Prevalence of Physical Inactivity and Screen Time among Youths in Mississippi, United States

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Abstract- Physical activity contributes significantly to the healthy growth and maturation of adolescents. Lack of adequate physical activity among youths is a public health burden in Mississippi. Adolescents and children of 6 years and above require at least one hour of physical activity daily for optimal health benefits. This study examined the prevalence of physical inactivity among high school students in Mississippi by gender, race, and grade. This is a cross-sectional study using data obtained from the Youth Risk Behavior Surveillance System (YRBSS) for 2019. The YRBSS monitors health-related risk factors contributing to the leading causes of death and disability among youths and young adults, including inadequate physical activity and screen time. The prevalence of students who engaged in physical activity was observed using univariate t-test statistical analysis at $p<0.05$. The percentage differences in the groups were determined using frequency distributions. The percentage of students who were not physically active at least one hour daily on all 7 days was 80.6% in blacks, 71.9%in whites, 84.4% in females, and 68.5% in males, 81.9%. Students in the 12th grade were less likely to be physically active at least one hour daily on all 7 days. Blacks(34.3%) and females(30.8%) reported watching television 3 or more hours a day.
Females and black youths in Mississippi had a lower prevalence of physical activity and higher screen time. Students in the 12th grade had a significantly lower prevalence of physical activity than other grades.

Index Terms- Physical inactivity, Screen time, Mississippi, Youths.

I. INTRODUCTION

Physical activity (PA) has immense health benefits and is an important determinant in maintaining good cardiorespiratory fitness. Despite these health benefits, the persistent rise in the prevalence of physical inactivity among youths continues to pose a huge public health burden both globally and in the United States, especially in Mississippi. According to the World Health Organization(WHO), physical inactivity is the fourth leading risk factor for global mortality (1). it increases the risk for many chronic diseases such a cancer, diabetes, hypertension, coronary disease, cerebrovascular disease, and overweight and obesity (2,3)
There has been evidence of a complex relationship between the amount of regular PA undertaken, fitness, level of inactivity, body mass index (BMI), and the link with non-communicable diseases (4). It is well known that physical activity contributes positively toward growth and maturation in children and adolescents; individuals who are active show higher scores on strength, motor, and cardiovascular fitness tests when compared to their inactive peers (5). The WHO recommends that adolescents should engage in at least one hour of moderate to intense physical activity daily, including activities that toughen the bones and muscles, at least 3 times a week, and low levels of recreational screen time(ST) (1). Although there is no consensus in the recommendations for ST in children and adolescents, several experts have established guidelines recommending no more than 2 hours of recreational ST for youth (3,6). Low levels of time spent in front of screens and monitors (screen time, ST) which could also be described as “sedentary time” are linked with improved physical, psychosocial, and mental health, especially among adolescents and children (7).
In the United States, The high levels of recreation screen time and physical inactivity among adolescents in the United States are of grave public health concern. A 2019 national report from the Youth Risk Behavior Surveillance System demonstrates that only 23.2% of high school students were physically active at least one hour a day on all 7 days, 44.1% were not physically active at least one hour a day on 5 or more days; 57.4 % played in at least one sports team; 19.8% watched television 3 or more hours a day (8).
Physical activity is a learned behavior that is influenced by friends, family, teachers, coaches, and the environment; these health-related behaviors are acquired majorly during the adolescence period (9). Adolescents who do not take advantage of the opportunities for confidence-building in their physical abilities early in life tend to be less active later in life (6). This behavior eventually tracks down to their adulthood and increases the risk for chronic illness and premature death and also contributes to the economic burden in the state of Mississippi. Studies have shown an inverse relationship between weight status and physical activity among youths (10). Increase in BMI was found to be associated with increased television viewing time and decreased moderate to vigorous physical activity (MVPA) (11).

Higher BMI value has been shown to be associated with increased risk of type 2 diabetes, high blood pressure, and elevated cholesterol, among youths(12).
Mississippi has the highest prevalence of cardiovascular disease risk factors, including obesity and type 2 diabetes in the nation with a similar rise in obesity and diabetes among children and adolescents(13). Studies have demonstrated that inadequate physical activity is a contributing factor to the development of these cardiovascular risk factors, which ultimately lead to health complications in adulthood, and premature death (14). Despite these concerns, there are few studies on the prevalence of physical inactivity among youths in Mississippi. The purpose of this study is to examine the prevalence of physical inactivity among youths in Mississippi by race, gender, and school grade which would help inform targeted strategies in interventions to improve physical activity and reduce screen time activities among youths in Mississippi.

II. YRBSS MISSISSIPPI DATA

We used data from the Center for Disease Control and Prevention (CDC) for Mississippi High School Risk Behavior Surveillance System (YRBSS) of 2019 for the analyses (8). The CDC developed the YRBSS, a cross-sectional survey, to monitor health risk behaviors among youth in the United States (8). The data examined the variations in the demographic subdivision, hence increasing the size of the sample and observing any changes in the prevalence with each survey cycle using a multistage sampling design in other to have a nationally representative sample of ninth through 12th-grade students who are attending both private and public schools in the United States (8).
The participation of the students in this survey was voluntary and anonymous using a self-administered questionnaire. More details about the sampling strategies are reported elsewhere (16). The following questions were used to assess the physical inactivity level of participants: [1] "Did Not Participate In At Least 60 Minutes Of Physical Activity On At Least 1 Day?, [2] Were Not Physically Active At Least 60 Minutes Per Day On 5 Or More Days?, [3] Were Not Physically Active At Least 60 Minutes Per Day On All 7 Days?, [4] Did Not Attend Physical Education (Pe) Classes On 1 Or More Days?, [5] Did Not Attend Physical Education (Pe) Classes On All 5 Days?, [6] Did Not Play On At Least One Sports Team?, [7] Watched Television 3 Or More Hours a Day?, [8] Played Video Or Computer Games Or Used A Computer 3 Or More Hours a Day?". The response options were dichotomized into "yes" or " no." The trends in the prevalence of physical activity among youths were determined by analyzing the data for 2019 [8]. The estimated prevalence of physical activity among participants was adjusted based on their gender, race, and ethnicity reference from 2019 YRBSS data [8]. The differences in the groups were examined with univariate t-test statistical analysis at $p < 0.05$ and frequency distribution was used to determine the percentage differences [16].

The YRBSS 2019 record contained a total of 1698 self-reported participants with 25% of females who reported that they did not participate in at least 60 minutes of physical activity on at least 1 day which was higher than males(15.4%) (Table 1). Among the races, blacks(25.6%) were less likely to report that they did not participate in at least 60 minutes of physical activity on at least 1 day compared to whites (14.6%), Hispanics (22%), and other races (Table1). Individuals who did not participate in at least 60 minutes of physical activity on at least 1 day were higher among those in the 10th grade (24.3%) when compared to other grade levels (Table 1).
The YRBSS (2019) revealed that those in 12th grade (62.5%) had a higher prevalence of not being physically active at least 60 minutes a day, on 5 or more days than other grades; females (67.7%) higher prevalence than male participants (51%) and the blacks (66%) had a higher prevalence than other races (Table 2). The results of participants who were not physically active at least 60 minutes per day on all 7 days demonstrated that blacks (80.6%) reported a higher prevalence when compared to Hispanics (76.8%), whites (71.9%), and other races (Table 3). Female participants (84.4%) reported a higher prevalence than males (68.5%); participants in 12th grade (81.9%) were more likely to report being physically active at least 60 minutes per day on all 7 days (Table 3).

Results for participants who did not attend physical education (PE) classes on 1 or more days (Table 4) showed Hispanics (66.9%) had higher prevalence when compared to other races; female participants (67.7%) reported higher prevalence than male (53.5%) and those in 12th grade (72.1%) reported that they did not attend PE when compared to other grades (Table 4).
Table 5 shows results for participants who did not attend PE on all 5 days with female participants (79.9%) more likely not to attend PE when compared to the male participants (70.9%); Hispanics (84.6%) had a higher prevalence when compared to other races and participants in 12th grade (85.2%) was significantly higher than other grades (Table 5).
Furthermore, the results from the data analysis revealed that female youths (48.4%) did not play on at least one sports team which was higher than for male youths (39.9%) (Table 6). According to race, Hispanics (49.2%) had a higher rate of playing on at least one sports team when compared to other races including whites (41.7%) and blacks (46.3%). The participants in the 12th grade (50.4%) had the highest rates of not playing in at least one sports team (Table 6).
Table 7 shows participants who watched television 3 or more hours a day. Female participants(30.8%) were observed to have had higher prevalence of watching television 3 or more hours a day when compared to the male participants (24.6%) (Table 7). Participants who identified as blacks showed a higher prevalence when compared to other races and participants in 9th grade (30.4%) reported higher prevalence when compared to other grades.
Bothe male (42.9%) and female(42.6%) participants played video or computer games or used the computer for 3 hours or more (Table 8). However, Whites (43.5%) and Hispanics (43.7%) had a higher rate of computer use for 3 hours or a day more when compared to

black participants (42.4%). Participants in the 11th grade had a higher prevalence of playing video or computer games for 3 hours or more when compared to other grades (Table 8).

Table 1: Did Not Participate In At Least 60 Minutes Of Physical Activity On At Least 1 Day

(in any kind of physical activity that increased their heart rate and made them breathe hard some of the time, during the 7 days before the survey)

	Male n(%)	**Female n (%)**		**Total**				
Sex	828 (15.4)	856 (25.0)		1698				
Race	American Indian/ Alaskan native n(%)	Asian n (%)	Black n (%)	Hispanic n (%)	White n (%)	NHOPI n (%)	Multiple race n (%)	Total n
	18 (N/A)	24 (N/A)	663 (25.6)	137(22.0)	710 (14.6)	9 (N/A)	82 (N/A)	1698
Grade	9^{th} n (%)	10^{th} n (%)		11^{th} n (%)		12^{th} n (%)		Total (n)
	557 (17.1)	410 (24.3)		336 (20.2)		381 (19.5)		1698(20.4)

NHOPI, National Hawaiian and Other Pacific Islanders. Source: Youth Risk Behavioral Surveillance System (YRBSS), 2019.

Table 2: Were Not Physically Active At Least 60 Minutes Per Day On 5 Or More Days

(doing any kind of physical activity that increased their heart rate and made them breathe hard some of the time, during the 7 days before the survey)

	Male n(%)	**Female n (%)**		**Total**				
Sex	828 (51)	856 (67.7)		1698				
Race	American Indian/ Alaskan native n(%)	Asian n (%)	Black n (%)	Hispanic n (%)	White n (%)	NHOPI n (%)	Multiple race n (%)	Total n
	22 (N/A)	24 (N/A)	663 (66)	137 (60.3)	710 (52.8)	9 (N/A0	82 (N/A)	1698
Grade	9^{th} n (%)	10^{th} n (%)		11^{th} n (%)		12^{th} n (%)		Total (n)
	557 (59.6)	410 (60.5)		336 (55.4)		381 (62.5)		1698

NHOPI, National Hawaiian and Other Pacific Islanders. Source: Youth Risk Behavioral Surveillance System (YRBSS), 2019.

Table 3: Were Not Physically Active At Least 60 Minutes Per Day On All 7 Days

(in any kind of physical activity that increased their heart rate and made them breathe hard some of the time, during the 7 days before the survey)

	Male n(%)	**Female n (%)**	**Total**
Sex	828 (68.5)	856(84.4)	1698 (76.6)

Race	American Indian/ Alaskan native n(%)	Asian n (%)	Black n (%)	Hispanic n (%)	White n (%)	NHOPI n (%)	Multiple race n (%)	Total n
	22 (N/A)	24 (N/A)	663 (80.6)	137 (76.8)	710 (71.9)	9 (N/A)	82 (N/A)	1698 (76.6)
Grade	9th n (%)	10th n (%)		11th n (%)		12th n (%)		Total (n)
	557 (74.8)	410 (74.7)		336 (75.6)		381 (81.9)		1698 (76.6)

NHOPI, National Hawaiian and Other Pacific Islanders. Source: Youth Risk Behavioral Surveillance System (YRBSS), 2019.

Table 4: Did Not Attend Physical Education (Pe) Classes On 1 Or More Days

(in an average week when they were in school)

	Male n(%)	**Female n (%)**		**Total**				
Sex	823 (53.5)	855 (67.7)		1691 (60.5)				
Race	American Indian/ Alaskan native n(%)	Asian n (%)	Black n (%)	Hispanic n (%)	White n (%)	NHOPI n (%)	Multiple race n (%)	Total n
	22 (N/A)	25 (N/A)	656 (59.5)	139 (66.9)	709(62.1)	9(N/A)	82 (N/A)	1691 (60.5)
Grade	9th n (%)	10th n (%)		11th n (%)		12th n (%)		Total (n)
	556 (48.6)	409(60.6)		336 (63.1)		376 (72.1)		1691 (60.5)

NHOPI, National Hawaiian and Other Pacific Islanders. Source: Youth Risk Behavioral Surveillance System (YRBSS), 2019.

Table 5: Did Not Attend Physical Education (Pe) Classes On All 5 Days

(in an average week when they were in school)

	Male n(%)	**Female n (%)**		**Total**				
Sex	823 (70.9)	855 (79.9)		1691 (75.5)				
Race	American Indian/ Alaskan native n(%)	Asian n (%)	Black n (%)	Hispanic n (%)	White n (%)	NHOPI n (%)	Multiple race n (%)	Total n
	22 (N/A)	25 (N/A)	656 (77.1)	139 (84.6)	709 (73.1)	9 (N/A)	82 (N/A)	1691 (75.5)
Grade	9th n (%)	10th n (%)		11th n (%)		12th n (%)		Total (n)
	556 (68.0)	409 (73.3)		336 (73.3)		376 (85.2)		1691 (75.5)

NHOPI, National Hawaiian and Other Pacific Islanders. Source: Youth Risk Behavioral Surveillance System (YRBSS), 2019.

Table 6: Did Not Play On At Least One Sports Team

(counting any teams run by their school or community groups, during the 12 months before the survey)

	Male n(%)	**Female n (%)**		**Total**				

Sex	817 (39.9)	856 (48.4)		1687 (44.2)				
Race	American Indian/ Alaskan native n(%)	Asian n (%)	Black n (%)	Hispanic n (%)	White n (%)	NHOPI n (%)	Multiple race n (%)	Total n
	22(/A)	25(N/A)	653 (46.3)	138 (49.2)	708 (41.7)	9 (N/A)	81 (N/A)	1687 (44.2)
Grade	9th n (%)	10th n (%)		11th n (%)		12th n (%)		Total (n)
	552 (40.8)	407 (43.3)		336 (42.4)		37.9(50.4)		1687 (44.2)

NHOPI, National Hawaiian and Other Pacific Islanders. Source: Youth Risk Behavioral Surveillance System (YRBSS), 2019.

Table 7: Watched Television 3 Or More Hours Per Day

(on an average school day)

	Male n(%)	**Female n (%)**		**Total**				
Sex	817 (24.6)	856 (30.8)		1687 (27.6)				
Race	American Indian/ Alaskan native n(%)	Asian n (%)	Black n (%)	Hispanic n (%)	White n (%)	NHOPI n (%)	Multiple race n (%)	Total n
	21 (N/A)	25 (N/A)	653 (34.3)	135 (30.6)	711 (21.5)	9 (N/A)	83 (N/A)	1688 (27.6)
Grade	9th n (%)	10th n (%)		11th n (%)		12th n (%)		Total (n)
	557 (30.4)	40.6 (24.8)		334 (28.5)		377 (26.6)		1688 (27.6)

NHOPI, National Hawaiian and Other Pacific Islanders. Source: Youth Risk Behavioral Surveillance System (YRBSS), 2019.

Table 8: Played Video Or Computer Games Or Used A Computer 3 Or More Hours Per Day

(counting time spent playing games, watching videos, texting, or using social media on their smartphone, computer, Xbox, PlayStation, iPad, or other tablet, for something that was not schoolwork, on an average school day)

	Male n(%)	**Female n (%)**		**Total**				
Sex	824 (42.9)	860 (42.6)		1699(42.7)				
Race	American Indian/ Alaskan native n(%)	Asian n (%)	Black n (%)	Hispanic n (%)	White n (%)	NHOPI n (%)	Multiple race n (%)	Total n
	22 (N/A)	25 (N/A)	660 (42.4)	139 (43.7)	711 (43.5)	9(N/A)	82 (N/A)	1699 (42.7)
Grade	9th n (%)	10th n (%)		11th n (%)		12th n (%)		Total (n)
	558 (43.4)	408 (40.5)		335 (44.0)		384 (43.1)		1699 (42.7)

NHOPI, National Hawaiian and Other Pacific Islanders. Source: Youth Risk Behavioral Surveillance System (YRBSS), 2019

III. DISCUSSION

There is a notable gap in gender participation in physical activity and screen time. Our study revealed that female youths in Mississippi had low participation in physical activity when compared to the male youths. This finding is consistent with studies demonstrating lower physical activities among female adolescents(9, 17).

Research has shown that findings on race/ ethnic differences in PA are equivocal. A previous study has reported non- Hispanic white youth to be less physically active than other races/ ethnicities while another study found that non -Hispanic blacks have lower levels of physical activity. The latter is consistent with the findings from our study. Our analysis revealed that blacks on average were less likely than whites to be physically active at least 60 minutes a day for 5 days or more(66%), less likely than whites to be physically active at least 60 minutes a day on all 7 days(80.6%). The differences could be linked to the higher socio-economic status seen in non-Hispanic white youths as research has shown that there is a direct relationship between PA and SES (18).

Several studies reported an age-related decline in PA among US youths based on findings from NHANES 2003 (19, 15). This report is consistent with results from our study with participants in the 12th grade less likely to engage in physical activity when compared to other grades. Other studies found a decline in PA with age and particularly in female adolescents (20, 21). This finding is detrimental as unlearning health-related behaviors with increasing age could increase risks of cardiovascular disease and related risk factors in adulthood.

IV. CONCLUSION

Female youths engaged less in physical activity and spent more time on television or computer more than the male youths. Blacks were more physically inactive when compared to the other race and ethnicity. Youths who were in 12th grade were less involved in physical activity than the other grades.

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