

Body Mass Index of children and adolescent participants in a voucher program designed to incentivise participation in sport and physical activity

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Abstract

Background

There has been limited population-level success in tackling overweight and obesity. The Active Kids program is a state-wide intervention that aims to increase participation in organised physical activity and sport among children and adolescents in NSW, Australia. This study profiled children and adolescents who registered for the Active Kids program by examining the prevalence of overweight and obesity across subgroups and by social disadvantage in this sample.

Methods

For participating children, each parent or carer was required to complete an online registration form with information about the child's height, weight, physical activity, sport participation, age, sex, primary language spoken at home, Aboriginality, disability status and postcode. Descriptive statistics were used to profile children and adolescents who registered in the program and multinomial regression models were used to determine which demographic characteristics were associated with an increased risk of overweight and obesity.

Results

In 2018, 671,375 parents registered a child or adolescent for the Active Kids Program. Among these children and adolescents, the prevalence of overweight and obesity was 17.2% and 7.6%, respectively. A large number of children and adolescents who lived in the most disadvantaged area ($n = 99,583$; 14.8%) registered for the program. There was a clear socio-economic gradient for obesity prevalence across areas of increasing disadvantage, with children and adolescents living in the most disadvantaged area being 1.87 (95% CIs 1.82, 1.93) times more likely to be overweight or obese compared with children and adolescents living in the least disadvantaged area.

Conclusions

The Active Kids program successfully reached a substantial proportion of overweight and obese children from socially disadvantaged backgrounds, providing financial support and opportunities for these children to participate in organised sport and physical activity. However, the program did not reach all children, and additional physical activity promotion strategies may be needed in a comprehensive approach. Nonetheless, these findings support government investment in reaching childhood overweight and obesity with large-scale programs.

Background

Overweight and obesity in childhood and adolescence are associated with adverse health consequences throughout the life course (1). As body mass index (BMI) increases, so does the prevalence of comorbid conditions, including cardiovascular disease, type 2 diabetes, and some cancers (2). Whilst many of these conditions occur in adulthood, early incidence of obesity poses immediate physical, social and mental health concerns during adolescence (3). Further, obese children and adolescents are five times more likely to be obese

in adulthood than those who were not obese, representing a lifelong personal burden and long-term societal impacts (4).

Cross-government sector and multi-strategy approaches to obesity prevention are recommended by the World Health Organisation (WHO)(5). In New South Wales (NSW), Australia, the State Government selected childhood obesity in 2016 as one of 12 priorities (6), setting a target to reduce childhood overweight and obesity by 5% over 10 years. The strategy takes a broad state-wide approach, focussing on the modifiable behaviours associated with overweight and obesity such as physical activity and diet. Implementation is addressed through a cross-government Healthy Eating Active Living (HEAL) Strategy coordinated by the NSW Ministry of Health (7) as well as through initiatives from other Government agencies, such as the Department of Education (munch and move/healthy canteens/Live life well at school) and the Office of sport (Active Kids program) (8). International success in tackling overweight and obesity through population- approaches has been limited (9), so it is important to understand the profile of those who participate in programs implemented at scale.

The Active Kids program, led by the NSW State Government's Office of Sport, is a policy initiative to increase participation in organised physical activity and sport among children in NSW. In the 2018 calendar year, all school-enrolled children in NSW were eligible to register for one \$100 voucher that could be used towards registration costs for accredited sport, fitness and active recreation programs. The Active Kids Program has been implemented state-wide for one calendar year and it is important to describe the characteristics of those who participated. It is particularly important to determine whether this program has reached children and adolescents living in low SES areas, as there still a disparity in overweight and obesity (10). This information will inform policy makers and program deliverers and assist in improving this and future policy interventions on a national and international level. This study described the profile of children and adolescents who registered for the Active Kids program by examining the prevalence of overweight and obesity across subgroups and by social disadvantage.

Methods

Participants

All primary and secondary school-enrolled children and adolescents, residing in NSW with a valid Australian Medicare card were eligible for an Active Kids voucher. To register children in the program, the parent, carer or guardian (adult) was required to complete an online registration form.

Data collection

The Active Kids program registration form was designed by a multi-sector steering group to ensure the information collected included all relevant socio-demographic information. The registration form data obtained for this study includes the child's date of birth (validated by Medicare), sex, primary language spoken at home, Aboriginality, disability status, postcode, adult reported height and weight of the child and 7 day recall of physical activity participation (11). Once registration data was submitted, the Active Kids voucher, valued up to AUD \$100, was emailed to the adult. The Human Research Ethics Committee at University of Sydney granted approval for the evaluation of Active Kids (Project number: 2017/946).

Body Mass Index

Height and Weight was reported by the parent or carer of each child and adolescent at the point of voucher registration. This method of collecting height and weight is consistent with the NSW state-based surveillance (i.e. the NSW Population Health Survey). BMI was calculated as weight divided by height, squared (i.e., kg/m²). Each child was categorised as thin, healthy weight, overweight or obese using the International Obesity Task Force (IOTF) definitions (13). The IOTF definitions provide a standard international definition for childhood overweight and obesity.

Physical activity

Meeting physical activity guidelines was assessed using a single item reported by the parent or carer (11). The item asked, "In a typical week, how many days was the child physically active for at least 60 minutes?" There is evidence that this is a valid and reliable measure of physical activity in adolescents (11).

Sport participation

Sport participation was determined using a single item reported by the parent or carer. The item asked "Approximately, how many organised sessions of sport or physical activity has the child participated in, in total, outside of school hours, during the last 12 months?"

Demographic characteristics

Demographic characteristics included age, sex, primary language spoken at home, Aboriginality, disability status, SES, and remoteness. SES was determined using postcode of residence and categorised using the Socio-Economic Index for Area (SEIFA), specifically the Index of Relative Socio-Economic Disadvantage (14), which ranks regions in Australia according to relative socioeconomic disadvantage. Postcode-based SEIFA percentiles were converted into quartiles ranging from 1 (most disadvantaged area) to 4 (least disadvantaged area). Location was assessed using postcode of residence and categorised using the Accessibility and Remoteness Index of Australia (ARIA+). ARIA + groups areas on the basis of relative access to services into major city, inner regional, outer regional or remote (15).

Data analysis

Frequencies and proportions for demographic characteristics were calculated for height and weight and body mass index data from children and adolescents. Chi-squared tests were conducted to determine whether there were significant differences between those providing and not providing height and weight data. Multinomial regression models were conducted to determine which demographic characteristics were associated with an increased risk of overweight and obesity and examined the interactions between SES and each demographic characteristic. All analyses were performed in SAS Enterprise Guide 9.4 (SAS Institute, Cary, NC, USA).

Results

Of the initial 671,375 parents who registered their children or adolescents for the Active Kids program in 2018, 306,450 (45.7%) provided height and weight data. Of these 1.1% were outside the accepted International

Obesity Taskforce range (13) and were excluded from the main analyses. Children who had valid height and weight data were significantly ($p < 0.001$) more likely to be older, boys, speak a language other than English at home, live in an area of higher SES, live in a major city, meet the physical activity guidelines, not identify as Aboriginal or Torres Strait Islander and not have a disability (Table 1).

Table 1

Descriptive statistics of children and adolescents in the Active Kids Program with and without BMI data

	Missing BMI data		BMI data		All		χ^2	p-value
	N	%	N	%	N	%		
All persons	364925	54.4	306450	45.7	671375	100.0		
Age category							4308.2	< 0.001
4–8	156676	58.2	112781	41.9	269457	40.1		
9–11	102498	55.1	83433	44.9	185931	27.7		
12–14	69053	50.0	69010	50.0	138063	20.6		
15–18	36698	47.1	41226	52.9	77924	11.6		
Sex							2173.1	< 0.001
Boys	188977	52.2	172875	47.8	361852	53.9		
Girls	174968	56.7	133575	43.3	308543	46.0		
Primary language spoken at home							201.7	< 0.001
English	339195	54.6	282040	45.4	621235	92.5		
Other	25730	51.3	24410	48.7	50140	7.5		
Aboriginality							3128.0	< 0.001
Indigenous	23839	66.0	12290	34.0	36129	5.4		
Non indigenous	335010	53.5	291678	46.5	626688	93.3		
Prefer not to say	6076	71.0	2482	29.0	8558	1.3		
Disability							1241.3	< 0.001
Yes	10004	56.5	7711	43.5	17715	2.6		
No	348864	54.1	295794	45.9	644658	96.0		
Prefer not to say	5881	71.1	2396	29.0	8277	1.2		
Missing	176	24.3	549	75.7	725	0.1		
Socio-economic status quartile							6882.7	< 0.001

	Missing BMI data		BMI data		All		χ^2	p-value
	N	%	N	%	N	%		
1st (most disadvantaged)	63089	63.4	36494	36.7	99583	14.8		
2nd	80927	57.7	59375	42.3	140302	20.9		
3rd	86780	54.7	72003	45.4	158783	23.7		
4th (least disadvantaged)	99558	49.6	101008	50.4	200566	29.9		
Missing	34571	47.9	37570	52.1	72141	10.8		
Location							4004.6	< 0.001
Major Cities	234979	53.3	205797	46.7	440776	65.7		
Inner Regional	74510	58.9	52084	41.1	126594	18.9		
Outer Regional and remote	21260	65.3	11323	34.8	32583	4.9		
Missing	34176	47.9	37246	52.2	71422	10.6		
Met physical activity guidelines (7 days)							456.2	< 0.001
No	298120	55.0	244027	45.0	542147	80.8		
Yes	66805	51.7	62423	48.3	129228	19.3		
Sport participation							14659.9	< 0.001
None	8377	68.5	3861	31.6	12238	1.8		
At least once a month	93319	61.5	58356	38.5	151675	22.6		
At least once a week	116280	53.4	101598	46.6	217878	32.5		
At least twice a week	72414	49.1	75202	50.9	147616	22.0		
At least four times a week	45317	44.7	55973	55.3	101290	15.1		
Not sure	29061	71.8	11406	28.2	40467	6.0		
Missing	157	74.4	54	25.6	211	0.0		

The Active Kids program participants were on average 10.3 (SD = 3.4) years old and 56.4% were boys (Table 2). The majority spoke English at home (92%), were non-Indigenous (95%) and did not have a disability (97%). One in five participants met physical activity guidelines and less than half of the participants (43%) played sport at least twice a week. The overall sample prevalence of overweight and obesity was 17.2% and 7.6%, respectively.

Table 2

Descriptive statistics of children and adolescents in the Active Kids Program by Body Mass Index categories

	Thin		Healthy weight		Overweight		Obesity		All	
	N	%	N	%	N	%	N	%	N	%
All persons	35357	11.5	195166	63.7	52675	17.2	23252	7.6	306450	100.0
Age category										
4–8	16937	15.0	66426	58.9	17799	15.8	11619	10.3	112781	36.8
9–11	9106	10.9	51717	62.0	16049	19.2	6561	7.9	83433	27.2
12–14	6317	9.2	47395	68.7	12000	17.4	3298	4.8	69010	22.5
15–18	2997	7.3	29628	71.9	6827	16.6	1774	4.3	41226	13.5
Sex										
Boys	18782	10.9	109315	63.2	30820	17.8	13958	8.1	172875	56.4
Girls	16575	12.4	85851	64.3	21855	16.4	9294	7.0	133575	43.6
Primary language spoken at home										
English	31984	11.3	179791	63.8	48731	17.3	21534	7.6	282040	92.0
Other	3373	13.8	15375	63.0	3944	16.2	1718	7.0	24410	8.0
Aboriginality										
Indigenous	1123	9.1	6771	55.1	2692	21.9	1704	13.9	12290	4.0
Non indigenous	33944	11.6	186848	64.1	49565	17.0	21321	7.3	291678	95.2
Prefer not to say	290	11.7	1547	62.3	418	16.8	227	9.2	2482	0.8
Disability										
Yes	942	12.2	4379	56.8	1513	19.6	877	11.4	7711	2.5

No	34048	11.5	189088	63.9	50570	17.1	22088	7.5	295794	96.5
Prefer not to say	298	12.4	1388	57.9	476	19.9	234	9.8	2396	0.8
Missing	69	12.6	311	56.7	116	21.1	53	9.7	549	0.2
Socio-economic status quartile										
1st (most disadvantaged)	3661	10.0	21015	57.6	7472	20.5	4346	11.9	36494	11.9
2nd	6334	10.7	37065	62.4	10863	18.3	5113	8.6	59375	19.4
3rd	8259	11.5	45219	62.8	12829	17.8	5696	7.9	72003	23.5
4th (least disadvantaged)	12831	12.7	68366	67.7	14755	14.6	5056	5.0	101008	33.0
Missing	4272	11.4	23501	62.6	6756	18.0	3041	8.1	37570	12.3
Location										
Major Cities	24316	11.8	131832	64.1	34614	16.8	15035	7.3	205797	67.2
Inner Regional	5714	11.0	33052	63.5	9176	17.6	4142	8.0	52084	17.0
Outer Regional and remote	1097	9.7	6992	61.8	2183	19.3	1051	9.3	11323	3.7
Missing	4230	11.4	23290	62.5	6702	18.0	3024	8.1	37246	12.2
Met physical activity guidelines (7 days)										
No	27247	11.2	153681	63.0	43527	17.8	19572	8.0	244027	79.6
Yes	8110	13.0	41485	66.5	9148	14.7	3680	5.9	62423	20.4
Sport participation										

None	556	14.4	2081	53.9	692	17.9	532	13.8	3861	1.3
At least once a month	7430	12.7	33360	57.2	10976	18.8	6590	11.3	58356	19.0
At least once a week	11975	11.8	63881	62.9	17827	17.6	7915	7.8	101598	33.2
At least twice a week	8339	11.1	49853	66.3	12503	16.6	4507	6.0	75202	24.5
At least four times a week	5807	10.4	38951	69.6	8593	15.4	2622	4.7	55973	18.3
Not sure	1242	10.9	7007	61.4	2077	18.2	1080	9.5	11406	3.7
Missing	8	14.8	33	61.1	7	13.0	6	11.1	54	0.0

Correlates of overweight or obesity

The odds of overweight and obesity for children and adolescents registered in the Active Kids program are displayed in Table 3. There was an inverse relationship between SES and overweight or obesity, with Active Kids participants living in the most disadvantaged area being 1.91 (95% CIs 1.88, 1.95) times more likely to be overweight or obese compared with children and adolescents living in the least disadvantaged area.

Interactions between socioeconomic status and demographic subgroups

Interactions were tested between SES and all demographic characteristics (i.e., age, sex, primary language spoken at home, Aboriginality, disability status, and remoteness). Significant interactions were found between SES and age, Aboriginality and location (Table 4).

Within each age group, the predicted probability of overweight or obesity decreased as socioeconomic disadvantage increased. For example, the predicted probability of overweight or obesity for 9–11 year olds living in the most disadvantaged area was 39.4% compared with 23.6% living in the least disadvantaged area. Across all socioeconomic areas, children (4–11 year olds) had a significantly higher predicted probability of overweight or obesity compared with adolescents (12–18 year olds).

Within each SEIFA quartile, the predicted probability of overweight or obesity was significantly higher for Aboriginal and Torres Strait Islander children and adolescents compared with Non-Aboriginal and Torres Strait Islander children and adolescents. For Non-Aboriginal and Torres Strait Islander children and adolescents, the probability of overweight or obesity decreased as the SEIFA quartile increased. However, for Aboriginal and Torres Strait Islander children and adolescents, the probability of overweight or obesity remained consistently high across the 1st, 2nd and 3rd SEIFA quartiles and decreased in the 4th SEIFA quartile.

Within location categories, the probability of overweight or obesity increased as socioeconomic disadvantaged increased. In the most disadvantaged area, children and adolescents living in major cities had a significantly higher probability of overweight or obesity (38.6% in major cities, compared with 31.3% in inner regional and 32.9% in outer regional and remote).

Table 3 Odds of overweight and obesity for children and adolescents in the Active Kids program

Overweight and obesity	
All persons	
Age category	
4–8	1.60 (1.57, 1.63)
9–11	1.61 (1.58, 1.64)
12–14	1.13 (1.11, 1.16)
15–18	Ref
Sex	
Boys	1.13 (1.11, 1.14)
Girls	Ref
Primary language spoken at home	
English	1.23 (1.21, 1.26)
Other	Ref
Aboriginality	
Indigenous	1.59 (1.55, 1.63)
Non-indigenous	Ref
Disability	
Yes	1.19 (1.15, 1.23)
No	Ref
Socio-economic status quartile	
1st (most disadvantaged)	1.91 (1.88, 1.95)
2nd	1.52 (1.49, 1.54)
3rd	1.39 (1.37, 1.41)
4th (least disadvantaged)	Ref
Location	
Major Cities	1.02 (0.99, 1.05)
Inner Regional	0.94 (0.91, 0.96)
Outer Regional and remote	Ref
Met physical activity guidelines (7 days)	
No	Ref

Overweight and obesity	
All persons	
Age category	
Yes	0.73 (0.72, 0.74)
Sport participation	
None	Ref
At least once a month	0.84 (0.82, 0.87)
At least once a week	0.70 (0.68, 0.73)
At least twice a week	0.67 (0.65, 0.69)
At least four times a week	0.54 (0.52, 0.56)

Table 4 Predicted probabilities of overweight and obesity for children and adolescents by socioeconomic status in the Active Kids Program

	Socioeconomic status quartile			
	1st (most disadvantaged)	2nd	3rd	4th (least disadvantaged)
Age category				
4–8	37.7	32.1	31.5	26.2
9–11	39.4	33.4	31.8	23.6
12–14	32.8	26.4	25.3	18.7
15–18	29.9	25.4	23.2	16.6
Aboriginality				
Indigenous	40.9	39.3	39.4	30.3
Non-indigenous	35.6	29.4	28.7	22.4
Location				
Major Cities	38.6	30.6	29.4	22.4
Inner Regional	31.3	29.2	27.5	24.2
Outer Regional and remote	32.9	31.4	27.5	20.1
Note. Interactions between socio-economic status and sex, primary language spoken at home, and disability status were not significant.				

Discussion

This study described the very large community-based sample of children and adolescents who registered for the Active Kids program in NSW in 2018. The prevalence of overweight or obesity in children and adolescents aged 4–18 years was 23.9%. Two NSW population surveys have reported a similar obesity prevalence. The 2015 NSW School Physical Activity and Nutrition Survey (SPANS) reported that 24.5% of school-aged children and adolescents were overweight or obese using objectively measured height and weight. The 2017 NSW Population Health Survey found that 21.4% of children aged 5–16 years were overweight or obese using a similar measure of parent-reported height and weight. This suggests that the Active Kids program reached its intended target populations of overweight and obese children and adolescents.

The Active Kids program reached a large number of children and adolescents living in the most disadvantaged SES area ($n = 99,583$; 14.8%). However, the program reached more than twice as many children and adolescents in the least disadvantaged area ($n = 200,566$; 29.9%). This suggests that although the program is reaching some children and adolescents in most disadvantaged area, a greater proportion from advantaged areas are accessing the program. These data identify an opportunity to investigate potential strategies to increase the reach into children from socio-economically disadvantaged areas.

Among the children and adolescents who registered for the Active Kids Program, clear socio-economic gradients were noted for obesity prevalence across areas of increasing disadvantage. Within the lowest SES area, children and adolescents who were younger, Aboriginal and Torres Strait Islander, or lived in major cities had higher levels of overweight or obesity. These findings are consistent with recent research identifying disparities in childhood overweight and obesity between subgroups, especially children living in low SES areas, even though overall childhood overweight and obesity rates have stabilised in many countries including Australia (16). This socio-economic disparity in overweight and obesity highlights the importance of ensuring large state-wide programs can reach the children and adolescents who are most at need.

The Active Kids program was successful in its reach into Aboriginal and Torres Strait Islander children. Of the children who registered for a voucher, 5.4% identified as Aboriginal and Torres Strait Islander, which is higher than the NSW population estimate of approximately 4% (17). This finding is promising as the Active Kids program was not specifically designed for Aboriginal and Torres Strait Islander children. Consistent with previous reports, we found that the prevalence of overweight and obesity was higher in Aboriginal and Torres Strait Islander children (18). These high levels of overweight and obesity among Aboriginal and Torres Strait Islander children are concerning as children who are overweight or obese are likely to remain overweight or obese into adulthood (19, 20). Adult overweight and obesity is one of the contributing factors to the health and life expectancy disparities between Aboriginal and Torres Strait Islander and non-Aboriginal and Torres Strait Islander Australians (21). Therefore, in order to reduce these disparities, it is imperative that programs are culturally appropriate and developed in collaboration with the Aboriginal community for preventing and treating overweight and obesity in Aboriginal and Torres Strait Islander children.

While there was no difference in the prevalence of overweight and obesity between children living in different locations (i.e., major cities, regional and remote areas), the interaction between location and SES did show clear patterns. Within each SEIFA quartile, children living in major cities had higher levels of overweight or obesity. The greatest disparity for children living in major cities was seen in the most disadvantaged area, where the

prevalence of overweight or obesity was 38%, compared with 30% for children living in inner regional areas, and 33% for children living in outer regional area. Children living in disadvantaged major cities in NSW could face a number of unique barriers to living a healthy lifestyle. Some of these barriers include land use issues (e.g., high access to energy-dense, nutrient poor foods and lack of supermarkets that supply fresh healthy food), infrastructure and maintenance issues (e.g., lack of sidewalks and street lighting), and social environment issues (e.g., high crime rates and the fear of crime) (22, 23).

Overall, the patterns of overweight and obesity across subgroups were as expected and consistent with previous research. However, one exception to this was age^{24 - 2}, as obesity declined with age among Active Kids registrants. The prevalence of obesity in 15–18 year olds was half that observed among 4–8 year olds. This is initially counter-intuitive as other population studies show increases in obesity through adolescence (24). This is likely due to the differential self-selection effects in Active Kids sample. Young children are less selected, as all groups and all weight ranges participate in sport, especially swimming lessons. However, participation in physical activity and sport is known to decline with age (25), our older adolescent sub-group is likely to be represented by those adolescents who maintain sport and physical activity, and show selection effects in fewer of them being overweight or obese. There is potential to increase the representativeness of the mid-older adolescents by more focused targeting of Active Kids to those aged 15 years and older, especially focusing on those who have dropped out of organised sport.

The major strength of the Active Kids program and this study is the large sample of children and adolescents who participated in the program and provided height and weight data. This large sample (n = 239,433) allowed the examination of subgroup estimates of overweight and obesity with precision. There were also some limitations to this study which must be considered when interpreting the findings. First, as the Active Kids data was cross-sectional, no determination of causality between variables (e.g., physical activity) and overweight or obesity is implied. Second, this study could have underestimated the prevalence of overweight or obesity due to reporting bias by parents, social desirability bias and selection bias. Parents may mis-specify weight in adolescents and children where the true BMI values are in the upper end of the BMI distribution (26, 27). However, parent-reported height and weight data is widely used in surveillance systems, such as the NSW SPANS (24), and has been shown to provide relatively accurate overweight and obesity estimates (insert Skinner reference). Selection bias may have occurred differentially, as this sample consisted of children and adolescents who registered for an Active Kids voucher, and especially older overweight or obese adolescents are less likely to participate in sport less likely to register for the voucher (28).

Conclusions

The Active Kids program successfully reached a substantial proportion of overweight and obese children across the NSW state population, including many from socially disadvantaged backgrounds (i.e., live in low SES areas and/or Aboriginal and Torres Strait Islander status). The program provided financial support and opportunities for these children to participate in organised physical activity and organised sport. As such, it contributes to the population health strategy in NSW around childhood obesity prevention (6). However, there is still potential to improve the reach of the program by further targeting socially disadvantaged groups, and older adolescents. The clear socio-economic gradient for obesity prevalence was maintained across age and other sub-groups, and warrants specific programmatic efforts. Continued evaluation of the Active Kids program

provides policy-relevant information to guide future implementation of this program to increase physical activity and sport participation in children and adolescents on a large scale.

List Of Abbreviations

ARIA Accessibility and Remoteness Index of Australia

BMI Body mass index

HEAL Healthy Eating Active Living

IOTF International Obesity Task Force

NSW New South Wales

SEIFA Socio-Economic Index for Area

SPANS School Physical Activity and Nutrition Survey

WHO World Health Organisation

Declarations

Ethics approval and consent to participate

The University of Sydney Human Research Ethics Committee granted ethics approval (Ref. No. 2017/946). By registering for the Active Kids program, the parent/guardian or carers provides consent for the Child's data to be used to evaluate the program.

Consent for publication

Yes.

Availability of data and material

The data that support the findings of this study are available from NSW Government, Office of Sport but are not publicly available.

Competing interests

The authors declare that they have no competing interests

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The funders had no role in the design and conduct of the study; collection, management, analysis, and interpretation of the data; preparation, review, or approval of the manuscript; and decision to submit the manuscript for publication.

Authors' contributions

KBO, BB, BCF, AB and LJR contributed to the study design. KBO conducted the data analysis and drafted the paper. KBO, BB, BCF, AB and LJR critically revised the paper and approved this version of the manuscript.

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