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Importance of Health Science Education for Personal Fitness Trainers

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ABSTRACT

Using a questionnaire developed for the current study, the Fitness Instructors Knowledge Assessment (FIKA©), we examined relations between commonly used indicators of knowledge (training and experience) and actual knowledge in the five areas of (a) nutrition, (b) health screening, (c) testing protocols, (d) exercise prescription, and (e) general training knowledge regarding special populations. FIKA provided reliable measures of knowledge in these areas, which are of critical importance in developing an optimal fitness program for the client and for avoiding unnecessary injuries. A survey of 115 health fitness professionals revealed that a bachelor's degree in the field of exercise science and possession of American College of Sports Medicine or the National Strength and Conditioning Association certifications as opposed to other certifications were strong predictors of a personal trainer's knowledge, whereas years of experience was not related to knowledge. These findings suggest that personal fitness trainers should have licensing requirements, such as a bachelor's degree in exercise science and certification by an organization whose criteria are extensive and widely accepted, before being allowed to practice their craft.

Key Words: personal trainers, health clubs, fitness industry, FIKA, fitness certification

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Introduction

Every day, people are bombarded with an array of enticing advertisements encouraging them to get into shape. With the recent emphasis on health and fitness, the number of health clubs within the United States reached an all-time high of 15,372 in 1999, and the number of memberships in U.S. health clubs increased to approximately 10 million by the end of the 1990s. Not surprisingly, the number of personal trainers has also grown. A recent survey found that over 62,000 personal trainers work in the United States, the mean age of personal trainers' clients was 37 years, and the mean number of sessions per client was 18 (9). However, unlike many other health professionals (e.g., doctors), personal trainers are not required by law to possess a license to practice (6). The lack of such a provision and the important health role of personal trainers raises the question, ''What are good predictors of expertise among personal trainers?''

Rupp et al. (11) stated that certification assures the client that the health fitness instructor has completed a professional training curriculum. A plethora of certifying organizations exists within the fitness industry, with each organization claiming to test knowledge, skills, and abilities that are essential for an effective fitness instructor. Past research has shown that few of the certifying organizations actually live up to this billing (2–4, 12). Some certificates are issued after relatively limited training in workshops, training that is much less comprehensive than a broad formal education. Thus, it may not be adequate for health clubs merely to require certification of its personal trainers, because not all certificates are equal.

Extensive training experience in the health and fitness profession does not necessarily translate into a knowledgeable and capable professional. Thomas et al. (12) studied the training and experience of 58 health fitness professionals in the Houston area. Most respondents had a fair amount of experience (41% had over 6 years of experience in the health fitness profession), yet 84% of these personal trainers recommended a higher percentage of protein in daily caloric intake than that advised by the U.S. Food and Drug Administration (6, 8, 13). Fuller and Harding (3) identified a set of college courses that they believed are necessary

for health fitness professionals (e.g., nutrition, physiology, exercise prescription). They found that no single course had been taken by more than 60% of the respondents in their study, and 38% of these health fitness professionals had completed none of the key courses. Similarly, Davis (2) found that only 39% of the 57 health fitness professionals in his study had degrees in the field of exercise science. However, fitness professionals who were certified by the American College of Sports Medicine (ACSM) or the National Strength and Conditioning Association (NSCA) and who had a background in exercise science or physical education performed better than individuals who were not certified by either the ACSM or NSCA on questions pertaining to exercise physiology, program design, and exercise nutrition. Thus, education may be more important than training experience for knowledge in personal trainers.

Fuller et al. (4) assessed possible relations among formal education, type of certifying organization, and level of knowledge. The researchers identified 13 core courses that they considered important in preparation as a personal trainer: (a) anatomy (human); (b) biochemistry; (c) biomechanics; (d) care and prevention of athletic injuries; (e) exercise physiology; (f) exercise prescription; (g) exercise testing; (h) fitness programming; (i) nutrition; (j) nutrition, exercise, and weight control; (k) physiology (human); (l) sports medicine; and (m) weight training. They found that individuals certified by ACSM or NSCA, as well as individuals working in rehabilitation, had completed an average of 74% ($n = 9$) of these core courses. Over 80% of this subsample had completed at least 3 or more of the core courses. Fitness knowledge was highest among ACSM-certified trainers and individuals working in rehabilitation, whereas the NSCA-certified trainers were most knowledgeable in the area of strength training.

In a previous study of 110 health clubs within Massachusetts, McInnis et al. (10) found that only 34% of clubs ($n = 37$) had staff entirely composed of individuals who possessed bachelor's degrees. They also found that 74% of clubs ($n = 82$) did not require a physician's consent before exercise for men over 40 or for women over 50 years old (10). This lack of screening is in direct violation of the ACSM's guideline for exercise prescription (1). Other researchers have found that only 3% of personal trainers followed ACSM guidelines for prescribing aerobic exercise to their clients (12).

A solid understanding of nutrition, health screening, testing protocols, exercise prescription, and knowledge regarding special populations (e.g., individuals with hypertension) is of critical importance in developing an optimal fitness program for clients. The Fitness Instructors Knowledge Assessment (FIKA©) was developed for this study to provide measures of knowledge in these areas. The purpose of this study was to examine the strength of the relations between years of professional fitness, training experience, education, and professional certification credentials and actual fitness training knowledge as determined via the FIKA questionnaire. On the basis of past research, we hypothesized that (a) number of years participants have worked as a health fitness professional would not be associated with performance on the 5 scales of the FIKA questionnaire, (b) participants with a bachelor's degree or higher in Exercise Science would score higher on all sections of the FIKA questionnaire than those without such a degree, (c) participants who have completed more core courses would score higher than those who have completed fewer core courses, and (d) participants with ACSM or NSCA certifications would score higher on all sections of FIKA than those with other certifications.

Methods

Experimental Design

All participants completed an 8-page questionnaire, which included the FIKA, designed by the authors of this study. The first page of the assessment packet contained background questions, whereas the remaining 7 pages contained questions that assessed the knowledge, skills, and abilities of the health fitness professional. The researchers contacted each of 12 fitness-certifying organizations, and requested a description of topics covered on each organization's health fitness instructor certification examination. All certifying organizations that were contacted complied with this request. Using this knowledge, the researchers developed a set of questions that tested knowledge of the health fitness professional in the 5 specific areas outlined above, without bias toward any particular certifying organization. Although past surveys used 15 or fewer questions, the researchers believed that a longer survey would provide a better measure of the participants' knowledge base.

In phase 1, a set of 55 multiple-choice questions was generated by one of the authors, who has taught courses in exercise science since 1988. The 55 questions were given to a group of health fitness professionals, graduate students in exercise science, and exercise physiologists who were asked to sort each question into 1 of 5 categories: (a) nutrition (e.g., ''Protein should contribute no more than _____% of the total daily caloric input for an average individual?''); (b) health screening (e.g., ''In order to have a positive risk factor for ''age'' the client must be _____?''); (c) testing protocols (e.g., ''When administering the Sit and Reach test, the client should _____?''); (d) exercise prescription (e.g., ''What intensity of exercise is most appropriate to develop a cardiovascular benefit in an apparently healthy individual?''); and (e) treatment of

Table 1. Proportion of correct responses and reliability for each knowledge domain on fitness instructors knowledge assessment (FIKA©).

FIKA© scale	Number of questions	Cronbach's α	Percentage correct	*SD*
Nutrition	9	0.72	46	0.25
Health screening	9	0.57	53	0.21
Testing protocols	11	0.64	48	0.17
Exercise prescription	10	0.63	41	0.23
Special populations	9	0.71	26	0.22
Overall	48	0.90	43	0.18

special populations (e.g., ''Which of the following exercise prescriptions would you recommend to a non-insulin-dependent diabetes mellitus [NIDDM] client?''). The order of these categories does not necessarily reflect our evaluation of their merit.

If a question was consistently placed into a given category, it was retained; if not, it was omitted. Of the 55 questions initially generated, 52 were consistently placed into the appropriate categories. In phase 2, the refined list of 52 questions was given to a different group of fitness professionals, graduate students in exercise science, and exercise physiologists to ensure clarity, accuracy, and content validity. Between 9 and 11 questions were retained for each category to produce the final 48 questions used in the questionnaire (see Table 1). Reliability (as indexed by Cronbach's α) ranged from 0.57 to 0.72 for the individual subscales, and attained 0.90 for the overall scale.

Experimental Procedures

The health fitness professionals in the current study were employed in four environments: (a) independent gyms or proprietorships, (b) large fitness chains, (c) colleges, and (d) self-employed. The study was approved by the Institutional Review Board for the Protection of Human Subjects before contact with the health clubs.

Initial contact with the manager of each facility was made by telephone. The researcher introduced himself as a student and informed the manager that he was compiling a profile of individuals working in the health fitness industry by means of a questionnaire. The questionnaire was administered over a 4-month period during the fall of 1999 and the winter of 2000 and was either given in person or left with the health club manager to distribute to employees. The latter option was implemented with most health clubs. Participants were assured both verbally and in written form (i.e., on the questionnaire itself) that all responses would be kept strictly anonymous and that no individual's name or health club affiliation would be collected. The researcher obtained informed consent from the respondents before administering the questionnaire. The respondents were told to answer each question to the best of their abilities and not to use any resource materials. They were told that there was 1 question that required mathematical computation, but that a calculator would not be needed because the numbers were all factors of 10. This information was also written on the FIKA survey next to that question.

For surveys administered in person, respondents were told to ask the researcher if a question arose and the researcher would answer the question to the best of his abilities, without compromising the survey. Once subjects finished the questionnaire, they were asked to place the survey into an envelope and then to seal the envelope. The researcher collected the envelopes, thanked the respondents for their time and cooperation, and exited the facility.

When the FIKA questionnaires were given to the health club manager to administer, a script was provided to each manager to read to the participants. The health fitness professionals were told, in the script that their manager read to them, that the survey was not to be taken outside of the health club premises and that they were not to use any resource materials. The researchers allowed 4 weeks for the manager to complete the data collection. If the manager requested additional time, one extra week was granted.

Participants

Participants were 115 health fitness professionals (61 men and 54 women), ages 20 to 54 (mean = 30.1 years, *SD* = 7.8 years), from the Inland Empire area of southern California. This area encompasses the eastern part of Los Angeles County, the western part of San Bernardino County, and the northwestern part of Riverside County, and consists of approximately 3 million people in 130 cities, ranging from very small to metropolitan. Thirty-three health clubs were identified in the target area. Each was contacted, and 28 facilities (85%) agreed to participate in the study.

Statistical Analyses

To test each of the 4 hypotheses, a two-tailed *t*-test was conducted to compare the relevant group means specified in each hypothesis. When appropriate, we present group means and standard deviations (*SD*) for relevant

Table 2. Demographic characteristics of the sample used.

Work setting	*n*	Occupation	*n*	Highest degree held	*n*
Independent health club	46	Fitness instructor	95	None	68
Corporate-owned health club	46	Fitness supervisor	15	A.A.	12
Self-employed	20	Fitness technician	1	B.A.*	31
College facility	3	Certified athletic trainer	3	M.A.	3
		Other	1		

* Most of these individuals (n = 22) held their degrees in Exercise Science.

Table 3. Percentage correct on 5 knowledge scales and overall for key predictors.

	5+ y experience		Bachelor's degree or higher in kinesiology		4 or more core courses		ACSM or NSCA certification	
FIKA©† scale	yes (n = 42)	no (n = 73)	yes (n = 22)	no (n = 93)	yes (n = 68)	no (n = 47)	yes (n = 11)	no (n = 104)
Nutrition	0.48	0.44	0.76***	0.39	0.67***	0.38	0.94***	0.41
Health screening	0.52	0.54	0.74***	0.48	0.70***	0.47	0.89***	0.49
Testing protocols	0.47	0.48	0.65***	0.44	0.59***	0.44	0.75***	0.45
Exercise prescription	0.45	0.37	0.70***	0.33	0.65***	0.31	0.86***	0.35
Special populations	0.29	0.24	0.56***	0.19	0.46***	0.19	0.73***	0.21
Overall	0.44	0.42	0.68***	0.37	0.61***	0.36	0.83***	0.38

† FIKA = fitness instructors knowledge assessment.
***$p < 0.001$; n = 115; significance tests compare yes vs. no.

groups. To predict the variance in overall knowledge scores that can be explained by the 4 main factors identified in our hypotheses, we conducted a linear regression of the 4 factors onto overall FIKA score. For this analysis, we presented the variance accounted for (R^2) and an F-test of the significance of the regression equation. To assess the unique contribution of each predictor, we calculated and tested the beta weight (β) of each predictor. Finally, to assess the strength of the relations between individual predictor variables, we report the relevant correlation coefficients (r). The α level for statistical significance of each statistical test was set at 0.05.

Results

As seen in Table 2, the majority of the 115 participants worked in either independently owned or corporate-owned health clubs. The vast majority of participants were fitness instructors, and most respondents had no college degree.

Table 3 displays results for analyses addressing each of the 4 hypotheses. Our first hypothesis was that the number of years that a participant had worked as a health fitness professional would not be associated with performance on the 5 scales of the FIKA questionnaire. Experience ranged from 0.2 years to 18.0 years (mean = 3.0, SD = 3.7). As predicted, the number of years individuals had worked as a health fitness professional was unrelated to scores on any of the 5 FIKA scales or overall. Fitness professionals with 5 or more years of experience had no greater knowledge than those with fewer years of experience (see Table 3).

As predicted in our second hypothesis, individuals with at least a bachelor's degree in exercise science scored higher on all FIKA scales, and overall, than individuals who did not hold a bachelor's degree in exercise science (see Table 3).

Our third hypothesis was that participants who had completed more core courses, as identified by Fuller et al. (4), would score higher on all FIKA scales than those who had completed fewer core courses. Participants completed between 0 and 12 of the 13 core courses (mean = 2.0, SD = 3.3). As predicted, individuals who had completed 4 or more core courses scored higher on all scales, and overall (see Table 3).

Our fourth hypothesis was that participants with ACSM or NSCA certifications would score higher on all FIKA scales than those without 1 of these certifications. Of the 115 respondents, 10 held certification

Table 4. Correlations and linear regression weights of 4 predictors of overall knowledge on the fitness instructors knowledge assessment questionnaire (FIKA@).†

Predictor variable	*r*	Final β
Five or more years of work experience	0.07	−0.03
B.A. or higher in exercise science	0.68***	0.18*
Four or more core courses	0.62***	0.30***
ACSM or NSCA certification	0.73***	0.51***

† F (4, 110) = 56.7, $p < 0.001$, and $R^2 = 0.67$ for this model.
* $p < 0.05$; *** $p < 0.001$; $n = 115$.

from only ACSM or only NSCA and 100 were certified by one or more other organizations but not by ACSM or NSCA; 1 was certified by ASCM, NSCA, and one other organization; and 4 held no certification. As predicted, respondents holding a certificate from either ASCM or NSCA scored higher on all scales, and overall (see Table 3).

Finally, we used the 4 predictor variables in a regression model to predict participants' performance on the FIKA questionnaire. As can be seen in Table 4, 3 of these 4 variables were strongly correlated with overall knowledge: (a) having a bachelor's degree in exercise science, (b) having taken 4 or more core courses, and (c) having an ACSM or NSCA certification. Years of experience was not related to knowledge. When all 4 predictors were entered into a regression model, 67% of the variance in fitness knowledge was accounted for [$R^2 = .67$, F (4,110) = 56.7, $p < 0.001$]. Having a bachelor's degree in exercise science made only a small unique contribution to predicting knowledge (beta = .18, $p < 0.05$). This may be due to the fact that having a bachelor's degree is substantially correlated both with having completed 4 or more courses in exercise science [r (115) = 0.70, $p < 0.001$] and with having an ACSM or NSCA certification [r (115) = 0.40, $p < 0.001$].

A regression model with only the 2 best predictors of overall knowledge (having a bachelor's degree in exercise science and having an ACSM or NSCA certification) explained the data nearly as well as the model with all 4 predictors [$R^2 = 0.63$, F (2,112) = 94.0, $p < 0.001$].

Discussion

The findings of this study address a number of issues raised by the ACSM Code of Ethics (7). The health fitness professional, by definition, is a professional who uses an individualized approach to assess, motivate, educate, and train clients regarding their health and fitness needs. However, to realize these objectives, the personal trainer must have a strong foundation in exercise science. This can best be accomplished through formal education. The fact that an individual has worked for years as a personal trainer or has met a minimum standard for passing a certification exam should not be misconstrued as proof of competence in designing a safe and optimal fitness program. As such, using years of experience as a barometer of the capabilities of potential hires in the health fitness industry may need to be reconsidered. Although many in the health fitness industry believe that practical experience is key, the results of this study show that formal education is a far better predictor of personal trainers' health fitness knowledge than years of experience. In addition, when it comes to certifying organizations, all certificates are not created equal. Certification by ACSM or NSCA was associated with much higher levels of health fitness knowledge than certification by any other certifying organization, or even certifications from several other certifying organizations.

Most certifying organizations do not require a personal trainer candidate to possess a college degree, or even to have completed college courses in exercise science. In fact, many organizations promote 7-day or weekend workshops in preparation for their examination. It seems unlikely that an individual will learn even the basics of this discipline in such a short time. Perhaps, in an effort to bring more credibility to the profession, certifying organizations should require a minimal number of core college-level courses completed, as identified by Fuller et al. (4), for their personal trainer certification. At McGill University's athletic department, in Quebec, Canada, a 14-week course that covers topics in anatomy, biomechanics, exercise physiology, exercise design and analysis, injury prevention, nutrition, and weight training has been offered to those who want to pursue a career in personal training; perhaps such a program should be implemented by 2- or 4-year colleges throughout the United States.

Practical Applications

Individuals seeking the assistance of personal trainers deserve to have a health fitness professional who possesses a proper level of knowledge, skills, and abilities in exercise science to design a safe, injury-free, and optimal fitness program. The results of the current study suggest that a person or health fitness club seeking to hire a personal trainer would do well to ask 2 key questions: (a) ''Do you have a college degree in exercise science?''; (b) ''Are you certified by ACSM or NSCA?'' In our sample, respondents who answered 'yes' to both of these questions scored an average of 85% on the FIKA questionnaire, compared with only 36% for those who answered 'no' to both questions, and 55% for those who answered 'yes' to only 1 of the

2 questions. These findings suggest that personal fitness trainers should have requirements such as a bachelor's degree in exercise science and certification by an organization whose criteria are extensive and widely accepted.

In 1994, California Assembly member Vivian Bronshavag (D-Haywood) proposed a bill that would require fitness instructors in California to pass an examination issued by the state to train clients (5). However, given a lack of statistical data (e.g., injury rates) and lack of support from professional associations (e.g., ACSM) on the effectiveness such a measure might have, the proposed bill was defeated.

Many other health-related professionals (e.g., nutritionists, certified athletic trainers) are required to earn a degree that imparts necessary health-related knowledge and an appropriately rigorous certification before practicing their craft. It is the authors' contention that such standards should be given serious consideration for personal fitness trainers as well. In recent years, the number of lawsuits brought forth as a result of alleged negligence on the part of fitness professionals has dramatically risen. Inadequate screening and premature certification of unqualified candidates can expose both health clubs and certifying organizations to liability should clients suffer injuries due to the negligence of an unqualified personal fitness trainer. Thus, it is in the best interest of all parties involved—clients, personal trainers, health clubs, certifying organizations, and society as a whole—to implement standards that may reduce the incidence of such injuries and the resulting legal entanglements.

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