Review of Related Literature

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REVIEW OF RELATED LITERATURE
The researcher has made every effort to obtain literature related to the problem and a brief account of the review of the studies relevant to the problem has been presented in this chapter.

The literature pertaining to Health Related Physical Fitness Knowledge Test has been abstracted in this chapter to provide the background material to evaluate the study as well as to interpret its findings. Till today, majority of fitness knowledge tests, which have been developed, do not have any standardised measures. In fact, very few physical fitness knowledge tests have been developed for either children or adolescents.

Adams (2006) conducted a study to determine the immediate and long-term effectiveness of a university level conceptually based Health Related Fitness course on Health Related Fitness Knowledge. 277 students in Group I represented students that had never taken and/ or were not currently enrolled in the required CBHR course. Group 2 consisted of students currently completing the course. Group 3 through 6 were grouped according to the number of weeks or years that had passed since they completed the required course. Group 3 represented students currently enrolled in school between 1
and 52 weeks post course completion. Similarly, Group 4 and 5 represented students enrolled either 53 to 104 or 105-156 weeks post course completion, respectively. Group 6 represented students currently enrolled and who completed the concept course of 157 or more weeks prior to their participation in the study. An eighty item, multiple-choice test was used to determine HRF knowledge. One way Anova was used to determine significant differences between groups in HRF knowledge. Significant differences were found between group I and all other groups and group 2 and all other groups. No mean differences were found between group 3 through 6. Results of this study suggest students develop an above average level of HRF knowledge immediately following completion of a university level CBHR fitness course. Besides, it was concluded that students retain and present for a minimum of four years, significantly higher levels of HRF knowledge than students that had never taken or completed a university level HBHR fitness course.

Ziccardi et. al (2004) conducted a study to describe college students’ knowledge of osteoporosis, health beliefs regarding osteoporosis, self-efficacy to perform osteoporosis-preventing activities, and actual performance of osteoporosis-preventing activities. This descriptive study used a survey method and the participants completed a questionnaire consisting of the Osteoporosis Preventing Behaviours Survey, the Osteoporosis Knowledge Test, the Osteoporosis Health Belief Scale and the Osteoporosis Self-Efficacy
One-hundred and ninety-four nursing students acted as subjects (86 sophomore students and 108 senior students). Senior students were more knowledgeable about osteoporosis than sophomore students and were more confident about performing osteoporosis-preventing behaviours. There were no significant differences between the groups regarding their health beliefs about osteoporosis, their performance of weight-bearing exercise, dietary calcium intake or intake of caffeinated products. These results may be useful in examining the curricula at nursing colleges as well as investigating methods of helping novice nurses, as health promoters, to make lifestyle changes. This, in turn, may lead to behaviours to prevent osteoporosis in themselves and those for whom they provide care.

Rasanen et. al (2004) conducted a study to assess the impact of nutrition counseling given to 7.5- to 9-year old children and their parents on children's nutrition knowledge and nutrient intakes. The subjects were participants in a prospective, randomised STRIP study (Special Turku Coronary Risk Factor Intervention Project for Children), whose aim was to decrease the intakes of saturated fat and cholesterol while increasing the intake of unsaturated fat in the intervention children from the age of 7 months onwards. Nutrition counseling was given only to the parents until the child's age has become 7 years. Nutrition knowledge and nutrient intakes (total energy, total fat, saturated fat, unsaturated fat and sodium) were studied in a time-restricted cohort of 47, 7-year old intervention and 51 control children.
Thereafter, nutrition counseling was given both to the children and parents. Children's nutrition knowledge and nutrient intakes were measured again at the age of 9 year. Biannual nutrition counseling were given to the intervention children and the parents maintaining the differences in saturated fatty acid intake attained during the intervention given to the parents alone (11.5 vs 13.3 E% (percent of energy intake), at the age of 7 year, P < 0.01; 11.1 vs 13.4 E% at the age of 9 year, respectively; P < 0.01). The intervention children used more polyunsaturated fatty acids at the age of 9 year than the control children (5.7 vs 5.1 E%, P = 0.05). At 7 year, the intervention and control children had similar nutrition knowledge scores (total knowledge score 12.9 vs 12.0, respectively, P = 0.13). After 1.5 year of nutrition intervention, at 9 year, the intervention children's nutrition knowledge was higher than that of the controls (total nutrition score 16.5 vs 13.2, respectively, P < 0.001) and the ability to explain the reasons for their picture choices in the nutrition knowledge test had increased. This study showed that only a relatively short period of counseling with low input is needed to increase in children's nutrition knowledge and ability to explain nutrition-related subjects if advice has first been given to the parents and if the parents have received reinforcement and concrete help with parent-child communication after their children have been involved in the counseling. The differences attained in nutrient intake could also be maintained.
Lee et al. (2004) assesses the reliability and validity of a geriatrics knowledge test designed for medical students. A total of 343 (86% of those sampled) medical students participated in the initial study, including 137 (76%) first-year, 163 (96%) third-year, and 43 (86% of those sampled) fourth-year students in the 2000-2001 academic year. To cross-validate the instrument, another 165 (92%) third-year and 137 (76%) first-year students participated in the study in the 2001-2002 academic year. An 18-item geriatrics knowledge test was developed. The items were selected from a pool of 23 items. An established instrument assessing the clinical skills of medical students was included in the validation procedure. The instrument demonstrated good reliability (Cronbach [alpha] = 0.80) and concurrent validity. Geriatrics knowledge scores increased progressively with the higher level of medical training (mean percentage correct = 31.3, 65.3, and 66.5 for the first-year, third-year, and fourth-year classes, respectively, P < .001). A significant (P < .01) relationship was found between the third-year students' geriatrics knowledge and their clinical skills. Similar results, except the relationship between knowledge and clinical skills, were found in the cross-validation study, supporting the reliability and known-groups validity of the test. The average scores of the student groups indicated substantial room for growth. The relationship between geriatrics knowledge and overall clinical skills needs further investigation.
Beier (2003) conducted studies on ten areas of health knowledge in 2 studies, 1 of college students (N = 169) and 1 of adults from the community (ages 19-70; N = 176). The measures assessed were knowledge of aging, orthopedic/dermatological concerns, common illnesses, childhood/early life, serious illnesses, mental health, nutrition, reproduction, safety and treatment of illness/disease. Significant gender differences favouring women were found for most areas of health knowledge, especially reproduction and early life. Results showed that cognitive ability accounted for the most variance in health knowledge with notability (personality and interest traits) and demographic variables accounting for smaller but significant amounts of variance across most knowledge domains.

Avans (2003) conducted a study to determine pre course knowledge of basic fitness principles of both major and non kinesiology major students. A difference was assessed through a 35-question test and the Data was analysed using frequency data, two sample t test, and pair wise comparisons (LSD). General demographic data included gender ethnicity, classification and age. The results indicate significant difference in knowledge between the non-majors and kinesiology major students (t 238 = 2.95). Kinesiology major answered more questions correctly. For the non-majors, 37% of the questions were answered incorrectly by over 75% of the respondents. The categories having the most incorrect answers by the highest percentages of respondents were body composition and cardiovascular endurance. All three questions
addressing supplements and their relation to either muscular strength or body composition were answered incorrectly by over 90% of the respondents. There was significant difference with regard to all of the questions that the non major group answered incorrectly when compared to the majors. It was concluded that student's knowledge of fitness principles is extremely poor. Knowledge leaned heavily towards the myths of exercise as for the majors, most were early in their programme (75%), so knowledge from other classes were limited. Their increase in knowledge could be due to a greater general interest in fitness and this is of interest with regard to the effectiveness of a kinesiology programme and the importance of a required, general education programme.

Susan (2002) conducted a study on instructional variables and high school students' knowledge and conceptions of Health Related Fitness. Primary data sources included a self-report survey designed to measure variables relating to the instruction of personal fitness and a written test used to assess student's knowledge of Health Related Fitness concepts. Analysis revealed significant findings relating to both instruction and learning. Instructional issues that may impact student knowledge and conceptions of fitness included limited space and textbooks, emphasis on participation as a tool to assess knowledge of fitness concepts and teachers' inaccurate conceptions of several FITT principles. Student knowledge and conceptions of health related fitness were found to be narrow, vague and often incorrect.
Problematic areas included the concept of specificity, goal setting and application of FITT principles, particularly the concept of intensity. The majority of students had problems applying basic principles to a real-life situation. Practical applications to Physical Education include a shift from low-order objectives such as memorization of terms and concepts to higher-order objectives such as problem solving and transfer to real-life situations. With the ultimate goal of increasing life time physical activity among our students, findings such as this may provide the framework necessary to create new and creative way of teaching for learning and transfer to the real world.

Julie (2002) investigated the effects of an eight week fitness curriculum on fitness knowledge, fitness test score, attitude and self-efficacy towards physical activity of fifth grade children. Seventy-eight (n = 78) fifth grade students enrolled in four classes and their regular Physical Education teachers at two local elementary schools in Lowndes County, Georgia participated in this study. The children's Physical Activity Attitude and self-efficacy survey was used to assess the participant's attitude and self-efficacy belief towards physical activity participation. A modified version of the super kids superfit knowledge test was used to assess student knowledge of the health related components of physical fitness. Fitness Gram, a nationally recognized health related activity assessment and computerized reporting system were used to conduct the physical fitness tests. An additional instrument, the system for observing fitness Instruction Time (SOFIT) was
used to verify the content of instruction, teacher involvement and student behavior within the Physical Education setting. Students within the intervention school participated in twenty four lessons which focused on specific fitness outcomes that were designed to improve student's attitude towards physical activity, increase student knowledge of fitness and improve the five components of fitness. The results of the independent sample t-test on the children's physical activity attitude & self-efficacy survey indicate the contribution of the intervention to the explained variance was minimal and not statistically significant. Although there was no statistical significance there are some indications of greater improvement in attitude, self-efficacy, and some physical measures in the intervention group.

Gregory (2002) conducted a study on the differences in physical activity, fitness knowledge and obesity in secondary Physical Education and substitute Physical Education students in Texas, America. 310 students participated in the study from a suburban high school in South Texas. The variables investigated were differences in physical activity level, health and fitness knowledge and body mass. Analysis was done to determine the differences by gender, ethnicity and grade level. Substitute Physical Education students had higher physical activity level than Physical Education students probably due to a high percentage of athletes in the substitute Physical Education sample. Physical Education students had significantly higher health related and fitness knowledge than substitute Physical
Education students and the Physical Education students continued to maintain higher health and fitness knowledge as they graduated to higher grade levels. Lastly, Physical Education students had significantly lower body mass index than substitute Physical Education students.

Wei et. al. (2001) discussed relevant problems in knowledge tests in order to improve the scientific quality of the tests in PE departments and institutes and to enrich the teaching and research contents in "Sports Measurement and Evaluation". The results indicated that in knowledge tests classical measurement theory is obviously disadvantageous, but item response theory is advantageous and has its broad prospect in application, based on reference materials of classic measurement theory and item response theory at home and abroad.

Berthouze & Aranda (2001) examined the validity of PAQAP a physical activity (PA) questionnaire, designed to provide a complete picture of the subject's regular PA and allows to measure his daily energy expenditure. This software has been made from a reliable method (QAPSE). A study was conducted on voluntary healthy males and females of various level of PA in order to test this software. This proved the validity of the PAQAP because of its strong relationship with the original method. By permitting to quantify energy expenditure or PA of subjects and/or
populations, this method showed it's usefulness in many areas such as research, sport and health.

Joan (2001) conducted a study to examine the impact of a web-based versus face-to-face instructional format of a lifetime fitness course on student’s wellness knowledge, attitudes and behaviors and levels of Health Related Physical Fitness. Subjects of this study were 48 self-selected volunteers enrolled in two sections, one web-based (n=18) and one face-to-face (n=30), of lifetime fitness at an NCAA, Division II University in the Midwest region of the United States. Data were analyzed at .01 level of significance using analysis of variance (ANOVA). Results of the study indicated a significant difference for wellness knowledge and behavior for both the web-based and face-to-face courses. Both groups improved their mean scores from pre-to post-test. No significant difference was indicated for wellness attitude for either course. Significant differences from pre to post-test were indicated in several areas of Health Related Physical Fitness for both groups. No significant differences were found among the two selected groups for any of the variables tested with the exception of the stress subscale for knowledge, bench press and sit and reach. Both the web-based and face-to-face instructional formats had a positive impact on students wellness knowledge and behaviour and levels of Health Related Physical Fitness. Results of this study seem to suggest that either a web-based or a face-to-face instructional format is a viable method of delivery for the lifetime fitness
Melony (2000) conducted a study to determine the effect of a female physical educator's physical appearance on the cognitive performance of junior high school students on a test of Health Related Fitness Knowledge. This study also attempted to determine if a female physical educator's physical appearance affected student attitudes toward the instructor. The study was designed to investigate the students' attitudes over a six-week period in order to determine if the physical educator's appearance had an effect over longer periods of exposure.

Following informed consent, ninety-three, 12 to 16 year old, seventh through ninth grade students participated in this study. A female Physical Educator taught a six-week instructional course on Health Related Fitness Knowledge to two randomly selected Physical Education classes from two junior high schools in North-East, Arkansas. The Physical Educator handled each class three times a week (Monday, Wednesday and Friday) for a 60-minute period. In both classes the instruction were identical. The only difference between the two classes was the female Physical Educator's physical appearance. At one junior high school, the instructor remained her normal body size (non-obese condition). For this group, the instructor was classified as having recommended weight and appeared physically fit. At the second junior high school, the Physical Education class was taught by the
same instructor; however, she wore an under garment to present an image of an obese Physical Educator (obese condition). For this group, the instructor was classified as being obese and appeared physically unfit.

A health related fitness examination was administered to the students in a pre test and post test format. Additionally, student attitudes toward the physical educator were assessed. A student attitude questionnaire (SAQ), which included 8 items and required responses on a 5-point Likert scale was administered to the students on three occasions during the 6-week instructional period (week one, week three and week six).

Post test means were compared between groups with the pre test scores which was used as a covariate. After satisfying the pre test score assumption of homogeneity for both groups, $F_{(1, 87)} = .336 \ p = .564$, a significant group x post test score interaction existed, $F_{(1, 88)} = 4.408 \ p = .039$. SAQ sums were analyzed for all participants and no significant group x time interaction was found. However, an SAQ sum score do indicated main effect was found to exist, Wilks' & Lambda; = .789, $F_{(2, 75)} = 10.056, \ p= .000$. Paired t-tests showed that significant differences existed between all combinations of SAQ mean scores, except for the values of week one to week three, which demonstrated a trend toward being significant $p= .053$). Within group paired t-tests were computed for the SAQ to detect if any differences existed independent of group. Analysis revealed significant differences in attitudes
occurred between the weeks one and three and one and six, for the non-obese condition $t (32) = -3.323, p= .002$; $t (32) = -3.800, p= .001$). Likewise, for the obese condition significant difference occurred between weeks one and six $t (44) = -2.517, p= .016$.

Rolfhus et. al (1999) developed twenty academic knowledge tests locate domain knowledge within a nomological network of traits. Spatial, numerical and verbal aptitude measures and personality and interest measures were administered to 141 undergraduates. Domain knowledge factored along curricular lines; a general knowledge factor accounted for about half of knowledge variance. Domain knowledge exhibited positive relations with general intelligence (g), verbal abilities after g was removed, Openness, Typical Intellectual engagement and specific vocational interests. Spatial and numerical abilities were unrelated to knowledge beyond g. Extraversion was found related negatively to all knowledge domains. Results also provide broad support for R. B. Cattell's (1971/1987) crystallized intelligence as something more than verbal abilities and specific support for P. L. Ackerman's (1996) intelligence-as-process, personality, interests, and intelligence-as-knowledge theory of adult intelligence.

Hart (1998) conducted a study to explore the student-athlete perceptions of National Collegiate Athletic Association (NCAA). These perceptions were identified through a sample of student athletes at a division I
NCAA member institution. A sample consisted of 70 student athletes who participated in the study by filling out a questionnaire regarding their knowledge and beliefs about NCAA. The evolution of NCAA has been influenced by outside forces such as; the media, corporate sponsorship and individuals, who have not always held the best interest of the student-athlete. Today, there is very little attention to student-athlete perceptions because they don't have a say in the rules and regulations created for them and mandated by the NCAA. The purpose of this study was to identify student-athlete attitudes and how their beliefs are influenced. Results show, student-athletes with greater knowledge of NCAA had a negative attitude towards NCAA while, those with less knowledge had a positive attitude towards NCAA. Negative perceptions came from (1) student-athletes having a bad experience in programs governed by NCAA; (2) financial hardships with athletic-scholarships and; (3) a fundamental belief that NCAA is crooked. Student-athletes that had positive beliefs felt their experiences as governed by NCAA were good. The positive attitude group believed NCAA rules and regulations were fair and impartial which benefited student-athletes and college sports. Implications for perceptions of student-athletes are necessary to bridge the gap between student-athlete involvement out of the playing arena and into the policy-making arena of NCAA.

Brett (1997) conducted a study on the effects of a physical fitness concepts curriculum on attitude, knowledge and fitness levels on Ninth-Grade
Physical Education students in Mexico. The study involved 424 ninth-grade Physical Education students in Albuquerque, NM, enrolled in either a traditional Physical Education curriculum (n=204) or a physical fitness concepts curriculum (n = 220). The hypotheses of the study were that involvement in a physical fitness concepts curriculum would have significantly positive effect on 9th grade students with regard to three objectives. (1) Attitude toward Physical Education (2) conceptual knowledge of physical fitness concepts and (3) physical fitness level attained. Results were obtained through ANOVA with attendance as the covariant. The dependent variables were assessed by attitude scale, written test of conceptual knowledge and AAHPERD physical Test. The first two objectives were significantly affected by the physical fitness concepts curriculum. A significantly greater post test flexibility mean was found for the concepts group, while there were no significant differences between the groups and the other fitness variables measured (cardio respiratory endurance, body composition and muscular endurance). The overall results are significant in those students who reported more positive attitudes and greater conceptual knowledge from involvement in the concepts curriculum.

Michael (1996) conducted a study to determine the physical fitness knowledge of physical educators. Eight groups participated in this study. There were 14 block one students, 17 block three students, 12 block five students, 11 block seven students, 10 basic instruction Physical Education
graduate students. There were 23 inservice physical educators (11 elementary physical educators and 12 secondary physical educators) apart from 11 exercise physiology master degree students. A forty question multiple choice test covering the domains of body composition, flexibility, muscular strength, muscular endurance and cardiovascular conditioning were administered to all the participants. Total scores for the test revealed that there were significant differences between the groups $F_{(7, 90)} = 9.830, p < 0.0000$. There were significant differences in the scores for the five domains: body composition $F_{(7, 90)} = 8.213, p < 0.0001$; flexibility $F_{(7, 90)} = 2.117, p < 0.0496$; muscular strength $F_{(7, 90)} = 5.593, p < 0.00$; muscular endurance $F_{(7, 90)} = 3.779, p < 0.0012$; and cardiovascular conditioning $F_{(7, 90)} = 2.709, p < 0.0135$. Scores indicated that all groups except the exercise physiology master's students (83%) and Physical Education graduate students (72%) had below average scores for the test. The data showed a trend between educational levels and scores ($z = 3.057$), as the educational level increased for the preservice groups so did the scores on the test.

Deborah (1995) conducted a study to determine if the objectives of Physical Education could be more effectively accomplished through a skill-related activity program, a self-directed activity program or a fitness-related activity program during a 12 week program. In addition, the purpose was to determine the lifestyle changes as a result of the long-term maintenance of the student's fitness level. The focus of this study was an attempt to improve
physical fitness, knowledge and lifestyle measures within the context of a single curriculum experience.

One hundred fifty-seven ninth-grade subjects from a public high school in Columbus, Georgia were pre-tested on five components of physical fitness, knowledge and lifestyle. Forty-seven subjects were assigned to the skill-related activities program, forty-eight to the self-directed activities program, and sixty-two to the fitness-related activities program. After the 12-week period, a post test was administered to the students utilizing the same instruments. A follow-up test on the same instruments was also given approximately three months later.

The data were analyzed via a 3 x 3 (Program x Test) Analysis of Variance with repeated measures as the second factor. Statistical analysis indicated a significant time of test effect for knowledge, lifestyle appraisal, skin fold measurements, one-mile run/walk, sit-ups, sit and reach and pull-ups. The main effects for program and Program x Test interaction effects were not significant for all seven dependent variables. Results of the study led to the conclusion that changes in knowledge, lifestyle and physical fitness components were not a function of the type of instructional programs.

Beeson (1993) conducted a study to: 1) evaluate health knowledge competencies, 2) assess health skills and 3) determine interrelationships among health knowledge, health skills and self-reported behavioural
demographic variables for Oregon entry-level college freshmen who had graduated from Oregon schools. An instrument, the 'Health Education Survey,' was developed with the assistance of two Delphi panels, consisting of (1) nationally known health educators and (2) recognized Oregon health educators. The first panel contributed to the health knowledge competency part of the survey, including issues of community health, consumer health, environmental health, family life, mental and emotional health, injury prevention and safety, nutrition, personal health, prevention and control of disease and substance use and abuse. The second panel contributed to the health skills part of the survey, including safe living, stressor/risk-taking management, physical fitness and nutrition, as defined by the Oregon Department of Education. Based on health information derived from the first two parts, the third survey section considered various demographic and behavioural variables, including substance use, eating habits and physical fitness. The data derived from administration of the survey were evaluated by criterion-referenced and empirical (analysis of variance, t-test, chi-square) measurements at.05 level of significance. Data analysis disclosed that: 1) the subjects did not meet the 85(percent) mastery standard for criterion-referenced measures for any of the health knowledge competencies or essential health skills; 2) there were significant differences among the subjects for the content areas of consumer health and the health skills of safe-living, physical fitness and nutrition, as well as the behavioural areas of marijuana
use, fitness level and wearing auto seat belts; and 3) gender differences existed for the content areas of family life and nutrition. From analysis of the research findings, it was recommended that there is a need for additional collaboration among secondary school health educators, education and health agencies and an appropriate higher education personnel to improve the health knowledge and skill needs of Oregon students. It was suggested that cooperative efforts at the secondary and university level to form coordinated, on-going evaluation and research projects would be one means to achieve this goal.

Merkle (1993) conducted a study on student knowledge of health and fitness concepts and its relation to locus of control. An analysis of health awareness among students indicates that students who were educated specially in health and related affairs and who obtained high scores in the health locus of control (HLC) questionnaire were not confident of their personal physical fitness. Other students who were not aware of several health aspects and who scored low in the HLC questionnaire had more confidence in their physical fitness.

Bakke, (1992) conducted a study to develop an interpretive program of nineteenth century American children's games and to examine the participants' knowledge and satisfaction attained as a result of participation in the program. The rationale for the development of this program was to allay
the misconception that nineteenth century Americans had no time to involve themselves in leisure activities. A one and one-half hour program was developed and presented to elementary students, university students and senior adults. The program consisted of three major components: 1) presentation of events which affected urban, rural, and native American nineteenth century games; 2) a demonstration of four games which were played by rural, urban and native Americans' and 3) an opportunity for participants to play three of the games which were presented. Prior to implementation of the program, a pre-test was given to evaluate the participants' knowledge of nineteenth century childrens’ games. A post presentation knowledge test was taken to determine the amount of change in knowledge level. These two knowledge tests consisted of 11, true/false questions developed from the presentation material. After the presentation, each participant was asked to complete a revised version of the Physical Activity Satisfaction Scale (Hupp, in press), regarding their satisfaction with the interpretive program. This instrument composed of 18 items which the participant rated on a five point Likert-type scale. The results of the study indicate that the interpretive games program had a significant effect on knowledge gain of the participants in the elementary group. The college group knowledge scores approached significance at the .05 level. All groups evaluated in the interpretive program reported the experience as satisfying. Elementary females scored significantly higher satisfaction levels than did the
elementary males. Finally, a low, positive association was found between program satisfaction and change in knowledge scores for the elementary subject group.

Janet (1992) conducted a study on the effect of nutrition and physical fitness lesson on fifth-grade students knowledge. A quasi experimental study was conducted to determine if nutrition and physical fitness lessons increased nutrition and physical fitness scores of fifth grade students. Twenty-eight fifth grade students received 30-45 minutes of nutrition and physical fitness lessons twice a week for 6 weeks. A nutrition and physical fitness post test was administered to compare differences in test scores. Results indicated a statistically significant difference on both nutrition and physical fitness post tests of the students who received the lessons.

Zawadzka (1991) conducted a study to evaluate current health and hygiene knowledge among school-age children and to identify the factors determining their cognizance of these matters. The article reports two fold investigation (so-called panel research), conducted on the selected sample of children (total n=5989, aged 7-15), which tackled those problems at first in 1983 and then a follow-up study was carried out in 1986. The knowledge tests, applied to inquiry, were adequate to progressiveness of a school education program (separate for each of the school grades). Results from both surveys showed that the pupils' knowledge on this subject had been becoming
relatively poorer with reaching the upper school stages. The younger children knew more about health and hygiene than older ones. Decrease of cognizance was assessed in about 15 per cent (with regard to the difference of levels of a Health Education program assigned to the different age groups). As the main sources of health knowledge were recognized as home, school, medical service and mass media. The harmonious cooperation of these four "institutions" in playing the health-related educational role is suggested.

Mott (1991) investigated the effectiveness of a personalized fitness module on knowledge, attitude and cardiovascular endurance of fifth grade students. The effectiveness of a personalized fitness module was compared to a traditional fitness unit, both of which were designed to develop knowledge, behaviour skills, fitness and positive attitude. 95 students in grade 5 and from intact Physical Education I health classes within two public schools participated in a seven week cardiovascular fitness programme. The experimental group of 48 participated in the personalized and non-competitive fitness module. The control group of 47 participated in the traditional unit, a teacher - centered fitness module. Students received a total of fourteen 55 minutes lessons over seven weeks. Pre and post test measurements included the super kids - super fit knowledge test, the Children's Attitude toward Physical Activity Inventory, and the one mile run/walk. Data were analyzed using group mean gain scores on eight dependent variables [Knowledge, six subscales of attitude and one mile
run/walk) followed by a multivariate analysis of variance. A significant difference between groups led to a discriminant function analysis as a post hoc test. Findings indicated that the use of the personalized unit can substantially improve one mile run/walk time. The use of modules of this type in Health and Physical Education programmes may promote life long exercise patterns and fitness.

Moore (1990) investigated the relationship of knowledge, attitudes and prevalence of steroid use among athletes and non-athletes. The subjects were 116 males and 106 females, who completed a questionnaire on knowledge, attitude and prevalence of steroid use. The median age for this group was 24 years old. In all, 23 percent of the sample reported use. Users were significantly more knowledgeable than non-users, and their attitude toward use was, as expected more positive. A moderate, significant correlation (r=.48, p is less than .001) was found between attitude and knowledge. In other words, the more individuals knew about steroids, the more favourable was their attitude towards their use. As expected, in this sample more athletes (32.5 percent) than non-athletes (1.5 percent) reported use (Chi-Square = 24.54, p is less than .001), and almost all (98 percent) of the users could be classified as athletes. Among male athletes, 35 percent reported use as only 10 percent of female athletes used. Power-lifters and body-builders were found to be more likely to use than non-lifters and non-body-builders.
Laurie (1988) conducted a study on the knowledge retained, cardiovascular fitness and skin fold measurements of college females before and after a physical fitness course. Ninety-four female college students were involved in physical education classes during the fall and winter quarters. Forty-seven subjects served as the control group enrolled in a physical education course other than physical fitness, and 47 subjects served as the experimental group enrolled in physical fitness course. Fitness knowledge, skin fold measurements, and cardiovascular fitness of each subject was measured at the beginning and end of the course. The data were subjected to an analysis of variance to determine if there were significant differences in mean gains between the experimental and control groups, the winter and fall academic quarters and the morning and afternoon classes. Results revealed significance for knowledge gained for the fitness group, the afternoon group, and the winter quarter group. Results also revealed no difference in skin fold measurements between any of the groups except the fall quarter group. There was also no difference between any of the groups in cardiovascular fitness.

Betty (1987) conducted a study to determine the immediate effect of a slide; tape programme in concepts of physical education at the Chapman elementary school in Chapman, Kansas. More specifically, it was the study of the effect of knowledge of fitness and physical activity and attitude toward physical activity. The 257 students were divided into a primary level, grade 1, 2 and 3; and an intermediate level, grade 4, 5 and 6. The research design
used was a Solomon four-test design. Students in the treatment group received a slide; tape programme on the concepts of physical education, during a four week period. Students in the non-treatment group received a slide; tape programme on different sport. A two-way analysis was conducted on the knowledge index for the primary level and a two way analysis was conducted on the knowledge index at the intermediate level to determine if any overall effect had occurred during the treatment. A significant difference in knowledge between the students who received the treatment and students who did not receive the treatment was observed, as measured by multiple choice test scores. A significant difference in attitude was observed in those who were given the treatment and those who were not. A significant difference in attitude was observed in those who are in different grade levels.

Wilson-Rolayne (1984) conducted a study to construct a pictorial paper-and-pencil physical fitness knowledge test for first graders based on the content contained in the AAHPERD (1981), Basic Stuff with a focus on the Exercise Physiology component of the series. The procedure for developing a physical fitness knowledge test for first graders involved construction of a two-way table of specifications delineating test content from Basic Stuff and utilization of a cognitive taxonomy from the Educational Testing Service. The pilot studies consisted of 15 test items. The first pilot study analysis indicated that the test did not discriminate well as the test for the second pilot study had three pictorial choices rather than two. The test was administered to 73 first-
The Kuder-Richardson Formula 20 yielded a reliability coefficient of .38 on the first pilot study and .40 on the second pilot study. Flanagan's method of item analysis was used to determine statistical validity of the 15 test items. Items meeting the criterion for acceptance were retained, while the remaining items were discarded or revised.

The final instrument contained 30 test items. The content areas remained the same from the pilot studies. Three cognitive levels reflected Piaget's theory of cognitive development on the table of specifications. A cognitive jury and an exercise physiology jury to establish content validity evaluated the test items.

The final instrument was administered to 215 first-graders in North Carolina in May, 1983. Statistical validity was established using Flanagan's Item Analysis. Functioning of the test item choices, difficulty rating, and discrimination were determined. Twenty-one items met the statistical criteria in all three areas. The Kuder-Richardson Formula 20 yielded a reliability coefficient of .41. The Rasch Analysis calibrated the item difficulty of the 30 items. Using the criterion suggested by Rentz Rentz (1978) and Canner Lenke (1978), the items that fit the Rasch Model were considered "good".

Rolayne (1984) conducted a study to construct a pictorial paper and pencil physical fitness knowledge test for first graders based on the content contained in the AAHPERD basic stuff with a focus on the exercise
physiology component of the series, and to establish reliability and validity of the instrument. The procedure for developing a physical fitness knowledge test for first graders involved construction of a two-way table of specifications delineating test content from basic stuff and utilization of a cognitive taxonomy from the educational testing service. The pilot studies consisted of 15 test items. The first pilot study analysis indicated that the test did not discriminate well as the test for the second pilot study had three pictorial choices rather than two. The test was administered to 73 first graders. Flangan's method of item analysis was used to determine statistical validity of the 15 test items. Items meeting the criterion for acceptance were retained, while the remaining items were discarded or revised. The final instrument contained 30 test items. The content areas remained the same from the pilot studies. Three cognitive levels reflected Piaget's theory of cognitive development on the table of specifications. The test items were evaluated by a cognitive jury and an exercise physiology jury to establish content validity. The final instrument was administered to 215 first-graders. Statistical validity was established using Flangan's. Item Analysis Functioning of the test item choices difficulty rating, and discrimination were determined. Twenty-one items met the statistical criteria in all three areas. The Kuder-Richardson formula 20 yielded a reliability coefficient of .41. The Rasch Analysis calibrated the item difficulty of the 30 items. Using the criterion suggested by
Rentz Rentz (1978) and canner Lenke (1978), the items fit the Rasch model and were considered "good".

Mood in (1971) designed a test to measure the college Physical Education major's knowledge of fitness. Two separate 60-item forms were developed. Responses from a sample of 4161 Physical Education major of 157 colleges and universities were used for developing the two forms. Mood also reported that mean test scores on a sample of college students increased with an increase in the number of credits taken in the Physical Education course.

In the late 1960's, several physical fitness knowledge tests (Kahnert, 1969; Mowen, 1968; Wade, 1968) were developed: The test used by Kahnert test was intended for college-age males, ages seventeen to twenty-seven; Mowen’s test was developed for high school boys for grades from nine through twelve; and Wade's tests were developed for college age students. Neither the tests by Mowen (1968) nor Wade (1968) included reliability information. Further, no validity information was reported for any of these three tests.