

Exploring Physical Fitness Profile of College Students Through Principal Component Analysis: A Case Study

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ABSTRACT

Universities offer lifetime physical fitness (PF) courses and organize health fairs to keep their students physically fit. Despite these efforts, only 49.9% of US students meeting the National Guidelines for physical activity, reporting low fitness levels, as evaluated by the respective scores of the five fitness components. Fitness evaluation though is a time-consuming process and students' time constrains have been postulated as reasons for lack of participation, motivation, and involvement. **PURPOSE:** Since time availability may influence students' participation in a battery of fitness testing for evaluating their PF levels, this study aimed through principal component analysis (PCA) to reduce the health-related PF components to the minimum required to assessed them in college students. **METHODS:** Students' (N=36) PF of cardiovascular endurance (i.e. Queens College-VO₂), musculoskeletal strength (i.e. handgrip-HG) and endurance (i.e. pushups-PU), flexibility (i.e. sit-and-reach-SR), and body composition (i.e bioelectrical impedance-BF) were assessed during a campus wide Health Fair. PCA was used to reduce the # of examined variables. Kaiser-Myer-Olkin (KMO) values and Bartlett's Sphericity test with Eigenvalues >1 were considered for the extraction of PCA. Varimax rotation and threshold of .7 in each PCA loading were used for correlation, differentiation, and interpretation between components. Parallel analysis was also used to verify the number of extracted components. Data analysis was performed by SPSS vs 28. **RESULTS:** From 36 students that participated in the fair, only 25% (6 Females, 3 Males) actually completed all fitness testing. For PC1, KMO was .61, p<.049. Two components were extracted; HG, VO₂, PU, BF with 60% and SR with 21% variance explained respectively. Running PCA again with SR removed this time, resulted to PC2 with KMO = .63, p<.007, yielding one component (HG, VO₂, PU) with 69% of the variance explained. **CONCLUSION:** This study confirmed the importance of musculoskeletal strength and endurance, and cardiovascular endurance for PF evaluation. Even though the sample size used in the PCA was marginally acceptable, results indicated that when examining PF in college students, instead of testing all 5 of them, for brevity 3 PF components may be used as well.