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ORIGINAL RESEARCH

"I Don't Have Time to Exercise": Determinants of Physical Activity and Diet Consumption Among Adolescents Living with HIV in Southern Tanzania – A Phenomenological Qualitative Study

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Background: Low physical activity and unhealthy diets are among the key modifiable risk factors for non-communicable diseases (NCDs), often initiated in adolescence. Little is known about the underlying factors influencing these two behaviors, particularly in adolescents living with HIV (ALHIV). This study aimed at qualitatively exploring the factors perceived to influence physical activity and diet consumption in this vulnerable population.

Methods: Semi-structured in-depth interviews were conducted with ALHIV aged 15 to 19 years (N=22) and their parents and caregivers (N=10) to explore the lived experiences and perceptions regarding physical activity and diet consumption. The interviews were carried out from May to July 2024 at the Chronic Diseases Clinic in Ifakara (CDCI) in Tanzania. Thematic content analysis was performed aided by NVivo software version 14. Three levels of the socio-ecological model (intrapersonal, interpersonal, and community levels) guided the theoretical categorization of findings.

Results: Factors reported to influence physical activity in ALHIV were intrapersonal factors (time constraints, insufficient knowledge); interpersonal (encouragement from family members and peers); and community level aspects (gender and social norms, negative beliefs, inadequate facilities). On the other hand, intrapersonal factors (lack of autonomy, weight gain concerns, food preferences); interpersonal factors (low family income, large family size); and community level factors (increased availability of fast foods) were reported to influence diet consumption among ALHIV. The adolescents' parents and caregivers similarly shared some of these views.

Conclusion: The findings suggest that both physical activity and diet consumption in ALHIV are influenced by multiple factors in the socio-ecological system. The community, parents and caregivers need to be engaged to provide support systems to address barriers to physical activity and diet consumption in ALHIV. Physical activity and nutrition education need to be integrated into HIV care programs and guidelines to emphasize these health behaviors in this population.

Keywords: ALHIV, lifestyle behaviors, non-communicable diseases, qualitative study

Introduction

Adolescents living with HIV (ALHIV) are a key group in HIV transmission worldwide, with 1.65 million adolescents aged 10–19 living with HIV globally.[1] Of these, 89% are in sub-Saharan Africa (SSA) and 5.8% in Tanzania.[1] The advancement in HIV treatment and increased access to antiretroviral therapy (ART) have contributed to near-normal life expectancy and a reduction in undernutrition among people living with HIV (PLHIV), leading to HIV being increasingly considered a chronic disease.[2] In Tanzania, 13% of ALHIV aged 10–14 years and 22% of ALHIV aged 15–19 were on ART as of 2018.[3]

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As PLHIV live longer, their risk of developing non-communicable diseases (NCDs) such as cardiovascular diseases and diabetes increases.[4,5] Several studies in SSA have found an increasing risk and prevalence of NCDs in ALHIV.[6–8] Long-term ART use with drugs like tenofovir alafenamide and integrase strand transfer inhibitors has been linked to weight gain and associated with an increased risk of metabolic syndrome and type 2 diabetes.[9,10] In rural Tanzania, Dolutegravir-based ART was associated with weight gain, higher obesity, and increased rates of hypertension.[11] Understanding these side effects helps to anticipate the potential NCD risk that ALHIV may face as they grow older, and provides an opportunity for early prevention of NCDs.

To address the rising burden of NCDs, it is crucial to adopt a healthier lifestyle, including physical activity and healthy eating. Physical inactivity and unhealthy diets are both modifiable risk factors for the development of NCDs that are mostly initiated during adolescence.[12] In SSA, ALHIV are reportedly less physically active than their HIV-negative peers.[13] Studies from Mozambique and South Africa have reported lower physical activity levels, more consumption of fast foods and sugary drinks, and limited nutritional knowledge in ALHIV.[14,15] ALHIV are at a higher risk of NCDs due to the combined effects of physical inactivity, poor diets, and possible side effects of long-term ART use.[16,17] Some of the contributing factors for this include urbanization and a shift in dietary habits.[12]

Research shows that socioeconomic and cultural factors such as income, family support, gender roles, and food taboos significantly influence adolescents' health behaviors, particularly diet consumption and physical activity. A systematic review reported that adolescents from lower socioeconomic backgrounds tend to engage in less physical activity and consume fewer fruits and vegetables.[18] Some studies have also found that parental support is linked to increased physical activity among adolescents.[19,20] In Tanzania, taboos, such as restricting adolescent girls from consuming chicken thighs, were reported to influence adolescents' food choices.[21] The study also reported a preference for energy-dense foods such as chips as a factor that shapes adolescents' eating habits.[21]

Tanzania implemented the National Adolescent Health and Development Strategy (2018–2022), which highlighted the need to understand the socio-cultural and economic conditions influencing adolescents' health.[22] Tanzania also developed Tanzania's Health Sector Strategic Plan V (HSSP V) 2021/26, which aims to reduce morbidity and mortality due to NCDs.[23] However, while the National Guidelines for the Management of HIV and AIDS in Tanzania emphasize key areas such as clinical HIV care, ART, and opportunistic infections, there is limited emphasis on lifestyle behaviors such as physical activity and diet and their role in the prevention of HIV/NCD multimorbidity.[24] This highlights a specific gap in HIV care and management that needs to be addressed.

While several studies in Tanzania have assessed physical activity and diet in the general adolescent population,[12,25,26] most studies have not qualitatively explored ALHIV's lived experiences regarding these behaviors. This is a missed opportunity in the efforts to prevent NCDs in this vulnerable population. Exploring the determinants of these two behaviors in adolescents is likely to prevent overweight and obesity in ALHIV and minimize the chances of developing NCDs in the future. Therefore, this study aimed to qualitatively explore the determinants of physical activity and diet consumption among ALHIV and their parents and caregivers in southern Tanzania.

Materials and Methods

Study Setting and Design

This cross-sectional qualitative study was conducted at the Chronic Diseases Clinic in Ifakara (CDCI) at the St. Francis Regional Referral Hospital (SFRRH) within Ifakara Town Council, Morogoro region, Tanzania. The clinic has an open prospective cohort called The Kilombero and Ulanga Antiretroviral Cohort (KIULARCO), which includes children, adolescents, and adults. The study took place from May to July 2024. A phenomenological qualitative approach was employed to capture the lived experiences of ALHIV regarding physical activity and diet consumption. Their parents and caregivers were also interviewed to gain their perspectives on these behaviors in ALHIV. The study adopted the Socio-ecological model to understand the interaction of factors across multiple levels, namely, the intrapersonal, interpersonal, and community levels.[27] Based on the scope of this study, we did not investigate the organizational and public policy levels of the theory.

Participants and Recruitment

The study involved twenty-two consented ALHIV and ten parents and caregivers from KIULARCO, selected through purposive sampling. The eligibility criteria were ALHIV aged 15–19, under active care, and who had a clinic visit during the study period. Before data collection, the CDCI team was briefed about the study to ensure that they provided informed support in the recruitment procedure. Eligible adolescents aged 18 to 19 who consented were interviewed on the same day of their clinic visit. Those accompanied by parents/caregivers were invited to participate as well, and if both agreed, they were interviewed separately, either on the same day or on a later scheduled date. For adolescents under 18, contact details for their parents/caregivers were requested, who were then informed about the study and invited to attend the clinic with their children for interviews.

Sample Size

The sample size in this study was determined based on data saturation when no new insights emerged from the data, which was assessed through ongoing data collection and analysis. The initial target sample size was 15 adolescents and 5 parents/caregivers, but the saturation of views was attained at 22 for ALHIV and 10 for parents and caregivers.

Study Procedure

Thirty-two in-depth interviews (IDIs) were conducted by JM and JS with guidance from the CDCI team. The researchers underwent comprehensive training on qualitative interviewing techniques and ethical considerations. Two semi-structured IDI guides were developed for ALHIV and their parents/caregivers. The IDI with the ALHIV explored their general understanding of physical activity and diet, experiences and factors influencing these behaviors. The IDI with the parents/caregivers focused on their perceptions and role in shaping these behaviors in ALHIV. The researchers familiarized themselves with the guides and pre-tested them on a few people from the target population to assess the clarity and cultural appropriateness of the questions. Some members of the CDCI team were also asked to review the guides before data collection. Their feedback, as well as that of the pre-test, was used to revise the tools accordingly. All interviews were conducted in Swahili, lasting 30 to 60 minutes, and were audio-recorded and supplemented by written notes.

Data Analysis

All audio-recorded interviews were reviewed and transcribed verbatim for familiarity with the data. A mind-mapping technique[28] was used as an entry point to data analysis to identify how the information related to each other and the objectives. Mind mapping is a visual technique that involves creating a central idea or theme and branching it out to related subtopics to develop a network of interconnected ideas.[28] Afterwards, the transcripts were uploaded to NVivo software version 14. The ideas from the mind map were used to support data interpretation.

Both inductive and deductive coding techniques were used. Inductive codes were derived from the participants' narratives, and the deductive codes were developed using IDI guides and the theoretical constructs. To enhance the validity of the analysis, an intercoder agreement was employed.[29] JM and NN independently coded the transcripts and compared their codes, and any discrepancies were discussed and resolved by reaching an agreement. The codes were grouped, and emerging patterns were used to identify themes.

Ethical Consideration

Ethical approval for the study was granted by the Ifakara Health Institute Review Board (IHI/IRB/No: 18–2024). This study complies with the ethical principles outlined in the Declaration of Helsinki. Participants were fully informed about the study before providing written consent, with proxy consent obtained from parents/caregivers for those under 18 along with the adolescents' assent. All participants were informed that their anonymized direct quotes may be used in publications and consented to this as part of the informed consent process. All interviews were conducted one-on-one with each participant in private counselling rooms at the CDCI. To ensure confidentiality, participants' names were not collected; each was assigned a unique identification number that was used throughout. All audio recordings and transcripts were stored securely in a password-protected computer, and access to them was restricted to authorized

research team members. After analysis, the transcripts were retained for a year to allow for potential revisiting in case any concerns arise. After the retention period, all transcripts will be deleted.

Results

Participant Demographics and Characteristics

As shown in Table 1, the adolescents were aged 15 to 19 years, with 72.7% having secondary school education, and 27.3% having primary school education. Bicycles, motorcycles, and tricycles were identified as the common modes of transport to the clinic. The parents or caregivers interviewed were between 25 and 64 years, 80% of whom had at least a primary education as shown in Table 2.

General Understanding of Physical Activity

Participants offered varying interpretations of physical activity, often using the term "exercise" to describe different types of physical activities. Most ALHIV described physical activity as any activity undertaken to refresh the body and maintain fitness:

> For me, when you talk about physical exercise, I understand it as anything done to refresh and energize the body so that it becomes strong. – (Male adolescent, 18 years)

Some adolescents described physical activity as any form of household work, for example, washing utensils, cleaning the house, washing clothes, and farm work. This view was also shared by some of the parents and caregivers, as reported by one of them:

> If you say physical exercise, I understand it as doing the small chores at home like washing clothes, washing dishes, going to the farm, eeh. – (Parent, 52 years)

The commonly mentioned types of physical activities were active transport such as walking and running; ball games such as football and netball; domestic chores; and occupational activities such as farm and mechanics work. Two of the ALHIV perceived sexual intercourse as part of physical activity, as explained by a participant:

> But also, young people in the community say that even engaging in sexual activity is sufficient exercise. - (Male adolescent, 19 years)

Table 1 Demographic Characteristics of Adolescents Living with HIV

Variables	Frequency (n)	Percentage (%)
Gender		
Male	12	54.5%
Female	10	45.5%
Age group (years)		
15–17	9	40.9%
18–19	13	59.1%
Education level		
Primary	6	27.3%
Secondary	16	72.7%
Transport to the clinic		
Tricycle	4	18.2%
Bicycle	5	22.7%
Car	4	18.2%
Motorcycle	6	27.3%
On foot	3	13.6%

Table 2 Demographic Characteristics of Parents and Caregivers

Variables	Frequency (n)	Percentage (%)
Gender		
Male	2	20.0%
Female	8	80.0%
Age		
25–35	4	40.0%
36–45	2	20.0%
46–64	4	40.0%
Education level		
No formal education	1	10.0%
Primary education	8	80.0%
Secondary education	1	10.0%
Occupation		
Farmer	4	40.0%
Entrepreneur	5	50.0%
Teacher	1	10.0%

Two forms of sedentary behaviors were discussed by some of the adolescents, namely, watching TV and sitting around making stories, especially for female adolescents:

> You know for us girls, most of the time you'll find us either studying, watching TV or just sitting somewhere making stories. We honestly don't exercise much. – (Female adolescent, 17 years)

General Understanding of Diet Consumption

Healthy diet consumption was described as eating a variety of foods consisting of proteins, carbohydrates, and vitamins. This was similarly expressed by some of the parents and caregivers. One of the adolescents said:

> When I say a healthy meal, I mean for example eating fruits, proteins, and carbohydrates at lunch – basically mixing a variety of foods. It's not just eating ugali with beans only; in that case, you can't say that you've eaten a healthy meal. – (Female adolescent, 15 years)

Other participants interpreted healthy diet consumption as the practice of eating three meals a day; that is, in the morning, afternoon, and evening. One of them said,

> A healthy meal means eating three times a day: in the morning, in the afternoon, and in the evening. - (Male adolescent, 16 years)

Some ALHIV mentioned dietary behaviors common among them, such as eating fast foods, soft drinks, and low intake of fruits and vegetables. They termed these as unhealthy eating behaviors:

> We young people nowadays prefer to eat chips, potatoes, and other small things like juice, biscuits, sweets, etc. – (Female adolescent, 16 years old)

Determinants of Physical Activity in ALHIV

Participants' views on the factors influencing physical activity in ALHIV were organized into two main themes: perceived facilitators and perceived barriers. In this study, facilitators refer to factors that motivate and encourage adolescents to participate in physical activity. Barriers are factors that obstruct or discourage this behavior in ALHIV.[30] These themes were further categorized into individual, interpersonal, and community levels as per the domains of the Socio-ecological Model[27] as illustrated in Figure 1.

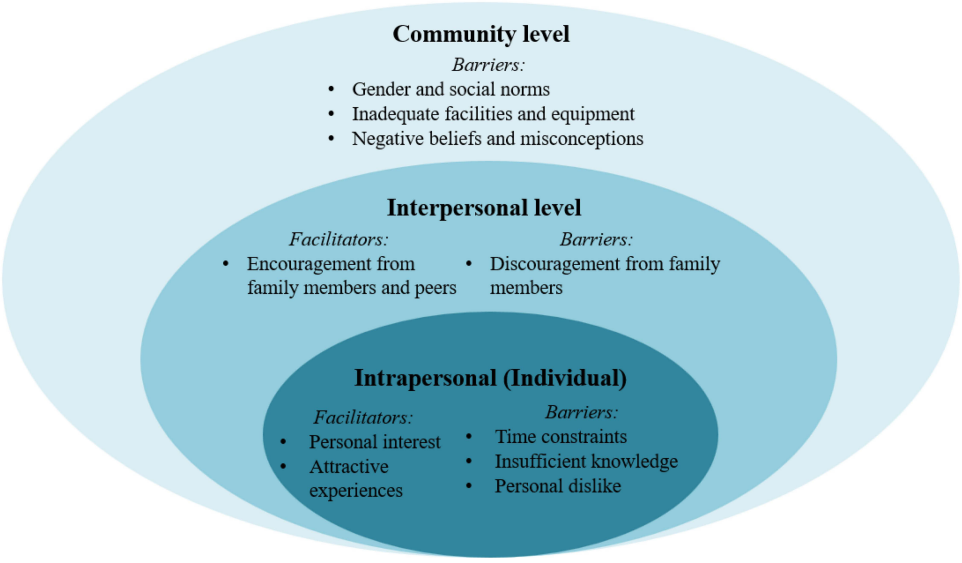

Figure 1 Perceived facilitators and barriers to physical activity in ALHIV according to the Socioecological model.

Perceived Facilitators for Physical Activity in ALHIV

Intrapersonal Level (Individual)

Personal Interest

Some of the ALHIV reported that they are genuinely interested in certain types of physical activity, such as football. Their interest was attributed to the belief that engaging in these activities could help them remain fit and healthy, therefore, this was a motivating factor for them.

> I like to play football, that's why when I see that it's time to play football, even if I'm working, I can stop working and go to play football.- (Male adolescent, 19 years)

Attractive Experiences

Some ALHIV explained that they engage in physical activity because it allows them to travel to different places. Others expressed that sports such as football could lead to future employment, which served as a motivating factor for them to stay physically active:

> I exercise because when we participate in UMISETA, we travel to various places like Morogoro, Tabora, etc.; that's what motivates me to go to netball exercises every day.- (Female adolescent, 16 years)

Some of the parents and caregivers had a similar view, as one of them said:

> As I said, this may be part of the job search; many think that they should run to the sports market to get jobs. So, they don't go there just to exercise, they go there to develop their talent.- (Caregiver, 43 years)

Interpersonal Level

Encouragement from family members and peers

Some adolescents reported that having family members, friends, and peers who like to exercise is a key motivating factor for them to engage in physical activity:

> One of the things that motivates me to exercise is my peers. The young people I grew up with in the neighborhood are into exercising, so if I don't exercise that means I'll be alone. Most of them are usually there, for example, when it comes to football, they are all in football. So I have to join them and exercise. - (Male adolescent, 18 years)

Perceived Barriers to Physical Activity in ALHIV

Intrapersonal Level (Individual)

Time constraints

The majority of the ALHIV reported that they have little time to engage in physical activity. They feel that domestic chores and tight school schedules consume most of their time and contribute to some level of physical inactivity, especially for female adolescents:

> I don't have time to exercise. For example, at school, there's so much studying that we don't get time to exercise. And even when I get home, there's a lot of work to do. When I get back from school, I still have to study, wash the dishes, cook, be sent on errands; so, I don't have time to exercise. - (Female adolescent, 18 years)

Insufficient knowledge

Some of the parents and caregivers believe that the lack of knowledge about physical activity is an aspect contributing to physical inactivity in ALHIV. They explained that most ALHIV have not been adequately educated about the types and importance of physical activity:

> But there are also others who don't know about exercise. That's why you find on the streets, children may be exercising, but all they do is just play football. You won't see a child running by just for exercise, and that is because no one has educated them about the types and importance of exercise. Therefore, if that education is provided by trainers or facilitators, I think it will be a good thing.- (Caregiver, 43 years)

Personal dislike

Some adolescents reported that they simply do not find physical activities enjoyable or stimulating and therefore prefer not to participate. Others explained that they do not like to exercise because whenever they do so, they get problems, such as nose bleeding:

> If I run too much, I get nosebleeds and I suddenly run out of energy. That's why I don't like to exercise.- (Female adolescent, 17 years)

Interpersonal Level

Discouragement from family members

Some ALHIV reported that their families do not make any effort to motivate them to engage in physical activity, which in turn discourages them from doing so:

> In my family, no one likes exercise, so there is no one who can encourage me to exercise. - (Male adolescent, 18 years)

Some of the parents and caregivers admitted to discouraging their children from exercising, partly because they believe it to be a waste of time. Some also believe that the health problems that some adolescents have, such as asthma and joint problems, could prevent them from exercising.

> In my son's case, I can say that exercise bothers him because he has a certain chest problem called asthma, so when you give him difficult tasks, it bothers him. That's why he doesn't exercise, and when he does, he only does the lighter ones. He doesn't even do any hard work. - (Parent, 42 years)

Community Level

Gender roles and social norms

Most adolescents reported that communities mostly expect female adolescents to perform all domestic chores and grant them less freedom compared to boys. Furthermore, certain sports like football are often viewed as "masculine", which discourages girls from participating. These views emerged as a significant barrier to physical activity in ALHIV:

> In many societies, it is known that the female child does all the housework, but the male child only has small tasks: maybe when he gets older and starts to earn money, but when he is younger, housework is not for him most of the time. So, you find that the

girl spends a lot of time doing housework, but when the boy comes back and decides to exercise or do something else, he just goes without being stopped by any parent or anything. - (Male adolescent, 19 years)

Inadequate facilities and equipment

Several ALHIV mentioned that there is limited access to open areas and stadiums for exercising in the area, due to flooding and the long distance to the available facilities. Others mentioned the lack of proper exercise tools, such as jerseys, training shoes, etc., as a factor contributing to their physical inactivity:

Areas for exercise are few and far from home. Maybe if I lived near a stadium like the national stadium, I would exercise even if it meant squeezing my schedule. - (Male adolescent, 16 years)

Some parents and caregivers had an opinion regarding the lack of equipment for physical activity:

I have mentioned the infrastructure, meaning the stadiums, but there is also no equipment for the children to use during exercise. When you exercise, you must have a jersey, maybe training shoes, if it is football then have a ball, etc. So many young people don't have them. (Caregiver, 43 years)

Negative beliefs and misconceptions

Some respondents reported a strong community belief that physical activity could lead to adolescents becoming spoiled and joining negative peer groups. Others viewed physical activity as a waste of time:

For example, my daughter will be going to Machipi later today for sports camp. Many people are saying to me, "You are just letting the child go to Machipi there, do you know what kind of environment she is going to live in?" Many parents believe that when a girl child has too much freedom to exercise, she will be spoiled. That is probably why, even in the street, you find many girls are not allowed to exercise. – (Parent, 33 years)

Determinants of Diet Consumption in ALHIV

Participants discussed several factors perceived to influence the dietary behaviors of ALHIV. Their views were similarly categorized into perceived facilitators and barriers, and then further categorized into the intrapersonal, interpersonal and community domains of the Socio-ecological model, as illustrated in Figure 2.

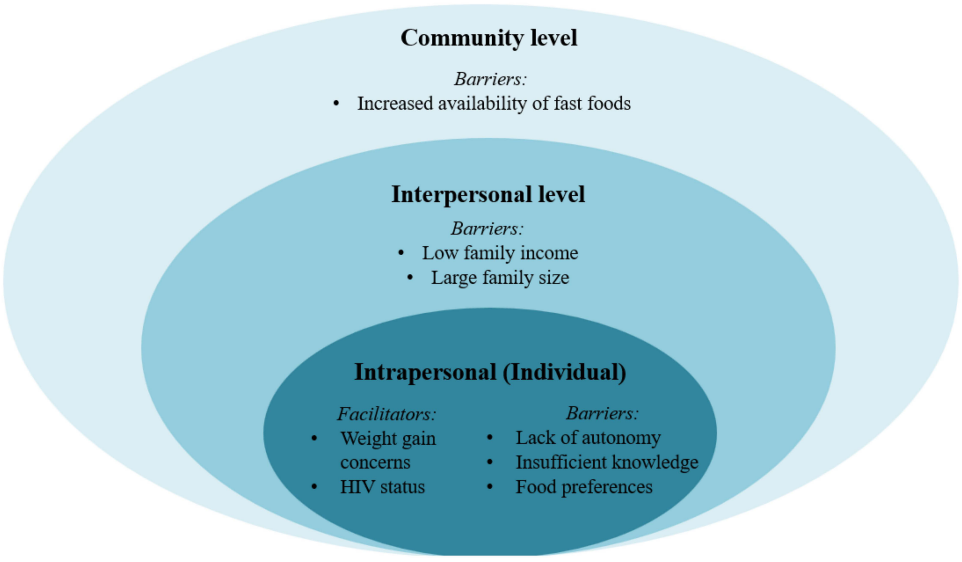

Figure 2 Perceived facilitators and barriers to diet consumption in ALHIV according to the Socioecological model.

Perceived Facilitators of Diet Consumption in ALHIV

Intrapersonal Level (Individual)

Weight gain concerns

Some adolescents expressed concerns about being fat and the fear of being called funny names as motivations to adopt healthier eating habits. They preferred being slim, and that is why they avoid certain foods, especially fatty foods:

> I don't like fatty foods because they can make you fat. Getting fat is not very good because sometimes they will call you 'tukunya tukunya' or 'bonge' or 'bigi'(overweight). For example, if you fail in class, the teacher will cane you and then say, oh bigi, why did you fail? - (Female adolescent, 15 years)

HIV status

Other adolescents mentioned that they are motivated to eat healthily because of their HIV status. They mentioned that they eat healthily to stay fit and avoid diseases, but also to ensure that other people do not find out about their health condition:

> Personally, because I am infected with HIV, I know that eating these healthy foods will boost my immunity. I eat these foods because I have been advised about the things to use so that my health improves, and because I love myself that's why I use these foods. – (Male adolescent, 19 years)

Perceived Barriers to Healthy Diet Consumption in ALHIV

Intrapersonal Level (Individual)

Lack of autonomy

Most adolescents reported a lack of freedom in meal choices at home as a key factor contributing to their low intake of fruits and vegetables and consumption of meals highly dense in carbohydrates. They explained that parents usually choose what foods should be prepared at home, and they are not in a position to contradict those decisions:

> You know I can't change a whole group of people to do this or that, no. Whatever is decided and whatever I find at home, I have to eat that. So, you find that most of the time green vegetables are not cooked at home.- (Female adolescent, 19 years)

Food preferences

Most of the adolescents highlighted their preference for fast food as a factor contributing to unhealthy dietary behavior. Common unhealthy foods mentioned include chips, sodas, fried bananas, biscuits, sweets, etc. They reported that they prefer these foods because they are readily available around their school and homes, and are cheaper, appealing, and convenient for them to eat.

> We young people nowadays prefer to eat chips, potatoes, and other small things like juice, biscuits, sweets, etc. – (Female adolescent, 16 years old)

Some parents/caregivers shared a similar view regarding adolescents' preference for fast food:

> I usually see this son of mine sometimes when he gets a little money, his favorite things to eat are usually chips and juices. You know how these young people are, they like to have fun (Laughs). So, I often see him rushing to eat chips and juices whenever he gets any money. – (Parent, 64 years)

Insufficient knowledge

Some of the adolescents presented the lack of nutritional education as a factor contributing to their poor eating behavior. They explained that this is because during clinic visits, more focus is usually placed on ART adherence, with little information being given about healthy eating. This emerged as a significant barrier to healthy diet consumption among ALHIV:

> Knowing whether I had a healthy meal is a challenge for me because food is food; you don't have to eat fruits for you to say you've eaten healthy food. You can eat fruits and still not be healthy.- (Male adolescent, 19 years)

Some of the caregivers shared a similar view about limited nutrition education among ALHIV:

> The first issue is a lack of education. You know these foods that cause harm to the body are often appealing; pork is appealing, meat is appealing, and chips are appealing. It's not easy for someone to prefer vegetables when they have the means to buy something else. Therefore, the lack of nutritional education is also a problem.- (Caregiver, 43 years)

Interpersonal Level

Low family income

Parents and caregivers pointed out that they are sometimes unable to purchase certain nutritious foods due to low income. They explained that fruits and vegetables, as well as proteins such as meat and eggs, are usually expensive and cannot be easily afforded by everyone. This leads to monotony in meals and increased reliance on meals dense in carbohydrates, and contributes to poor dietary habits among ALHIV:

> For example, there are days when we eat fried cassava and drink water only, and the morning goes by like that. In the afternoon, we cook ugali, maybe with sardines and the day goes by like that. Sardines are good, but green vegetables and fruits are also required. The problem is we don't have the income to be able to buy all these other foods, so what we get is what he eats. – (Parent, 42 years)

Large family size

Some adolescents reported that living in a large family made it challenging to access a healthy diet, as they had to rely on cheaper, less nutritious food that could feed everyone. They mentioned that they often miss out on fruits, vegetables, and protein-rich options because they are expensive and usually come in small amounts, which are not enough for the entire family:

> We often eat beans because they are plentiful and there are many of us at home. When you buy vegetables, they come in small amounts, so they aren't enough for everyone. Vegetables are often served to grandfather, grandmother and our eldest brother. The rest of us are just given beans. - (Male adolescent, 15 years)

Community Level

Increased availability of fast foods

Most adolescents in this study reported that fast foods such as chips, fried bananas, fried cassavas, and sugary drinks such as soda and artificial juices are widely available in their community. They pointed out that these foods are not only sold in the community but also within the school environment and are more affordable compared to healthier alternatives like fruits. This emerged as a significant barrier to healthy diet consumption among ALHIV:

> For me, at school I usually eat fried cassava and other things, because most of what they sell is cassava, samosas, fried bananas, and ice cream, that's it. They don't really sell fruits.- (Female adolescent, 18 years)

Discussion

This phenomenological qualitative study explored the determinants influencing physical activity and diet consumption of ALHIV in southern Tanzania. The findings illuminate multiple factors at the intrapersonal, interpersonal, and community levels, as reported by adolescents and their parents and caregivers. This study suggests that family and peer support are the key motivators for ALHIV to engage in physical activity, while gender and social norms, time constraints, negative beliefs, and a lack of areas for physical activity were reported as barriers. For diet consumption, concerns about body weight and HIV status were identified as key facilitating factors; while food preferences, lack of autonomy, and low family income were perceived to be barriers to healthy dietary consumption.

Facilitators for Physical Activity

This study reveals that encouragement from family members and peers along with their participation in physical activity play a key role in ALHIV's engagement in these practices. This finding was reported in other studies that emphasized the value of family and peer support in enhancing physical activity among ALHIV.[30,31] Our study also revealed some contradictory views, whereby some participants reported parents' restrictions as a barrier to ALHIV's engagement in physical activity. Similar concerns were raised in previous studies, which reported that while parental support was linked with higher levels of adolescent physical activity, restrictive parenting was associated with lower physical activity, especially among older adolescents.[19,32] This highlights the need to enlighten and strengthen family and peer support systems to actively promote physical activity in ALHIV.

Barriers to Physical Activity

Gender roles and social norms were reported as barriers to ALHIV's participation in physical activity. This aligns with findings from studies in coastal Kenya, Ethiopia, India, South Africa and the United Kingdom.[33,34] This calls for community and public sensitization to address the existing misconceptions and promote equitable participation in physical activity for ALHIV. Additionally, our study found that there are negative beliefs and misconceptions about physical activity within the community. Parents were concerned that engaging in physical activity might expose adolescents to harmful peer groups. This emerged as a significant barrier to physical activity among ALHIV, similar to other studies from Nigeria and Slovakia,[35,36] and further emphasizes the need for community and public sensitization.

Our findings revealed time constraints as a barrier to physical activity, and this was attributed to tight school schedules and domestic chores. The same finding was documented in other studies,[37,38] and strongly highlights the need for scheduled mandatory physical activity sessions in schools. Schools need to offer a variety of exercises and recreational activities to meet the diverse interests and abilities of adolescents, including those with HIV. Additionally, ALHIV reported limited access to community facilities primarily due to flooding in the area and the long distances to existing facilities. These findings align with other studies from sub-Saharan Africa, which have identified the lack of accessible exercise spaces and inadequate infrastructure as barriers to physical activity in adolescents.[39,40]

Facilitators of Healthy Diet Consumption

In this study, adolescents expressed concerns about gaining weight and the fear of being mocked as motivation to avoid foods that could lead to weight gain. Similar results were documented in other studies where adolescents desiring to lose weight adopted healthier dietary habits.[41,42] Additionally, in our study, ALHIV believed that healthy food strengthens body immunity, and their desire not to appear diseased further motivated their commitment to healthy eating. A study in Tanzania revealed the same evidence that PLHIV may prioritize healthy diets to strengthen their immune systems and manage the stigma associated with their condition.[43]

Barriers to Healthy Diet Consumption

In this study, ALHIV reported having little influence over the foods prepared at home due to parental control. This finding aligns with previous studies, which reported that although adolescents have some control over their food choices, parental influence remains a dominant factor, particularly within the home environment.[44,45] However, parents and caregivers explained that while adolescents consume most meals at home, they often use their pocket money to purchase unhealthy snacks outside the home. Similar findings have been documented in studies from Kenya, Ethiopia, and Bangladesh, emphasizing the need to increase access to nutritious snacks in schools and communities.[46–48]

Low family income was said to limit access to diverse, nutrient-rich foods such as fruits and vegetables, leading to increased consumption of carbohydrate-dense meals. Similar findings have been reported in other low-resource settings, where limited financial capacity often compromises dietary quality.[15,49] Furthermore, some adolescents shared that living in a large family often led to reduced dietary quality, frequently resulting in limited access to nutritious foods. This same finding was documented in studies from Kenya and developed countries like the USA.[46,50,51] Nutrition support programs could help address these issues, emphasizing the need for integrated approaches to address social determinants of health in ALHIV.

Strengths

The strength of our study lies in the in-depth understanding of the determinants of physical activity and diet consumption among ALHIV in southern Tanzania. By adopting a qualitative methodology, the study provides nuanced insights into adolescents' lived experiences and perceptions about these behaviors, which are often underrepresented in quantitative research. Triangulation of responses from ALHIV with those of their parents and caregivers helped provide further insights, as they often play a key role in adolescents' lives.

Limitations

Our study also has several limitations. Firstly, the study was conducted in only one town in Tanzania, and therefore, some of the views shared may be specific to adolescents in this setting, limiting the generalizability of findings to other areas. Secondly, participants were recruited from the CDCI through purposive sampling; that is, only those willing to participate in the study were involved, thus leading to a potential selection bias. Adolescents who are more engaged in health care may have different views from those who are not, therefore, those not linked to care may be underrepresented.

Conclusion

This study sheds light on multiple factors at the intrapersonal, interpersonal, and community levels that influence physical activity and diet consumption among ALHIV. The findings demonstrate that encouragement from family members and peers motivates ALHIV to engage in physical activity, while insufficient knowledge, gender and social norms, negative beliefs, and inadequate facilities were reported as barriers to physical activity. Healthy diet consumption in ALHIV was influenced by their HIV status and weight concerns, while lack of autonomy, low income, and large family sizes contributed to unhealthy eating in ALHIV. Engaging parents and caregivers is essential to ensure supportive environments for ALHIV to engage in physical activity and healthy diet consumption.

Policy and Program Implications

Generally, the findings from this study suggest the need to review existing policies and programs to better address ALHIV's well-being needs. Specifically, the study calls for the National Guidelines for the Management of HIV and AIDS in Tanzania to include strategic objectives that support physical activity and healthy diet consumption for PLHIV, including adolescents. HIV care programs also need to integrate physical activity and nutritional education into the day-to-day care activities for PLHIV, including adolescents. Public awareness campaigns are crucial to challenge the negative perceptions about physical activity in adolescents, including those living with HIV. Initiatives like improved school meal programs and community gardens could help enhance healthy eating for adolescents, including those living with HIV.

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Author Contributions

All authors made a significant contribution to the work reported, in the conception, design, execution, acquisition of data, analysis and interpretation. They critically reviewed the manuscript, gave final approval of the version to be published, agreed on the journal to which the article has been submitted, and agreed to be accountable for all aspects of the work.

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Disclosure

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References

1. UNICEF. AIDS HIV and AIDS. *New HIV Infect among young people aged 15–24 years*; 2020:1–6. Available from: https://www.unicef.org/tanzania/media/2436/file/HIVProgrammeFactSheet.pdf. Accessed May 12, 2025.
2. Joint United Nations Programme on HIV/AIDS (UNAIDS). HIV care and support: HIV care and support taking into account the 2016 WHO consolidated guidelines; 2016:1–42. Available from: https://www.unaids.org/sites/default/files/media_asset/JC2741_HIV-care-and-support_en.pdf. Accessed May 12, 2025.
3. United States Agency for International Development. Insights on HIV and sexual & reproductive health care for adolescents and young people. 2017.
4. Patel P, Rose CE, Collins PY, et al. Noncommunicable diseases among HIV-infected persons in low-income and middle-income countries: a systematic review and meta-analysis. *AIDS*. 2018;32(Suppl 1):S5–S20. doi:10.1097/QAD.0000000000001888
5. World Health Organization. *Global Report on Hypertension*. Vol. 01; 2023.
6. Kamkuemah M. A high prevalence of NCD multimorbidity in South African adolescents and youth living with HIV: implications for integrated prevention. 2021.
7. Innes S, Patel K. Noncommunicable diseases in adolescents with perinatally acquired HIV-1 infection in high-income and low-income settings. *Curr Opin HIV AIDS*. 2018;13(3):187–195. doi:10.1097/COH.0000000000000458
8. Ndirangu-Mugo E, Sibongile Shumba C, Gatiti P, Daniel Mutwiri B, Abubakar A, Teitelman A. Interventions for prevention of non-communicable diseases among adolescents living with HIV: a systematic review. *SN Compr Clin Med*. 2022;4(1):118. doi:10.1007/s42399-022-01186-1
9. Wood BR, Huhn GD. Excess weight gain with integrase inhibitors and tenofovir alafenamide: what is the mechanism and does it matter? *Open Forum Infect Dis*. 2021;8(12):ofab542. doi:10.1093/ofid/ofab542
10. Bares SH, Wu X, Tassiopoulos K, et al. Weight gain after antiretroviral therapy initiation and subsequent risk of metabolic and cardiovascular disease. *Clin Infect Dis*. 2024;78(2):395–401. doi:10.1093/cid/ciad545
11. Weisser M, Mapesi H, Vanobberghen F, et al. Body weight changes in people living with HIV starting dolutegravir versus efavirenz-based regimens in a large cohort in rural Tanzania. *Aids*. 2024. doi:10.1097/QAD.0000000000004085
12. Shayo FK. Co-occurrence of risk factors for non-communicable diseases among in-school adolescents in Tanzania: an example of a low-income setting of sub-Saharan Africa for adolescence health policy actions. *BMC Public Health*. 2019;19(1):1–8. doi:10.1186/s12889-019-7320-1
13. Kitilya B, PrayGod G, Peck R, et al. Levels and correlates of physical activity and capacity among HIV-infected compared to HIV-uninfected individuals. *PLoS One*. 2022;17(1 January):1–15. doi:10.1371/journal.pone.0262298
14. Chirindza N, Leach L, Mangona L, Nhaca G, Daca T, Prista A. Body composition, physical fitness and physical activity in Mozambican children and adolescents living with HIV. *PLoS One*. 2022;17(10 October):1–16. doi:10.1371/journal.pone.0275963
15. Kamkuemah M, Gausi B, Oni T. High prevalence of multimorbidity and non-communicable disease risk factors in South African adolescents and youth living with HIV: implications for integrated prevention. *S Afr Med J*. 2022;112(4):259–267. doi:10.7196/SAMJ.2022.v112i4.15967
16. Kamkuemah M, Gausi B, Oni T. Missed opportunities for NCD multimorbidity prevention in adolescents and youth living with HIV in urban South Africa. *BMC Public Health*. 2020;20(1):1–11. doi:10.1186/s12889-020-08921-0
17. Nkinda L, Buberwa E, Memiah P, et al. Impaired fasting glucose levels among perinatally HIV-infected adolescents and youths in Dar es Salaam, Tanzania. *Front Endocrinol*. 2022;13:1–10. doi:10.3389/fendo.2022.1045628
18. Gautam N, Dessie G, Rahman MM, Khanam R. Socioeconomic status and health behavior in children and adolescents: a systematic literature review. *Front Public Health*. 2023;11:1–23. doi:10.3389/fpubh.2023.1228632
19. Dly S, Tang TCW, Chung JSK, Lee ASY, Capio CM, Chan DKC. Parental influence on child and adolescent physical activity level: a meta-analysis. *Int J Environ Res Public Health*. 2022;19(24). doi:10.3390/ijerph192416861
20. Doggui R, Gallant F, Bélanger M. Parental control and support for physical activity predict adolescents' moderate to vigorous physical activity over five years. *Int J Behav Nutr Phys Act*. 2021;18(1):1–10. doi:10.1186/s12966-021-01107-w
21. Lekey A, Masumo RM, Jumbe T, et al. Food taboos and preferences among adolescent girls, pregnant women, breastfeeding mothers, and children aged 6–23 months in Mainland Tanzania: a qualitative study. *PLOS Glob Public Heal*. 2024;4(8):1–16. doi:10.1371/journal.pgph.0003598
22. MOHCDGEC. National adolescent health and development strategy 2018 - 2022. *Minist Heal Community Dev Gender, Elder Child*. 2018:1–41.
23. MOHCDGEC. National multisectoral nutrition action plan. 2021:9–25.
24. MOHCDGEC. National guidelines for the management of HIV and AIDS in Tanzania. *Natl AIDS Control Program*. 2019;309. doi:10.5005/jp/books/13071_20
25. Tengia-kessy A, Killenga JN. Prevalence of excess body weight and associated factors among secondary school adolescent girls in northern Tanzania: a cross-sectional study. *Pan Afr Med J*. 2020;37(253). doi:10.11604/pamj.2020.37.253.25349
26. Tluway FD, Leyna GH, Mmbaga EJ. Magnitude and factors associated with overweight and obesity among adolescents in in semi-rural area of Babati District, Tanzania. *Tanzan J Health Res*. 2018;20(2 SE–Articles). doi:10.4314/thrb.v20i2.2
27. Scarneo SE, Kerr ZY, Kroshus E, et al. The socioecological framework: a multifaceted approach to preventing sport-related deaths in high school sports. *J Athl Train*. 2019;54(4):356–360. doi:10.4085/1062-6050-173-18
28. Fearnley CJ. Mind mapping in qualitative data analysis: managing interview data in interdisciplinary and multi-sited research projects. *Geo Geogr Environ*. 2022;9(1):1–19. doi:10.1002/geo2.109
29. Halpin SN. Inter-coder agreement in qualitative coding: considerations for its use. *Am J Qual Res*. 2024;8(3):23–43. doi:10.29333/ajqr/14887
30. Kitilya B, Sanga E, Praygod G, Kavishe BB, Ditlevsen K, Peck R. Perceptions, facilitators and barriers of physical activity among people living with HIV: a qualitative study. *BMC Public Health*. 2023;23(1):1–12. doi:10.1186/s12889-023-15052-9
31. Alexandra L, Mendonc G, Cazuza J, Júnior DF. Physical activity in adolescents: analysis of the social influence of parents and friends. *Jornal de pediatria*. 2014;90(1). doi:10.1016/j.jped.2013.05.006

32. Hosokawa R, Fujimoto M, Katsura T. Parental support for physical activity and children's physical activities: a cross-sectional study. *BMC Sports Sci Med Rehabil*. 2023;15(1):1–9. doi:10.1186/s13102-023-00700-9
33. Cowley ES, Watson PM, Foweather L, et al. "Girls aren 't meant to exercise": perceived influences on physical activity among adolescent girls — the HERizon project. 2021.
34. Hardy-Johnson P, Dhuria P, Strommer S, Weller S, Barker M, Fall C. Exploring the diet and physical activity behaviours of adolescents living in India and sub-Saharan Africa: a qualitative evidence synthesis. *Public Health Nutr*. 2021;24(16):5288–5298. doi:10.1017/S1368980021002408
35. Adebusoye B, Leonardi-Bee J, Phalkey R, Chattopadhyay K. Barriers and facilitators of physical activity among school attending adolescents in Lagos State, Nigeria: a qualitative study exploring views and experiences of decision-makers in secondary schools. *Heal Sci Rep*. 2023;6(1):1–10. doi:10.1002/hsr2.997
36. Karchynskaya V, Kopcakova J, Geckova AM, Katrusin B, Reijneveld SA, de Winter AF. Barriers and enablers for sufficient moderate-to-vigorous physical activity: the perspective of adolescents. *PLoS One*. 2024;19(2 February):1–16. doi:10.1371/journal.pone.0296736
37. Abdelghaffar EA, Hicham EK, Siham B, Samira EF, Youness EA. Perspectives of adolescents, parents, and teachers on barriers and facilitators of physical activity among school-age adolescents: a qualitative analysis. *Environ Health Prev Med*. 2019;24(1). doi:10.1186/s12199-019-0775-y
38. Martins J, Costa J, Sarmento H, et al. Adolescents' perspectives on the barriers and facilitators of physical activity: an updated systematic review of qualitative studies. *Int J Environ Res Public Health*. 2021;18(9):4954. doi:10.3390/ijerph18094954
39. Zelenović M, Manić M, Stamenković A, Čaprić I, Božić D. Barriers to physical activity in adolescents: a systematic review. *Turkish J Kinesiol*. 2021;7(1):22–30. doi:10.31459/turkjkin.840536
40. Sluijs Van EMF, Ekelund PU, Crochemore-silva I, Europe PMC Funders Group. Physical activity behaviours in adolescence: current evidence and opportunities for intervention. *Lancet*. 2022;398(10298):429–442. doi:10.1016/S0140-6736(21)01259-9.Physical
41. Bodega P, de Cos-Gandoy A, Fernández-Alvira JM, Fernández-Jiménez R, Moreno LA, Santos-Beneit G. Body image and dietary habits in adolescents: a systematic review. *Nutr Rev*. 2024;82(1):104–127. doi:10.1093/nutrit/nuad044
42. Song L, Zhang Y, Chen T, Maitusong P, Lian X. Association of body perception and dietary weight management behaviours among children and adolescents aged 6–17 years in China: cross-sectional study using CHNS (2015). *BMC Public Health*. 2022;22(1):1–10. doi:10.1186/s12889-022-12574-6
43. Boncyk M, Shemdoe A, Ambikapathi R, et al. Exploring drivers of food choice among PLHIV and their families in a peri-urban Dar es Salaam, Tanzania. *BMC Public Health*. 2022;22(1):1–12. doi:10.1186/s12889-022-13430-3
44. Neufeld LM, Andrade EB, Ballonoff Suleiman A, et al. Food choice in transition: adolescent autonomy, agency, and the food environment. *Lancet*. 2022;399(10320):185–197. doi:10.1016/S0140-6736(21)01687-1
45. Daly AN, O'Sullivan EJ, Kearney JM. Considerations for health and food choice in adolescents. *Proc Nutr Soc*. 2022;81(1):75–86. doi:10.1017/S0029665121003827
46. Ssewanyana D, Abubakar A, van Baar A, Mwangala PN, Newton CR. Perspectives on underlying factors for unhealthy diet and sedentary Lifestyle of adolescents at a Kenyan coastal setting. *Front Public Health*. 2018;6(February. doi:10.3389/fpubh.2018.00011
47. Trübswasser U, Talsma EF, Ekubay S, et al. Factors influencing adolescents' dietary behaviors in the school and home environment in Addis Ababa, Ethiopia. *Front Public Health*. 2022;10:1–10. doi:10.3389/fpubh.2022.861463
48. Barnett I, Gonzalez W, Bipul M, Chowdhury D, Wouabe ED, Deo AK. Improving adolescents' food choices: learnings from the Bhalo Khabo Bhalo Thakbo ("eat well, live well") campaign in Bangladesh. *Field Exch*. 2021;(66):23–25.
49. Gebrie M, Perry L, Xu X, Kassa A, Cruickshank M. Nutritional status and its determinants among adolescents with HIV on anti-retroviral treatment in low- and middle-income countries: a systematic review and meta-analysis. *BMC Nutr*. 2023;9(1):1–15. doi:10.1186/s40795-023-00714-z
50. McCullough ML, Chantaprasopsuk S, Islami F, et al. Association of socioeconomic and geographic factors with diet quality in US adults. *JAMA Network Open*. 2022;5(6):E2216406. doi:10.1001/jamanetworkopen.2022.16406
51. Curran M, Hartley RP. Food security and policy effects by family size: how does quality of well-being depend on quantity of children. *How Does Qual Well Being Depend Quant Child*. 2021;04:1–31.