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ORIGINAL ARTICLE

Factors Influencing HIV Testing Uptake Among Adolescents in Selected Communities of Rivers State: A Cross-Sectional Study

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Keywords

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ABSTRACT

Background: Despite the availability of testing services, willingness to undergo HIV testing among adolescents remains low, posing barriers to effective prevention and treatment efforts. Our study assesses factors that influence HIV testing uptake among adolescents in selected communities in Rivers State, Nigeria.

Methods: A cross-sectional study design and a multi-staged sampling technique were used to survey 671 adolescents on the uptake of HIV tests using an interviewer-administered questionnaire. Data was analysed using IBM SPSS version 27. Bivariate analyses were conducted to assess the association between independent and outcome variables (HIV testing uptake). A multivariate logistic regression model was used to ascertain predictors adjusting for confounding. Ethical approval was obtained for the study.

Results: The median age of respondents was 18 years; about 356 (53.9%) were females, and 56 (8.3%) had no formal education. Less than half of the respondents, 296 (43.8%), have ever been tested for HIV. The factors that influenced HIV testing uptake were the level of education, marital status, and current school attendance. Specifically, those with tertiary and secondary education were 0.25 and 0.30 times less likely to have had an HIV test done (aOR=0.25, 95% CI: 0.17-0.37, p=0.001), and (aOR=0.30, 95% CI: 0.14-0.63, p=0.001) compared to those with no formal education.

Conclusion: About half of the respondents have never been tested for HIV. There is a need for stakeholders and the government to implement strategies that promote early and routine HIV testing and emphasise the importance of regular HIV testing as a preventive measure among adolescents.

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INTRODUCTION

The World Health Organization (WHO) defines adolescents as individuals between the ages of 10 and 19 years.[1,2] According to the United Nations Children's Fund (UNICEF), there are approximately 1.3 billion adolescents in the world today, making up 16% of the world's population.[3] HIV/AIDS continues to be a major global public health concern that mostly affects vulnerable groups, such as adolescents.[4] According to the Joint United Nations Programme on HIV/AIDS (UNAIDS), the global HIV testing coverage was 81% in 2020.[5] In Sub-Saharan Africa, a substantial proportion of new HIV infections, roughly 37%, are thought to affect young people between the ages of 15 and 24 years.[6] Based on the National HIV/AIDS Indicator Impact Survey (NAIIS) conducted in Nigeria in March 2019, only 14% of young women between 15 to 24 years old were aware of their HIV status. The survey also revealed that Nigeria has a 1.4% HIV prevalence rate, with an estimated 1.8 million people living with HIV.[5,7] Additionally, the survey reported that the HIV prevalence rate in Rivers State is higher than the national prevalence rate, standing at 3.8%.[8] The same rate was also observed among adolescents.[9] In Rivers State, Nigeria, the prevalence of HIV/AIDS among adolescents is an important issue[10] because it is higher than the national prevalence. The Nigeria Demographic and Health Survey of 2018 showed that the percentage of adolescents 15-19 years with knowledge about HIV prevention was 11.5% among females and 12.2 % among males.[11] The NAIIS survey also reported that Rivers State has an estimated 210,082 persons living with HIV, with only about 40,314 (21%) on life-saving antiretroviral treatment (ART).[8] These results highlight how important it is to prioritise HIV testing within this age group.

Rivers State, situated in the Niger Delta region of Nigeria, faces a disproportionately high burden of HIV/AIDS.[8] Adolescents in communities affected by the oil industry activities may be vulnerable to engaging in risky sexual behaviours due to factors such as unemployment, poverty, the presence of transient oil workers, and limited opportunities for personal growth. These factors can increase the risk of HIV and other sexually transmitted infections.[12]

HIV testing uptake is pivotal in preventing the spread of HIV/AIDS and factors such as individual perceptions and peer, family, and community domain factors may influence HIV testing uptake among adolescents. Young people may be quite aware of and knowledgeable about voluntary counselling and testing (VCT) programmes, yet they nevertheless test far less often for HIV than is ideal. This gap may be explained by several important factors that affect the choice to undertake testing. For instance, perception of their own risk of HIV infection and whether they understand the potential benefits of early testing and stigma associated with HIV might serve as barriers and prevent the utilization of testing services.

The HIV pandemic disproportionately affects young people, making them more susceptible to the harmful effects of HIV and STIs transmitted through sexual activity.[11,13] Understanding the various factors influencing HIV testing among adolescents, including stigma, age, education, sexual activity, knowledge, attitudes towards testing services, fear of test results, and access to testing facilities, is crucial for developing tailored interventions to boost testing rates and mitigate the spread of HIV among this vulnerable population.[14] Therefore, we considered it essential to identify the factors that influence HIV testing uptake among adolescents in Rivers State.

Table 1: HIV and STI testing uptake among respondents

Characteristics	Frequency (n=671)	Percentage (%)
Ever been tested for HIV		
Yes	294	43.8
No	345	51.4
Not sure	32	4.8
Ever been tested for STI in the past 12 months		
Yes	191	28.5
No	415	61.9
Not sure	65	9.7

MATERIALS AND METHODS

A study was carried out in Rivers State, Nigeria using a cross-sectional study design. We used a structured interviewer-administered questionnaire integrated into Kobo Collect to collect data from male and female adolescents aged 10 to 19 years residing in selected communities (Emuoha-bundele, Amapa, Ikwerre-Igwuruta, Choba-Alakahia, and Etche-Chokocho) in Rivers State. The inclusion criteria specified that the adolescents must have resided in the state for at least one year. The sample size was derived by employing Cochran's formula for sample size calculation for a descriptive study, as outlined by Israel (2013). [15] After applying a non-response rate of 10% and with the help of a trained research assistant, data was collected from 671 adolescent respondents using Android phones with the link to the Kobo Collect. The sampling technique was multistage.

Stage 1: Selection of Local Government Areas. Four Local Government Areas (LGAs) by balloting from the list of all 23 LGAs using the simple random technique by balloting. Two were urban/semi-urban and the other two were rural LGAs.

Stage 2: Selection of ward. Four wards, one ward from each of the selected LGAs, using a simple random technique of balloting.

Stage 3: Selection of a community. A list of all the communities in the ward was obtained, and one community was selected in each of the four wards by simple random sampling (balloting).

Stage 4: Selection of study respondents. In each chosen community, a participant from 167 consenting households was selected consecutively.

Data was retrieved from the questionnaires, cleaned, sorted, and pre-processed in Microsoft Excel version 2016, before being imported and analysed using IBM SPSS version 27 by IBM Corporation, Armonk, New York, United States. Categorical data were presented as frequencies and percentages (%). The Chi-square ($\chi 2$) test was used to assess the association between independent variables and the outcome variables (HIV testing uptake). Thereafter, significant variables were used for the bivariate and multivariate logistic regression model to ascertain the size and direction of the effects of predictors adjusting for confounding. Individual, peer, family, community, and national domains are other categories of independent factors.

The University of Port Harcourt's Research and Ethics Committee granted ethical approval (UPH/CEREMAD/REC/MM78/040).

Participants 18 years of age or older signed a consent form before the survey and assent was obtained from those younger than 18, likewise informed consent from their parents or guardians.

RESULTS

The mean age of the participants was 17.7 years, with a standard deviation of 1.3 years. About 356 (53.9%) were females, 56 (8.3%) had no formal education, 161 (24%) had primary education, 428 (63.8%) had secondary education, and 338 (50.4%) resided in rural areas.

Table 1 shows that less than half, 294 (43.8%) of the respondents had ever been tested for HIV.

Table 2 shows the socio-demographic factors influencing the uptake of HIV tests by the respondents. Marital status, level of education, whether they were enrolled in school at the time, where they lived, the parents' educational attainment, and the mother's job were all associated with the number of people who had HIV tests done. HIV testing was higher among the married respondents 23 (82.1%) compared to singles 271 (44.4%), ($\chi 2 = 15.39$; $p < 0.001$).

The uptake of HIV tests was higher among those with a higher level of education. It was higher among those tertiary level of education 22 (88.0%), secondary 217 (52.8%), and primary 44 (29.3%) compared to those with no formal education 11 (20.8%), ($\chi 2 = 55.77$; $p < 0.001$). Similarly, HIV testing uptake was higher among those whose mothers had a post-secondary educational level 35 (57.4%) compared to secondary 183 (48.9%) and primary/lower 76 (37.3%), ($\chi 2 = 10.75$; $p < 0.005$). A higher proportion of respondents in school at the time 222 (58.0%), had HIV tests done compared to those not in school 72 (28.1%). ($\chi 2 = 54.99$; $p < 0.001$).

Table 2: Sociodemographic factors influencing HIV testing uptake among respondents

Sociodemographic	HIV Testing Uptake (Freq %) n=639		Total	Chi-square (P-value)
	Yes=294	No=345		
Age				2.48 (0.12)
10-14	10 (33.3)	21 (66.7)	31(100.0)	
15-19	284 (21.9)	324 (78.1)	608 (100.0)	
Sex				0.34 (0.56)
Female	161 (47.1)	181 (52.9)	342(100.0)	
Male	133 (44.8)	164 (55.2)	297 (100.0)	
Marital Status				
Single	271 (44.4)	340 (55.6)	611 (100.0)	**15.39 (0.001) ***
Married	23 (82.1)	5 (17.9)	28 (100.0)	
Educational level				**55.77 (0.001) ***
No education	11 (20.8)	42 (79.2)	53 (100.0)	
Primary	44 (29.3)	106 (70.7)	150 (100.0)	
Secondary	217 (52.8)	194 (47.2)	411 (100.0)	
Tertiary	22 (88.0)	3 (12.0)	25 (100.0)	
Currently attending school				**54.99 (0.001) ***
Yes	72 (28.1)	184 (71.9)	256 (100.0)	
No	222 (58.0)	161(42.0)	383 (100.0)	
Resides with				**26.12 (0.001) ***
Both Parents	86 (37.4)	144 (62.6)	230 (100.0)	
Single Parents	69(43.1)	91 (56.9)	160 (100.0)	
Relatives/Others	96 (50.5)	94 (49.5)	190 (100.0)	
Self	43 (72.9)	16 (27.1)	59 (100.0)	
Educational level-mother				**10.75 (0.005) ***
Post-secondary	35 (57.4)	26 (42.6)	61 (100.0)	
Secondary/Grade II Teacher's education	183 (48.9)	191 (51.1)	374 (100.0)	
Lower (Primary & lower)	76 (37.3)	128 (62.7)	204 (100.0)	
Educational level-father				**16.14 (0.001) ***
Post-secondary	56 (56.0)	44 (44.0)	100 (100.0)	
Secondary/Grade II Teacher's education	186 (48.8)	195 (51.2)	381 (100.0)	
Lower (Primary & lower)	52 (32.4)	106 (67.1)	158 (100.0)	
Mother's occupation				**8.78 (0.012) ***
Upper (Professionals & non-academic professionals)	51 (53.1)	45 (46.9)	96 (100.0)	
Middle (non-manual skilled workers)	94 (52.5)	85 (47.5)	179 (100.0)	
Lower (Petty traders & Unemployed)	149 (40.9)	215 (59.1)	364 (100.0)	

*Statistically significant **($p \leq 0.05$);** γ=Fisher's Exact p

Multivariable findings

Belief in abstinence (aOR=0.38, 95% CI; 0.19-0.74, p=0.004), and justification of physical violence (aOR=0.41, 95% CI; 0.23-0.78, p=0.007), were linked to lower odds of testing compared to those who do not believe. In the peer domain, no significant factors were identified after adjusting for confounders. In the family domain, respondents with deceased mothers had a 1.99 increased likelihood of HIV testing uptake (aOR=1.99, 95% CI: 1.18-3.35, p=0.010) compared to those whose mothers were alive (Table 4).

Exposure to mass media frequently and occasionally correlated 3.02 times (aOR=3.02, 95% CI: 1.45-6.28, p=0.003), and 1.40 times (aOR = 1.40, 95% CI: 0.79-2.49, p=0.247), with higher odds of HIV testing uptake in the community domain (Table 5).

DISCUSSION

This study aimed to determine the factors influencing HIV testing uptake among adolescents. Less than half of the respondents reported having undergone HIV testing. The relatively higher testing rate (43.8%) in this study (relative to previous data, which showed that 14% of young women 15 to 24 years knew their HIV status)[7] suggests progress, a positive direction towards improved awareness or willingness to get tested among the respondents. However, the testing rate reported in this study is lower than reported among young adolescents in Eswatini, Southern Africa, at 52.0%[16], lower than the global testing coverage of 81% in 2020[5] and lower than the national target of 95%.[17] This observed variation may be due to variations in the study population as the global testing coverage and national target are not restricted to only adolescents.

This study showed that marital status significantly predicts HIV testing uptake, with unmarried individuals being more likely to uptake HIV testing compared to married individuals. The logistic regression coefficient for marital status suggests that, after accounting for other factors, being unmarried is associated with a significantly higher likelihood of HIV testing uptake compared to being married in this study. This is in tandem with a study conducted by Utheim et al that reported that being married was negatively associated with HIV testing uptake.[18] This could be attributed to unmarried individuals having greater autonomy over their healthcare decisions. The finding, however contrasted with the findings by Ajiboye et al [19] conducted among youths in Ethiopia that reported that those ever married were more likely to have tested for HIV. [19] The variations observed in these studies highlight the importance of considering contextual factors (various circumstances, conditions, and influences that surround a particular situation or event) when examining the relationship between marital status and HIV testing uptake among adolescents. For example, in some cultures, there may be a stigma associated with premarital sexual activity, which could affect testing behaviour.

Table 3: Bivariate and Multivariate results for sociodemographic factors influencing HIV testing uptake among respondents

Variables	HIV Testing Uptake (Freq %) n=639		cOR [95% CI]	P-value	aOR [95% CI]	P-value
	Yes n=294	No n=345				
Marital Status						
Single [R]	271 (44.4)	340 (55.6)	-	-	-	-
Married	23 (82.1)	5 (17.9)	0.17 [0.07-0.46]	**0.001***	0.31 [0.11-0.92]	**0.034***
Educational level						
No education [R]	11 (20.8)	42 (79.2)	-	-	-	-
Primary	44 (29.3)	106 (70.7)	0.63 [0.29-1.33]	0.230	0.70 [0.31-1.57]	0.385
Secondary	217 (52.8)	194 (47.2)	0.23 [0.12-0.47]	**0.001***	0.30 [0.14-0.63]	**0.001***
Tertiary	22 (88.0)	3 (12.0)	0.04 [0.01-0.14]	**0.001***	0.25 [0.17-0.37]	**0.001***
Currently attending school						
No [R]	222 (58.0)	161(42.0)	-	-	-	-
Yes	72 (28.1)	184 (71.9)	0.28 [0.20-0.39]	**0.001***	0.29 [0.17-0.48]	**0.001***
Resides with						
Both Parents [R]	86 (37.4)	144 (62.6)	-	-	-	-
Single Parents	69(43.1)	91 (56.9)	0.22 [0.12-0.42]	**0.001***	1.33 [0.56-3.15]	0.52
Relatives/Others	96 (50.5)	94 (49.5)	0.28 [0.15-0.54]	**0.001***	1.20 [0.50-2.88]	0.68
Self	43 (72.9)	16 (27.1)	0.38 [0.20-0.72]	**0.003***	1.28 [0.55-2.97]	0.50
Educational level-mother						
Post-secondary	35 (57.4)	26 (42.6)	2.27 [1.27-4.06]	**0.005***	0.84 [0.36-1.96]	0.68
Secondary/Grade II Teacher's education	183 (48.9)	191 (51.1)	1.61 [1.14-2.29]	**0.006***	1.24 [0.74-2.08]	0.41
Lower (Primary & lower) [R]	76 (37.3)	128 (62.7)	-	-	-	-
Educational level-father						
Post-secondary	56 (56.0)	44 (44.0)	2.59 [1.55-4.35]	**0.001***	0.59 [0.27-1.31]	0.200
Secondary/Grade II Teacher's education	186 (48.8)	195 (51.2)	1.94 [1.32-2.87]	**0.001***	0.55 [0.31-0.97]	**0.038***
Lower (Primary & lower) [R]	52 (32.4)	106 (67.1)	-	-	-	-

***Statistically significant (p≤0.05);** Notes: R=reference, cOR=crude Odds Ratio, aOR=adjusted Odds Ratio

This study suggests that there are significant associations between education level, school attendance, and HIV testing uptake among adolescents. The study indicates that adolescents with tertiary and secondary education were less likely to have undergone HIV testing compared to those with no formal education. Specifically, the adjusted odds ratios (aOR) of 0.25 and 0.30 for tertiary and secondary education, respectively, suggest a significant decrease in the likelihood of HIV testing uptake among educated adolescents. This finding may seem counterintuitive at first glance, as one might expect individuals with higher levels of education to be more knowledgeable about HIV/AIDS and more proactive in seeking testing. However, several factors could explain this result. For example, adolescents with higher education levels may believe they are less likely to contract HIV infection or may face barriers such as stigma or lack of access to testing services despite their education.

The finding that those with higher educational levels are less likely to undergo HIV testing contrasts with a study in Nigeria among young adults, which reported that those with higher educational attainment had higher odds of having ever tested for HIV, [20] same was reported in the study among youths in Gambia. [21] These findings also contrast with a study by Nshimirimana et al., which identified higher levels of education and older age as determinants of HIV testing uptake [6]

In a recent study, lower odds of HIV testing uptake were reported in rural locations. However, this current study did not find any significant difference in testing uptake between urban and rural areas. This finding contrasts with a study conducted in Tanzania, which reported that HIV testing uptake increases with age [22], and a study in Burundi that reported lower odds of HIV testing uptake in rural areas [6] and Madrid, where early sexual debut and history of STI were significant factors.[14]

This study demonstrated lower odds of HIV testing uptake among adolescents who were in school compared to those out of school. This might be attributed to the reduced availability of time for healthcare-seeking among students. Likewise, adolescents who are out of school may have more opportunities to access community-based HIV testing programmes. Although several studies [6,20] showed the influence of social demographic factors on HIV testing uptake, this review did not find one that highlighted the influence of in and out-of-school adolescents. Individual beliefs regarding dating, sexual intercourse, abstinence, contraceptive use, boys forcing sex, and the justifiability of physical violence were found to influence HIV testing uptake among adolescents. Those who believed in abstinence or justified physical violence were less likely to undergo HIV testing compared to those who did not hold such beliefs. This finding is supported by a study conducted by Worku et al., which also highlighted the impact of individual beliefs on HIV testing uptake.[7]

Parents and peers can shape adolescents' attitudes towards HIV testing. Family domain factors,

including the presence of a living father and mother, ease of discussing sex-related matters with the father, and having older siblings, were significant. Adolescents whose fathers were not alive were more likely to undergo HIV testing (55.6%) compared to those with living fathers. A qualitative study by Mason et al. in Nigeria corroborates the role of family as factors that promote the uptake of HIV testing among youths[23] It suggests that in families where both parents are alive, there may be a perception of lower HIV risk, leading to less perceived need for testing. Conversely, in families where one or both parents are deceased, adolescents may feel more vulnerable or responsible for their health, increasing the likelihood of seeking HIV testing. Furthermore, those who communicated well with their fathers and had strong family connections were also more inclined to get tested. Additionally, adolescents with deceased mothers showed a higher likelihood of testing, emphasizing the influence of maternal presence on health-seeking behaviours. These findings underscore the importance of family dynamics and suggest interventions to strengthen family connections and promote open communication about sexual health and HIV testing among adolescents.

Factors within the community domain, such as exposure to mass media, participation in healthy after-school programs, and perceptions of neighbourhoods with high crime rates were associated with HIV testing uptake. Adolescents exposed to mass media often and occasionally were 3.02 and 1.40 times more likely to undergo HIV testing, respectively, compared to those who never were. According to a study done among young women in Eastern Africa, HIV testing among young women was significantly affected by both individual and community-level factors.[7] Mason et al. reported the role of parents, family-centred and social media approaches as factors that promote the uptake of HIV testing.[23] Additionally, a study in Nigeria by Idowu et al. showed the influence of higher media exposure as factors that promote the uptake of HIV.[20] These highlight the potential importance of mass media exposure as a useful tool in promoting HIV testing among adolescents.

Factors within the community domain, such as exposure to mass media, participation in healthy after-school programs, and perceptions of neighbourhoods with high crime rates, were associated with HIV testing uptake. Adolescents exposed to mass media often and occasionally were 3.02 and 1.40 times more likely to undergo HIV testing, respectively, compared to those who never were. According to a study done among young women in Eastern Africa, HIV testing among young women was significantly affected by both individual and community-level factors. [7] Mason et al. reported the role of parents, family-centred and social media approaches as factors that promote the uptake of HIV testing[23]. Additionally, a study in Nigeria by Idowu et al. showed the influence of higher media exposure as factors that promote the uptake of HIV. [20] These highlight the potential importance of mass media

exposure as a useful tool in promoting HIV testing among adolescents.

Table 4: Bivariate and Multivariate results for factors influencing HIV Testing Uptake in the individual domain

Individual domain	HIV Testing Uptake (Freq %) n=639 Yes =294 No=345		cOR [95% CI]	p-value	aOR [95% CI]	p-value
Believe that it is OK to 'date'						
Yes	177(49.9)	178(50.1)	0.74 [0.50-1.09]	0.135	0.78 [0.41-1.47]	0.445
No	35 (24.6)	107(75.4)	0.24 [0.15-0.40]	**0.001***	1.09 [0.52-2.26]	0.825
Not sure [R]	82 (57.7)	60 (42.3)	-	-	-	-
Believe in abstinence						
Yes	102(63.4)	59 (36.6)	3.24 [2.05-5.12]	0.001*	0.38 [0.19-0.74]	**0.004***
No	137(42.8)	183(57.2)	1.40 [0.94-2.08]	0.094	0.72 [0.41-1.27]	0.254
Not sure R	55 (34.8)	103(65.2)	-	-	-	-
Believe that physical violence can be justifiable						
Yes	97 (66.9)	48 (33.1)	3.05 [1.88-4.96]	**0.001***	0.41 [0.23-0.78]	**0.007***
No	142(39.9)	214(60.1)	1.00 [0.67-1.49]	0.995	0.53 [0.29-0.95]	**0.033***
Not sure [R]	55 (39.9)	83 (60.1)	-	-	-	-

***Statistically significant (p<0.05);** Notes: R=reference, cOR=crude Odds Ratio, aOR=adjusted Odds Ratio

CONCLUSION

Less than half of the respondents have been tested for HIV, the rate is lower than the global target. This may make them more likely to engage in risky behaviours unknowingly, contributing to the ongoing transmission of HIV. Sociodemographic, individual and community domain factors influenced HIV testing among adolescents. The predictors of HIV testing were marital status, educational level, whether they were in school or out of school, and exposure to mass media. The government of Rivers State and stakeholders in adolescent health should continue to expand existing public health campaigns by encouraging further testing to bridge the gap toward the global testing rate. Implementing strategies that promote early and routine HIV testing while emphasizing its importance as a preventive measure is crucial.

Table 5: Bivariate and Multivariate results for factors (risk and protective) influencing HIV Testing Uptake in the community and national domain

Variables	HIV Testing Uptake (Freq %) n=639	cOR [95% CI]	P-value	aOR [95% CI]	P-value	
	Yes=294	No=345				
Go to clubs or parties						
Often	29 (67.4)	14 (32.6)	5.09 [2.52-10.29]	**0.001***	0.48 [0.19-1.19]	0.112
Occasionally	204 (53.0)	181 (47.0)	2.77 [1.94-3.97]	**0.001***	0.66 [0.40-1.08]	0.097
Never [R]	61 (28.9)	150 (71.1)	-	-	-	-
Go to the movies						
Often	19 (55.9)	15 (44.1)	3.37 [1.63-6.98]	**0.001***	2.18 [0.81-5.89]	0.123
Occasionally	201 (60.2)	133 (39.8)	4.02 [2.85-5.68]	**0.001***	0.62 [0.38-1.00]	0.051
Never [R]	74 (27.3)	197 (72.7)	-	-	-	-
Drink alcohol						
Often	20 (51.3)	19 (48.7)	1.86 [0.94-3.65]	**0.071***	0.54 [0.20-1.42]	0.212
Occasionally	175 (53.7)	151 (46.3)	2.05 [1.47-2.85]	**0.001***	0.69 [0.42-1.13]	0.137
Never [R]	99 (36.1)	175 (63.9)	-	-	-	-
Smoke cigarettes						
Often	8 (38.1)	13(61.9)	0.85 [0.34-2.08]	0.714	2.49 [0.82-7.55]	0.108
Occasionally	93 (58.1)	67 (41.9)	1.91 [1.32-2.75]	**0.001***	1.41 [0.85-2.35]	0.188
Never [R]	193 (42.1)	265 (57.9)	-	-	-	-
Exposure to mass media						
Often	51 (31.9)	109(68.1)	0.42 [0.26-0.67]	**0.001***	3.02 [1.45-6.28]	**0.003***
Occasionally	169 (49.9)	170 (50.1)	0.89 [0.59-1.32]	0.550	1.40 [0.79-2.49]	0.247
Never [R]	74 (52.9)	66 (47.1)	-	-	-	-
Engaged in healthy after-school programs						
Often [R]	21 (61.8)	13 (38.2)	-	-	-	-
Occasionally	198 (49.0)	206 (51.0)	2.71 [1.28-5.74]	**0.009***	0.37 [0.14-0.99]	**0.047***
Never	75 (37.3)	126 (62.7)	1.62 [1.14-2.28]	**0.007***	0.77 [0.49-1.23]	0.278
Neighbourhoods have high crime rates						
Often	74 (63.2)	43 (36.8)	1.99 [1.19-3.34]	**0.009***	0.61 [0.31-1.19]	0.150
Occasionally	163 (40.9)	236 (59.1)	0.80 [0.53-1.20]	0.282	0.89 [0.51-1.54]	0.674
Never [R]	57 (46.3)	66 (53.7)	-	-	-	-

***Statistically significant (p≤0.05);** Notes: R=reference, cOR=crude Odds Ratio, aOR=adjusted Odds Ratio.

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