ORIGINAL ARTICLE

The prevalence of health risk behavior engagement among grade 4 to 7 learners in primary schools: A phase one needs analysis

KURT JOHN DANIELS and HAMILTON PHARAOH

Department of Physiotherapy, University of Kwazulu-Natal, School of Health Sciences, Westville, South Africa

DOI: 10.4081/jphia.2023.2328

Abstract. Health risk behaviour, as it pertains to adolescent behaviour, poses a massive challenge for many fields of medicine, not only due to developmental and psychological concerns but also its inevitable contribution to the burden of disease through trauma and non-communicable diseases resulting from risky behavioural choices. The objective study is to explore the prevalence of health risk behavior engagement among grade 4-7 learners at four primary schools in the Western Cape, South Africa, as well as establish a need for a prevention program starting at primary school level. An observational, descriptive, quantitative design was used to conduct this study. Non-probability, heterogenous, purposive sampling was used to select the study population. A needs analysis assessment using a modified self-administered Child Health Risk Behaviour survey was conducted using 7-inch electronic tablets. Four primary schools agreed to participate yielding a total sample size of n=1147 learners in grades 4 to 7. Learners' age ranged from nine years old to fourteen years old with a mean age of 11.45 (SD 1.271). Riding a bicycle without a helmet, physical fight (86.1 and 64.1% among boys and girls respectively), ever smoked a cigarette (boys 36.3%; girls 28.3%) and consuming alcohol without permission (boys 28.7%; girls 23.8%) had the most engagement. Sexual curiosity questions had by far the most positive engagement and consistency of engagement among both boys and girls. This evidence reaffirms the need that early, bespoke and scientific intervention/prevention programs are needed to combat health risk behaviour and subsequently reduce the burden of disease.

Introduction

Health risk behaviour, as it pertains to adolescent behaviour, poses a massive challenge for many fields of medicine, not only due to developmental and psychological concerns but also its inevitable contribution to the burden of disease through trauma and non-communicable diseases resulting from risky behavioural choices. Health risk behaviours are often established during childhood, extend to adolescents and continue through to adulthood (1). Combining this with a multitude of unique external factors such as urban vs. rural environments, cultural influences and an alarming disparity between socio-economic statuses, South African youth engaging in risky behaviour is a national public health concern.

Adolescence spans almost a decade and is a critical time when youth experiment and engage in health behaviours that could be detrimental to their well-being. Most of the resultant morbidity and mortality stemming from risky behavioural choices could be prevented (2). However, according to the World Health Organisation (WHO), an alarming number of children (pre-adolescents) engage in health risk behaviours. Evidence from the early 2000s (1,3-5) suggests that pre-adolescents are curious and may engage in these behaviours, however, research has still mostly focussed on adolescents (1).

Most existing research strategies are directed to identifying ways to combat health risk behaviour (6). Despite current intervention strategies, youth continue to engage in unprotected sex, drug and alcohol use and violent behaviour (7). However, intervention once risky behavioural choices have already been made could prove to be costly and does not reduce the number of young people making unhealthy lifestyle choices (2). Thus, there is a need to shift the emphasis of young people's health care towards improved preventative service delivery and possibly accept the notion that adolescent intervention may be too late to prevent risky behavioural choices.

The fight against risky behavioural choices, even at an adolescent age, is challenging as behavioural patterns may have already been formed in childhood. In South Africa, influences such as growing up in an urban or rural setting and socio-economic status could contribute to the choices adolescents make concerning risky behaviour. Most initiatives aimed at combatting health risk behaviours are either school-based or implemented at government hospitals and day clinics (2).

Primary prevention targets should include the understanding of health risk exposure (curiosity) vs. health risk engagement (participation). While preventing exposure to risky behaviours fuelled by external factors (such as parents or peers) is virtually impossible in South Africa, providing

Correspondence to: Kurt John Daniels, Department of Physiotherapy, University of Kwazulu-Natal, School of Health Sciences, Westville, South Africa
E-mail: danielsk@ukzn.ac.za

Key words: risky behaviour, prevention, youth, child, intervention

the younger demographic with relevant information and education may prevent the progression to health risk engagement in their adolescent years. Secondary prevention targets require a bespoke approach to young people who have already engaged in risky behaviour and entail a service that will not only effect change but limit the consequences of such health risk behaviours (2).

This quantitative study forms part of a larger study aimed at exploring health risk behaviour prevention strategies among grade four to seven learners (ages 9-14). The larger study aims to design and evaluate the need and feasibility of a health risk prevention program/intervention targeting the same age group. This article discusses the first phase of the study by exploring health risk behaviour engagement among grade four to seven learners at four primary schools in the Paarl region in the Western Cape, South Africa.

The data gathered from phase one will be triangulated with focus group interviews from major stakeholders (grade four to seven learners, school principals, parents and health care workers) as well as a scoping review of existing intervention or prevention programs, utilising an intervention mapping framework, to design the prevention program for the larger study. The phase one data serves as a baseline to ascertain whether there is a need to start prevention programmes earlier in childhood development, with booster programmes throughout their adolescent life.

Materials and methods

Ethical considerations. Ethical clearance was granted from the Research Ethics Committees and Higher Degrees Committees of the University of Kwa-Zulu Natal (HSSREC/00001649/2020). Permission to conduct the study was obtained from the Western Cape Education Department, principals, and governing bodies of the schools involved. The participants were informed, throughout the research, that their participation is voluntary and that they could choose not to participate or withdraw at any given time during the study without any consequences.

Learners were provided with a detailed explanation of the research prior to completing the questionnaire. A written description, in language that the learners could understand, of the research aim and objectives was provided on the questionnaire and assent was obtained through the first two questions of the questionnaire. Confidentiality and anonymity were assured to those learners that participated. All precautions concerning COVID19 safety and prevention of infection will be followed.

Study setting. The study was conducted in the Drakenstein Municipality, which has the town of Paarl at its centre. Paarl is a densely populated town with a population of 197735 (census 2011) (8), located about 59 km from Cape Town city centre and categorized as a peri-urban. The peri-urban categorization of the research setting denotes that both rural and urban characteristics co-exist.

Study design. An observational, descriptive, quantitative design was used to conduct this study. Baseline data was obtained, collated, and analysed quantitatively.

Study population. All grade 4-7 learners currently enrolled in a primary school in the Paarl region, were invited to partake in the study. The Paarl region has 20 primary schools in the area, with approximately 50 learners per class and three classes per grade currently enrolled in grades 4-7. Thus, the estimated learner population is 12 000 learners.

Sampling. The principals of all the primary schools in the Paarl region were sent an invitation to partake in the study. Non-probability, heterogenous, purposive sampling was used to select the study population. The specific criteria for purposive sampling were that only grade 4 to 7 learners were selected with the heterogeneity of different grades and different school locations.

Sample size calculation. Sample size calculations were based on a Raosoft Inc. online sample size calculator software. A total of 31 schools in the region, and 50 learners per class with three classes per grade would yield a total sample size of 18600 learners. Using the Raosoft Inc. software, a minimum sample size was calculated (Margin of error=5%, Confidence level=95%, Total population size=18600 learners, Response distribution=50%, Recommended minimal sample size=377 learners). Therefore, a minimum of three schools that agree to participate in the study will suffice.

Inclusion criteria

- All grade 4-7 learners currently enrolled with the department of education and attending a primary school in the Paarl region of the Drakenstein Municipality.

Exclusion criteria

- Learners with disabilities at special needs schools.
- Any learner who is unable to complete the self-reported questionnaire for any medical reason.

Study framework (intervention mapping). Intervention Mapping is not a new health promotion theory framework and was first introduced by Bartholomew, Parce, and Kok (1998) (9). It is a framework that tries to bridge the gap between theories and practice and is a stepwise approach to describe the planned process for theory and evidence-based development, implementation, and evaluation of health promotion interventions (9). Despite the step-by-step approach, the planning process is iterative and cumulative rather than linear, with programs moving in both directions as new themes and concepts are evolving, and each step depends on the findings of the preceding step (10). A systematic review by Garba and Gadanya (2017) (10) reported that most studies that utilized an intervention mapping framework have found it to be useful in designing disease prevention programs, and have been successfully applied in communicable and non-communicable disease prevention.

Pre-data collection. Before commencing with data collection, the following activities were completed by the researcher.

Equipment and COVID-19 protocols. Due to strict COVID-19 rules issued by the government and the department of education, the researchers acquired 7-inch tablets (Mercer). The

CHRB survey questionnaire was uploaded onto Microsoft forms and distributed to the tablets using the researcher's WiFi connection. The tablets were used to complete the questionnaire as they reduced learner-to-learner contact and researcher-to-learner contact according to COVID-19 protocols. The tablets were sterilized using a hand sanitiser before and after each data collection session. The learner's hands were sterilized using hand sanitiser before and after each data collection session. Learners were spaced at least 1.5 m from each other and had to wear masks during the data collection procedure, in accordance with COVID-19 protocols.

School visits. The researcher scheduled appointments with the principals of the schools that agreed to partake in the study after the successful registration of ethics for the research project. These visits aimed to determine facility-specific operating procedures during COVID-19. Also, facility-friendly methods were developed in consultation with each facility to facilitate the data collection process.

Training of research assistants. Three fieldworkers were recruited and trained to assist with data collection. These three fieldworkers will assist in completing the data collection at all the sites.

Pilot trial: data collection procedure pilot. Before the data collection period, the CHRBS questionnaire data collection procedure was piloted on an independent group of conveniently selected grade 4 to grade 7 learners.

The pilot aimed to establish if the learners understand the questions and could answer the items in the questionnaires. It also helped the PI determine the time needed for the learners to complete the survey.

The desired outcome was the optimisation of the data collection procedure.

Data collection procedure. Data collection took place during the COVID-19 pandemic with strict Covid-19 protocols in place. Phase 1 consisted of a needs analysis assessment using a modified Child Health Risk Behavior Survey (CHRBS). Before the administration of the survey, the PI was responsible for training the RA. The survey was conducted in the form of a self-administered electronic questionnaire using 7-inch tablets.

The PI and trained RA's were available on-site during the completion of the questionnaire to answer any questions that the learners may have. A short description and explanation of what was expected and what the study entails were done before the learners commenced. Learners were allowed to refrain or exit the survey at any point.

Learners were recruited class-by-class to a central location. All tablets were connected to a research WiFi router and pre-paid data was provided by the PI. A maximum of 25 learners per class were recruited at a time. Learners were spaced out at least 1.5 m away from each other at all times and were required to wear their masks during the completion of the questionnaire. For the younger grades, a researcher would read aloud the questions of the survey to ensure that all learners were at the same question at the same time. Two more researchers would walk around the room and deal with any difficulties experienced by the learners. On completion, learners were instructed to submit their questionnaire, place the tablet on the seat, sanitise their hands and return to their classroom. Between groups, researchers would sanitize their hands and the chairs and tablets using a microfibre cloth and sanitiser spray.

Tools and data collection methods. The Child Health Risk Behavior Survey (CHRBS) was developed from the standardized youth risk behaviour surveillance survey (YRBSS) and is a 21-item questionnaire covering the conceptual categories of the Centre for Disease Control (CDC) survey, assess the potential for unintentional injury, intentional injury or violence, tobacco use, alcohol, and other drug use, sexual activity, and health practices (1). The CHRBS was previously developed and published by Riesch *et al* (2006) (11) and scored a test-retest reliability (when compared to the YRBSS) coefficient of .958 and .977 between a small city and large city sample (Riesch, Anderson, Angresano *et al* 2006). The CHRBS was translated into Afrikaans and adapted for use in the South African context.

Items 1-3 assess the potential for unintentional injury by looking at riding a bicycle or skateboard without a helmet, driving in a vehicle without a seatbelt and riding in a vehicle with a driver that has consumed alcohol. It should be noted that many children in lower socio-economic areas in South Africa may not be able to afford a traditional skateboard or bicycle, so this question was modified to include homemade push scooters and go-karts. The subsequent six items assess the potential for intentional injury and include carrying a weapon, feeling unsafe at school, having something stolen from you, stealing something, being in a physical fight and thoughts of suicide. The next set of two items assesses tobacco use and includes smoking cigarettes and chewing. The fourth set of 4 items assesses alcohol and drug use and includes using alcohol without adult permission, using inhalants, marijuana and other illegal drugs. The fifth set of 3 items assesses sexual activity/curiosity and includes going out with a boy/girl, holding hands and kissing a boy/girl. The final 3 items assess general health practices and include trying to lose weight quickly, exercise routines and sleep patterns.

Data analysis. Descriptive statistics, namely means, standard deviation, frequencies, and percentages were used to analyse the quantitative data. Categorical data were analysed using cross-tabulations and the Chi-square test was used to determine the significance between categories of health risk behaviour engagement. Data is presented in the form of tables, histograms and bar graphs.

Data management. Once data was collected and learners submitted the electronic forms, each form would be saved on the Microsoft MS Forms server cloud storage. Data were password protected and could only be accessed by the PI. Anonymization was ensured at the time of data collection as learners were not required to enter any personal identifiable information on the questionnaire and all questionnaires were numbered on submission. Only the numbered questionnaires were used to identify participant data. An Excel spreadsheet

Table I. Overview of descriptive data.

	N	Frequency	Percent	Mean	Std. Deviation
Age	1,147			11,45	1,271
9		54	4,7		
10		251	21,9		
11		292	25,5		
12		281	24,5		
13		218	19,0		
14		51	4,4		
Gender					
Female		554	48,3		
Male		593	51,7		
Race					
Black/African		338	29,5		
Coloured		799	69,7		
Indian		4	0,3		
Cape Malay		6	0,5		
Grade					
Grade 4		370	32,3		
Grade 5		281	24,5		
Grade 6		252	22,0		
Grade 7		244	21,3		

was downloaded with the questionnaire information which was stored on a password-protected laptop.

Results

A total of four primary schools agreed to participate in the study yielding a total sample size of n=1147 learners in grades 4 to 7. Learners' age ranged from nine years old to fourteen years old with a mean age of 11.45 (SD 1.271). 65.4% of the total sample were female and a majority of 69.7% categorized themselves as coloured. The sample size distribution was equal across the four schools. The majority of the sample was in grade four (n=370; 32.3%). Table I provides an overview of the sample descriptive data.

Table II displays the prevalence of health risk behaviour by gender. To gage positive risky behaviour engagement, learners who answered 'Always', 'Sometimes' and 'Yes' for individual survey questions were compiled into a positive "yes answer" while learners who answered "Never", "Don't know" and "No" were considered a "no answer". Riding a bicycle/scooter or equivalent without a helmet and driving in a car without using a seatbelt yielded the highest percentage among boys and girls in the unintentional injury category. In the category of intentional injury, physical fight yielded the highest engagement with 86.1 and 64.1% of boys and girls respectively reporting that they had been involved in a physical fight. This was followed by 43.1% of boys and 40.3% of girls feeling unsafe in the same category. Being stolen from and thoughts of suicide engagement were higher among girls than boys while carrying a weapon and stealing were higher among boys than girls.

In the category of Alcohol, tobacco and hard drugs, Ever smoked a cigarette (boys 36.3%; girls 28.3%) and consuming alcohol without permission (boys 28.7%; girls 23.8%) had the most engagement. Approximately 17% of boys reported having smoked marijuana. Boys averaged 73.8% across all questions while girls averaged roughly 50%.

Table III summarizes the mean category scores of each category and a z-test analysis was performed to identify whether there were any significant differences between the categorical scores and gender. With a 95% confidence interval and a two-tailed P-value, boys scored significantly higher than girls in all categories.

Tables IV.I and IV.II provides an overview of the spearmen's ranked correlation between age and various categorical questions as well as a 2-tailed P-value to determine whether age was significantly correlated with the highest prevalence engagement questions in each category. An extremely weak, but positive correlation are noted with age and unintentional injury categorical data with both being significant. In the intentional injury category, extremely weak and negative correlations are seen between age and feeling unsafe and physical fighting, while carrying a weapon was the only positive correlation. All correlations in this category were significant. All questions in the categories Alcohol, tobacco and Marijuana, as well as Sexual curiosity, were weakly negatively correlated with Age. All categorical questions were significant.

Discussion

This research further expands on the limited knowledge that would attempt to establish health risk behaviour engagement

Table II. Prevalence of health risk behaviour.

Prevalence of health-risk behaviour by gender

	Boys (n=593)		Girls (n=554)	
Behaviour	Yes (n)	Percentage (%)	Yes (n)	Percentage (%)
Unintentional injury				
Without helmet	359	60,5	390	70,4
Without seatbelt	377	63,6	355	64,1
Driver drinking	171	28,8	130	23,5
Dangerous swim area	211	35,6	94	17,0
Intentional injury				
Carry weapon	122	22,0	64	11,6
Feel unsafe	239	43,1	223	40,3
Stolen from	136	24,5	408	73,6
Stealing	202	36,5	117	21,1
Fight	480	86,1	355	64,1
Thoughts of suicide	80	14,4	130	23,5
Alcohol, tobacco and hard drugs				
Ever smoked tobacco	215	36,3	157	28,3
Ever chewed tobacco	13	2,2	11	2,0
Smoked a whole cigarette	72	12,1	54	9,7
Smoked dagga/weed	102	17,2	35	6,3
Alcohol without permission	170	28,7	132	23,8
Inhalants	59	9,9	24	4,3
Hard drugs	14	2,4	7	1,3
Sexual curiosity				
Gone out	414	69,8	263	47,5
Held hands	437	73,7	306	55,2
Kissed	427	72,0	251	45,3
General health				
Been on a diet	184	31,0	194	35,0
Exercise	515	86,4	447	80,7

Table III. Z-test health risk behaviour category scores by gender.

z-Test: HRB category scores and gender

	Boy (n=593)	Girl (n=554)	Two-tail P-value
Unintentional injury (Min=4 Max=12)			
Mean	6,54	6,32	0.02
Variance	2,98	2,47	
Intentional injury (Min=6 Max=14)			
Mean	8,60	8,29	<0.01
Variance	2,18	2,30	
Tobacco use (Min=3 Max=6)			
Mean	3,45	3,35	0.01
Variance	0,55	0,53	
Drug and alcohol use (Min=4 Max=8)			
Mean	4,53	4,29	<0.01
Variance	0,71	0,54	
Sexual curiosity (Min=3 Max=6)			
Mean	5,13	4,44	<0.01
Variance	1,36	1,80	

Table IV. I. Spearman's correlation between age and unintentional injury.

Unintentional injury				
		Age	Driven in a car without a safety belt	Driven in a vehicle with drunken driver
Age	Spearman's Ranked Correlation	1	0,073	0,065
	Sig. (2-tailed)		0,013	0,028
	N	1,147	1,147	1,147

Table VI. II. Spearman's correlation between age and unintentional injury; alcohol, tobacco and marijuana and sexual curiosity.

Intentional injury					
		Age	Felt unsafe at school	Physical fight	Carried a weapon
Age	Spearman's Ranked Correlation	1	-0,086	-0,096	0,101
	Sig. (2-tailed)		0,003	0,001	0,001
	N	1,147	1,147	1,147	1,147
Alcohol, tobacco and marijuana					
		Age	Ever smoked	Drank alcohol without permission	Smoked Dagga/Weed
Age	Spearman's Ranked Correlation	1	-0,253	-0,220	-0,080
	Sig. (2-tailed)		<0,005	<0,005	0,007
	N	1,147	1,147	1,147	1,147
Sexual curiosity					
		Age	Gone out with a girl/boy	Held hands or put your armaround girl/boy	Kissed a girl/boy
Age	Spearman's Ranked Correlation	1	-0,140	-0,199	-0,203
	Sig. (2-tailed)		<0,005	<0,005	<0.005
	N	1,147	1,147	1,147	1,147

in youth and pre-adolescents in primary schools in South Africa. This preliminary data was gathered to assess the need for intervention/prevention within a younger population.

From the data analysed, it is evident that children and pre-adolescents are engaging in health risk behaviours and require intervention/prevention programmes to assist in better decision-making. Trends noted in the health risk behaviour engagement of this population are consistent with both previous international (1) and South African (12,13) trends. Unintentional Injury, intentional Injury, unauthorized alcohol use, tobacco curiosity and sexual curiosity engagement are among the highest prevalence of health risk behaviour identified in this age group. However, while trends are similar, this population is younger than the populations in the aforementioned studies.

It is imperative to note that the author is not inferring that a child's curiosity about tobacco (Ever smoked a cigarette) and vague interpersonal actions regarding sexual curiosity (Held hands, put your arm around a boy/girl and kissed a boy/girl) will lead to engaging behaviour. However, it is important to understand that a relationship between behavioural aspects of curiosity and learning and long-term memory exists. Evidence shows that infants explore their environments actively and in a systematic manner to reduce uncertainty and bridge gaps in knowledge (14). These are fundamental aspects of curiosity. Curiosity, or a strong desire to know about something,

is described as an epistemic emotion and is accompanied by a positive effect (15). Research on curiosity in young adults (age 18-30) has shown that pre-information curiosity, post-information interest and surprise enhance learning and memory in adults (14). Despite this, little research has been done on curiosity in children.

The results of the present study also highlight the need for a bespoke intervention/prevention programme for children in the Paarl region. Multi-faceted extrinsic determinants of behaviour that South African youth and pre-adolescence are exposed to from a young age like environmental factors and the massive divide between the rich and the poor means that certain risky health behaviours may have already been formed and contextualised by these circumstances.

According to Kok G.2014 (16), when planning behaviour change, three major challenges are encountered ie. i) Correct identification of the change objectives, ii) the selection and application of appropriate behaviour change methods in an intervention and iii) adequate implementation of the intervention. Therefore, the most frequent intervention failures are because of incorrect identification of the change objectives, inappropriate choice of methods or applications or inadequate implementation of the programme (16). The intervention mapping framework offers a scientific approach to systemic theory and evidence-based planning for behaviour change (9). The results of the present study form part of a needs analysis component (Step 1) of the IM framework.

Conclusions

This study provides an opportunity to address a gap in the current strategy by assessing health risk behaviour engagement among young people, which could later be supported by further booster programs throughout their adolescents. Based on early findings, young people between the ages of nine years old and fourteen years old are positively engaging in risky behaviour.

The findings of this study are both alarming and should not continue to be ignored. This evidence reaffirms the need that early, bespoke and scientific intervention/prevention programs are needed to combat health risk behaviour and subsequently reduce the burden of disease. It would, therefore, be postulated that if prevention could start in childhood years, it could assist young people and adolescents in making less risky health behaviour decisions.

Contributions

KJD, is the primary investigator and will be completing the study in fulfillment of a PhD degree; HP, is the study supervisor and is responsible for the overall study concept design and will assist with the data collection process. All authors provided edits and critiqued the manuscript for scientific content. All authors have read and approved the final manuscript.

Funding

This project is funded by the National Research Foundation (NRF) of South Africa (Thuthuka). The funders had no role in the design of the study and will not have any role during the execution, analysis, interpretation of results or the decision to submit results.

Ethical approval and consent to participate

Ethical clearance was granted from the Research Ethics Committees and Higher Degrees Committees of the University of Kwa-Zulu Natal (HSSREC/00001649/2020). Permission to conduct the study was obtained from the Western Cape Education Department, principals, and governing bodies of the schools involved. The participants were informed, throughout the research, that their participation is voluntary and that they could choose not to participate or withdraw at any given time during the study without any consequences.

Conflict of interest

The authors declare no potential conflict of interest.

Accepted: 19, December 2022; submitted: 20, September 2022.

References

1. Riesch SK, Brown RL, Anderson LS, Wang K, Canty-Mitchell J and Johnson DL: Strengthening families program (10-14): Effects on the family environment. West J Nurs Res 34: 340-376, 2012.
2. Thomas C: Health risk behaviours of high school learners and their perceptions of preventive services offered by general practitioners. South African Fam Pract 51: 216-223, 2009.
3. Burgess Dowdell E: Alcohol use, smoking, and feeling unsafe: Health risk behaviors of two urban seventh grade classes. Issues Compr Pediatr Nurs 29: 157-171, 2006.
4. Donovan RA, Pieper AL and Ponce AN: Walking the maternal tightrope: Work and family in America. New Engl J Public Policy 22: 16, 2007.
5. Riesch SK, Jacobson G, Sawdey L, Anderson J and Henriques J: Suicide ideation among later elementary School-aged youth. J Psychiatr Ment Health Nurs 15: 263-277, 2008.
6. Daniels KJ and Pharaoh H: Developing a children's health risk behaviour prevention program targeting grade 4-7 learners in the western cape, South Africa: A study protocol. BMC Public Health 21: 1021, 2021.
7. Khuzwayo N, Taylor M and Connolly C: Changing youth behaviour in South Africa. Heal SA 25: 1031, 2020.
8. StatsSA:[Internet].[cited2020May22].Availablefrom:http://www.statssa.gov.za/?page_id=993&id=drakenstein-municipality.
9. Bartholomew KL, Parcel GS and Kok G: Intervention mapping: A process for developing Theory-and Evidence-Based Health Education Programs. Health Educ Behav 25: 545-63, 1998.
10. Garba RM and Gadanya MA: The role of intervention mapping in designing disease prevention interventions: A systematic review of the literature. PLoS One 12: e0174438, 2017.
11. Riesch SK, Anderson LS, Angresano N, Canty-Mitchell J, Johnson DL and Krainuwat K: Evaluating content validity and Test-retest reliability of the Children's health risk behavior scale. Public Health Nurs 23: 366-372, 2006.
12. Visser M: Risk behaviour of primary school learners in a disadvantaged community-a situation analysis. South African J Educ 23: 58-64, 2003.
13. Pharaoh H, Frantz JM and Smith M: Concept mapping: Stakeholders' Stakeholders' perceptions of what should be included in interventions programmes aimed at reducing engagement in health risk behaviour amongst youth and quality of life. African J Phys Health Educ Recreation Dance: 20, 2014.
14. Gruber MJ and Fandakova Y: Curiosity in childhood and adolescence-what can we learn from the brain. Curr Opin Behav Sci 39: 178-184, 2021.
15. Vogl E, Pekrun R, Murayama K and Loderer K: Surprised-curious-confused: Epistemic emotions and knowledge exploration. Emotion 20: 625-641, 2020.
16. Kok G: A practical guide to effective behavior change How to apply theory- and evidence-based behavior change methods in an intervention. Eur Heal Psychol 16: 156-170, 2014.