

Poor Eating Habits and Chronic Malnutrition Among Adolescent Girls in Secondary Schools in Popokabaka, Democratic Republic of Congo, 2018

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Résumé

Introduction. L'adoption de mauvaises habitudes alimentaires pendant l'adolescence peut avoir des effets dramatiques sur l'état nutritionnel et sanitaire à l'âge adulte. Afin de briser le cycle intergénérationnel de la malnutrition dans la population congolaise, il convient d'accorder plus d'attention aux adolescentes. D'où l'importance de déterminer l'ampleur des mauvaises habitudes alimentaires et de la malnutrition chronique auprès des adolescentes, ainsi que le lien qui existe entre ces deux variables.

Matériels et méthodes. Une étude transversale analytique a été menée en avril 2018 auprès de 434 adolescentes âgées de 12 à 17 ans fréquentant les écoles secondaires de Popokabaka. Des interviews structurées ont été organisées utilisant les techniques de rappel de 24 heures et de fréquence alimentaire hebdomadaire auxquelles la clinique, l'anthropométrie et la biochimie ont été ajoutées. Le test de chi-carré et la régression logistique ont été utilisés pour l'analyse des données.

Résultats. Les mauvaises habitudes alimentaires les plus répandues chez les adolescentes sont la consommation insuffisante de graines et céréales complètes, la consommation fréquente de corps gras, de sucreries et d'aliments trop salés préparés hors ménage/fast-foods (95,4%), de friandises (94,0%) et de boissons sucrées (90,7%). La malnutrition chronique touche 14,5% des adolescentes. La consommation fréquente de friandises (ORa=0,13 ; IC_{95%}=0,05-0,30) et la consommation insuffisante de graines et céréales complètes (ORa=9,37 ; IC_{95%}=2,69-32,67) sont statistiquement liées à la malnutrition chronique.

Conclusion. La malnutrition chronique des adolescentes fréquentant les écoles secondaires à Popokabaka est causée par leurs mauvaises habitudes alimentaires.

Mots-Clés – Mauvaises Habitudes Alimentaires, Malnutrition Chronique, Adolescentes, RDC

Abstract

Introduction: Adopting poor eating habits during adolescence can dramatically affect nutritional and health status in adulthood. To break the intergenerational cycle of malnutrition in the Congolese population, it is crucial to focus more on adolescent girls. This study aims to assess the prevalence of poor eating habits and chronic malnutrition among teenage girls and to examine the link between the two variables.

Materials and Methods: An analytical cross-sectional study was conducted in April 2018 among 434 adolescent girls aged 12 to 17 years attending secondary schools in Popokabaka. Structured interviews were conducted using 24-hour recall and weekly food frequency techniques, supplemented with clinical, anthropometric, and biochemical assessments. Chi-square tests and logistic regression analyses were used to analyze the data.

Results: The most common poor eating habits among adolescent girls included inadequate consumption of whole grains and cereals, frequent consumption of fatty foods, sweets, and highly salted foods prepared outside the home (fast foods, 95.4%), snacks (94.0%), and sugary beverages (90.7%). Chronic malnutrition affected 14.5% of the adolescents. Frequent consumption of snacks (AOR=0.13; 95% CI=0.05–0.30) and inadequate consumption of whole grains and cereals (AOR=9.37; 95% CI=2.69–32.67) were statistically associated with chronic malnutrition.

Conclusion: Chronic malnutrition among adolescent girls attending secondary schools in Popokabaka is linked to their poor eating habits.

Keywords – Poor eating habits; chronic malnutrition; adolescent girls; DRC

I. INTRODUCTION

Adolescence is a critical period for the development of health-related lifestyles, habits, attitudes, and beliefs (1). It forms the foundation for health in adulthood (2). It is also a critical age during which the adoption of unhealthy habits can have dramatic effects on health status later in life (3) (4). Community-based nutrition education programs in developing countries primarily address health problems such as stunted growth, wasting, and overweight, focusing on mothers and children under five years old. However, similar programs targeting adolescents are lacking (2). This gap was highlighted during the 2015 International Summit on the Nutrition of Adolescent Girls and Young Women in the United States, where participants identified several shortcomings in both the literature and the practice of adolescent nutrition education (5).

To reverse this trend, school and health personnel, as well as parents and other community members working with secondary school students, must be aware of the beliefs and health-related choices that guide adolescents' behaviors (1). Adolescents are often exposed to advertising, youth magazines, and the Internet, frequently providing insufficient or inaccurate nutrition information. Additionally, their natural desire for independence often leads to consuming food outside the home (6). Yet, it is widely acknowledged that a healthy diet is fundamental to human health, ensuring proper physical, mental, and emotional development and effective learning ability during childhood and adolescence. It is well known that poor nutrition affects more than half of the women living in low- and middle-income countries. Suppose adolescent girls enter their reproductive years in a state of malnutrition. In that case, it can lead to slowed fetal growth, stunted child growth, and reduced productivity in adulthood, perpetuating these issues across generations. To break the intergenerational cycle of malnutrition in the population, greater attention must be paid to adolescent girls (5). Evidence-based recommendations regarding programs and interventions targeting adolescents are necessary. To our knowledge, no studies have been conducted on adolescent girls' eating habits and nutritional status in the Democratic Republic of Congo. This study seeks to determine the prevalence of poor eating habits among adolescent girls and their association with chronic malnutrition.

II. METHODOLOGY

2.1. Study Setting

This study was conducted in the rural health zone of Popokabaka, located in the Kwango province, which faces various nutritional challenges, such as stunted growth and konzo. The map of Popokabaka is presented in Figure 1.

2.2 Study Type

This study is an analytical cross-sectional study.

2.3. Study Population and Period

The study was conducted in April 2018 and involved adolescent girls. The inclusion criteria covered girls aged 12 to 17 years attending secondary schools in the rural health zone of Popokabaka. Those who were absent from school during data collection were excluded. Additionally, 14 students refused to participate in the study: 13 due to fear of revealing their HIV status and one due to religious beliefs (Jehovah's Witness). These 14 students were in their final years of secondary school (5th and 6th grades), aged 16 to 17 years.

2.4. Sampling

The statistical unit of this study was an adolescent girl attending a secondary school in Popokabaka. A simple random sampling technique was used to select girls from the 12 secondary schools in the rural health zone. An exhaustive list of 536 adolescent girls, sorted alphabetically by name, was compiled. A random draw without replacement was performed until the sample size was reached. The sample size was calculated using Fischer's formula, assuming an unknown prevalence of chronic malnutrition among adolescents and a desired precision of 5%. The minimum sample size was estimated at 423.

2.5. Operational Definitions

- Eating Habits

Eight eating habits were assessed based on international recommendations (7). These included the consumption of fruits and vegetables, whole grains and cereals, sweets (pastries and confectionery like cakes, candies, lollipops, chewing gum) rich in free sugars, skipping breakfast, consumption of food prepared outside the home (e.g., fried snacks like beignets, popcorn, croquettes) rich in sugars and/or fats, existence of food taboos and restrictions, consumption of sodas (sweetened beverages), and alcohol consumption.

- Sociodemographic Characteristics

Sociodemographic characteristics included age, place of residence, school grade, and household size.

2.6. Data Collection Techniques

Data were collected using a structured interview and questionnaire. A questionnaire developed and validated by the principal investigator was pre-tested with 10 adolescent students from the Makiese Institute, a school in the neighboring health zone not included in the study.

Data Collection

Before the study began, permissions were obtained from the Sub-Coordinator of Primary, Secondary, and Vocational Education (Sous-Proved), school directors, parent-teacher association leaders, and the parents of the students. The data collection team consisted of 10 individuals, all from the Yaka tribe, with at least a diploma-level education. They were trained for two days on anthropometric and biochemical measurement techniques and on understanding and administering the survey questionnaire.

The interviews were conducted in French, Yaka, or Lingala, depending on the student's choice, to allow full expression. Data on eating habits were collected using 24-hour recall and weekly food frequency techniques. Each participant was interviewed to identify all the food and drinks consumed the previous day and night using the USDA-developed "multi-pass" technique (8).

The trained surveyors used standardized tools to estimate food quantities accurately, based on local Congolese recipes common in Popokabaka. At the end of each day, the surveyors met with the principal investigator to review data for completeness and accuracy. To minimize information bias, measurement instruments (scales, stadiometers, and HemoCue® 301 devices) were calibrated before taking anthropometric and biochemical measurements. The structured interview questionnaire was validated by an expert.

Data Processing and Analysis

All data collected during the survey were entered into a mobile application using the “Survey.CTO” program. Data, including GPS coordinates, were transmitted from the phones to a secure virtual server (ksph.surveycto.com). After quality control and coherence checks, the data were exported to SPSS 21.0, Stata 13, and WHO Anthro Plus for analysis.

In the descriptive part of the study, means and standard deviations were calculated for continuous variables with a normal distribution, while proportions with 95% confidence intervals were calculated for categorical variables. The results were presented in frequency tables and figures.

Pearson’s chi-square test or Fisher’s exact test was used to explore associations between chronic malnutrition and eating habits. Multinomial logistic regression was used to identify risk factors. A significance level of $\alpha = 0.05$ was set for statistical decision-making.

2.7. Ethical Considerations

The informed consent form was read aloud to each respondent (student, parent, or parent representative, such as the school director or parent-teacher association president). The respondent was invited to sign the form to authorize the student's participation and to confirm that they had agreed to respond freely to the questions asked. No personal identifiers were recorded on the survey questionnaire. Participants were informed that participation was voluntary and that they were free to accept or decline the interview without any consequences.

III. RESULTS

Table I: Sociodemographic Characteristics of Adolescent Girls in Secondary Schools in the Popokabaka Health Zone, April 2018

Characteristics	Mean (SD)	n=434	%
Age (years)			
12–14		187	43.1
15–17		247	56.9
Place of Residence			
Popo City		410	94.5
Outside Popo City		24	5.5
Grade			
First Year		153	35.3
Second Year		94	21.7
Third Year		98	22.6
Fourth Year		64	14.7
Fifth Year		24	5.5
Household Size			
<6 People		48	11.1
≥6 People	8.31 (2.74)	386	88.9

The majority of adolescent girls surveyed resided in Popo City and lived in households with at least six members. The average household size was 8.31 (SD=2.74) members. Over one-third of the girls were in their first year of secondary school.

Table II: Nutritional Status of Adolescent Girls in Secondary Schools in the Popokabaka Health Zone, April 2018

Nutritional Status	z-score	n=434	%(95% CI)
Wasting (BMI-for-Age)			
Well-nourished	≥ -2	410	94.7 (92.4–96.8)
Malnourished	< -2	23	5.3 (3.5–7.8)
Stunting (Height-for-Age)			
Well-nourished	≥ -2	370	85.5 (82.0–88.7)
Malnourished	< -2	63	14.5 (11.3–18.2)

The data in Table II indicate that chronic malnutrition is the most concerning form of malnutrition among adolescent girls.

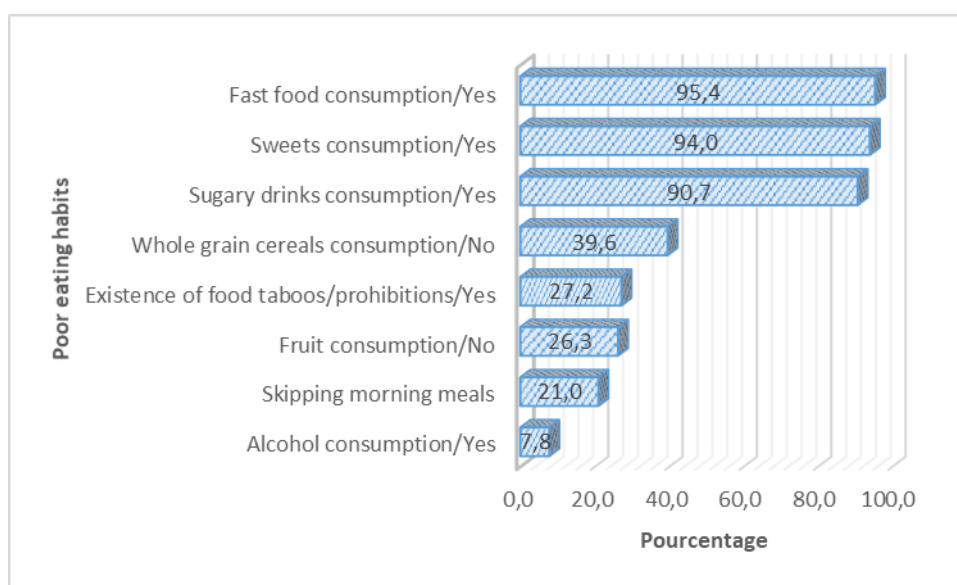


Fig 2: Poor Eating Habits of Adolescent Girls in Secondary Schools in the Popokabaka Health Zone, April 2018

Figure 2 reveals that the most prevalent poor eating habits among adolescent girls were regular consumption of fast foods (95.4%; 95% CI=93.3–97.2%), snacks (94.0%; 95% CI=91.7–96.1%), and sugary beverages (90.7%; 95% CI=87.8–92.9%).

Table III: Eating Habits Associated with Chronic Malnutrition in Adolescent Girls

Variables	Adjusted OR	95% CI	P-value
Skipping Meals / Yes	0.88	0.42–1.77	0.730
Fast Food Consumption / Yes	0.68	0.21–2.19	0.518
Snack Consumption / Yes	0.13	0.05–0.30*	<0.001
Sugary Beverage Consumption / Yes	0.62	0.17–2.30	0.475

Alcohol Consumption / Yes	0.31	0.05–2.00	0.217
Food Taboos/Restrictions / Yes	1.03	0.54–1.98	0.928
Inadequate Whole Grain/Cereal Intake / No	9.37	2.69–32.67*	<0.001
Inadequate Fruit Intake / No	1.74	0.94–3.20	0.077

Table III shows that frequent consumption of snacks (AOR=0.13; 95% CI=0.05–0.30, $p<0.001$) protects against chronic malnutrition, while inadequate consumption of whole grains and cereals (AOR=9.37; 95% CI=2.69–32.67, $p<0.001$) is a significant risk factor. These two eating habits are statistically associated with chronic malnutrition.

IV. DISCUSSION

This study aimed to determine the prevalence of poor eating habits and chronic malnutrition among adolescent girls attending secondary schools in the rural health zone of Popokabaka, as well as the relationship between these two variables. The findings indicate that poor eating habits and chronic malnutrition are significant issues within the surveyed population of adolescent girls.

The study revealed that the most prevalent poor eating habits among the girls were regular consumption of fast foods or foods prepared outside the home (95.4%; 95% CI=93.3–97.2%), snacks (94.0%; 95% CI=91.7–96.1%), and sugary beverages (90.7%; 95% CI=87.8–92.9%). These results are consistent with those reported by Yaya et al. in their study conducted across 33 sub-Saharan African countries (9). It is important to highlight the deleterious effects of the latter two eating habits on satiety, as they suppress appetite and may limit subsequent meal intake. Additionally, these food groups mainly provide free sugars and fats, contributing to a reduction in nutritional density (10).

The high proportion of adolescents consuming foods prepared outside the home (fast foods) indicates that the nutrition transition has reached the rural health zone of Popokabaka. This proportion is significantly higher than that reported in a study conducted in Poland, where only 50% of adolescent girls exhibited this eating habit (11).

Skipping meals was reported by two out of ten students (21.0%). This result is similar to those found by other authors (11). Breakfast is particularly important for students, as it provides the nutrients necessary to meet daily energy demands, especially after more than 10 hours of fasting. Another study conducted in rural Canada reported a slightly higher percentage (25.8%) of adolescents skipping meals (1), although it did not specify which meal was skipped.

This study also revealed that frequent snack consumption (AOR=0.13; 95% CI=0.05–0.30, $p<0.001$) and inadequate consumption of whole grains and cereals (AOR=9.37; 95% CI=2.69–32.67, $p<0.001$) are associated with chronic malnutrition among the surveyed adolescents. Frequent snack consumption appears to protect against chronic malnutrition, whereas inadequate consumption of whole grains and cereals seems to increase the risk of developing chronic malnutrition.

To combat these poor eating habits, large-scale interventions targeting adolescent girls, who are future mothers, are essential to break the cycle of malnutrition in the Democratic Republic of Congo (DRC). Specifically, nutrition education campaigns in secondary schools should focus on behavioral changes promoting healthy eating habits. International guidelines recommend encouraging the general population, particularly adolescents, to consume fewer high-calorie foods rich in fats, free sugars, or salt/sodium, and to consume more fruits, vegetables, and dietary fibers, such as whole grains.

Moreover, promoting good practices related to nutrition and health in schools could enhance the growth and development of adolescent girls while reducing risk factors for non-communicable diseases. Improving adolescents' knowledge, skills, and competencies in nutrition and healthy diets can be achieved through lessons included in the current curriculum.

Efforts should also be made to regulate the availability of unhealthy foods in key environments such as schools, public institutions, restaurants, and retail outlets frequented by adolescents. Limiting access to sugary soft drinks in schools, promoting

fresh and nutrient-rich family meals, and introducing school meal programs could help eliminate hunger and improve dietary habits.

This study found that 14.5% of adolescent girls attending secondary schools in Popokabaka suffer from chronic malnutrition. In the DRC, the prevalence of chronic malnutrition among children under five years has stagnated between 43% and 47% for nearly two decades. This significant disparity between these two vulnerable populations deserves further investigation. While some malnourished children may have died, as mortality is one of the consequences of malnutrition, others might have experienced catch-up growth due to improved nutritional conditions during adolescence - a second window of opportunity for intervention.

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CONFLICT OF INTEREST STATEMENT

The authors declare that they have no conflict of interest.

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