years) in Langa and Fisantekraal, two low socioeconomic settlements in South Africa.

Methods Participants were recruited through door-to-door visits. Standardized instruments including a socio-demographic questionnaire, household hunger score, lived poverty index, anthropometric assessments, and 24-hour dietary recalls were used for data collection.

Results There were no significant differences in the prevalence of household hunger ($p = 0.496$), the lived poverty index ($p = 0.111$) and the prevalence of low micronutrient intakes between the NEETS and non-NEETs ($p > 0.05$). The prevalence of inadequate daily iron intake had the lowest prevalence while the prevalence of inadequate calcium intake was highest in this group of adolescents and young adults. The insufficient intake of micronutrients among adolescents and young adults can be attributed to the diets consumed by this demographic group.

Keywords Adolescents, Dietary intake, Food security, Nutritional status, Micronutrient intake, South Africa, Young adults

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Introduction

Globally about one in five young people aged 15–24 is neither in employment, education, or training (NEETs) with two out of three NEETs being young women [1]. In South Africa about 33.3% of the approximately 10,2 million young people aged 15–24 years in the first quarter of 2022 are NEETs [2]. NEETs face challenges due to their limited skill set, social interactions, job opportunities, and financial situation [3]. Poverty is often a direct consequence of unemployment and employability significantly decreases with lower levels of education [3]. The food and nutrition security of individuals in these circumstances is frequently compromised.

Adolescents and young adults are under-represented in nutrition research, including in Africa. South Africa is currently investigating how to best address the needs of adolescent and young adult NEETs in the country-specific context to improve employability and access to education [4]. In this study, we aimed to compare the anthropometric status, dietary intake and food security of NEETs and non-NEET adolescents and young adults (aged 18–24 years) living in two low-income neighbourhoods.

Methods

This cross-sectional study utilised secondary data from adolescents and young adults who participated in the 'Evaluation of the Implementation of the Health Promotion Levy' study in Langa, (2018) and the 'Nutrition Capabilities of the Youth study' (2019) in Fisantekraal. Both studies used the same instruments and methods. Data was collected by the same group of trained field workers. The study included 970 participants aged 18 to 24 years. Recruitment and data collection were done via door-to-door visits. All participants provided written informed consent before enrolment. The study included one individual per household, and the study team collected data using standardized instruments. Data collected included: socio-demographic data (Supplement file- Appendix A), household hunger score (HHS) (Supplement file- Appendix B) [5], lived poverty index (Supplement file- Appendix C) [6], weight (kg) and height using an A & D Personal Precision Scale, (Tokyo, Japan) and a stadiometer, respectively. WHO cut points were used for classification body mass index (BMI) [7]. Dietary data was collected by means of one 24-hour-recall (Supplement file- Appendix D) per participant using the multiple-pass process. Portion sizes were determined through the use of food models and examples of common household measures. All data were coded, captured, and analysed in the nutrition database of the South African Medical Research Council [8] to translate foods into nutrients. Inadequate micronutrient intake was defined using the Estimated Average Requirements (EARs) cutoffs [9, 10] (Table 1). The top four most common micronutrient deficiencies were selected for consideration. Comparison of the prevalence of adequate intake for iron, vitamin A and calcium between NEETs and non-NEETs exclude the 18-year-olds. The cutoff points for 18-year-olds differ from cutoff points for those above 18 years. When grouped as NEETs and non-NEETs the 18-year-old groups were too small and thus comparing them separately was not possible. Vitamin D has the same cut-off point for both 18-year-olds and those above 18 years, thus all respondents' vitamin D data were presented collectively by sex and not by age grouping.

Details of the methods are provided in the supplemental file.

Table 1 Estimated Average Requirements for iron, vitamin A, and average intakes for calcium and vitamin D

Micronutrient	Age	Female	Male
*Iron	18 years	7.9 mg	7.7 mg
	19–24 years	8.1 mg	6 mg
*Vitamin A	18 years	360 µg	485 µg
	19–24 years	500 µg	625 µg
[α]Calcium	18 years	1100 mg	1100 mg
	19–24 years	800 mg	800 mg
[α]Vitamin D	18 years	10 µg	10 µg
	19–24 years	10 µg	10 µg

Data sources: *Food and Nutrition Board and Institute of Medicine* * Food & Nutrition Board (2001),[α]IOM (2011) [9]

Statistical analysis

All continuous variables were non-normally distributed and are expressed as medians [interquartile range (IQR)]. Categorical data are expressed as frequencies and percentages. We used the ANOVAs/ Mann-Whitney U test to establish differences between NEETS and non-NEETs for the continuous variables. We performed cross-tabulation to establish differences between BMI categories, household income brackets, household asset ownership, HHS categories, and LPI categories of NEETs and non-NEETs and used Pearson's correlation to analyse the relationship between these categorical variables.

Results

A total of 970 participants were included in this study (Table 2), with 77.7% from Langa ($n = 754$) and 22.3% from Fisantekraal ($n = 216$). Of the non-NEETs that were still at school, 68.1% ($n = 111$) were attending school only and not involved in any form of employment, while the rest [31.9% ($n = 52$)] were also engaged as wage earners ($n = 18$), part-time workers ($n = 4$), casual workers ($n = 3$) or in other forms employment ($n = 27$).

The median weight of the respondents was 64.1 kg (18.0) and 8.3% were underweight, 19.2% were overweight, 9.8% were moderately obese and 8.8% were

Table 2 Participant characteristics

Participant characteristics	All ($n=970$)	NEETs ($n=596$)	Non-NEETs ($n=374$)	*P*- value
Survey area				
Langa	754 (77.7)	456 (60.5)	298 (39.5)	
Fisantekraal	216 (22.3)	140 (64.8)	76 (35.2	
Age (in years)	21 (3)	21(3)	22(3)	0.031*
Sex [n (%)]				
Male	352 (36.4)	191 (32.1)	161 (43.2)	
Female	616 (63.6)	404 (67.9)	212 (56.8)	
Weight (kg)	64.1 (18.0)	64.6 (17.6)	63.1(18.1)	0.649*
Height (cm)	1.64 (0.11)	1.63 (0.11)	1.64 (0.12)	0.016*
BMI (kg/m^2)	23.4 (7.4)	23.8 (6.9)	23.1 (7.7)	0.106*
$^{\beta}$BMI classification [n (%)]				
Underweight ($BMI < 18.5\ kg/m^2$)	75 (8.3)	31 (9.0)	44(7.8)	
Healthy weight ($BMI\ 18.5\ kg/m^2$ to $24.9\ kg/m^2$)	488 (53.9)	190 (55.2)	298 (53.0)	
Pre-obese ($BMI\ 25.0\ kg/m^2$ to $29.9\ kg/m^2$)	174 (19.2)	57 (16.6)	117 (20.8)	
Moderately Obese ($BMI\ 30.0\ kg/m^2$ or $34.9\ kg/m^2$)	89 (9.8)	35 (10.2)	54 (9.6)	
Severely obese ($BMI\ 35.0\ kg/m^2$ or 39.9)	46 (5.1)	19 (5.5)	27 (4.8)	
Very severe obesity ($BMI \geq 40.0\ kg/m^2$)	34 (3.8)	12 (3.5)	22 (3.9)	
Level of education achieved [n (%)]				
Elementary level (Grade 0–6)	61 (6.4)	42 (7.1)	19 (5.3)	
Lower secondary (Grade 7–9)	180 (19)	120 (20.3)	60 (16.8)	
Upper secondary (grade 10–12)	708 (74.6)	430 (72.6)	278 (77.9)	
Employment status [n (%)]				
Unemployed	707 (72.9)	596 (100)	111 (29.7) $^{\infty}$	
Self-employed	9 (0.9)	0	9 (2.4)	
Wage earner	100 (10.3)	0	100 (26.7)	
Part-time	24 (2.5)	0	24 (6.4)	
Casual	14 (1.4)	0	14 (3.7)	
Other	116 (12.0)	0	116 (31.0)	
Currently in school [n (%)]	163 (16.8)	0	163 (43.6)	
Marital status [n (%)]				0.141 $^{\alpha}$
Single	879 (93.1)	547 (92.1)	350 (94.9)	
Married	33 (3.4)	26 (4.4)	7 (1.9)	
Separated	10 (1.0)	5 (0.8))	5 (1.4)	
Living together	23 (2.4)	16 (2.7)	7 (1.9)	
Have Electricity				
Yes	930 (97.9)	575 (98.0)	355 (97.8)	0.868 $^{\alpha}$
No	20 (2.1)	12 (2.0)	8 (2.2)	
Household hunger Score				
Little or no hunger at all (0–1)	846 (87.7)	515 (86.7)	331 (89.2)	0.496$^{\alpha}$
Moderate hunger in the household (2–3)	112(11.6)	74 (12.5)	38 (10.2)	
Severe hunger in the household (4–6)	7 (0.7)	5 (0.8)	2 (0.5)	
Household income bracket				

Table 2 (continued)

Participant characteristics		All ($n=970$)	NEETs ($n=596$)	Non-NEETs ($n=374$)	*P*- value
< 3001		404 (43,0)	245 (42,0)	159 (44,7)	0.090 [α]
3001–4000		109 (11,6)	65 (11,1)	44 (12,4)	
4001–5000		77 (8,2)	51 (8,7)	26 (7,3)	
5001–7500		80 (8,5)	43 (7,4)	37 (10,4)	
7501–10,000		37 (3,9)	20 (3,4)	17 (4,8)	
10,001–15,000		17 (1,8)	11 (1,9)	6 (1,7)	
15,001–20,000		10 (1,1)	6 (1,0)	4 (1,1)	
20,001–30,000		5 (0,5)	1 (0,2)	4 (1,1)	
40,001+		1 (0,1)	1 (0,2)	0 (0)	
Don't know		200 (21,3)	141 (24,1)	59 (16,6)	
Lived Poverty Index		0.48 ± 0.52	0.44 ± 0.51	0.51 ± 0.53	$p=0.111$
Household assets ownership	Response				
Refrigerator	Yes	750 (78.9)	456 (77.7)	294 (81.0)	0.224 [α]
	No	200(21.1)	131 (22.3)	69 (19.0)	
Freezer	Yes	46 (6.1)	27 (5.9)	19 (6.4)	0.796 [α]
	No	7.6 (93.9)	428 (94.1)	278 (93.6)	
Electric stove	Yes	699 (93.0)	426 (93.6)	273 (91.9)	0.371 [α]
	No	53 (7.0)	29 (6.4)	24 (8.1)	
Gas stove	Yes	43 (5.7)	26 (5.7)	17 (5.7)	0.371 [α]
	No	709 (94.3)	429 (94.3)	280 (94.3)	
Microwave	Yes	588 (61.9)	351 (59.8)	237 (65.3)	0.090 [α]
	No	362 (38.1)	236 (40.2)	126 (34.7)	
Land	Yes	37 (3.9)	26 (4.4)	11 (3.0)	0.278 [α]
	No	915 (96.1)	562 (95.6	353 (97.0)	
Grow anything on land	Yes	7 (21.9)	3 (14.3)	4 (36.4)	0.197 [α]
	No	25 (78.1)	18 (85.7)	7 (63.6)	

[α] p-value is the asymptotic Significance (2-sided) of the Pearson's Chi-square test between NEET status and other variables (test significance-$p \le 0.05$)

* p-value is the Mann-Whitney U for differences between NEETs and non-NEETs, test significance-$p \le 0.05$

[β]as classified by (WHO Consultation (2000) [28])

[∞] Non-NEETs that were attending school only

severely obese. There was no significant difference in weight, height and BMI between NEETs and non-NEETs. The NEETS were significantly shorter ($p=0.016$) than their non-NEET counterparts (Table 2). Close to 40% of the individuals in this population group were either pre-, moderately, or severely obese (Table 2). There was no significant difference between the NEETs and non-NEETs in the prevalence of obesity.

Figure 1 shows the frequency of going without water, cash, medication food and cooking fuel in the previous year. The average LPI calculated for the five variables was 0.48 ± 0.52. The LPI for NEETs was not significantly different to the LPI for non-NEETs (0.44 ± 0.51 and 0.51 ± 0.53 respectively, $p=0.111$).

There were non-significant correlations between ownership of assets and NEETs status as shown in Table 2, though a higher percentage of NEETs owned a refrigerator, microwave, and land. Additionally, crosstab analysis showed no relationship between ownership of assets and HHS. There was no significant correlation between LPI, BMI and nutrient intake.

The most commonly consumed foods in this group of adolescents and young adults were commercial bread with margarine, maize meal, rice, fruit, coffee/tea, and sugar (Table 3). The least commonly consumed foods are other dairy products, cooked vegetables, red meat, organ meat, fish, legumes, nuts, and vegetables. Furthermore, many participants reported non-consumption of vegetables, organ meat and legumes within the previous months.

We assessed dietary intake of four of the most commonly occuring deficiencies (iron, Vitamin A, vitamin D and calcium). Overall, the prevalence of inadequate daily intake of iron was highest among females aged between 19 and 24 years (28.3%), while males between 19 and 24 years had a lower prevalence of inadequate iron intake (10.5%) (Fig. 2A). Inadequate calcium intake and vitamin D had the highest prevalence compared to other micronutrient intakes (Fig. 2A). Figure 2B shows a comparison of the prevalence of inadequate micronutrient intake between NEETs and non-NEETs. There was no significant difference in the prevalence of inadequate intake between NEETs and non-NEETs.

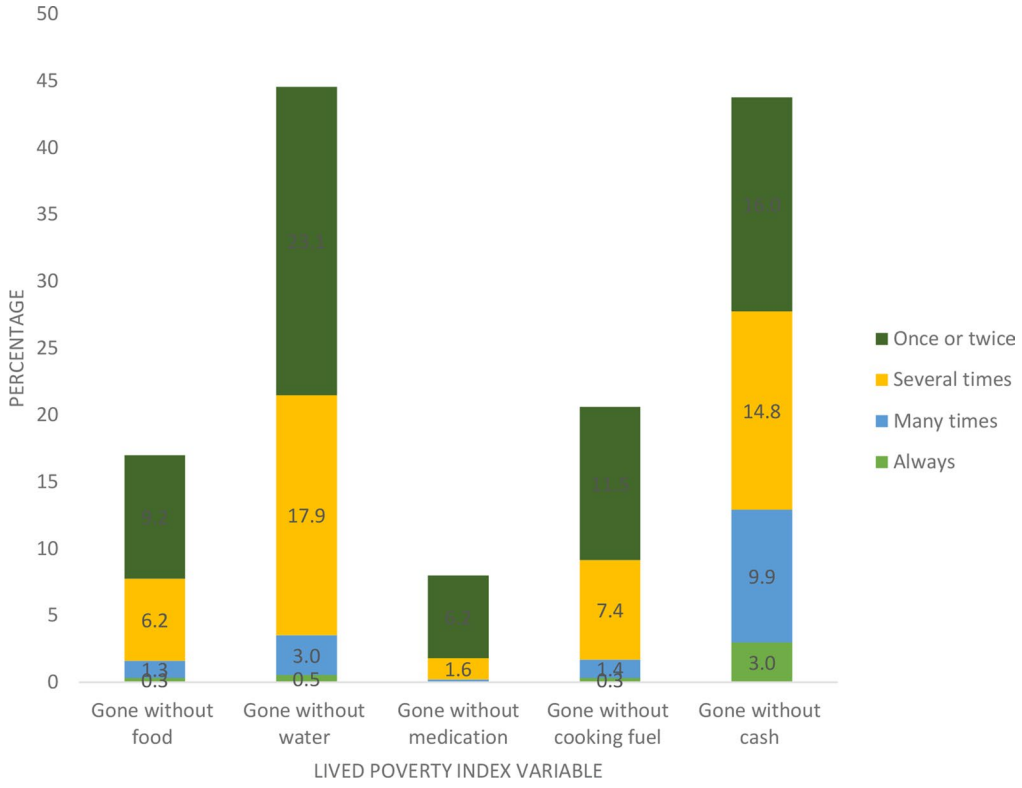

Fig. 1 Prevalence of going without basic necessities

Discussion

In this study, we expected that there would be a relationship between the NEETs' status in the HHS and other variables, however, our analysis showed there was no relationship with any of the variables. The mean HHS and mean LPI for NEETs were higher than those of non-NEETs but were not significantly different. The lack of significant difference in HHS observed between NEETs and non-NEETS in our study population is possibly because the study population lives in a low socioeconomic setting where financial resources are limited as evidenced by the similarity in the lived poverty index (LPI).

NEETs are largely classified as socially disadvantaged hence, analysing their dietary intake is essential. In this study, we observed the double burden of malnutrition, a phenomenon that is not foreign to South Africa [11, 12]. Levels of overweight and obesity were high, additionally there is a probability of micronutrient deficiencies occurring. This double burden of malnutrition is potentially a result of limited food selection and food access within the food environment. This is further exacerbated by the poverty status of both NEETs and non-NEETs. The prevalence of low intake of vitamin A and calcium is similar between the groups showing that adolescents and young adults in low socioeconomic settings, could be experiencing micronutrient deficiencies.

Despite the low prevalence of self-reported household hunger, the micronutrient deficient diets of these adolescents and young adults suggest that they are food insecure based on the definition of food insecurity. The food security definition according to FAO says 'a situation that exists when all people, at all times, have physical, social, and economic access to sufficient, safe and *nutritious* food that meets their dietary needs and food preferences for an active and healthy life' [13]. The findings on most commonly consumed foods coupled with the prevalence of low nutrient intakes reflects poor dietary quality among the adolescents and young adults in these population groups. The neglect of nutrition in this critical stage of the life cycle perpetuates the vicious cycle of poverty and malnutrition especially given the proportion of females of reproductive age and the average age of first pregnancy in South Africa [14].

The food environment could play a role in the lack of differences in the nutrient status of NEETs and non-NEETs. Analysis of the food environment was not within the scope of this study, but it is conceivable food cultural practices are likely to play a role in shaping the dietary patterns of this population group [15]. Food practices are usually passed from one generation to the next [16–18]. This may explain the pattern in the dietary intake of this population group. According to the SANHANES, at least a quarter of individuals are not meeting the

Table 3 Frequency of consumption of certain foods

Food	Never	1–3 times/month	Once a week	2–4 times a week	5–6 times a week	Once a day	2–3 times a day	>4 times a day
Milk/Amasi/curdled milk	94 (12.6)	108 (14.4)	103 (13.8)	228 (30.4)	85 (11.3)	123 (16.4)	7 (0.9)	1 (0.1)
Other dairy	344 (45.8)	146 (19.4)	74 (9.9)	113 (15.0)	50 (6.7)	23(3.1)	1 (0.1	-
Eggs	205 (27.3)	91 (12.1)	100 (13.3)	252 (33.6)	59 (7.9)	41 (5.5)	2 (0.3)	1 (0.1)
Chicken	14 (1.9)	27 (3.6)	64 (8.5)	357 (47.5)	228 (30.4)	60 (8.0)	1 (0.1)	-
Red meat	332 (44.2)	160 (21.3)	147 (19.6)	103 (10.6)	5 (0.7)	4 (0.5)	-	-
Organ meat	500 (66.6)	112 (14.9)	74 (9.9)	59 (7.9)	5 (0.7)	1 (0.1)	-	-
Highly Processed meat	319 (42.5)	60 (8.0)	62(8.3)	185 (24.6)	74 (9.9)	45 (6.0)	6 (0.8)	-
Fish (raw/cooked/canned)	321 (42.7)	139 (18.5)	150 (20.0)	133 (17.7)	7 (0.9)	1 (0.1)	-	-
Fried Fish	433 (57.7)	187 (24.9)	75 (10.0)	47 (6.3)	4 (0.5)	4 (0.5)	-	-
Salted/dried fish	736 (98.1)	9 (1.2)	3 (0.4)	2 (0.3)	-	-	-	-
Fruit	43 (5.7)	40 (5.3)	81 (10.8)	290 (38.6)	132 (17.6)	131 (17.4)	31 (4.1)	3 (0.4)
Fresh/raw Vegetables	275 (36.6)	43 (5.7)	59 (7.8)	200 (26.6)	103 (13.7)	69 (9.2)	3 (0.4)	-
Cooked Vegetables	335 (44.5)	18 (2.4)	47 (6.3)	180 (23.9)	75 (10.0)	94 (12.5)	3 (0.4)	-
Fried/stir-fried Vegetables	606 (80.6)	13 (1.7)	27 (3.6)	84 (11.2)	10 (1.3)	12 (1.6)	-	-
Fried potato chips	253 (33.7)	159 (21.2)	140 (18.6)	164 (21.8)	20 (2.7)	13 (1.7)	2 (0.3)	-
Root vegetables	216 (28.7)	43 (5.7)	61 (8.1)	316 (42.0)	58 (7.7)	57 (7.6)	1 (0.1)	-
Legumes	338 (44.9)	117 (15.6)	140 (18.6)	143 (19.0)	10 (1.3)	2 (0.3)	2 (0.3)	-
Rice	9 (1.2)	8 (1.1)	36 (4.8)	453 (60.4)	193 (25.7)	47 (6.3)	4 (0.5)	-
Maize	32 (4.3)	46 (6.1)	153 (20.3)	445 (59.2)	59 (7.8)	15 (2.0)	2 (0.3)	-
Pasta	265 (35.3)	116 (15.4)	188 (25)	168 (22.4)	10 (1.3)	3 (0.4)	1 (0.1)	-
Instant noodles	520 (69.1)	28 (3.7)	49 (6.5)	102 (13.6)	27 (3.6)	24 (3.2)	2 (0.3)	-
Bread home-baked	279 (37.2)	163 (21.7)	126 (16.8)	148 (19.7)	27 (3.6)	6 (1)	1 (0.1)	-
Bread commercial	37 (4.9)	40 (5.3)	80 (10.6)	200 (26.6)	193 (25.7)	164 (21.8)	37 (4.9)	1 (0.1)
Marg/butter on bread	102 (13.6)	8 (1.1)	21 (2.8)	235 (31.4)	204 (27.2)	155 (20.7)	21 (2.8)	3 (0.4)
Vetkoek	338 (45.0)	108 (14.4)	115 (15.3)	147 (19.6)	25 (3.3)	15 (2.0)	3 (0.4)	-
Confectionary, baked goods, biscuits	413 (54.9)	108 (14.4)	86 (11.4)	112 (14.9)	19 (2.5)	13 (1.7)	1 (0.1)	-
Commercial breakfast cereals	307 (40.9)	17 (2.3)	17 (2.3)	145 (19.3)	136 (18.1)	128 (17.0)	1 (0.1)	-
Sugar	51 (6.8)	33 (4.4)	50 (6.6)	200 (26.6)	189 (25.1)	194 (25.8)	34 (4.5)	1 (0.1)
Sweets	492 (65.4)	69 (9.2)	51 (6.8)	85 (11.3)	31 (4.1)	22 (2.9)	2 (0.3)	-
Salty snacks	385 (51.7)	73 (9.8)	62 (8.3)	134 (18.0)	53 (7.1)	35 (4.7)	3 (0.4)	-
Soft drinks regular	55 (7.3)	44 (5.9)	90 (12.0)	267 (35.5)	145 (19.3)	110 (14.6)	35 (4.7)	6 (0.8)
Soft drinks diet	663 (84.2)	25 (3.3)	13 (1.7)	39 (5.2)	37 (4.9)	3 (0.4)	2 (0.3)	-
Nuts	583 (77.5)	69 (9.2)	30 (4.0)	57 (7.6)	8 (1.1)	5 (0.7)	-	-
Coffee/Tea	162 (21.5)	31 (4.1)	51 (6.8)	220 (29.3)	117 (15.6)	139 (18.5)	31 (4.1)	1 (0.1)
Fast food restaurant meals	363 (48.3)	287 (38.2)	56 (7.5)	36 (4.8)	4 (0.5)	5 (0.7)	-	-
Sit-down restaurant meals	576 (76.6)	142 (18.9)	14 (1.9)	18 (2.4)	1 (0.1)	1 (0.1)	-	-
Ready-to-Eat Meals	546 (72.6)	127 (16.9)	44 (5.9)	29 (3.9)	2 (0.3)	4 (0.5)	-	-

recommended fruit and vegetable intake [19]. This consistent finding of low fruit and vegetables, nuts, seeds and legumes intakes in South Africa points to the possibility of transmitted food practices and knowledge. While on the other hand it could point to other factors. Previous studies in South Africa have observed that individuals are aware of the importance of fruits and vegetables to health, however, grocery shopping is influenced by availability, price of commodities and durability of the commodities [19]. In this population group, only about 20% of the population do not own refrigerators while less than 25%, 10% and 13% have fruit, raw vegetables, or cooked vegetables respectively, at least once a day. Yet global dietary recommendations suggest that individuals should consume five servings or more of fruit and vegetables a day [20, 21]. As suggested by Neufeld et al., (2022) the youth can be equipped with the knowledge, skills, and desire to steer them towards a healthy and socially acceptable diet [22].

Given the limited education attained by adolescents and young adults in our study, their jobs are likely low-income jobs providing income equal to or below the poverty datum. The vicious cycle of poverty and malnutrition has intergenerational effects and is difficult to

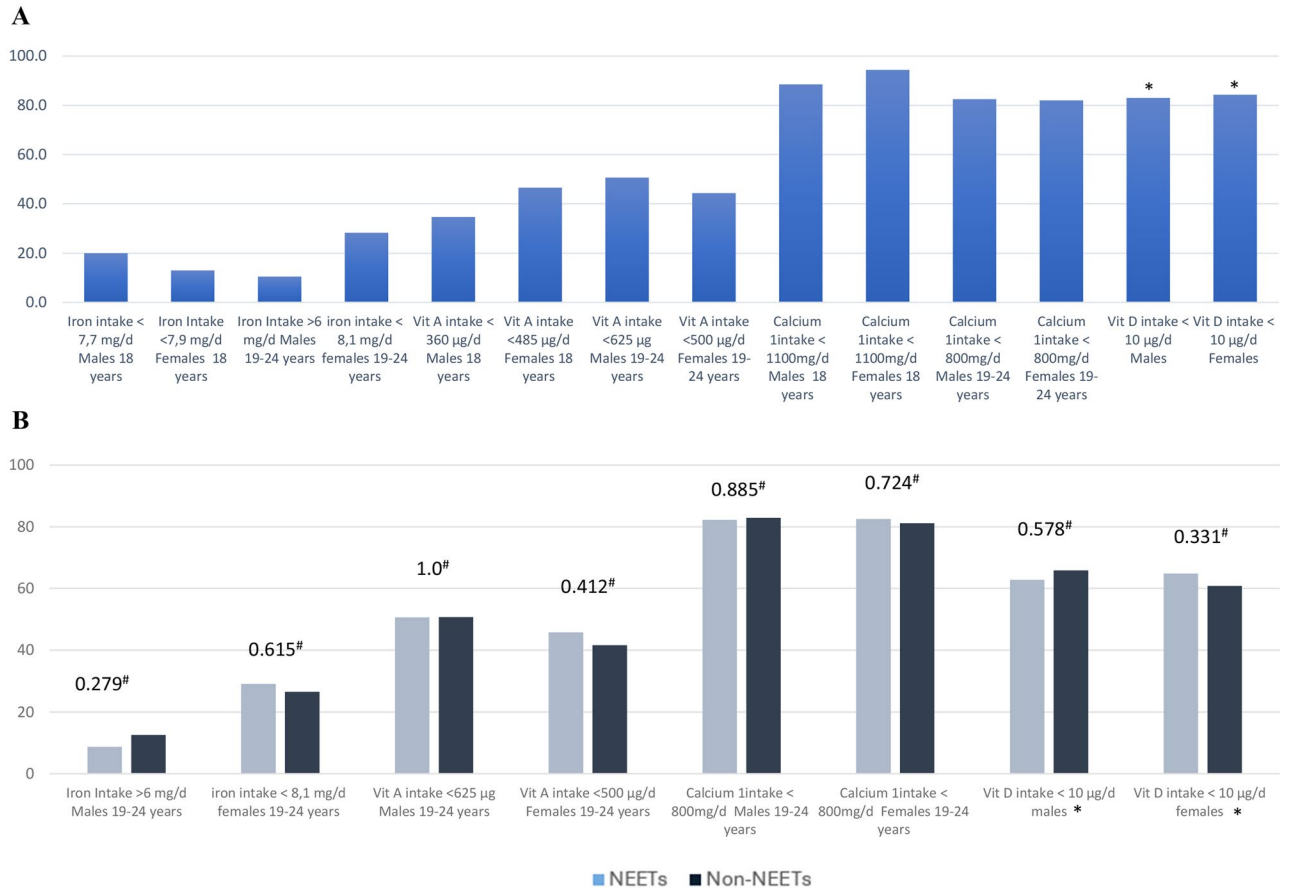

Fig. 2 Frequency of inadequate intake: **A**: Overall frequency of inadequate daily micronutrient intake. **B**: Frequency of inadequate daily micronutrient intake by groups (NEETs compared to non-NEETs). Estimated Average Requirements (EAR) are used as cutoffs for adequate intakes. Refer to Table 1 for the EAR values used. * Same cut-off for both 18-year-olds and 19 to 24 years old. # Chi square test p-value Legend

break because parents with low education levels struggle to provide good nutrition, development, and health for their children [23]. Subsequently, their children tend to be malnourished and have poor developmental and educational outcomes, leading to limited economic productivity later in life [23]. There is need to break this cycle of poverty. Adolescents and young adults who receive adequate nutrition are likely to experience optimal development, which may lead to increased productivity. In the future, they will consequently be better able to support their families. A sustainable employment drive may help in reducing the number of NEETs.

Mandatory national food fortification of wheat flour, brown bread and maize meal with Folic Acid, Iron, Niacin, Pyridoxine (Vitamin B6), Riboflavin (Vitamin B2), Thiamine (Vitamin B1), Vitamin A and Zinc [24] was based on consumption levels of children < 9 years old reported in the 1999 National Food Consumption Survey and estimated to provide adequate micronutrients to adults [25]. Although the study participants commonly consumed these fortified food items, food volumes and choices may have shifted since 1999 thus rendering the fortification program ineffective. For instance, in rural areas of the Western Cape, potatoes are the staple [26] and among vulnerable populations in Gauteng and Eastern Cape individuals consume insufficient quantities of food [27]. Our study shows that only 52.5% and 10.1% individuals consume commercially baked bread and maize meal respectively for 5 or more days per week. Foods that are not part of the mandatory fortification programme, such as breakfast cereals and rice are consumed by 35.2% and 32.5% of the individuals for 5 or more days per week. Given the reported low micronutrient intakes among young adults, it may be necessary to consider diversifying food fortification methods to help individuals in lower socio-economic groups meet their micronutrient dietary requirements.

Limitations

- HHS focuses on total lack during a particular period [5, 26] and is thus not sensitive enough to detect moderate levels of food insecurity. It does not take into consideration food insecurity-related coping

mechanisms e.g., reducing portion sizes to cover more meals or the selection of cheaper less healthy foods [27].
- HHS focuses on households but does not give details on individual hunger, however it gives context to the type of environment respondent resides in and is an indicator of vulnerability of the respondent.
- We did not assess the role of parents and guardians with regards to dietary decisions because collection of data on presence of parents or guardians within the households was not within the scope of the primary studies. However, we cannot rule out the lack of agency in this sample to make dietary decisions when a parent or guardian is present.

Conclusion

In conclusion, there is limited data on the dietary intake of adolescents and young adults, yet nutrition plays a critical role in their growth and development. Our results show that in our research setting, both NEETs and non-NEETs young adults are vulnerable to micronutrient deficiencies.

Supplementary Information

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Supplementary Material 1

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Author contributions

SS analysed the data and drafted the article. NS revised critically for important intellectual content and approved the final version of the article for publication review. ECS contributed to the concept, design, acquisition of data, revised critically for important intellectual content and approved the final version of the article for publication.

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Data availability

No datasets were generated or analysed during the current study.

Declarations

Ethical approval and consent to participate

Both studies followed the Declaration of Helsinki guidelines and were approved by the Biomedical Research Ethics Committee of the University of the Western Cape (BM18-6-2 and BM19-3-4).

Consent for publication

N/A.

Competing interests

The authors declare no competing interests.

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