

Adolescent Girls' Participation in Organized Sport

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ABSTRACT

PURPOSE: Physical activity has positive benefits for adolescents. This study examined moderate-vigorous physical activity (MVPA) of adolescent girls involved in organized sport. Additional analyses examined levels of MVPA for adolescents sorted by individual, team, and recreational sports.

METHODS: Participants were 13 year-old adolescents participating in the Iowa Bone Development Study (169 girls and 159 boys). Participants completed the Physical Activity Questionnaire for Adolescents (PAQ-A) and wore an ActiGraph activity monitor for at least 8 hrs/day and at least 3 days/week. Actigraph data provided an objective measure of MVPA and the PAQ-A measured the type of activity and whether the activity was organized or not. Maturity was entered as a co-variate.

RESULTS: Girls participating in organized sport were more active than their peers. The most active girls were the ones participating in multiple sports and in a variety of sports regardless if the sport was organized or not.

CONCLUSIONS: Girls appear to be dependent on sport to be physically active. These findings suggest the need to support more sport programs for girls as a means to help them achieve healthy levels of MVPA. Findings also suggest the need to help girls engage in other types of physical activities.

INTRODUCTION

- Physical activity (PA) levels appear to be higher in adolescents involved in organized sport when compared to their peers (Lanver, Roth, & Brooks-Gunn, 2009)
 - Gender differences exist in PA levels associated with organized sport
 - Girls demonstrate lower participation levels in strenuous activities (Vilhjalmsson & Kristjansdottir, 2003)
 - Girls prefer individual sports whereas boys prefer team sports (Bélanger, Gray-Donald, O'Loughlin, Paradis, & Hanley, 2009)

RESEARCH QUESTIONS

- Are girls who participate in organized sport more active than their peers?
- Are there significant differences in activity levels based on participating in individual, team, and/or recreational sports?

DATA COLLECTION METHODS

- The Iowa Bone Development Study (IBDS) is a prospective, longitudinal study examining the natural history of peak bone mass and strength.
 - Sample Size: Adolescents (13 years old): 169 girls and 159 boys
 - Organized, unorganized sport, and other active leisure activities were assessed with the (PAQ-A)
 - MVPA AMOUNT was measured using the Actigraph 7164
 - Participants were asked to wear all day for 5 d/wk including weekends
 - Maturity was measured using self-report Tanner Staging
 - Boys included to provide a comparison

STATISTICAL METHODS

- Data were examined for distribution characteristics, mean, standard deviation, and quartiles were calculated
- Activity monitor data (MVPA AMOUNT) was skewed so transgressive analysis was used to find a transformation
 - Box-Cox transformations used
- Group comparisons based on linear models with sport types as the predictor and MVPA AMOUNT as outcome
- Group comparisons performed on transformed variables using SAS GLM for non-adjusted and adjusted analyses for three groups (organized sport, sport combinations, and team sport combined with other sports)
- Age at time of accelerometry wear and Tanner staging were considered as covariates for analysis and entered if significantly associated with the outcome variables
 - Tanner stage (self report) was used for girls and age was used for boys since these variables were associated with the MVPA AMOUNT
- All data were analyzed by gender. P-value was set at 0.05.

RESULTS

Table 1 - Demographic and Physical Activity Characteristics of Participants by Gender

Variable	Mean	STD	Min	Q1	Median	Q4	Max	P-value*
Girls (n=169)								
Accelerometry age	13.13	0.28	12.60	13.00	13.10	13.30	14.50	0.2735
Height, cm	160.22	6.63	142.20	156.20	160.70	164.50	177.90	0.0063
Weight, kg	54.83	13.91	32.20	45.20	52.10	62.40	104.00	0.0869
Days between accelerometry and questionnaire date	46.67	32.24	0	17.00	45.00	69.00	120.00	0.5513
MVPA AMOUNT	15737	21243	0	2199	7430	20295	107704	0.0004
Transformed MVPA AMOUNT	9.26	3.99	1.00	6.85	9.28	11.94	18.12	<0.0001
Boys (n=159)								
Accelerometry age	13.11	0.30	12.60	13.00	13.00	13.20	14.70	
Height, cm	162.66	9.16	137.70	156.00	163.10	169.20	185.90	
Weight, kg	57.60	15.30	30.40	45.90	56.20	66.50	115.10	
Days between accelerometry and questionnaire date	44.48	34.33	0	16.00	35.00	66.00	120.00	
MVPA TIME	5.50	5.25	0	1.20	3.71	8.40	25.50	
MVPA AMOUNT	25048	25546	0	5498	16671	37587	118098	
Transformed MVPA TIME	1.56	0.81	0	0.79	1.55	2.24	3.28	
Transformed MVPA AMOUNT	11.22	3.53	1.00	8.61	11.36	13.92	18.54	

- Girls engaged in less MVPA AMOUNT than boys (P<.0001)



Table 4 - Most Frequently Reported Organized Sport by Gender

Sport	Girls		Boys	
	N	%	N	%
Running	32	18.9	35	22.0
Volleyball	32	18.9	31	19.5
Basketball	25	14.8	23	14.5
Dance	23	13.6	18	11.3
Soccer	18	10.7	17	10.7
Walking	12	7.1	12	7.5
Marching Band	8	4.7	12	7.5

- Girls are less likely to participate in running and basketball than boys
- Same percentage of girls and boys participate in organized soccer

Table 5 - Most Frequently Reported Unorganized Individual, Team, and Recreational Sports by Gender

	Individual		Team		Recreational	
	N	Percent	N	%	N	%
Girls						
Running	89	52.66	50	29.59	61	36.09
Swimming	50	29.59	47	27.81	58	34.32
Dance	39	23.08	27	15.98	27	15.98
Gymnastics	16	9.47	18	10.65	19	11.24
Boys						
Running	85	53.46	72	45.28	70	44.03
Swimming	39	24.53	70	44.03	41	25.79
Wrestling	21	13.21	23	14.47	24	15.09
Golf	14	8.81	15	9.43	23	14.47
Tennis	12	7.55	15	9.43	17	10.69

- Girls and boys tend to report the same unorganized sports as organized sports (except of marching band for girls)
- Popular recreational sports: bicycling, walking, weight lifting, and skateboarding
- More girls participate in bicycling and walking than boys



Table 2 - Maturity by Gender

Variable	Girls		Boys		P-value*
	N	%	N	%	
Name					
Tanner Stage	1	0.6	2	1.3	0.0279*
	2	1.3	30	18.9	
	3	73	43.2	57	35.8
	4	66	39.1	61	38.4
	5	16	9.5	9	5.7

- Significantly greater percentage of girls were at a higher (more mature) Tanner stage than boys (P=0.0279)

Table 3 - Distribution of Number of Organized Sport by Gender

Variable	Girls		Boys		P-value*	
Name	N	%	N	%		
At least 1 Organized Sport	no	64	37.9	50	31.4	0.2221
	yes	105	62.1	109	68.6	
Total Number of Organized Sport	0	64	37.9	50	31.4	0.1763
	1	44	26.0	44	27.7	
	2	23	13.6	38	23.9	
	3	20	11.8	17	10.7	
	4	11	6.5	9	5.7	
	5	5	3.0	1	0.6	
	6	1	0.6	0	0.0	
	7	1	0.6	0	0.0	

- There were no significant differences in the number of organized sports for girls compared to boys

Table 6 - Adjusted MVPA for Number of Organized Sport by Gender

Dependent	Overall Test for group		Organized Activity Group			p-values for comparisons				
	FValue	ProbF	Mean	0	1	>=2	0 vs 1	0 vs >=2	1 vs >=2	0 vs 1/>=2
Girls										
Adjusted MVPA AMOUNT	2.29	0.105	8.42	9.66	9.85	0.117	0.046	0.807	0.039	
Boys										
Adjusted MVPA AMOUNT	1.28	0.281	10.69	11.84	11.2	0.112	0.431	0.351	0.165	

- 0 -> no organized sport
- 1 -> 1 organized sport
- >=2 -> 2 or more organized sports
- Adjustments were for Tanner stage for girls and age for boys

Table 7 - Adjusted MVPA for Sports Combinations by Gender

Dependent	Overall Test for group		Team/Other Sport Group			p-values for comparisons				
	FValue	ProbF	Mean	0	1	2	0 vs 1	0 vs 2	1 vs 2	0 vs 1/2
Girls										
Adjusted MVPA AMOUNT	2.42	0.092	7.54	9.23	9.76	0.093	0.029	0.411	0.042	
Boys										
Adjusted MVPA AMOUNT	0.61	0.545	10.24	11.27	11.35	0.312	0.279	0.898	0.275	

- 0 -> no sport or only recreational sports reported
- 1 -> any combination of team, individual, and/or recreational sport reported
- 2 -> team, individual, and recreational sports all reported
- Adjustments were for Tanner stage for girls and age for boys
- Girls in a combination of sports had greater MVPA AMOUNT when compared to no sport or only recreational sport girls

CONCLUSION

- Girls spend less time in MVPA AMOUNT than boys. (See Table 1)
- Girls and boys participate in similar types of unorganized and organized sport. (See Tables 4 and 5)
- Girls involved in organized sport or multiple sports are more active than their peers. (See Tables 6 and 7)

IMPLICATIONS

- Sport is an important mode of physical activity for adolescent girls.
 - In our sample organized sport was more important for girls than boys.
- However, as girls age, it is more difficult to participate in organized sport due to the competitive nature of many sport programs.
 - Strategies should be developed to help girls participate in other types of physical activity (lifestyle, active transport, etc).
 - Parents should encourage their daughters to be involved in team, individual, and recreational sports.
- Policies that support equal opportunities for girls and boys to participate in sport should be enforced.
- Given the low level of MVPA in most adolescent girls, future research should examine the effect of more organized sport programs for girls.

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STRENGTHS & LIMITATIONS

- Strengths
 - Analyzed participation in different types of organized and unorganized sport
 - Considered maturity
- Limitations
 - Sample from Midwest (USA)
 - Inadequate representation of minority adolescents

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