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.\textsuperscript{1-3}
  - Low levels of physical activity engagement may result from a lack of HRFK.\textsuperscript{2}
- As such, the \textit{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.\textsuperscript{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 9\textsuperscript{th} to 11\textsuperscript{th} 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

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

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<td>• Gender</td>
<td>• Free and reduced meal (FARM)</td>
</tr>
<tr>
<td>• Grade</td>
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</tr>
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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 responses (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
\[ Y_{tij} = \pi_{0ij} + \pi_{1ij} \text{(Year)}_{tij} + \epsilon_{tij} \]  \hspace{1cm} [1]

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

Equation 3
\[ \beta_{00j} = \gamma_{000} + \gamma_{001}(\text{FARM})_j + \gamma_{002}(\text{SF-PE})_j + \gamma_{003}(\text{SAP})_j + u_{00j} \]  \hspace{1cm} [3a]
\[ \beta_{01j} = \gamma_{010} \]  \hspace{1cm} [3b]
\[ \beta_{10j} = \gamma_{100} + \gamma_{101}(\text{FARM})_j + \gamma_{102}(\text{SF-PE})_j + \gamma_{103}(\text{SAP})_j + u_{10j} \]  \hspace{1cm} [3c]
\[ \beta_{11j} = \gamma_{110} \]  \hspace{1cm} [3d]
Results

- Overall mean HRFK score across of $74.23 \pm 8.53$ across three grade levels.

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Results

• Predicted HRFK score of $68.26 \pm 1.32$ 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 ($p>0.05$).

• Gender significantly predicted HRFK growth rate ($p<0.05$).
  • 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!

The authors wish to thank the school districts and Focused Fitness® for sharing the data for this analysis with us.

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References


