Vol. 15(2), pp. 120-130, April-June 2023
DOI: 10.5897/JPHE2023.1444
Article Number: 157099A70839
ISSN 2141-2316

http://www.academicjournals.org/JPHE

ACADEMIC JOURNALS
expand your knowledge

Journal of Public Health and Epidemiology

Full Length Research Paper

Knowledge and determinants of non-communicable disease risk factors among adolescents in Jos North Local Government Area, Plateau State

Olutomi Yewande SODIPO[1]*, Hadiza Abigail AGBO[2], Emilia Asuquo UDOFIA[3] and Ayuba Ibrahim ZOAKAH[4]

[1]Department of Community Medicine, Jos University Teaching Hospital, Plateau State, Nigeria.
[2]Department of Community Medicine, Jos University Teaching Hospital, Plateau State and College of Medical Sciences, University of Jos, Jos, Nigeria.
[3]Department of Community Health, School of Public Health, University of Ghana, Legon, Ghana.
[4]Department of Community Medicine, Jos University Teaching Hospital, Plateau State and College of Medical Sciences, University of Jos, Jos, Nigeria.

Received 14 March, 2023; Accepted 8 June, 2023

Risk factors for non-communicable diseases pose a huge burden among adolescents. This study used a qualitative approach to assess the knowledge and factors associated with non-communicable disease risk factors among adolescents in Jos North Local Government Area, Plateau State. Four focus group discussions were conducted, with sixteen (eight males and eight females) in-school and out-of-school adolescents, each selected purposively. Qualitative data were analyzed using thematic content analysis. Most adolescents mentioned peer pressure and habits of parents and siblings as factors associated with smoking and alcohol use. The high cost of fruits and poverty were cited as the reasons for not consuming the required servings of fruits and vegetables. Some respondents cited a lack of awareness of the type of physical activity, and time-wasting effort as reasons for physical inactivity. Reasons for engaging in a lot of screen time included idleness and internet availability. A few respondents cited having family members who were overweight or obese as a reason for being overweight/obese. Some respondents cited overthinking, excess salt consumption, smoking, and alcohol consumption as a factor associated with hypertension.

Key words: Non-communicable diseases, risk factors, determinants, adolescents, Nigeria.

INTRODUCTION

Non-communicable diseases (NCDs) disproportionately affect people in low- and middle-income countries, where over 77% of global NCD deaths occur (WHO, 2021). In West and Central Africa, adolescents comprise 23.3% of the region's population, and in Nigeria, more than 1 in 4 are adolescents (PMA, 2020; UNFPA, 2021). The aforementioned shows that adolescents comprise a substantial part of the national population. In addition,

*Corresponding author. E-mail: olutomisodipo@gmail.com.

Proimos and Jonathan, 2021 identified that most of these NCDs are linked to behavioral risk factors such as tobacco use, alcohol consumption, physical inactivity, a sedentary lifestyle, and an unhealthy diet. Globally, over 150 million adolescents smoke; 81% adolescents do not participate in sufficient physical activity; 12.7% of adolescents partake in heavy episodic drinking and over 60% are overweight (WHO, 2014; WHO, 2018; Guthold et al., 2020) These factors help contribute to the estimated 7 million annual deaths from tobacco use, 3 million deaths from harmful use of alcohol, and nearly 4 million deaths linked to obesity and overweight (Rodriguez-Fernandez and Whitlock, 2019).

Adolescence, the transition period between childhood and adulthood, is an important phase for acquiring future lifestyles, mainly through experimentation of risky health behaviors influenced by self-independence, impulsivity, sensation seeking, and undue pressure (WHO, 2015; Shulman et al., 2016). During this period, unhealthy behaviors such as tobacco use, alcohol consumption, a sedentary lifestyle, physical inactivity, and unhealthy diet are barely perceived as harmful. On the contrary, this perception encourages the persistence of such behaviors (Puwar et al., 2018). These behaviours jeopardize not only their current health but also their health as future adults, and the health of their unborn children, which will invariably affect the health indices and development of the nation at large (Saydah et al., 2015; Patton et al., 2016). Globally, urbanization, globalization, socioeconomic status of families, educational status, and sociocultural factors have been implicated in the high prevalence of NCD risk factors (AMA, 2012; Huisman and Smits, 2015).

Adolescents worldwide are vulnerable to the promotion of unhealthy foods, tobacco, and alcohol use, and several grow up in environments that are especially unfavorable to the adoption of eating healthy and engaging in adequate physical activity (UNICEF, 2021; WHO, 2022). Good knowledge of NCD risk factors has been shown to influence if and when adolescents engage in risky behaviors. A person's knowledge and awareness about NCDs and their risk factors is an important antecedent to engaging in preventive strategies (Jain et al., 2018). Despite the importance of early identification of NCD risk factors and the attendant complications of these risk factors in later life, Nigeria does not have NCD surveillance data that targets adolescents both in and out of school. Even though the 2013 Nigerian National Policy and Strategic Plan of Action on Prevention and Control of NCDs exists, it focuses on persons 18 years and above, leaving out the bulk of the adolescent population (FMOH, 2013). In addition, the National Multi-Sectoral Action Plan for the Prevention and Control of Non-Communicable Diseases (2019-2025) only explicitly mentions adolescents as the outcome indicator of increasing school physical activity (FMOH, 2019). This has led to a dearth of data on NCD risk factors in adolescents, especially those out of school with a higher risk of adverse health outcomes. The lack of up-to-date evidence for decision-making is an essential factor hampering the drive to prevent and control NCDs. Promoting healthy behaviors during adolescence, and taking steps to better protect young people from health risks can be done if adolescents have timely and adequate knowledge about NCDs (WHO, 2013, 2015). Therefore, conducting a study about the knowledge of and factors associated with NCD risk factors among adolescents will aid in identifying deficiencies in knowledge and implementing targeted interventions to tackle NCD risk factors among adolescents.

MATERIALS AND METHODS

Study design and study area

This was a comparative cross-sectional study among in-school and out-of-school adolescents in Jos North Local Government Area, Plateau state during the period from August 2020 till November 2020. This study was qualitative, with focus group discussions (FGDs) used for data collection. Jos North LGA has 22 government secondary schools (1 boarding and 21-day schools) and 51 registered private secondary schools (3 boarding and 48-day schools) (Plateau State Ministry of Education, 2019). In addition, there are eight recognized and duly registered markets (Plateau State Government, 2023).

Study population

This consisted of all consenting in-school and out-of-school adolescents aged 10 to 19. Eligible in-school adolescents were those who attended co-educational day secondary schools. Eligible out-of-school adolescents were those who had dropped out of school without completing their senior secondary school, those who never attended school, or those who participated in non-formal school programs. These out-of-school adolescents had to be found in the marketplace during regular school hours.

Sample size and selection

Selection of both in-school and out-of-school adolescents was done purposively. The FGD groups were stratified based on gender and school status. Adolescents aged 15-19 were purposively selected, because they represented the middle and older age group of adolescents who usually engage more in risky behaviours (Itanyi et al., 2018; WHO, 2018).

Stratification based on gender was carried out to allow adolescents of the same gender to feel free to express their opinions and not feel uncomfortable or shy in the presence of the opposite gender. Sixteen out-of-school adolescents (eight males and eight females) and sixteen in-schools (eight males and eight females) were purposively selected with the aid of the prominent market leader.

Conduct of the focus group discussions

Four FGDs were conducted, that is, one each for male and female out-of-school adolescents and one each for male and female in-school adolescents using the FGD guide. The number of FGDs was sufficient to achieve saturation (Hennink et al., 2019; Hennink and

Kaiser, 2022). The discussions were conducted in classrooms for in-school adolescents and a hospital (close to the primary market) for out-of-school adolescents. Seats were provided and arranged in a circular fashion for the discussion. For identification during the discussion, numbers were assigned to participants, which served as identifiers. Informed verbal consent or assent as appropriate was obtained from all the participants, and the procedure of the discussion was explained to the participants. The principal researcher moderated the sessions using a FGD guide. The guide contained questions on knowledge of NCD risk factors and determinants associated with NCD risk factors. A research assistant also took notes while another recorded the sessions with a digital voice recorder. The sessions were conducted in English as both in-school and out-of-school respondents had a basic understanding of the English. Each session lasted approximately 45 min to ensure the optimum concentration of participants.

Ethical clearance

Ethical clearance for the study was obtained from the Jos University Teaching Hospital Human and Research Ethics Committee (HREC). Permission was obtained from the Plateau State Ministry of Education through the Area Directorate Office. Advocacy visits were paid to the school principals and market heads to solicit their support for the research. Each in-school adolescent selected for the study was given a letter of permission to be filled out by the parents or guardians who granted the researcher consent to conduct the investigation and obtain approval for audio recording. Assent (verbal and written in the form of thumbprint) was also obtained from the 10-17-year-old adolescents and informed verbal or written consent (as appropriate) was obtained from 18-19 year olds before the commencement of the study. Parents, guardians, and participants were assured that their information they provided would be anonymous and confidential. Participants could opt out of the study at any time without loss of any benefits of the study.

Data management

Information obtained from the FGDs was transcribed verbatim. The FGDs were typed immediately after translation. This was carried out both by the research assistants and note- takers.

Data analysis

The transcribed data were carefully read line by line several times by the researcher (data immersion) to understand and familiarize oneself with the content. Then, the transcribed data was analysed using content analysis. The content analysis involved grouping the data into emerging codes and then grouping the codes that shared similar meanings into sub-themes and finally grouped into themes.

Trustworthiness

Credibility was assured by using two methods of data collection; the FGDs and principal researcher and research assistant field notes (methodological triangulation). Several distinctive questions were asked regarding topics related to knowledge risk factors for NCDs; participants were encouraged to support their statements with examples, the principal researcher asked follow-up questions, and the principal researcher studied the data from raw interview material until the theory emerged to provide the scope of the phenomenon under investigation (prolonged engagement). The principal researcher concentrated on the aspects of the interviews and field notes that were most relevant to the issue under study and focused on them in detail; the data was read, analysed, theorized, and the concepts revised accordingly until the findings provided depth (persistent observation).—Transferability was guaranteed by providing descriptive data of the behaviours of participants and study context (thick description) to enable transferability to other contexts. Dependability and confirmability were ensured by transparently describing the steps taken from starting a research project to developing and reporting the findings. Finally, reflexivity was guaranteed by supplementing results from the reflexive notes with information obtained during audio recording transcriptions and while interpreting and analyzing the data.

RESULTS

Different themes and sub-themes emerged from the FGDs. These include:

1) Adolescents' knowledge of NCD risk factors varied between adequate and inadequate knowledge (Table 1).
2) Factors associated with behavioural risk factors: smoking and alcohol (peer pressure, anger issues, habits of parents and siblings, stressful events, poor academic performance, working adolescents, idleness, relationship issues, lack of education, parental neglect and movies); fruit and vegetable consumption (cost, non-preference for fruits and vegetables, poverty, residence, living arrangements, mother's belief); physical inactivity (time wasting activity); sedentary lifestyle (idleness, internet data).
3) Factors associated with physical risk factors: overweight/obesity (family history); hypertension (intense thinking, behavioural risk factors)

Item 1: Knowledge of behavioural and physical risk factors for NCDs

The knowledge adolescents had on risk factors for NCDs varied between adequate and inadequate knowledge as evidenced by their responses (Table 2).

Item 2: Factors associated with behavioral risk factors

Findings revealed that most respondents mentioned peer pressure, anger issues, and habits of parents and siblings as factors associated with smoking and alcohol use. Others cited reasons such as stressful events, poor academic performance, working adolescents, idleness/ boredom, relationship issues, lack of education, parental neglect, and movies as factors associated with smoking and alcohol use (Table 3).

Item 3: Factors associated with physical risk factors

A few of the respondents cited having family members who were overweight or obese as a reason for being overweight/obese. Some of the respondents cited intense thinking, excess salt consumption, smoking and alcohol as factors associated with hypertension (Table 4).

Table 1. Socio-demographics of adolescents in the focus group discussion.

Session	Age (years)	Participants frequency (%)	No. of sessions
FGD 1(in-school, girls)	15	3 (37.5)	1
	16	3 (37.5)	
	17	2 (25.0)	
FGD 2(in-school, boys)	16	5 (62.5)	1
	17	2 (25.0)	
	18	1 (12.5)	
FGD3(out-of-school, girls)	15	1 (12.5)	1
	16	3 (37.5)	
	17	1 (12.5)	
	18	2 (25.0)	
FGD 4(out-of-school, boys)	15	1 (12.5)	1
	16	1 (12.5)	
	17	5 (62.5)	
	19	1 (12.5)	
Total no. of participants		32	
Total no. of sessions		4	

Source: Focus Group Discussion of In-school and Out-of-school adolescents

DISCUSSION

The level of knowledge about NCD risk factors in this study varied between adequate and inadequate in both groups of adolescents. Some responses that indicated inadequate knowledge of NCD risk factors were drinking dirty water and intense thinking. This understanding of risk factors could be attributed to the poor state of education in public schools and the absence of formal education for out-of-school adolescents (Matthew, 2013; Chethana et al; 2014; Olaoluwa et al., 2016). Variation in the level of knowledge in both groups of participants suggests that adolescents might engage in harmful behaviours unknowingly, which could predispose them to NCDs.

Most participants in this study mentioned peer pressure and habits of parents and siblings as factors associated with smoking and alcohol use. Some other reasons mentioned were stressful events and having to work as adolescents.

Findings from studies in Zambia and Northern Island revealed that employment of adolescents and young adults was positively associated with alcohol use compared to those who were unemployed (Singkorn et al., 2019; Mungandi et al., 2022). Peer pressure was a predictor of alcohol consumption in Botswana (Riva et al., 2018). This was similar to the findings in a systematic review, where peer influence was the most common risk factor for risky health behaviours in Nigerian adolescents (Oyewole et al., 2018). Parental tobacco use was a predictor for tobacco use among young adolescents in a study 68 LMICs (Xi et al., 2016). This was similar to studies in Saudi Arabia and Nigeria, where respondents whose parents smoked cigarettes were more likely to have smoked cigarettes (Al-Zalabani and Kasim, 2015; Raji et al., 2017). This was at variance with a study of South African out-of-school youth aged 13-20 years, where the odds of being a smoker were lower when their parents were smokers (Desai et al., 2019). The reason proffered was that any child, to some extent, does not want to make the same mistakes as their parents (Desai et al., 2019).

Socioeconomic status also plays an important role in predisposing adolescents to unhealthy lifestyles. Due to the poor socioeconomic status of their parents, female adolescents had to drop out of school and take up low-paying jobs or remain jobless. This led to increased free time, loss of income, and disruption of the family structure, which put the pressure of fending for the family on the adolescents, predisposing them to alcohol abuse (Brito et al., 2015).

Orimadegun and Ola (2012) revealed that adolescents who worked to earn payment after school hours were twice as likely to use tobacco products. A study in the USA showed that adolescents with work stress were more likely to use alcohol (Holliday and Gould, 2016). In our environment, adolescents engage in street hawking, domestic services, babysitting, or working in shops or

Table 2. Knowledge of behavioural and physical risk factors for NCDs.

Item	Sub-theme	Supporting verbatim quotes	Respondents supporting quotes	Context/supporting information (if any)
Adequate knowledge	Smoking and alcohol	Liver cancer can be gotten from taking too much alcohol and smoking	Female, OS, P3, FGD 3	
		Smoking can lead to lung cancer	Female, IS, P5, FGD 1	
	High sugar intake	You can get diabetes from taking a lot of sugar	Male, OS, P4, FGD 4, Male, IS, P6, FGD 2 Female, IS, P1, FGD 1	
	High salt intake	Taking too much salt can cause you to have hypertension	Female, OS, P5, FGD 3	
	Dirty water	If you don't take care of your body by taking dirty water	Male, IS, P2, FGD 2	
Inadequate knowledge	Wrong placement of money	If you put money in your breast, you can have breast cancer	Female, IS, P3, FGD 1	She had heard this from adults around her and some other participants echoed in agreement while others laughed that this was not true.
	Thinking too much	Thinking too much can cause hypertension	Male, OS, P5, FGD 4; Male, IS, FGD 2; Female, IS, FGD 1	

Source: Focus Group Discussion of In-school and Out-of-School adolescents

Table 3. Factors associated with behavioral risk factors.

Theme	Sub-theme	Supporting verbatim quotes	Respondents supporting quotes	Context/supporting information (if any)
Smoking and alcohol use	Peer pressure	*When I see my friend doing it, I will want to do it too so that I will feel among or else they will start calling me Holy Holy*	Female, IS, P2, FGD 1	Other participants laughed in agreement.
		If there are four of us and three of us are smoking and this one is not smoking and always we are together, sometimes you will even abuse him like guy you don't have mind, we are big boys, then you will just be thinking-let me just try it	Male, IS, P7, FGD 2	
	Anger issues	*When you are angry and you drink it calms one down, that is the only way you can calm down and if you are addicted to it, you cannot stop it*	Male, IS, P3, FGD 2	The participant attributed being angry due to having issues with one's girlfriend
		They drink to help cool their temper, maybe somebody vexed them or maybe they are angry	Female, IS, P4, FGD 1	The participant was referring to boys.

Table 3. Cont'd

Habits of parents and siblings	*If he sees his brother is taking alcohol and they are not talking to him, he will think it is good to take*	Male, OS, P8, FGD 4	Other participants echoed in agreement and there was a lot of laughter.
	If your father is smoking or drinking, you might think that it is good	Male, OS, P2, FGD 4	
	I had a neighbour, when the father wants to drink beer he will send him and say go and buy for me this, on his way coming he will take out of it and up till today he still does that	Male, IS, P5, FGD 2	
Stressful events	*Some engage because of stress and become addicted to drugs e.g. if you are hawking or stressful work.*	Male, OS, P4, FGD 4	The participant shook his head sadly as he said it
	There are some parents that put too much pressure on their children so the children engage to forget	Female, IS, P6, FGD 1; Male, IS, P1, FGD 2	Pressure from parents meant having to contribute to household income.
	If some people want to farm, they cannot farm if they do not take drink because they need energy to farm	Male, OS, P6, FGD 4	Some others confirmed what he said and mentioned that the work they do is usually strenuous
Poor academic performance	*Maybe someone finished school 2014 and has not gotten admission till now*	Female, IS, P2, FGD 1	The participant mentioned she knew an individual who had been affected. One of the participants mentioned that getting pregnant in school could also lead one to stopping school and engaging in drinking. The others looked at themselves when this was said, as if it was not to be mentioned
	Not performing well in school and you are not passing, maybe when you fail exams. You see yourself as a failure	Female, IS, P3, FGD 1	
Working adolescents	*We need to make money to support our parents*	Male, OS, P5, FGD 4	The participant quickly went on to explain that it was not that their parents did not want to support them but the means were not available.
	Some engage because they have money. I usually support myself with the money I get from work	Male, OS, P6, FGD 4	
	They take it so that they won't be tired money so they feel it's better to smoke or do other things since they have nothing doing	Male, IS, P2, FGD 2	
	Some of the times when we don't have anything doing we take drinks		Being tired in this context was with regards to carrying blocks and farming.
Idleness	*Some parents will not let them go out and look for*	Male, OS, P3, FGD 4 Male, IS, P3, FGD 2	The participant had a sad facial expression when he mentioned this.
	If the girlfriend is always nagging, she is disturbing him too much, maybe he got her pregnant and she is the troublesome kid and he doesn't have what to provide for her, her needs, he goes here he doesn't get, he goes there he doesn't get, the next thing that would come to his mind will be to start drinking to forget about		

Table 3. Cont'd

		his troubles	Female, OS, P1, FGD 3	The participant mentioned this animatedly.
	Relationship issues	*If you are in a relationship with a girl and she suddenly starts messing up, you will now be thinking what you have done to deserve this and need to calm down*	Male, IS, P3, FGD 2	The participant mentioned that this had happened to him and some others made jest of him, in a friendly way though.
	Lack of education	*Some of their parents could not take them to school so they will not know the effect of smoking and drinking so they will just go and engage themselves*	Male, IS, P5, FGD 2	This was not said in accusation but as a way to explain the inability of parents in fulfilling the needs for their children to attend school
		Only science students are taught about these things	Female, IS, P3, FGD 1	The participant was a science student and mentioned that those in arts classes were not taught.
	Parental neglect	*Some parents do not care for their children*	Female, OS, P7, FGD 3	Parental neglect meant parents not providing for their children, allowing them fend for themselves, in terms of food and school fees
	Movies	*Some will be watching movies and then see these kinds of things and would think it is fun*	Male, IS, P2, FGD 2	
		They copy it from their role models in films	Female, OS, P6, FGD 4	
Fruit and vegetable consumption	Cost	*There is no money, only one apple is ₦200. Like our parents will tell you that they are looking for money for food not for fruits and you gats chop wetin you see for table, na wetin be the problem*	Female, IS, P2, FGD 1	
		If someone is addicted to drinking and I have ₦100 I will not think to buy paw and eat I will think to go and get high	Male, IS, P8, FGD 2	Others reiterated this point that fruits were the last thing on their minds if they had not eaten.
	Non-preference for fruits and vegetables	*I don't eat fruits because I don't feel like eating it*	Male, IS, P7, FGD 2	
		Fruits is not strong food, it does not give you energy to be able to do work	Male, OS, P5, FGD 4	
	Poverty	*It's mostly in houses where there is money that they eat fruits but, in our case, if you have money to buy eat/eat different varieties of fruits and vegetables in a day, your parents would call it misplaced priorities*	Female, OS, P3, FGD 3	This was said as a statement of fact, with the acceptance of her reality and not with regret.
		Some of us eat food only once a day and it is what you see you will eat	Male, OS, P5, FGD 4	The participant looked at the others for support and the others agreed.

Table 3. Cont'd

	Residence	*When you stay somewhere or in an area where they don't sell these things. Some areas don't have main market around so you find it difficult to transport yourself there to buy it and still come back*	Female, IS, P2, FGD 1 Male, IS, P6, FGD 2	
	Living arrangements	*I only eat vegetables when I travel to my mum's place. She is the one who disturbs me to eat but as I am here in Jos I am just busy, I don't have time to eat it*	Male, OS, P6, FGD 4	The participant mentioned that he had to leave his home as he was seeking University admission
	Mother's belief	*My mother said fruits and vegetables is mostly for old people like her and not for a young person like me*	Female, IS, P1, FGD 1	The participant said it in a way that showed she did not agree with her mother's views.
Physical inactivity	Time wasting activity	*There is lack of knowledge on the benefit of exercise, on which is best for you, which one will not waste your time that you will do sharp sharp* *Like we come from our area to here, we will trek and still trek to go back* *I don't have time because of hand work that I do*	Female, IS, P7, FGD 1 Female, IS, P4, FGD 1 Male, OS, P5, FGD 4	This was a problem because it added to the stress they already went through doing house chores.
Sedentary lifestyle	Idleness	*Some people don't have work doing so they would like to spend their time using their phones or playing games* *I can spend almost the whole day on my phone chatting with friends*	Male, IS, P4, FGD 2 Male; OS, P2, FGD 4	
	Internet data	*There are some phone apps that dash you 50MB every day to watch film*	Male, OS, P1, FGD 4	He further reiterated that one could access Facebook and some other sites and the more you made use of the data given you, the more data you are given.

Source: Focus Discussion of In-School and Out-of-School adolescents

saloons (Alonso et al., 2017). Those who work away from home could be exposed to behaviours such as tobacco use and alcohol consumption while at work. In addition, the financial freedom associated with working could be a trigger to engage in risky behaviours. However, there is also the opinion that working adolescents have a higher sense of responsibility and engage in fewer risky behaviours (Alonso et al., 2017).

Most participants cited the high cost of fruits, not liking fruits or vegetables, and poverty as reasons for not consuming the required servings of fruits and vegetables. This was in agreement with findings in other studies which cited lacking household food security (lack of sufficient food at home), high cost of fruits, non-availability of fruits, not liking fruits, and attitudes of parents as factors influencing the eating habits of children (Ilesanmi, 2014; Lapuente et al., 2019; Sato et al., 2020). In this study, one adolescent cited the mother's belief in not consuming the required servings of fruits and vegetables. It is known that parents' knowledge and attitudes greatly influence their children's eating habits (Vio et al., 2015). This is even more worrisome, especially because adolescents usually do not have control over what they eat.

Table 4. Factors associated with physical risk factors.

Theme	Sub-theme	Supporting verbatim quotes	Respondents supporting quotes	Context/supporting information (if any)
Overweight/obesity	Family history	*It can be inherited mostly* *If it is in your family, you can have it*	Female, IS, P7, FGD 1 Male, OS, P3, FGD 4	
Hypertension	Intense thinking	*Thinking too much. When you think too much, there are some of use that can't even sleep*	Male, OS, P5, FGD 4	Thinking too much was as a result of looking for ways to look for money to fend for themselves.
	Behavioural risk factors	*Eating plenty salt can cause one to have hypertension* *If a person smokes and if a person drinks, the person can have hypertension*	Female, OS, P4, FGD 3 Male, IS, P8, FGD 2	The participant then went on to give an example of an individual in their compound who developed hypertension from taking alcohol which then led to a stroke.

Source: Focus Group Discussion of In-school and Out-of-school Adolescents

Some participants cited reasons for physical inactivity, such as lack of awareness of the type of physical activity, time-wasting effort, and time constraints to do. This was similar to the findings in a systematic review by Duffey et al. (2021) which showed that having a busy schedule was cited as one of the most common barriers to being physically active among adolescent girls. In a study in the United Kingdom, the lack of choice and variety to choose activities was a reason for physical inactivity among adolescents (Chaput et al., 2020). Idleness and availability of internet data were cited as reasons for engaging in much screen time. In a study conducted in Ghana, computer and internet use among adolescents contributed largely to the total sedentary time of both boys and girls, especially those who attended private schools who were more affluent (Asare and Danquah, 2015)

A few participants cited having family members who were overweight or obese as a reason for being overweight/obese. This was similar to the study in Portugal, which showed that adolescents with one obese parents, especially the fathers, had a higher risk of being obese compared to those whose parents were not obese (De Morais MacIeira et al., 2017). A study by Sahoo et al. (2015) also posited that having an obese parent predisposed adolescents to being obese. Some participants cited intense thinking, excessive salt consumption, smoking, and alcohol as ~~factors~~ associated with hypertension. Findings from an interventional study among in-school adolescents in India showed that at baseline, a higher proportion knew that stress could lead to hypertension, while less than a third knew that excess salt could contribute to hypertension (Chaudhari et al., 2016) This was similar to findings from studies in Ghana and Bangladesh where few of the adolescents knew that unhealthy diet could lead to hypertension (Amponsem-Boateng et al., 2019; Parvin et al., 2020).

Conclusion

Findings from the study imply that adolescents' health behaviors are influenced not only by knowledge but other factors such as interpersonal factors, organizational factors, community and cultural factors, and the broader context as depicted by the socio-ecologic model.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

REFERENCES

Al-Zalabani A, Kasim K (2015). Prevalence and predictors of adolescents' cigarette smoking in Madinah, Saudi Arabia: a school-based cross-sectional study. BMC Public Health 15(17):1-7.

Alonso F, Esteban C, Useche SA, Faus M (2017). Smoking while Driving: Frequency, Motives, Perceived Risk and Punishment. World Journal of Preventive Medicine 5(1):1-9.

Amponsem-Boateng C, Zhang W, Oppong TB, Opolot G, Kyere EKD (2019). A cross-sectional study of risk factors and hypertension among adolescent senior high school students. Diabetes, Metabolic Syndrome and Obesity: Targets and Therapy 12:1173-1180.

Asare M, Danquah SA (2015). The relationship between

physical activity, sedentary behaviour and mental health in Ghanaian adolescents. Child and Adolescent Psychiatry and Mental Health. Child and Adolescent Psychiatry and Mental Health 9(1):1-8.
Australian Medical Association (AMA) (2012). Alcohol Marketing and Young People: Time for a new policy agenda. Available at: https://ama.com.au/sites/default/files/documents/alcohol_marketing_young_people.pdf.
Brito A, Hardman C, de Barros M (2015). Prevalence and factors associated with the co-occurrence of health risk behaviors in adolescents. Revista Paulista de Pediatria. Sociedade de Pediatria de São Paulo 33(4):423-430.
Chaput JP, Willumsen J, Bull F, Chou R, Ekelund U, Firth J, Jago R, Ortega FB, Katzmarzyk PT (2020). 2020 WHO guidelines on physical activity and sedentary behaviour for children and adolescents aged 5–17 years: summary of the evidence. International Journal of Behavioral Nutrition and Physical Activity 17(1):1-9.
Chaudhari AI, Rami K, Thakor N (2016). Assessment of knowledge regarding noncommunicable diseases and their risk factors among students of higher secondary school : an interventional study. International Journal of Medical Science and Public Health 5(01):115-118.
Chethana AA, Abhay KV, Hiremath SG (2014). Non - communicable diseases : Awareness of risk factors and lifestyle among rural adolescents. International Journal of Biological and Medical Research 5(1):3769-3771.
Desai R, Ruiter RAC, Schepers J, Reddy SP, Mercken LAG (2019). Tackling smoking among out of school youth in South Africa: An analysis of friendship ties. Addictive Behaviors Reports 10(2019):100214
Duffey K, Barbosa A , Whiting S, Mendes R, Aguirre IY, Tcymbal A , Abu-Omar K , Gelius P, Breda J (2021). Barriers and Facilitators of Physical Activity Participation in Adolescent Girls: A Systematic Review of Systematic Reviews. Frontiers in Public Health 9(743935):1-18.
Federal Ministry of Health Nigeria (FMOH) (2013). National Policy and Strategic Plan of Action on Prevention and Control of Non-Communicable Diseases (NCDs) Non-Communicable Disease Control Programme Federal Ministry of Health Abuja, Nigeria.
Federal Ministry of Health Nigeria(FMOH) (2019). National Multi-Sectoral Action Plan for the Prevention and Control of Non-Communicable Diseases (2019-2025)', pp. 1-138.
Guthold R, Stevens GA, Riley LM, Bull FC (2020). Global trends in insufficient physical activity among adolescents: a pooled analysis of 298 population-based surveys with 1•6 million participants. The Lancet Child and Adolescent Health 4(1):23-35.
Hennink M, Kaiser BN (2022). Sample sizes for saturation in qualitative research: A systematic review of empirical tests. Social Science and Medicine 292(114523):1-10.
Hennink MM, Kaiser BN, Weber MB (2019). What Influences Saturation? Estimating Sample Sizes in Focus Group Research. Qualitative Health Research 29(10):1483-1496.
Holliday E, Gould TJ (2016). Nictoine, adolescence, and stress: A review of how stress can modulate the negative consequences of adolescent nicotine abuse. Neuroscience and Biobehavioural Reviews 6(65):173-184.
Huisman J, Smits J (2015). Keeping Children in School: Effects of Household and Context Characteristics on School Dropout in 363 Districts of 30 Developing Countries. SAGE Open 5(4):1-16.
Ilesanmi O (2014). Determinants of Fruit Consumption among In-school Adolescents in Ibadan, South West Nigeria. European Journal of Nutrition and Food Safety 4(2):100-109.
Itanyi IU, Onwasigwe CN, McIntosh S, Bruno T, Ossip D, Nwobi EA, Onoka CA, Ezeanolue EE (2018). Disparities in tobacco use by adolescents in southeast, Nigeria using Global Youth Tobacco Survey (GYTS) approach. BMC Public Health 18(317):1-11.
Jain S, Gupta SK, Gupta S, Jain V, Jain S (2018). Knowledge of Modifiable Risk Factors of Non Communicable Diseases (NCDs): A Cross Sectional Study from Urban Slum Bhopal. National Journal of Community Medicine 9(6):443-447.
Performance Monitoring and Accountability (PMA) 2020). Adolescents and Young Adults Health Brief. 2017. John Hopkins Bloomberg School of Public Health and Bill & Melinda Gates Institute for Population and Reproductive Health.
Lapuente M, Estruch R, Shabaz M, Casas R (2019). Relation of fruits and vegetables with major cardiometabolic risk factors, markers of oxidation, and inflammation. Nutrients 11(2381):1-40.
Matthew IA (2013). Provision of secondary education in Nigeria: Challenges and way forward. Journal of African Studies and Development 5(1): 1-9.
De Morais Macleira LM, Tavares Lopes De Andrade Saraiva JM, Da Conceição Santos L (2017). Overweight and obesity and their associated factors among early adolescence school children in urban and rural Portugal. BMC Nutrition 3(1):1-15.
Mungandi K, Likwa RN, Hamoonga TE, Banda J, Zyambo C (2022). Predictors of alcohol consumption among adolescents and young adults in Lusaka, Zambia. African Health Sciences 22(4):704-715.
Orimadegun AE, Ola OO (2012). Risk factors associated with smokeless tobacco use and cigarette smoking among teenagers in a sub-urban area of south west Nigeria. Journal of Public Health 20:631-637.
Oyewole BK, Animasahun VJ, Chapman HJ (2018). Tobacco use in Nigerian youth : A systematic review. PLoS ONE 13(5):1-13.
Parvin M, Khatun S, Biswas HB and Mallick DR (2020). Awareness of Hypertension among Secondary School Children in Bangladesh. IOSR Journal of Nursing and Health Science 9(4):45-54.
Patton GC, Sawyer SM, Santelli JS, Ross DA, Afifi R, Allen NB, Arora M, Azzopardi P, Baldwin W, Bonell C, Kakuma R, Kennedy E, Mahon J, McGovern T, Mokdad AH, Patel V, Petroni S, Reavley N, Taiwo K, Waldfogel J, Wickremaranthe D, Barroso C, Bhutta Z, Fatusi AO, Mattoo A, Diers J, Fang J, Ferguson J, Ssewamala F, Viner RM (2016). Our future: A Lancet commission on adolescent health and wellbeing. The Lancet 387 (10036):2432-2478.
Plateau State Government (2023). Plateau State Government: Local Government Areas. Available at: http://www.plateaustate.gov.ng/page/jos-north
Plateau State Ministry of Education (2019). Directory of Students in Public and Private Secondary Schools in Jos North LGA, Plateau State.
Proimos J, Jonathan DK (2012). Noncommunicable Diseases in Children and Adolescents. Paediatrics 130(3):379-381.
Puwar T, Saxena D, Yasobant S, Savaliya S (2018). Noncommunicable diseases among school-going adolescents: A case study on prevalence of risk factors from Sabarkantha District of Gujarat, India. Indian Journal of Community Medicine 43(5):33-37.
Raji MO, Muhammad H, Usman AM, Muwafaq U, Oladigbolu RA, Kaoje AU (2017). Cigarette Smoking among Out-of-School Adolescents in sokoto Metropolis, North-West Nigeria. Health Science Journal 11(3).
Riva K, Allen-Taylor L, Schupmann WD, Mphele S, Moshashane N, Lowenthal ED (2018). Prevalence and predictors of alcohol and drug use among secondary school students in Botswana: a cross-sectional study. BMC Public Health 18:1-14.
Rodriguez-Fernandez R, Whitlock JL (2019). Addressing non-communicable diseases in adolescence. The Economist Intelligence Unit. [Internet]. [cited 2019 Jun 9]. Available from: https://www.younghealthprogrammeyhp.com/content/dam/young-health/Resources/research/EIU%202019%20FINAL.PDF
Sahoo K, Sahoo B, Choudhury AK, Sofi NY, Kumar R, Bhadoria AS (2015). Childhood obesity: causes and consequences. Journal of Family Medicine and Primary Care 4(2):187.
Sato Y, Miyanaga M, Wang D (2020). Psychosocial Determinants of Fruit and Vegetable Intake in Japanese Adolescents : A School-Based Study in Japan. International Journal of Environmental Research and Public Health 17(5550):1-11.
Saydah S, Bullard KM, Imperatore G, Geiss L, Gregg EW (2015). Cardiometabolic Risk Factors Among US Adolescents and Young Adults and Risk of Early Mortality Sharon. Paediatrics 131(3).
Shulman EP, Smith AR, Silva K, Icenogle G, Duell N, Chein J, Steinberg L (2016). The dual systems model: Review, reappraisal, and reaffirmation. Developmental Cognitive Neuroscience 17:103-117.
Singkorn O, Apidechkul T, Putsa B, Detpetukyon S, Sunsern R, Thutsanti P, Tamornpark R, Upala P, Inta C (2019). Factor associated with alcohol use among Lahu and Akha hill tribe youths,

northern Thailand. Substance Abuse Treatment, Prevention, and Policy 14(5):1-14.
United Nations International Children's Fund (UNICEF) (2021). Marketing of unhealthy foods and non-alcoholic beverages to children. Available at: http://www.irishheart.ie/iopen24/marketing-unhealthy-foods-children-t-38_1319_263.html.
United Nations Population Fund (UNFPA) (2021) State of World Population.
Vio F, Fretes G, Montenegro E, González CG, Salinas J (2015). Prevention of Children Obesity: A Nutrition Education Intervention Model on Dietary Habits in Basic Schools in Chile. Food and Nutrition Sciences 06(13):1221-1228.
World Health Organization (WHO) (2013). Global Action Plan for the prevention and control of Noncommunicable diseases 2013-2020. Geneva: World Health Organization.
World Health Organization (WHO) (2015). The Global Strategy for Women's, Children's and Adolescents' health (2016-2030). Genva: World Health Organization.
World Health Organization (WHO) (2018). Orientation Programme on Adolescent Health for Health-care Providers, Department of Child and Adolescent Health and Development. Geneva: World Health Organization.
World Health Organization (WHO) (2018) Global status report on alcohol and health 2018, Global status report on alcohol and health.
World Health Organization (WHO) (2021). Noncommunicable diseases, Key Facts. Available at: https://www.who.int/news-room/fact-sheets/detail/noncommunicable-diseases
World Health Organization (WHO) (2022). Adolescent and young adult health, Fact Sheets. Available at: https://www.who.int/news-room/fact-sheets/detail/adolescents-health-risks-and-solutions.
Xi B, Liang Y, Liu Y, Yan Y, Zhao M, Ma C, Bovet P (2016). Tobacco use and second-hand smoke exposure in young adolescents aged 12 – 15 years : data from 68 low-income and middle-income countries. Lancet Global Health 4(11):e795-805.