 DOI:10.5281/zenodo.17795962

Title

ASSESSING FACTORS THAT AFFECT THE UPTAKE OF MICRONUTRIENT SUPPLEMENTS AMONG ADOLESCENT GIRLS IN REFUGEE CAMPS

Author

JOSEPHINE WATAMU

Co-Author

JUSTIN MAKAMO

Issued April 2026 Certificate

AR20262WK4MF

ABSTRACT

Nutrition of adolescent girls and adolescent women in low to medium income countries (LMICs) is especially important because of the high burden and severe consequences of malnutrition. Unfortunately, an estimated 41% of all forcibly displaced people are children and many of these children live in refugee camps. Thus, a multi-sectoral approach to food and nutrition response in conflict settings has been advocated. Therefore, a mixed methods study was conducted to assess factors that affect the uptake of micronutrient supplements among adolescent girls in refugee camps. Nine adolescent girls at Dzaleka refugee camp were purposively sampled to participate in the study. Data was collected using a structured questionnaire and open-ended questions. The data was analysed using SPSS and Microsoft Excel. The study findings point to inadequate knowledge about micronutrient supplements, particularly among primary school going girls. Also, attitudes towards micronutrient supplements were negative largely because programs that promote the supplements are low-scale and irregular. Some of the caregivers, including parents, relatives and teachers, do encourage adolescent girls to take micronutrient supplements for their nutritional wellbeing and good health. Going forward, adolescent girls would like to see that micronutrient supplements are readily available both at the camp clinic and in schools. Also, there is need for large-scale micronutrient supplementation in the refugee camp with schools as entry points and couple with nutrition education campaigns. ASSESSING Nutrition of adolescent girls and adolescent women in low to medium income countries (LMICs) is especially important because of the high burden and severe consequences of malnutrition. Unfortunately, an estimated 41% of all forcibly displaced people are children and many of these children live in refugee camps. Thus, a multi-sectoral approach to food and nutrition response in conflict settings has been advocated. Therefore, a mixed methods study was conducted to assess factors that affect the uptake of micronutrient supplements among adolescent girls in refugee camps. Nine adolescent girls at Dzaleka refugee camp were purposively sampled to participate in the study. Data was collected using a structured questionnaire and open-ended questions. The data was analysed using SPSS and Microsoft Excel. The study findings point to inadequate knowledge about micronutrient supplements, particularly among primary school going girls. Also, attitudes towards micronutrient supplements were negative largely because programs that promote the supplements are low-scale and irregular. Some of the caregivers, including parents, relatives and teachers, do encourage adolescent girls to take micronutrient supplements for their nutritional wellbeing and good health. Going forward, adolescent girls would like to see that micronutrient supplements are readily available both at the camp clinic and in schools. Also, there is need for large-scale micronutrient supplementation in the refugee camp with schools as entry points and couple with nutrition education campaigns.

KEYWORDS: Micronutrients, Children, Food, Refugee, Adolescent Girls

INTRODUCTION

The study is located within the broader theme of humanitarian aid, with a focus on the nutritional wellbeing of adolescent girls that have been displaced by war and are living in refugee camps. It investigates factors that affect the uptake of micronutrient supplements among

adolescent girls in refugee camps. Such supplements include iron, folic acid, zinc and vitamins.

BACKGROUND OF THE STUDY

Nutrition of adolescent girls and adolescent women in low to medium income countries (LMICs) is especially important because of the high burden and severe consequences of malnutrition (encompassing underweight, overweight/obesity, and micronutrient deficiencies) in these settings *(Keats et. al., 2022).* Unfortunately, an estimated 41% of all forcibly displaced people are children and many of these children live in refugee camps *(Benjeddi et. al., 2023).* Children are even more vulnerable to nutrient inadequacies because they undergo physiological changes, and their bodies are in great need for nutrients such as vitamins and minerals and due to the fact that they also start to develop dietary attitudes and patterns.

Therefore, they are vulnerable to malnutrition and are more susceptible to the harmful consequences of nutritional deficiencies *(Cholopoulos, 2021).* To address the problem, several nutritional programmers have been implemented by humanitarian organizations to aid vulnerable populations during emergency settings. According to recent Sphere guidance, although food insecurity is one cause of malnutrition, providing food assistance to vulnerable population is unlikely to contribute to a long-lasting solution. Thus, a multi-sectoral approach to food and nutrition response in conflict settings has been advocated. Successful nutrition interventions in non-conflict nutrition settings are characterized by a combination of political commitment, multi- sectoral collaboration, community engagement, community-based service delivery platform, and wider programmed coverage and compliance. In conflict settings, consensus on specific guidelines uptake is still obscure *(Shah et. al., 2021).*

PROBLEM STATEMENT

The uptake of micronutrients is inadequate among adolescent girls and is a significant public health problem *(Ayal et. al., 2022). Shah et. al., (2021)* find the situation to be particularly serious in conflict settings as despite interventions to address the problem, there is very little information on achieved coverage or effectiveness of such interventions that have been delivered.

In an ideal situation, there should be a good response by end users to efforts being made by stakeholders, such as UNICEF to make micronutrients readily available through an increase in consumption of micronutrients to ensure better health outcomes. This is particularly so for adolescent girls living in refugee camps. However, low uptake could signal some underlying social, cultural and economic factors that need to be investigated.

If the problem is not addressed, the entire supply chain of micronutrient supplements will be negatively affected. Firstly, there will be many cases of malnutrition among adolescent girls, with undesirable social and economic outcomes in future. Secondly, it will be difficult for supply chain actors, UNICEF to forecast demand for such supplements from adolescent girls living in refugee camps. This will result in stockpiles of unused and expired supplements and subsequent loss of financial resources that would have been used to procure such supplements.

RESEARCH OBJECTIVES

Main study objective

- To assess factors that affect the uptake of micronutrient supplements among adolescent girls in refugee camps.

Specific study objectives

- To identify micronutrient supplementation programs being implemented in refugee camps.
- To explore social, cultural and economic factors that affect participation of adolescent girls in micronutrient supplementation programs in refugee camps.
- To make recommendations on actions that are needed to improve the uptake of micronutrient supplements among adolescent girls in refugee camps.

RESEARCH QUESTIONS

- What micronutrient supplementation programs are being implemented in refugee camps?
- What social, cultural and economic factors affect participation of adolescent girls in micronutrient supplementation programs in the refugee camps?
- What recommendations can be made on actions that are needed to improve the uptake of micronutrient supplements among adolescent girls in refugee camps?

SIGNIFICANCE OF THE STUDY

The study is significant in many ways. Firstly, it will contribute to gaps that are in the literature about the uptake of micronutrient supplements among adolescent girls in refugee camps. Secondly, it will help to identify the best practices that can be scaled up to improve the uptake of micronutrient supplements among adolescent girls in refugee camps. Thirdly, the findings of the study will contribute to formulation of a policy on the promotion of micronutrient supplementation among adolescent girls living in refugee camps.

LITERATURE REVIEW

Definition of terms

Awuchi et. al., (2020) define micronutrients as essential elements that are required by human and other organisms in varying quantities throughout life to coordinate a range of physiological functions for health maintenance. For human nutrition, such micronutrients are required in amounts generally below 100 milligrams per day. Vitamins and minerals are essential micronutrients and all essential nutrients cannot be synthesized in humans, either at all or may be in insufficient amounts, and therefore must be obtained by the diet.

Awuchi et. al., (2020) define micronutrient deficiency (may also be referred to as dietary deficiency) as insufficiency of at least one of the micronutrients required for optimal human (and animal or plant) health. Just like under normal situations, micronutrient deficiencies do occur among populations living in refugee camps. Therefore, as part of the humanitarian effort under such circumstances, micronutrient supplementation is equally critical to prevent or treat malnutrition.

Zelman (2023) defines micronutrient supplements as products that contain a variety of recommended nutrients in one dose, typically essential vitamins and minerals that the body needs in small amounts for proper functioning. Vitamins include vitamins A, D, E, and K and are important for eye health and immune system support, among other functions. Minerals include iron, manganese, copper, zinc, and selenium and they are critical for muscle health, nervous system function, and repairing damage to cells.

Blancquaert et al., (2017) find some micronutrients to be in low quantities in plant-based foods, which are the main sources, and that deficiencies can occur when there is insufficient dietary intake, as occurs in malnutrition, indicating the need for supplementation programs to prevent inadequate supply. In this regard, *Awuchi et. al., (2020)* identify major micronutrient supplementation programs as those that include zinc and folic acid, vitamin A for children 6 to 59 months, iron and folic acid for women of child-bearing age, zinc as a treatment for diarrheal diseases, staple food fortification, salt iodization and multiple micronutrient supplements, among others.

Empirical Literature Review

Micronutrient supplementation programs being implemented in refugee camps *Rah et. al., (2012)* studied the program experience and findings of large-scale micronutrient powder (MNP) distribution in refugee camps and in an emergency context in Bangladesh, Nepal, and Kenya. In this study, the MNP contained 15–16 micronutrients as per the WHO/World Food Programmed/UNICEF joint statement, whereas the iron content was reduced to 2.5 mg from sodium-ethylenediaminetetraacetate (NaFeEDTA) in a malaria-endemic area in Kenya. Hundreds of thousands of children aged 6–59 months and pregnant and lactating women were targeted to consume MNP either daily or every other day over an extended period of time. Extensive social marketing campaigns were undertaken to promote regular use of the product. A significant decrease in the prevalence of stunting was observed in Nepal and Kenya but not in Bangladesh. A key challenge is to ensure high MNP acceptance and adherence among beneficiaries.

Social, cultural and economic factors that affect participation of adolescent girls in micronutrient supplementation programs in refugee camps *Tondeur et. al., (2016)* have reported micronutrient powders (MNP) to be highly acceptable in Pakistan, Ghana, Burkina Faso and Malawi. They scored highly in terms of the likeability of the products, food preparation methods, and perceived benefits, among other factors. However, they report that in refugee contexts, MNP is not always well accepted and that adherence can be low. Therefore, when introducing any nutrition or health intervention, including within refugee contexts, the issues of acceptability and adherence in the local context should be key considerations. More so among adolescent girls who also form a good section of refugee populations living in camps.

Other than the social factors above, *Nechitilo et. al., (2016)* report low perceptions of severity of nutrient deficiencies and personal susceptibility among the target populations. This is associated with low knowledge and awareness around deficiencies. Perceived

seriousness and susceptibility vary by nutrient, that is, high for iron during pregnancy but low for all other micronutrient deficiencies, including iron outside pregnancy. Continued maintained adherence to an initiated regimen is influenced by the woman's perceptions of the health benefits of, and barriers to, regular supplement use.

In addition, *Goyena et. al. (2019)* cites poor perceptions and attitudes as key social factors that affect adoption of micronutrient powders. For example, mothers' perceptions and attitudes toward preparing and feeding MNPs to the child and attitudes and strategies of community health workers in promoting MNP can determine whether a program to promote such products can succeed or not. Other than the social factors above, *Mbule et al. (2013)* find that poverty and limited access to nutrition and health education information contribute to low uptake and utilization of the public- health intervention package to combat anaemia in pregnancy. However, *Dinga (2013)* finds that age, education level, marital status, and family size are not significantly associated with uptake of IFAs.

THEORITICAL FRAMEWORK

This study is guided by the Health Belief Model (HBM), which explains health-related behaviors based on individuals' beliefs and perceptions regarding health problems and preventive actions. The model is appropriate for assessing factors affecting the uptake of micronutrient supplements among adolescent girls in refugee camps, as supplementation behaviors is influenced by personal beliefs, perceived benefits, and barriers to use.

According to the Health Belief Model, individuals are more likely to adopt a health behavior if they believe they are susceptible to a health problem, perceive the condition as serious, believe that taking action will reduce the risk, and perceive fewer barriers to performing the behaviors. The model also emphasizes the role of cues to action and self-efficacy in influencing health behaviors. In this study, perceived susceptibility refers to adolescent girls' beliefs about their risk of micronutrient deficiencies such as anaemia. Perceived severity relates to their understanding of the consequences of micronutrient deficiencies, including poor health, fatigue, and reduced school performance. Perceived benefits refer to beliefs about the advantages of taking micronutrient supplements, such as improved strength and wellbeing. Perceived barriers include factors such as fear of side effects, lack of food, cultural beliefs, stigma, or limited access to supplements within the refugee camps.

Cues to action include health education sessions, advice from healthcare workers, school-based nutrition programs, and peer encouragement that motivate adolescent girls to take supplements. Self-efficacy refers to the confidence of adolescent girls in their ability to take micronutrient supplements regularly as recommended. The Health Belief Model is therefore suitable for this study as it provides a framework for understanding how individual beliefs and perceptions influence the uptake of micronutrient supplements among adolescent girls in refugee camp settings.

RESEARCH METHODOLOGY

This chapter presents the general theory as to how the study was undertaken. In this regard, *Saunders, Lewis and Thornhill (2019)* emphasize inclusion of the theoretical and philosophical assumptions upon which the study is based and the

implications of these for the methods that were used. In addition, this chapter includes sections on the research design and methodology, research setting, target population, sampling technique and sample size. It also highlights the research instruments that will be used study participants, a plan for the pilot study and methodology for data analysis.

RESEARCH DESIGN AND METHODOLOGY

In terms of the research design, the researcher used concurrent triangulation design to collect and analyze the data. Almeida (2015) finds enormous advantages associated with this design. For example, both qualitative and quantitative data are collected in the same phase. In addition, data collection and analysis are performed in a shorter timescale. Besides, it enables cross-validating and confirming findings from a single study. Also, Saunders, Lewis & *Thornhill (2019)* find this design to be more practical than other designs.

The study used the mixed methods approach during data collection and analysis. *Pearson et. al., (2015) and Saunders, Lewis & Thornhill, (2019* find the mixed methods strong as the researcher is able to integrate quantitative and qualitative data collection techniques and analytical procedures in the same research project. To this effect, *Dusingizimana et. al. (2021)* has used mixed methods to study factors that influence access to and use of micronutrient powders in Rwanda.

RESEARCH SETTING

The study was conducted at Dzaleka Refugee Camp in Dowa District. This is the biggest refugee camp in Malawi with diverse nationalities and ethnicities of people freeing political, economic and social challenges in their countries.

TARGET POPULATION

Participants in this study were drawn from a population of adolescent girls that are living at Dzaleka Refugee Camp in Dowa District.

SAMPLING TECHNIQUE

Because the population of adolescents is not as large, the study used purposive sampling technique, in particular critical case sampling. *Saunders, Lewis & Thornhill (2019)* find this technique suitable and able to generate a statistically good sample of participants for the study. Also, *Benoot, Hannes and Bilsen (2016)* argue that critical case sampling strategy for purposive sampling technique permits logical generalization and maximum application of information to other cases. It helps stakeholders to make informed decisions about the viability of a certain innovation.

SAMPLE SIZE

The study used a sample of 15 adolescent girls. These were drawn from a population of adolescents living at the refugee camp. The sample also included a Congolese leader and a camp officer as key informants.

RESEARCH INSTRUMENT

The study used a survey and open-ended interviews to collect the following types of data, based on the conceptual framework.
As mentioned above, a structured questionnaire was administered to adolescent girls to collect standardized

responses from the participants. Respondents were requested to answer a series of questions related to uptake of micronutrient supplements, rating them across some pre-determined scale.

During the surveys, the researcher asked follow-up questions depending on what was emerging from the discussion with the respondent to obtain an in-depth understanding of the problem and associated issues being studied.

PILOT STUDY

The researcher conducted a pilot study to achieve reliability and validity of the research methods and tools that would be used. *Saunders, Lewis & Thornhill (2019)* define reliability as ability to produce the same results if the research is conducted by another researcher. For validity, *Saunders, Lewis and Thornhill (2019)* define it as the appropriateness of the measures used, accuracy of the analysis of the results and generalizability of the findings. In this study, this was achieved by ensuring that the questionnaire uses simple language to ensure quick understanding of the questions.

DATA ANALYSIS

In this study, quantitative data was analyzed using the Statistical Package for Social Sciences and Microsoft Excel. Qualitative data was analyzed using thematic analysis.

Working in SPSS, the researcher coded quantitative data using numerical codes. This enabled the researcher to enter the data more quickly with fewer errors *(Saunders, Lewis & Thornhill, 2019).* Working within the same SPSS environment, the researcher computed means and percentages. The means and percentages allowed for the presentation of data in ways that make them easier to understand. *Conner and Johnson (2017)* recommend quantitative data and visuals such as graphs and charts for the summaries.

The means were computed using the formula

$$\text{Mean } (X) = \frac{\sum X_i}{n}$$ Bluman (2007)

where x_i represents values of a random variable X, i=1,2,3,…, n; and n represents total number of values in the sample.
To compute the percentage, the following formula applies.

$$(\%) = \frac{f}{n}.100$$

where f = frequency of the class and n = total number of values

In thematic analysis, the researcher coded the qualitative data to identify themes or patterns for further analysis, related to the research questions.

ETHICAL CONSIDERATIONS

The study achieved ethical standards in many ways. Firstly, the researcher cited all literature used during proposal formulation and report preparation. Secondly, she obtained the written consent of the participants and their caregivers before administering the questionnaire and interviewing them.

LIMITATIONS

Due to the high cost of materials and services, the study was constrained by

financial, human and material resources. Therefore, the number of adolescent girls participating in the study was also limited.

RESULTS AND DISCUSSION

This chapter presents the response rate realized after administering the questionnaire, demographic information collected and the main research findings. In addition, it provides a summary of the chapter, highlighting the key aspects addressed in this chapter.

RESPONSE RATE

The survey conducted in this study used a sample of 15 adolescent girls at Dzaleka refugee camp. These were purposively sampled. Out of the 15, 9 participated in the study and completed the questionnaire, representing a 60% response rate. This is considered acceptable and is a result of good research design which entailed an in-person survey. Also, participants demonstrated self-motivation to participate in the survey. More importantly, the researcher was also highly motivated to investigate the issues about micronutrient supplementation programs in the refugee camp.

Studies show that there has been a steady increase in average response rate from 48% in 2005 to 53% in 2010 to 56% in 2015 and 68% in 2020 *(Holtom et al., 2022).* Achieving an acceptable survey response rate is important because too low a figure can give rise to sampling bias, particularly if the number of nonresponses is unequal among survey respondents. More generally and irrespective of your survey type, typical survey response rates can lie anywhere in the region between the 5% to 30% range, with those surveys distributed from unknown senders tending to be at the lower end of this scale. By contrast, a survey response rate of 50% or higher is often considered to be excellent for most circumstances, with those at the higher end of the scale likely to have been driven by high levels of motivation to complete the survey. In-person surveys typically delivers the best average survey response rates.

DEMOGRAPHIC INFORMATION

The graph below shows the distribution in percentage of the age groups of the 9 adolescent girls that participated in the study.

The Age Group of 11-13 years old the percentage is 44.44, the Age Group of 14-16 years old the percentage is 33.33 and the Age Group of 17-18 years old is 22.22%.

Those in age groups 11-13 and 14-16 years were still in primary school. Those in the 17-18 years age group were attending secondary school. In addition, those in secondary school demonstrated a better understanding of micronutrients than those in primary school, pointing to the need to scale up micronutrient education in primary schools. *Kabahenda et al., (2011)* recommend nutrition education campaigns targeting caregivers to improve feeding practices and children nutrition status. They argue that the effectiveness and sustainability of such campaigns can be enhanced if nutrition education is integrated into other food-production and public health programmers.

Specifically, in their study of effects of nutrition education on nutrition knowledge and iron status in primary school pupils of Gatanga District, Muranga County, Kenya, *Gitau et al., (2013)* noted that schools provide a social context in which children

learn and develop, thus making schools a desirable environment for nutrition education promotion. They found notable increases in hemoglobin levels among pupils that participated in the study. Pupils became more confident in answering nutrition questions after the intervention, making it more likely for them to participate in micronutrient supplementation programs. For children living in refugee camps, this is particularly important and such campaigns can be implemented through schools operating within the refugee camps.

The average household size is 8. However, household members are distributed according to their age groups is describe below.

Number of Household Members by the Age of less than 18 years old is 39, the Number of Household Members by the Age 18-64 years old is 29 and Number of Household Members by the Age of more thsn 64 is 1.

Few are over the age of 64. The large presence of household members less than 18 years of age may indicate the high risk of vulnerability of households to nutrition insecurity and hence the need for large-scale micronutrient supplementation programs targeting this age group.

RESEARCH FINDINGS

The sections below outline the major findings of the study in line with objectives and research questions of the study.

Micronutrient supplementation programs

Key informant interviews held with members of the camp management showed that micronutrient supplementation programs at Dzaleka Refugee Camp were being implemented on a small-scale and largely on an ad-hoc basis in response to cases of malnutrition presented at the camp clinic. The main stakeholder is World Food Program, providing ready-to-use therapeutic food only to camp dwellers presenting severe acute malnutrition (SAM). There is no large-scale preventive program to ensure that moderate acute malnutrition (MAM) cases do not worsen to become SAM. In addition, micronutrient supplementation programs are not demand-driven. The system is top- down. As a result, supplies of micronutrient supplements are low and Camp management is forced to issue micronutrient supplements selectively. So, current programs fail to meet the demand that exists within the refugee camp. The situation is compounded by closure of soy-corn blend (Likuni Phala) program and incomplete data of camp residents. Some refugees are yet to be registered in the camp register.

Knowledge about micronutrient supplements

The study revealed gaps in terms of the knowledge that adolescent girls have about micronutrient supplements. The gaps are serious within the group attending primary schools. Those in secondary school were fairly knowledge about these products. Among the many benefits of micronutrient supplements, they were able to mention only two as describe.

Prevent Malnutrition is 70% and the Improve Cognitive abilities is 30%.

The study finds that adolescent girls in refugee camps do not have thorough knowledge about importance of micronutrients in improving their nutritional well-being and health. When they consume ready-to-use therapeutic food (RUTF) from

the shops, they just take it as any other ordinary food. Therefore, there is need to intensify sensitization campaigns within the refugee camp to raise adequate knowledge about the importance of micronutrients and programs that supply micronutrient supplements.

In terms of access to information about micronutrient supplements in the camp, only 20% indicated that they were able to access such information from the school. The remaining 80% cited peer- peer sources. None reported any health campaigns conducted by organizations that are supporting the camp. In addition, such information was not available at the camp clinic.

Attitudes and social norms towards uptake of micronutrient supplements

The 70% of the study respondents demonstrated negative attitudes towards uptake of micronutrient supplements, mainly due to lack of knowledge about their importance. The situation is made worse by the fact that the supplements are not readily available within the refugee camp. However, all respondents agree that when the micronutrient supplements are available, they receive them free of charge. All respondents also acknowledged the support they receive from their teachers who encourage them to take these supplements regularly. However, micronutrient supplements in the camp are not readily available due as they are not supplied regularly by the camp management and organizations that support the camp. Therefore, greater emphasis is needed to create demand and address the supply side constraints with improved logistical planning, enhanced motivation and supervision of community workers with involvement of multiple stakeholders *(Zaidi et al., 2020).*

Socially, uptake by adolescent girls of micronutrient supplements is affected by some traditional beliefs that exist within the camp. Some of the study respondents come from families that are well established in the use of traditional medicine such that they do not believe in modern or western medicine. Therefore, there is need to discourage such traditional beliefs by using health or nutrition campaigns that should be conducted regularly within the refugee camp. Due to the irregularity of micronutrient supplementation programs in the camp, household members do not know their role in encouraging adolescent girls to take micronutrient supplements.

Role of caregivers

There are two perspectives with regard to the role of caregivers in encouraging adolescent girls to take micronutrient supplements. 30% of the respondents indicated that their parents and relatives would not agree that they should take micronutrient supplements due to their traditional beliefs as explained above. However, 70% indicated that their parents and relatives allow them to take these supplements because they also believe in modern or western medicine.

Preference for sources of micronutrient supplements

Adolescent girls that participated in the study indicated that they would prefer that for school going girls, any micronutrient supplements should be administered by schools so that such girls can access them easily. They would not want to involve camp leaders due to high risk of corruption associated with such leaders. For out-of-school girls, they would prefer that such

supplements should be available at the clinic so that such girls can access them.

SUMMARY OF THE RESEARCH FINDINGS

The researcher interviewed 9 out of 15 adolescent girls that represented the planned sample size. This represents 60% response rate which is considered acceptable by current academic standards. Besides, 77.7% of the adolescent girls were in the 11-16 age group and most of them were in primary school. Also, 39 of the 69 household members associated with the adolescent girls in this study were less than 18 years of age, representing 56.52%.

The study assessed the adolescent girls' knowledge about micronutrient supplements, existing attitudes and social norms that affect uptake of micronutrient supplements by adolescent girls, the role of caregivers and access issues to do with uptake of such supplements. The study findings point to inadequate knowledge about micronutrient supplements, particularly among primary school going girls. Also, attitudes towards micronutrient supplements were negative largely because programs that promote the supplements are low-scale and irregular.

Some of the caregivers, including parents, relatives and teachers, do encourage adolescent girls to take micronutrient supplements for their nutritional wellbeing and good health. Going forward, adolescent girls would like see that micronutrient supplements are readily available both at the camp clinic and in schools.

CONCLUSION FROM THE STUDY

The study findings show that there is inadequate uptake of micronutrients among adolescent girls in Dzaleka refugee camp. The situation is worse for adolescent girls that come from poor families which cannot afford to buy nutrient-rich foods from the market.

RECOMMENDATIONS FROM THE STUDY

Large-scale programs should be designed and implemented to address serious micronutrient supplementation challenges that Dzaleka refugee camp is facing. Such programs should target all adolescent girls as a preventive strategy rather than an ad hoc one that responds to severe acute malnutrition cases as and when such cases present themselves at the camp clinic.

Schools should be the entry point for any largescale micronutrient supplementation program that may be implemented in the refugee camp. This is so because schools provide a social context in which children learn and develop, thus making schools a desirable environment for nutrition education promotion.

Stakeholders should design and implement nutrition education campaigns targeting caregivers in refugee camps to improve feeding practices and children nutrition status. In addition, such nutrition campaigns should be integrated into other food-production and public health programmers.

AREA FOR FURTHER STUDY

There is need for further studies on economic factors that determine uptake of micronutrient supplements among adolescent girls in refugee camps. This includes support by donors to implement

such programs, and household income dynamics that can affect uptake of these supplements.

REFERENCES

1. Alami, A., Sany, S.B.T., Lael-Monfared, E., Ferns. G.A., Tatari, M., Hosseini, Z and Jafari, A. (2019) "Factors that influence dietary behavior toward iron and vitamin D consumption based on the theory of planned behavior in Iranian adolescent girls. *Nutrition Journal*, 18(8). https://doi.org/10.1186/s12937-019-0433-7.
2. Almeida, F. (2018) "Strategies to Perform a Mixed Methods Study". *European Journal of Education Studies*, 5(1), 137-151.
3. Awuchi, C. G., Igwe, V. S., Amagwula, I. and Echeta, C. K. (2020) "Health Benefits of Micronutrients (Vitamins and Minerals) and their Associated Deficiency Diseases: A Systematic Review". *International Journal of Food Sciences*, 3(1), 1-32.
4. Ayal, B.G., Demilew, Y.M., Derseh, H.A., and Kidie, A.A. (2021) "Micronutrient intake and associated factors among school adolescent girls in Meshenti Town, Bahir Dar City Administration, Northwest Ethiopia". *PLoS ONE* 17(11): e0277263. https://doi.org/10.1371/journal.pone.0277263
5. Baxter, R., & Lawton, R. (2022) The Positive Deviance Approach. Cambridge: THIS Institute. DOI: 10.1017/9781009237130.
6. Benjeddi, H., Kwee, D., Gruppen, M., Kuip, M., Hensbroek, M.B., and Furth, T. (2023) "Nutritional status of refugee children living in temporary settlements in Europe and MENA region: A systematic review and meta-analysis". *European Journal of Pediatrics*, 182, 3397–3404. Benoot, C., Hannes, K. and Bilsen, J. (2016) "The use of purposeful sampling in a qualitative evidence synthesis: A worked example on sexual adjustment to a cancer trajectory". *BMC Medical Research Methodology*, 16(21), 2-12.
7. Cholopoulos, N. (2021) The prevalence of micronutrient inadequacies among refugee children worldwide: A systematic review of the evidence. A postgraduate research thesis. Thessaloniki: Aristotle University of Thessaloniki.
8. Conner, B. and Johnson, E. (2017) "Descriptive Statistics". *American Nurse Today*, 12(11), pp.52- 55.
9. Dinga, L. O. (2013) Factors associated with adherence to iron/folate supplementation among pregnant women attending antenatal clinic at Thika district hospital in Kiambu County, Kenya. Unpublished MSc Thesis. Nairobi: University of Nairobi.
10. Dusingizimana, T., Weber,J.L., Ramilan, T., Per Ole Iversen, P.O. and Brough, L. A. (2021) "Mixed-Methods Study of Factors Influencing Access to and Use of Micronutrient Powders in Rwanda". *Global Health: Science and Practice*, 9(2), 274-285.