

# **Physical Activity and Nutrition: Results from a Survey of Jones County High School Students**

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## **Background**

In the 2016 Jones County Community Health Needs Assessment (CHNA) and Health Improvement Plan (HIP), physical activity, nutrition, and obesity were identified as priority areas for Jones County. However, limited data were available for youth. The purpose of this project was to collect data on the physical activity and nutrition of high school students in Jones County, Iowa. The data will be shared with the schools and communities, and utilized by Jones County Public Health to fulfill the state required CHNA for the year 2020.

## **Methods**

Students were provided with an anonymous electronic survey to be completed voluntarily through their individual schools via email. The questionnaire was compiled using questions previously proven effective [1,2]. Additionally, students were asked to voluntarily participate in a PhotoVoice portion of the project independent from the questionnaire. Students expressing interest in participating in the PhotoVoice portion of the project were contacted by email with further instructions. PhotoVoice is a process by which people can identify, represent, and enhance their community through photographs; it enables them to act as recorders, and puts them in a position to influence social action and change in their own communities [1]. A total of 25 students volunteered to participate in this portion of the project; unfortunately none of these students followed through and submitted the requested information, so this portion of the project was not able to be completed.

## **Results and Discussion**

There are approximately 915 high school students in Jones County and there were 373 responses to the survey, resulting in a response rate of 40.8 percent. The majority (55.2 percent) of the respondents were from Monticello High School, followed by 30.3 percent from Anamosa High School, and 14.5 percent from Midland (Table 1). Eight percent (30) respondents were 14 years old, 30 percent (112) were 15 years old, 21.7 percent (81) were 16 years old, 21.2 percent (79) were 17 years old, and 19 percent (71) were age 18 years or older. Of the students who chose to answer the question (n=317), 52.7 percent (167) identified as female, 46.7 percent (148) identified as male, and 0.6 percent (2) identified as other or transgender.

Table 1. Demographics by High School

Age (years)	Anamosa	Midland	Monticello
14	7	2	21
15	34	17	61
16	20	9	52
17	25	12	42
18+	27	14	30
<i>Total</i>	113	54	206

### *Physical Activity*

Promoting physical activity is an important part of enhancing public health, as the health benefits of physical activity are innumerable. Studies have suggested regular physical activity may have positive effects on chronic diseases, such as cardiovascular disease, hypertension, and type 2 diabetes. Additionally, physical activity has a beneficial effect on mental disorders or conditions, such as anxiety disorders or depression. It reduces stress and depression, and increases self-confidence and emotional wellbeing.

Students were asked to self-identify their level of health as excellent, very good, good, fair, or poor. Of the 372 responses, 19.6 percent (73) reported excellent health, 39.7 percent (148) reported very good health, 26.9 percent (100) reported good health, 12.1 percent (45) reported fair health, and 1.6 percent (6) reported poor health.

The Centers for Disease Control and Prevention (CDC) recommends adolescents get at least 60 minutes of aerobic, muscle, and/or bone strengthening exercise per day at a minimum [3]. Of the respondents who reported excellent or very good health, 75.6 percent (167) reported completing over 1 hour of physical activity per day, 4 or more days per week (Table 2). With students reporting good health, 46 percent (46) of respondents reported achieving more than one hour of physical activity per day, 4 days per week. In contrast, for those who reported fair or poor health, only 17.7 percent (9) of participants reported completing more than one hour of physical activity per day, 4 days per week. The majority of participants who reported fair or poor health exercised one hour or less per day, 1 - 3 days per week (56.8 percent).

Table 2. Perceived Health and Physical Activity Levels

	Excellent/Very Good		Good		Fair/Poor	
Active 4 or more days per week						
> 1 hour/day	167	75.6%	46	46.0%	9	17.7%
1 hour/day	15	6.8%	16	16.0%	7	13.7%
< 1 hour/day	1	0.5%	3	3.0%	4	7.8%
Active 3 days per week						
> 1 hour/day	13	5.9%	4	4.0%	-	-
1 hour/day	11	5.0%	12	12.0%	10	19.6%
< 1 hour/day	3	1.4%	4	4.0%	3	5.9%
Active 1 - 2 days per week						
> 1 hour/day	-	-	1	1.0%	-	-
1 hour/day	1	0.5%	7	7.0%	4	7.8%
< 1 hour/day	7	3.2%	6	6.0%	12	23.5%

Of the 220 students that reported excellent or very good health, 59.3 percent said organized sports was their most enjoyed activity outside of school (Table 3). Of these students, 64 (48.9 percent) reported participating in organized sports for 3-5 hours per day. Only 14.5 percent of youth with excellent or very good health reported inactive activities such as video games, television, computers for gaming, or social networking as their most enjoyed activity outside of school. Respondents reporting poor health primarily reported inactive activities as their most enjoyed activity outside of school (39.2 percent).

Table 3. Activities Enjoyed Outside of School and Self-Described Health

	Excellent/V. Good		Good		Fair/Poor	
<b>Organized sports</b>	131	59.3%	28	28.0%	6	11.8%
1-2 hours/day	48		14		1	
3-5 hours/day	64		11		5	
6 or more hours/day	19		3		-	
<b>Unstructured physical activity</b>	26	11.8%	23	23.0%	9	17.7%
1-2 hours/day	8		10		8	
3-5 hours/day	15		8		-	
6 or more hours/day	3		4		-	
<b>Physical chores</b>	27	12.2%	15	15.0%	13	25.5%
1-2 hours/day	7		6		5	
3-5 hours/day	14		4		4	
6 or more hours/day	6		5		4	
<b>Academic activities</b>	4	1.8%	5	5.0%	3	5.9%
1-2 hours/day	3		4		-	
3-5 hours/day	-		1		1	
6 or more hours/day	1		-		2	
<b>Inactive activities</b>	32	14.5%	29	29.0%	20	39.2%
1-2 hours/day	9		4		3	
3-5 hours/day	16		18		9	
6 or more hours/day	7		7		8	

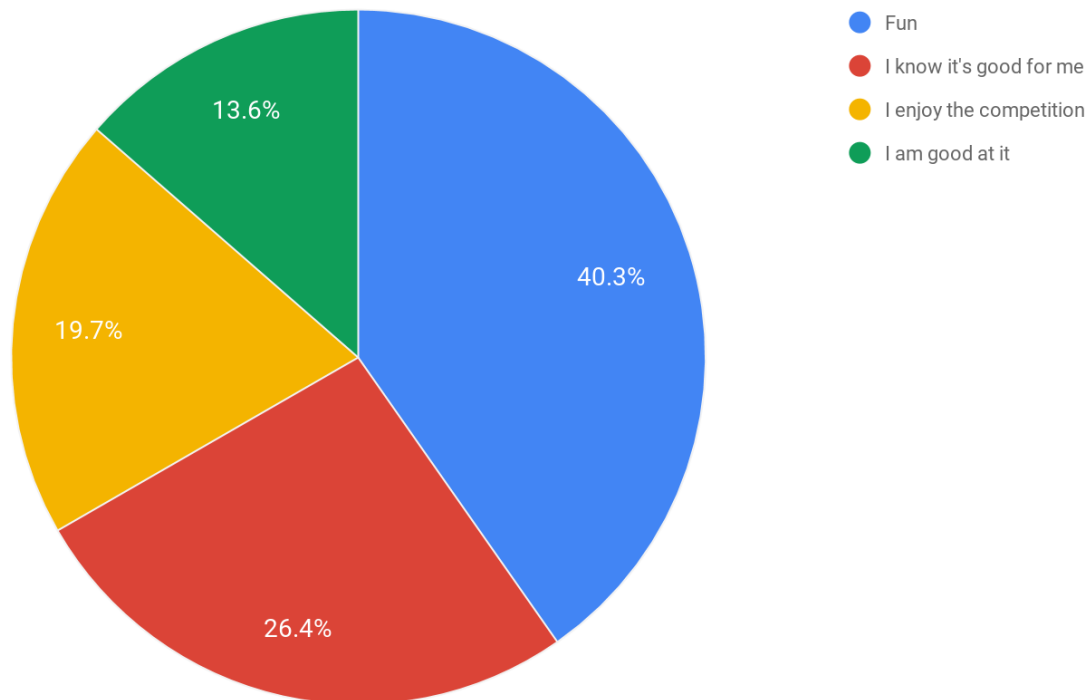
When asked who influences them to do the activities they most enjoy doing outside of school, 56.5 percent (209) respondents answered “Myself.” Friends (17.8 percent) and parents (16.2 percent) were the next two most common responses, followed by coaches or teachers (9.5 percent).

Parents can influence their children’s physical activity through role modeling (being active themselves), material support (financial, logistic, co-participation), and encouragement. According to the CDC, children whose caregivers achieve the recommended weekly total amount of physical activity of 150 minutes or more are more likely to achieve the weekly recommended amount of physical activity themselves [4]. In a study on parental support and physical activity, only 36 percent of youth reported high levels of physical activity when neither parent provided any support or modeling [5]. When one parent provided support for their child’s physical activity, this percentage increased to 56 percent, and when both parents were supportive, 70 percent of youth surveyed reported high levels of physical activity. Interestingly, research has also indicated relationships between parental role modeling and sedentary behaviors may be stronger than the relationship for physical activity [6]. Children are more likely to watch television if their parents watch television regularly [7], and television has been associated with decreased physical activity levels and higher levels of obesity [8-11].

Coaches and teachers can also influence youths’ physical activity behaviors, particularly their self-perceptions. Many teenagers will consider feedback from their coaches more heavily than encouragement from their parents when determining their competence and worth [12]. Furthermore, studies have shown learning in physical education class, as well as motivation in and outside of class, can be positively affected by teachers who present physical activities to students in an autonomous manner [13-14]. This can be achieved by providing students with more opportunities for choice in activities, as well as by providing a rationale for doing the different activities, allowing more student input in the decision-making process, and empathizing with students’ concerns [15].

Participants stated the most important reason for participating in their preferred outside of school activities (Figure 1) was because they were fun (41 percent), they like the competition (20.8 percent), or they know it’s good for them (19.7 percent). Studies of physical activity in youth have found “fun” to be an important factor that positively influences physical activity [16]. Enjoyment is one of the most effective types of intrinsic motivators for sustained participation in physical activity, though it must also be accompanied by positive feedback and opportunities for social relationships [17].

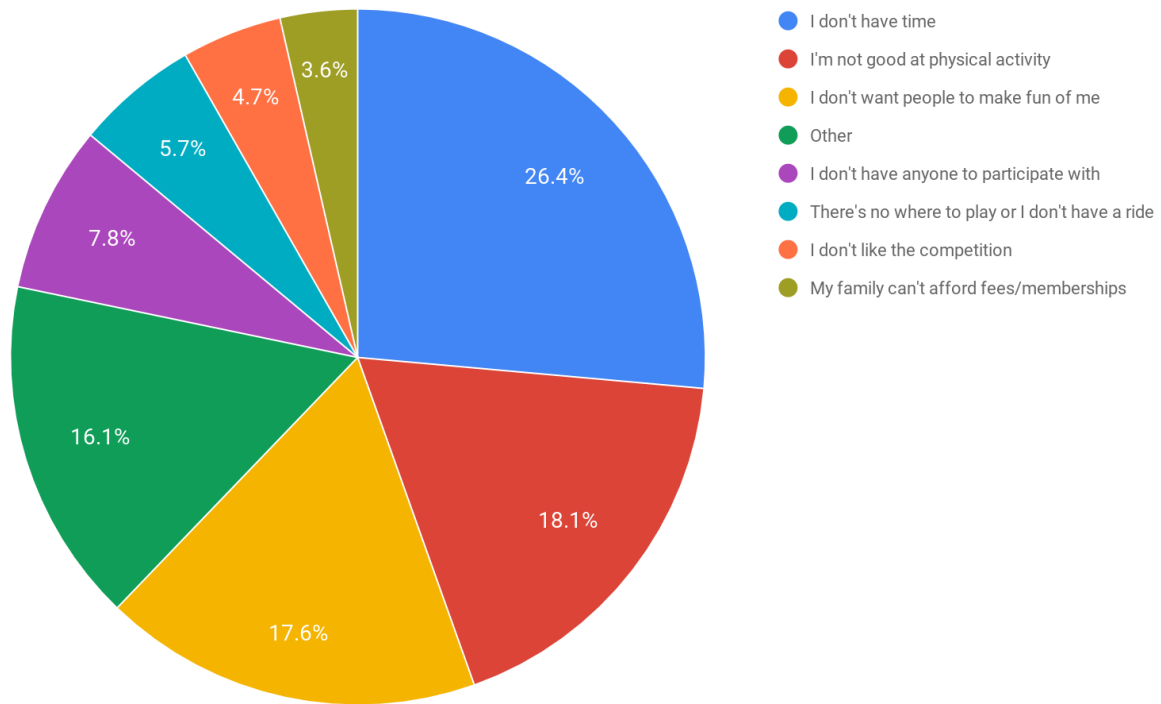
Figure 1. Factors Influencing Participation in Physical Activity



Students were also asked what prevents them from participating in physical activity. Lack of time was the most commonly cited reason (26.4 percent) for not participating in physical activity. Additional barriers to participating in physical activity were feelings of not being good enough (18.1 percent), fear of being made fun of (17.6 percent), and other (16.1 percent). This is consistent with studies in which youth reported physical activity not only needed to be fun, but competence and confidence were important for participation [16,18]. Common themes for those who provided other reasons for not participating physical activity included not enjoying physical activity, health limitations, or laziness.



Figure 2. Factors Preventing Participation in Physical Activity



In addition, youth were asked if their families participate in physical activities together, such as going hiking, walking, or bike rides. Most respondents indicated their families never or rarely participated in activities together, with 30.4 percent (112) answering never and 34.2 percent (126) answering rarely. Only 12 percent (44) respondents said their families were regularly (1-3 days per week) active together. Participating in physical activity together can foster a sense of unity within a family. This is important because parental bonding has been shown to be a strong influence on physical activity [19]. Children who have strong bonds with their parents are more likely to be physically active than those who do not have a strong relationship with their parents, and their perceptions of physical activity and its benefits are generally more positive.

To further investigate why youth may not be physically active, students were asked whether they felt their community has facilities where they can go to be physically active. Students in Anamosa were more more likely to agree with this statement than students in Midland or Monticello (Table 4), although almost half of the respondents from Monticello did feel their community provides a number of facilities for physical activity.

Table 4. Community Facilities for Physical Activity

	Anamosa		Midland		Monticello	
Agree	70	62.0%	15	27.8%	97	47.1%
Neutral	27	23.9%	22	40.7%	68	33.0%
Disagree	16	14.2%	16	29.6%	34	16.5%

Furthermore, students were also asked how they felt about the statement: “My community provides many different opportunities to be physical activity if I choose.” The majority of respondents from Anamosa and Monticello agreed with this statement, while students from Midland were more equivocal and almost as twice as likely to disagree with this statement than students from Anamosa or Monticello (Table 5).

Table 5. Community Opportunities for Physical Activity

	Anamosa		Midland		Monticello	
Agree	72	63.7%	23	42.6%	122	58.2%
Neutral	29	25.7%	19	35.2%	62	30.1%
Disagree	11	9.7%	10	18.5%	20	9.7%

The role of the built environment is important for encouraging physical activity; individuals who live closer to sidewalks, parks, and gyms are more likely to exercise [20-22]. It is crucial to consider the accessibility of sports facilities when promoting an environment conducive to physical activity or designing programs for enhancing physical activity [23]. A recent study exploring the correlation of outdoor recreation availability with physical activity and weight status in Minnesota youth examined whether the availability of recreation resources impacted the physical activity or weight of 9th and 12th grade boys and girls [24]. In the 9th grade populations, recreational land did not guarantee an improvement in the 9th grade outcomes. However, a concentration of recreational trails did significantly improve instances for increased levels of physical activity and better weight status. On the other hand, the presence of recreational trails did not produce any significant improvements for 12th grade outcomes, although the inclusion of recreational land did show significant positive trends for 12th grade girls achieving 30 minutes of physical activity five or more days of the week. These trends show the presence of recreational trails is conducive to an increase in the frequency and consistency of physical activity overall in the populations considered.

## *Nutrition*

Nutrition, as well as physical activity levels, contributes significantly to overall health and wellness. It is crucial to establish healthy eating habits during childhood and adolescence to facilitate proper growth and development, as well as to prevent certain health conditions. Healthy eating patterns include consuming a variety of fruits and vegetables, whole grains, dairy products, a variety of lean, protein rich foods, and oils. The foods we eat, and the nutrients they provide, are the most important continuing environmental factors influencing growth, development, functional abilities, and health [25]. The CDC also has reported a correlation between adequate hydration and enhanced cognitive function, which is imperative for academic success. Proper diet and nutrition has been linked to improved academic performance, reduced absenteeism, and improved mood in students.

The United States Department of Agriculture has created a food guide, MyPlate, in an effort to educate Americans on the proper foods to consume for their age and activity levels [26]. MyPlate identifies daily amounts of foods, in nutrient-dense forms, to eat from five major food groups and their subgroups. The five main food groups include fruits and veggies, whole grains, proteins, dairy, and fats. The patterns also include an allowance for oils and a limit on the maximum number of calories available for other uses, such as added sugars, solid fats, added refined starches, or alcohol. For example, females ages 14 -18 years should consume 1.5 - 2 cups (or servings) of fruit and 2.5 - 3 cups of vegetables per day depending on their activity level. Males ages 14 - 18 years should consume 2 - 2.5 cups of fruit and 3 - 4 cups of vegetables per day depending on activity level.

Although they were asked about frequency of consumption rather than servings, 31.2 percent (116) of students reported consuming fruit at least once per day, 9.9 percent (37) consumed green salad at least once per day, and 21.8 percent (81) consumed other vegetables at least once per day (Table 6). Interestingly, a greater percentage of males than females reported daily consumption of fruit (33.8 percent vs 29.3 percent), green salad (12.8 percent vs 7.2 percent), and other vegetables (24.3 percent vs 20.4 percent).

Table 6. Frequency of Consumption - Fruit, Veggies, and Soda

	Fruit		Green Salad		Other Veggies		Soda	
Did not eat/drink	26	7.0%	130	35.0%	43	11.6%	155	41.7%
1 - 3 times during the past 7 days	118	31.7%	148	39.8%	143	38.4%	133	35.8%
4- 6 times during the past 7 days	109	29.3%	53	14.3%	103	27.7%	39	10.5%
1 - 2 times PER DAY during the past 7 days	88	23.7%	28	7.5%	60	16.1%	23	6.2%
3 or more times PER DAY during the past 7 days	28	7.5%	9	2.4%	21	5.7%	20	5.4%

Of those students who reported excellent or very good health, 36.7 percent (81) ate fruit every day, 10.4 percent (23) ate green salad every day, and 27 percent (60) ate vegetables other than green salad every day.

Furthermore, of those who described their health as excellent or very good, 48.4 percent (107) stated they had not consumed any soda in the preceding seven days. In addition, female students were more likely to report not drinking any soda in the previous week (51.5 percent) as compared to male students (37.2 percent). The Harvard University College of Public Health notes people who regularly consume 1-2 sugary drinks have a 26 percent greater risk of developing type 2 diabetes than people who rarely have such drinks [27].

Table 7. Healthy Food Choices and Self-Described Health

	Excellent/V. Good		Good		Fair/Poor	
Always	30	13.6%	6	6.0%	4	7.8%
Frequently	73	33.0%	24	24.0%	6	11.8%
Sometimes	99	44.8%	62	62.0%	32	62.8%
Never	18	8.1%	7	7.0%	9	17.7%

Students at all levels of health most commonly stated they only sometimes pay attention to making healthy food choices (Table 7). Students that described themselves as having excellent or very good health reported always paying attention to the foods they eat almost twice as often as those with good, fair, or poor health. On the other hand, students that described their health as fair or poor reported never paying attention to the foods they eat more than twice as often as those who described their health as good, very good, or excellent.

*Overweight & Obesity*

Obesity has become a major global public health issue. It is associated with poorer mental health outcomes and reduced quality of life. Obesity is also associated with the leading causes of death in the U.S. and worldwide, including diabetes, heart disease, stroke, and some cancers [28]. Obesity is a complex health issue resulting from a combination of factors, including genetics, dietary patterns, physical activity, inactivity, medication use, community environment, and education. According to the National Health and Nutrition Examination Survey (NHANES), 2013 - 2014, more than 1 in 3 adults were considered to be overweight and more than 1 in 3 adults were considered to be obese [29]. Jones County has similar rates for adults. Nationally, about 1 in 6 children and adolescents ages 2 to 19 were considered to have obesity [29]; however, measuring overweight and obesity in children can be difficult since they grown at different rates at different times. There are no data available for youth overweight and obesity in Jones County.

Jones County high school students were asked how they describe their own weight, and most students described themselves as about the right weight (Table 8). However, females were almost twice as likely as males to describe themselves as slightly or very overweight.

Table 8. Self-Described Weight

	Female		Male		Transgender/Other/Not Specified	
Very overweight	12	7.2%	6	4.1%	4	6.9%
Slightly overweight	49	29.3%	22	14.9%	15	25.9%
About the right weight	90	53.9%	87	58.8%	26	44.8%
Slightly underweight	13	7.8%	29	19.6%	11	19.0%
Very underweight	3	1.8%	2	1.4%	2	3.4%

As obesity rates continue to rise, it will become more and more imperative for adolescents to have the ability to recognize signs of increased weight and the tools to improve their overall

health [30]. Education regarding healthy lifestyle choices and the promotion of physical activity will continue to be a crucial facet to improving the overall health and quality of life for youth and adolescents.

### ***Conclusion***

Physical activity and good eating habits are important aspects of a healthy lifestyle, as well as critical components of efforts to reverse the obesity epidemic.

The majority of Jones County high school students who responded to the survey describe their health as excellent (19.6 percent) or very good (39.8 percent), and the majority (65.8 percent) report getting more than one hour of physical activity on most days. It is important to note students reported a high level of self-motivation for participating in physical activity, which could help them maintain their physical activity levels over time. Furthermore, respondents stated the two most important reasons for participating in physical activity outside of school were because it was fun (37.6 percent) or because they knew it was good for them (24.6 percent). Parents, teachers, and coaches should continue to ensure physical activity is fun for youth in order to encourage lifelong participation.

The majority of respondents did not report consuming enough fruits and vegetables daily, which is similar to most Americans. Jones County Public Health should investigate strategies that can be implemented in collaboration with schools on promoting healthy eating habits among students and families to improve the dietary habits of Jones County residents. It would also be important to evaluate what programs, if any, are already in place, as well as the availability of nutritious choices and the level of knowledge youth and adults have in regards to nutrition.

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