# A CROSS SECTIONAL ANALYSIS OF DIETARY PRACTICES AND NUTRITION STATUS OF FEMALE UNDERGRADUATE STUDENTS AT KENYATTA UNIVERSITY, KENYA

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# Abstract

Background The rapid changes in eating habits and lifestyles in Kenya have resulted to the overweight/obesity transition. Students are likely to make poor food choices which may affect their nutrition status during the beginning of college and this may continue throughout their life. This study aimed to establish the dietary practices, assess nutrition status based on body mass index and the relationship between selected dietary practices and nutrition status of female undergraduate students at Kenyatta University, Kenya. Methods The study adopted a cross-sectional analytical design involving sample of 422 female undergraduate students randomly selected from Kenyatta University. Food Frequency Questionnaire and the Minimum Dietary Diversity – Women were used to assess dietary practices. Weight and height were measured to assess the nutrition status of the female students. Results The results showed that 64.0% of the participants had consumed ≥ 5 food groups while 36% had consumed <5 food groups over a period of 24 hours. In terms of nutrition status, 68.4% of the participants had normal BMI while 23.9% were overweight, 5.55% were underweight and 2.3% were obese. MDDS-W was significantly associated with nutrition status (p=0.044). Conclusion The results illustrated unhealthy eating habits and sub-optimal nutrition status among a significant number of the female students. Policy makers should scale up interventions that would help improve dietary practices of women of reproductive age particularly university students.


# Background

Kenya, like many developing countries has been experiencing rapid changes in dietary habits and lifestyles resulting to the overweight/obesity transition. Students are likely to make poor food choices which may affect their nutrition status during the beginning of college and this may continue throughout their life. [1-2] Young adults' feeding practices have been characterized with frequent snacking, overweight/obesity and skipping of meals particularly breakfast. [1] A study conducted in a Zimbabwe University associated students' poor choices in food with inadequate nutrition knowledge and their failure to understand their nutrition requirements. [3] Another study among female undergraduate students attending various universities in Nairobi revealed that most of the students did not get the recommended daily meals. [4]

An individual's nutrition status results from interrelated factors that are influenced by the quantity and quality of food consumed and physical health. Three hundred million women in the world are estimated to be obese making obesity a global health problem. The prevalence is even higher in urban areas where the level of obesity in Kenya is now approaching 50% among women in urban areas, aged between 19 and 49 years. [5] A study among undergraduate students in Nairobi showed that 22.9% of the students were overweight and obese while 5.5% were underweight. [4] Evidence suggests that a young female adult's nutrition status has important effects for her health and the health of her children and is an important factor in breaking the malnutrition cycle. [6]

Various studies have demonstrated a positive correlation between good dietary practices and a woman's nutrition status, menstruation, ovulation, the likelihood of conception and pregnancy outcomes. [7-9]

The purpose of this study was to determine the dietary practices, assess the nutrition status and establish the relationship between dietary practices and nutrition status among female students at Kenyatta University.

# Methods

A cross-sectional analytical study design was adopted in the study. The study population included female undergraduate students at Kenyatta University, Kenya. Kenyatta University is a public university in Kenya located 16 kilometers from Nairobi city. The University was chosen purposively as it consist a high number of students with diverse social, economic and cultural backgrounds. A total of 422 students were selected to participate in the study but 32 had incomplete questionnaires hence the final analysis included 390 students.

### Data Collection and statistical analysis

Data was collected using a researcher administered questionnaire. A Food Frequency Questionnaire (FFQ) and the Minimum Dietary Diversity – Women (MDD-W) was used to assess dietary practices. Weight was taken using a salter scale and height using a stadiometer.

Data obtained was analyzed using Statistical Package for Social Sciences (SPSS) version 22 for windows. Descriptive statistics like mean, standard deviations and percentages were used to describe the study population. To determine the MDDS of the students, a point was awarded to each food group consumed over the reference period and a sum computed for all points. [10] Adequate consumption was based on consumption of five or more food groups. Food Frequency was determined based on how many times a food group was consumed over a one week period. BMI was used to assess nutrition status. The BMI was classified as either underweight (<18.5 $kg/M^2$), normal (18.5-24.99$Kg/M^2$), overweight (25-29.99$Kg/M^2$) and obese (>30$Kg/M^2$).

Chi-square test was used to establish relationship between dietary practices and nutrition status. In all the analyses, a P value of <0.05 was considered significant.

# Results

### Dietary practices among female students

### Frequency of consumption of various foods among the respondents

Table 1 below shows results from the 7 day food frequency questionnaire. The food group most frequently consumed was cereals and cereal products with 59.5% of the respondents consuming daily.

Milk and milk products were consumed everyday by 24.7%. Only 11.8% of the students consumed meat, poultry and their products every day and while 2.9% never consumed. Fruits and vegetables were consumed everyday by 38.5% and 47.1% of the students, respectively. Beverages were consumed by 45.4 % of the students every day.

**Table 1: Frequency of food consumption**

| Food type | Frequency per week | | | |
|---|---|---|---|---|
| | Everyday (%) | 1-2 times a week (%) | 3-6 times a week (%) | Never consumed (%) |
| Cereals and cereal products | 59.5 | 17.8 | 22.7 | - |
| Roots and tubers | 4.9 | 62.4 | 16.4 | 16.4 |
| Milk and milk products | 24.7 | 45.7 | 19.8 | 9.8 |
| Meat, poultry & products | 11.8 | 58.0 | 27.3 | 2.9 |
| Legumes and nuts | 25.9 | 46.6 | 21.3 | 6.3 |
| Fruits | 38.5 | 35.9 | 25.0 | 0.6 |
| Vegetables | 47.1 | 29.9 | 19.8 | 3.2 |
| Sweets | 34.5 | 34.2 | 19.5 | 11.8 |
| Beverage; soft drinks, fresh juice,Fresh squash, tea, cocoa | 45.4 | 31.3 | 17.2 | 6.0 |
| Others; Sausages, Smokies, Hotdogs, pizza | 9.5 | 50.9 | 19.8 | 19.8 |

### Minimum dietary diversity score

The mean MDDS was 5.11±1.66 with a minimum score of 0 and a maximum score of 10 food groups. More than half of the respondents (64%) had consumed ≥ 5 food groups while 36% had consumed <5 food groups (Figure 1).

### Nutrition status of the respondents

The mean height of the respondents was 160.3 ± 6.5 SD cm. The lowest height was 139 cm while the highest height was 179 cm. The mean weight was 58.7± 9.3 SD kg with the lowest and highest weight being 36 kg and 88 kg, respectively. The mean BMI was 23 ± 3.1 SD with a low of 15 kg/$m^2$ and a high of

34.9 kg/$m^2$. Generally, 68.4% of the respondents had normal BMI while 23.9% were overweight, 5.55% were underweight and 2.3% were obese (Figure 2).

### Relationship between minimum dietary diversity-women and nutrition status

Table 2 shows results of chi-square test between MDDS-W and nutrition status. The test revealed a significant relationship between dietary diversity-women and nutrition status of the respondents ($\chi^2$ =7.214, df =1, p =0.044).

Table 2: Relationship between Knowledge, Attitudes on Pre-conception Dietary Practices and Dietary practices

| Variable | N=390 | |
|---|---|---|
| MDDS-W vs. | $\chi^2$ | P value |
| Nutrition status | 7.214 | 0.044* |

* Significance at p<0.05

# Discussion

The young population in university contributes to the poor eating habits among university students. [4, 11-12] Junk food makes up the main meals for most young people in urban and peri-urban centres.

The respondents of this study had an adequate MDDS with a mean of 5.11±1.66. The results compare with previous studies. [13-14] However, these previous studies considered a total of 13 and 8 food groups, respectively in contrast to this study which considered 10 food groups. The higher dietary diversity could be attributed to the affordability of meals in the University's cafeterias and the nearby market where most of the students get their meals from. The low consumption of nuts and seeds observed among the respondents could be as a result of financial constraints.

From the 7 day food frequency, several undesirable food habits were observed among the respondents in this study including consumption of sweets with about 88.8% of the students consuming at least once in a week, intake of beverages with 45.4 % of the students consuming every day and foods like sausages, smokies and hotdogs being consumed by 50.9 % of the respondents every day. Excess intake of these foods has been associated with diabetes, overweight, obesity and cardiovascular diseases. [15] Similar results have been reported in previous studies. [1,3-4] The frequent consumption of these unhealthy foods could be attributed to the ease in access of these foods in the university's cafeterias, tuck shops and a nearby local market. An additional contributing factor could be as a result of a clash between class times

and meals which interferes with normal meal patterns. The low consumption of fruits and vegetables could be attributed to costs and their seasonality.

Majority of the students in this study had normal nutrition status (68.4%). The relatively high level of overweight reported among the respondents could be attributed to high intake of unhealthy foods like sausages, hot dogs, sweets and beverages as witnessed in the study.

Various forms of malnutrition have been associated with women's dietary practices. Malnutrition may predispose women to non-communicable diseases like coronary heart disease, diabetes mellitus, overweight and obesity. The study results showed that underweight was significantly higher among students who had lower MDDS-W while Overweight was found to be higher among those who did not frequently consume fruits and vegetables. The findings of this study compares with a previous study that reported that malnutrition was more prevalent among adolescents who consumed inadequate amounts of fruits and vegetables. [16] Fruits and vegetables contain fibers that help with digestion and weight control.

# Conclusion

Findings of this study demonstrated high frequency of intake of unhealthy foods like soft drinks, sausages, hotdogs and sweets. The results illustrated a significant number of female students had sub optimal nutrition status. Proper dietary practices ensure female students meet their nutrition requirements for optimum nutrition status. Nutrition status had a significant relationship with dietary practices. Policy makers in the ministry of health and education should scale up intervention programs aimed at improving dietary practices among women of reproductive age. University eating premises should also find ways of ensuring that the food and meals available are nutritious, varied, convenient, acceptable and affordable. This would ensure that students are discouraged from relying on unhealthy and convenient fast foods that expose them to poor nutrition status.

# Abbreviations

**MDDS-W**: Minimum dietary diversity score – Women

**BMI**: Body mass index

**FFQ**: Food frequency questionnaire

**SD**: Standard deviation

# Declarations

### Ethics approval and consent to participate

Approval to conduct the research was sought from Kenyatta University graduate school and ethical clearance obtained from Ethical Review Committee of Kenyatta University. A research permit was obtained from the National Council for Science Technology and Innovation (NACOSTI). Permission was also sought from the Kenyatta University administration. Participation was voluntary through informed written consent from the respondents. Confidentiality and privacy of the data collected was assured and maintained during and after the study.

### Consent for publication

Not applicable

### *Availability of data and materials*

All the datasets used and analysed in the current study are available in this published article. ***Competing interests***

The authors declare that they have no competing interests.


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### *Authors' contributions*

GW conceived the study. GW designed the study with assistance from PC and EN. GW collected data from the field, conducted data analysis and wrote the manuscript. All authors read and approved the final manuscript.

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# Figures

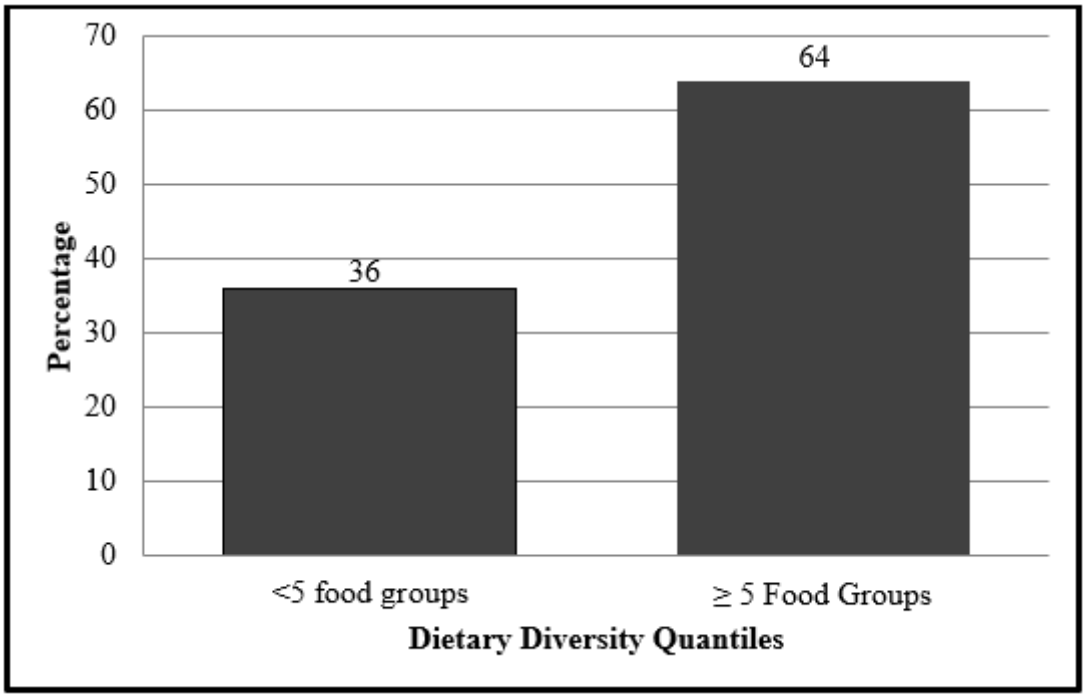
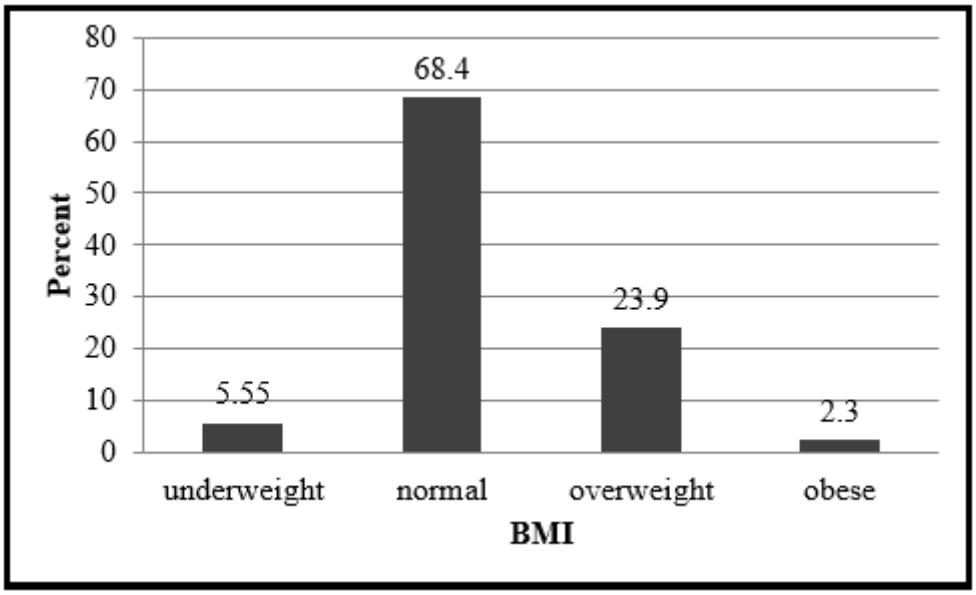



**Figure 1**

Respondents minimum dietary diversity scores




## Figure 2

Respondents nutrition status