Improving Fitness Knowledge with *Five for Life:* High School Effectiveness

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Background

- Health-related fitness knowledge (HRFK) plays an essential role in promoting physical activity among adolescents.[1-3]
  - Low levels of physical activity engagement may result from a lack of HRFK.[2]
- As such, the *National Standards & Grade-Level Outcomes for K-12 PE* include "acquisition of the knowledge to achieve and maintain a health-enhancing level of physical activity and fitness" as a primary outcome.[4]
- To improve HRFK in PE classes, effective research-based curricular must be available to physical educators.

Five for Life

Five for Life-Advanced Curriculum

- Introduces training principles.
- Instructs students on the use of behavior logs which allow students to track personal habits and how those habits affect health, performance, and fitness.
- Students design fitness plans based on their individual goals.
- One academic year in duration.

Purpose

The purpose of this analysis was to examine the growth in health-related fitness knowledge during high school years with *Five for Life* curriculum implementation.

Methods

Participants

- 9,883 high school students (49.4% female) from 40 high schools in a Mid Atlantic state.
- 15.32 ± .75 years old (14 to 20), enrolled in 9th to 11th grade.
- Ethnic/racial makeup: 14.59% Asian American, 15.90% Black/African American, 19.01% Latino/Hispanic, 45.74% White/Caucasian, 4.76% other.

Methods

Participants

Student level	Frequency	School level	M ± SD	Min	Max
Female/Male	49.4%/50.6%	FARM (%)	27.46 ± 19.59	5.00	65.00
Grade 9	39.5%	PE Student/Faculty	294.95 ± 63.28	204.80	486.20
Grade 10	49.5%	SAP	87.88 ± 6.38	75.75	95.75
Grade 11	11.0%	HRFK score (%)	74.23 ± 8.53	57.54	92.59

Note. FARM (%) = Free And Reduced Meal Percentage; PE = Physical Education; SAP = School Academic Performance (% of passing state test); HRFK = Health-related fitness knowledge.

*Only students with at least 2 data points were used in this analysis.

Methods

Student Level Variables

- Gender
- Grade
- HRFK

School Level Variables

- Free and reduced meal (FARM)
- Student faculty ration PE (S/F-PE)
- School Academic Performance (SAP)

Methods

Student Level Variables

- Gender, grade, and HRFK data collected using the online platform, Welnet®, where the knowledge test was deployed.
- 11-item HRFK test was designed specifically for the *Five for Life –Advanced* curriculum.
  - Questions were content validated through a panel of curriculum developers.
  - Student performance was based on the percentage of correct Reponses (correct items/total items).

Methods

School Level Variables

- FARM, S/F-PE, and SAP were obtained through the school report from the state department of education and school district webpages.
- For SAP, school level passing rates for reading, mathematics, science and social science for the past three years were used.
  - We competed an aggregated average passing rate for each school.

Methods

Procedures

- Participants completed the HRFK test online from 2012 to 2016 as they progressed from 9th to 11th grade.
- Age, grade level, school, and date were recorded during test.

Methods

Data Analysis

- Three-level hierarchical linear modeling (HLM)[6] was used to analyze data.
  - Level 1: Grade Level
  - Level 2: Student
  - Level 3: School

Methods

Equation 1

- $Y_{tij} = \pi_{0ij} + \pi_{1ij}\,(\text{Year})_{tij} + e_{tij}$ [1]

Equation 2

- $\pi_{0ij} = \beta_{00j} + \beta_{01j}(\text{Gender})_{ij} + r_{0ij}$ [2a]
- $\pi_{1ij} = \beta_{10j} + \beta_{11j}(\text{Gender})_{ij} + r_{1ij}$ [2b]

Equation 3

- $\beta_{00j} = \gamma_{000} + \gamma_{001}(\text{FARM})_j + \gamma_{002}(\text{SF-PE})_j + \gamma_{003}(\text{SAP})_j + u_{00j}$ [3a]
- $\beta_{01j} = \gamma_{010}$ [3b]
- $\beta_{10j} = \gamma_{100} + \gamma_{101}(\text{FARM})_j + \gamma_{102}(\text{SF-PE})_j + \gamma_{103}(\text{SAP})_j + u_{10j}$ [3c]
- $\beta_{11j} = \gamma_{110}$ [3d]

Results

- Overall mean HRFK score across of 74.23 ± 8.53 across three grade levels.

Student level	Frequency	School level	M ± SD	Min	Max
Female/Male	49.4%/50.6%	FARM (%)	27.46 ± 19.59	5.00	65.00
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Results

- Predicted HRFK score of 68.26 ± 1.32 at 9th grade, holding all other factors constant.
- SAP and S/F-PE were positive predictors, while FARM was a negative predictor of HRFK (however, all were non-significant).
- Males tended to score .25 percentage points lower than females during 9th grade, but differences were non significant ($p>.05$).

Results

- Predicted student HRFK growth was 9.14 ± 1.40 percent each year, holding other factors constant.
- FARM, SAP, and S/F-PE negatively predicted HRFK growth rate, however not significantly ($p>.05$).
- Gender significantly predicted HRFK growth rate ($p<.05$).
  - Males had a significantly lower HRFK growth rate than females from 9th to 11th grade.
  - Yielded a significant performance gap by 11th grade, even though they started almost identically in 9th grade.

Results

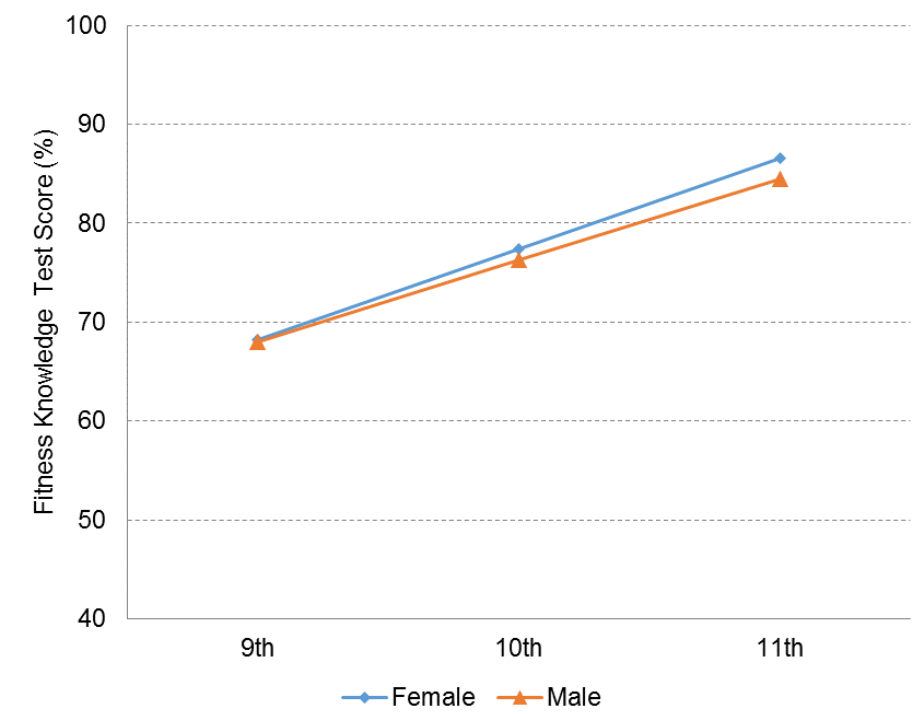

Figure 1. Predicted Health-related Fitness Knowledge Growth in High School

Discussion

Major Findings

- This analysis provides preliminary support for the effectiveness for the *Five for Life* curriculum for improving HRFK among high school-aged students.
- High school students using *Five for Life-Advanced* significantly increased their HRFK from 9th to 11th grade.
- Males reported significantly lower knowledge growth rates than females.

Discussion

Limitations

- This study is limited in several important ways:
  - No treatment fidelity procedures were undertaken, thus it is unknown what content from the curriculum was used in each of the classes.
  - No comparison group, therefore unable to determine if changes in HRFK were solely due to curriculum, or if other actors were at play.
  - Data collection procedures, and specifically the submission of scores by physical educators into an online system, opens the door for inaccurate scores to be reported.
- Because of inherent limitations in this study, additional research is needed to further understand the effectiveness of the *Five for Life* curriculum.

Thank you!

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