

## **A Confirmatory Factor Analysis of Physical, Nutritional and Social Wellness Construct of Health Related Lifestyle in Physical Education Teachers**

**Mamta Bajaj\***

\*Research Scholar, Shri Venkateshwara University, Gajraula, Amroha (Uttar Pradesh)  
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### **Abstract**

**Background:** To determine the reliability and validity of items related to physical, social and nutritional wellness.

**Methods:** The sample consisted of 100 male and female physical education teachers ( Primary, secondary and degree college teachers) working in Uttar Pradesh in which male teachers constituted the major portion of the study (65%) with an average age of 35.01 years. The items of physical , nutritional and social was taken from the life style assessment inventory (LSAI, 1994). Participants responded on five point summated rating scale “Yes/always, Often, Once, Rarely, No/never”.

**Results:** Alpha coefficients of the selected items was greater than .70. The composite reliability (CR) of each constructs was more than 0.7 as well as greater than the average variance extracted. Further, average variance extracted (AVE) was greater than .50 which shows the convergent validity of the constructs.

**Keywords:** Validity, Reliability, Physical, etc

### **INTRODUCTION**

Better health is central to human happiness and well-being. It also makes an important contribution to economic progress, as healthy populations live longer, are more productive, and save more. Many factors influence health status and a country's ability to provide quality health services for its people. It is estimated that globally 1.9 million of death is taking place due to lack of physical activity. Regular participation in physical activity can reduce the risk of different diseases especially diabetes and other heard diseases. Insufficient physical activity is 1 of the 10 leading risk factors for death worldwide. Globally, 1 in 4 adults is not active enough (WHO). Exercise is also known to reduce pain perception and improve mental health and quality of life (Paley CA, Johnson MI, 2015). WHO, also state that “when Good nutrition combined with regular physical activity a good health can be achieved. Poor nutrition can lead to reduced immunity, increased susceptibility to disease, impaired physical and mental development, and reduced productivity.” Poorer eating habits as well as less physical activity were associated with the risk of obesity(Vilchis-Gil J, Galván-Portillo M, Klünder-Klünder M, Cruz M, Flores-Huerta S.2015).Measurement validity addresses how accurately the instrument measures the outcome or construct your intervention is attempting to affect. In this context, an instrument is valid if it actually measures what you intend it to measure (National center for technology innovation). The process of developing and validating an instrument is in large part focused on reducing error in the measurement process(Carole L. Kimberlin and almut G.Winterstein). Thus, in the present study attempt has been made to validate the items of physical activity and nutritional wellness in the teachers of physical education.

### **Objective of the Study**

To determine the reliability and validity of items related to physical and nutritional wellness.

### **PROCEDURE AND METHODOLGY:**

- 1. Participants:** The sample consisted of 100 male and female physical education teachers (Primary, secondary and degree college teachers) working in Uttar Pradesh in which male teachers constituted the major portion of the study (65%) with an average age of 35.01 years.
- 2. Measure:** The items of physical, nutritional and social was taken from the life style assessment inventory (LSAI, 1994). Participants responded on five point summated rating scale "Yes/always, Often, Once, Rarely, No/never".

### **PHYSICAL COMPONENT**

P1: I exercise aerobically at least three times per week for 20 minutes or more. P2: When participating in physical activities, I include stretching and flexibility exercises. P3: I include warm-up and cool-down periods when participating in vigorous activities. P4: I engage in resistance-type exercises at least two times per week. P5: My physical fitness level is excellent for my age. P6: My body composition is appropriate for gender (men 10%-18% body fat; women 18%-25%). P7: I have appropriate medical check-ups regularly and am able to talk to my doctor and ask questions that concern me. P8: I keep my immunizations up-to-date. P9: I keep up with the medical history of close relatives. P10: I keep records of the time, date and results of medical tests. **Nutritional Assessment:** N1: I eat at least 3 to 5 servings of vegetables and 2 to 4 servings of fruits each day. N2: My daily diet includes at least 6 to 11 servings from the bread, cereal, rice and pasta food group. N3: I limit my daily intake of dairy products to 2 to 3 servings. N4: My daily intake of meats, eggs and nuts is 2 to 3 servings. N5: I make a conscious effort to choose or prepare foods low in saturated fat. N6: When purchasing a food item, I read the labels to identify foods high in salt, hidden sugars, tropical oils, and saturated fat. N7: I avoid adding salt to my food without first tasting it. N8: I avoid eating unless I'm hungry. N9: I stop eating before feeling completely full. N10: I avoid binge eating. **Social Wellness Assessment:** S.1: I have at least one person in whom I can confide. S.2: I have a good relationship with my family. S.3: I have friends at work or school with whom I gain support and talk with regularly. S.4: I am involved in school activities. S.5: I am involved in my community. S.6: I do something for fun and just for myself at least once a week. S.7: I am able to develop close, intimate relationships. S.8: I engage in activities that contribute to the environment. S.9: I am interested in the views, opinions, activities, and accomplishments of others.

- 3. Data analysis:** Confirmatory Factor Analysis (CFA) is the next step after exploratory factor analysis to determine the factor structure of our dataset. In the EFA we *explore* the factor structure (how the variables relate and group based on inter-variable correlations); in the CFA we *confirm* the factor structure we extracted in the EFA (statwiki.org). Confirmatory factor analysis (CFA), using AMOS 22 (trial version), was first applied to evaluate adequacy of the measurement items that connect to corresponding latent variables simultaneously.

### **RESULTS AND DISCUSSIONS**

Data collected was analyzed through a series of validated tools and procedures. The critical step involved in the development of a measurement scale is the assessment of the reliability of constructs. The factor analysis of the collected data was conducted next. Further, confirmatory factor analysis was performed in order to confirm the findings. The results of the analysis are described in the following sub-sections.

The reliability of items was assessed by computing the coefficient alpha (Cronbach, 1951), that measures the internal consistency of the items. For a measure to be acceptable, coefficient alpha should be above 0.7. Table 4, 5 and 6 shows that the selected items all alpha coefficients were greater than .70.

**Table-1: Exploratory Factor Analysis of Physical Wellness Component**

| Kaiser-Meyer-Olkin Measure of Sampling Adequacy and | Bartlett's Test of Sphericity                 | P1            | P2   | P3   | P4   | P5   | P6   | P7   | P8   | P9   | P10  | Total Variance explained (%) | Cronbach Alpha |
|---|---|---------------|------|------|------|------|------|------|------|------|------|------------------------------|----------------|
|   |   | Communalities |      |      |      |      |      |      |      |      |      |                              | 40.049         |
| .613  | Approx. Chi-Square 540.559, df 45, Sig. .000. | .513          | .005 | .704 | .713 | .570 | .357 | .020 | .373 | .179 | .571 | 65.175                       | .860           |
| .766  | Approx. Chi-Square 260.041, df 10, Sig. .000  | .550          |      | .726 | .712 | .661 | -    | -    | -    | -    | .610 |                              |                |

Factor analysis was applied on the ten items in order to identify which component were more contributing in nature. The Kaiser-Meyer-Olkin(KMO) Measuring Sampling Adequacy statistics (.613) indicates that the sample is adequate and the p value of Bartlett's Test of Sphericity statistics (0.000) indicates that the correlation matrix of the variable considered in the study is not an identity matrix. This indicate that the factor analysis can be done on the data. The results indicate that the communalities of P1, P3, P4, P5 and P10 was greater than .50 and the total variance explained of all the items were 40.049% with an internal consistency of .480. Thus, only those items were retained whose communalities were greater than .50 and other were removed. In the second stage, the items like P1, P3, P4, P5 and P10 were once again check through data reduction procedure and it was found that the total variance explained was 65.175% with an internal consistency (Cronbach Alpha) of .860. Thus, for further study only five items were retained .

**Table-2: Exploratory Factor Analysis of Social Wellness**

| Kaiser-Meyer-Olkin Measure of Sampling Adequacy and | Bartlett's Test of Sphericity                 | Communalities |      |      |      |      |      |      |      |      |      | Total Variance explained (%) | Cronbach Alpha |
|---|---|---------------|------|------|------|------|------|------|------|------|------|------------------------------|----------------|
|   |   | N1            | N2   | N3   | N4   | N5   | N6   | N7   | N8   | N9   | N10  |                              |                |
| .584  | Approx. Chi-Square 502.152, df 45, Sig. .000. | .500          | .004 | .699 | .711 | .577 | .307 | .021 | .363 | .152 | .574 | 39.088                       | .487           |
| .790  | Approx. Chi-Square .46290, df 10, Sig. .000   | .532          |      | .715 | .715 | .664 | -    | -    | -    | -    | .612 | 64.735                       | .858           |

Factor analysis was applied on the ten items in order to identify which component were more contributing in nature. The Kaiser-Meyer-Olkin(KMO) Measuring Sampling Adequacy statistics (.584) indicates that the sample is adequate and the p value of Bartlett's Test of Sphericity statistics (0.000) indicates that the correlation matrix of the variable considered in the study is not an identity matrix. This indicate that the factor analysis can be done on the data. The results indicate that the communalities of N1, N3, N4, N5 and N10 was greater than .50 and the total variance explained of all the items were 39.088% with an internal consistency of .487. Thus, only those items were retained whose communalities were greater than .50 and other were removed. In the second stage, the items like N1, N3, N4, N5 and N10 were once again check through data reduction procedure and it was found that the total variance explained was 64.735% with an internal consistency (Cronbach Alpha) of .858. Thus, for further study only five items were retained .

**Table-3: Exploratory Factor Analysis of Nutritional Wellness Component**

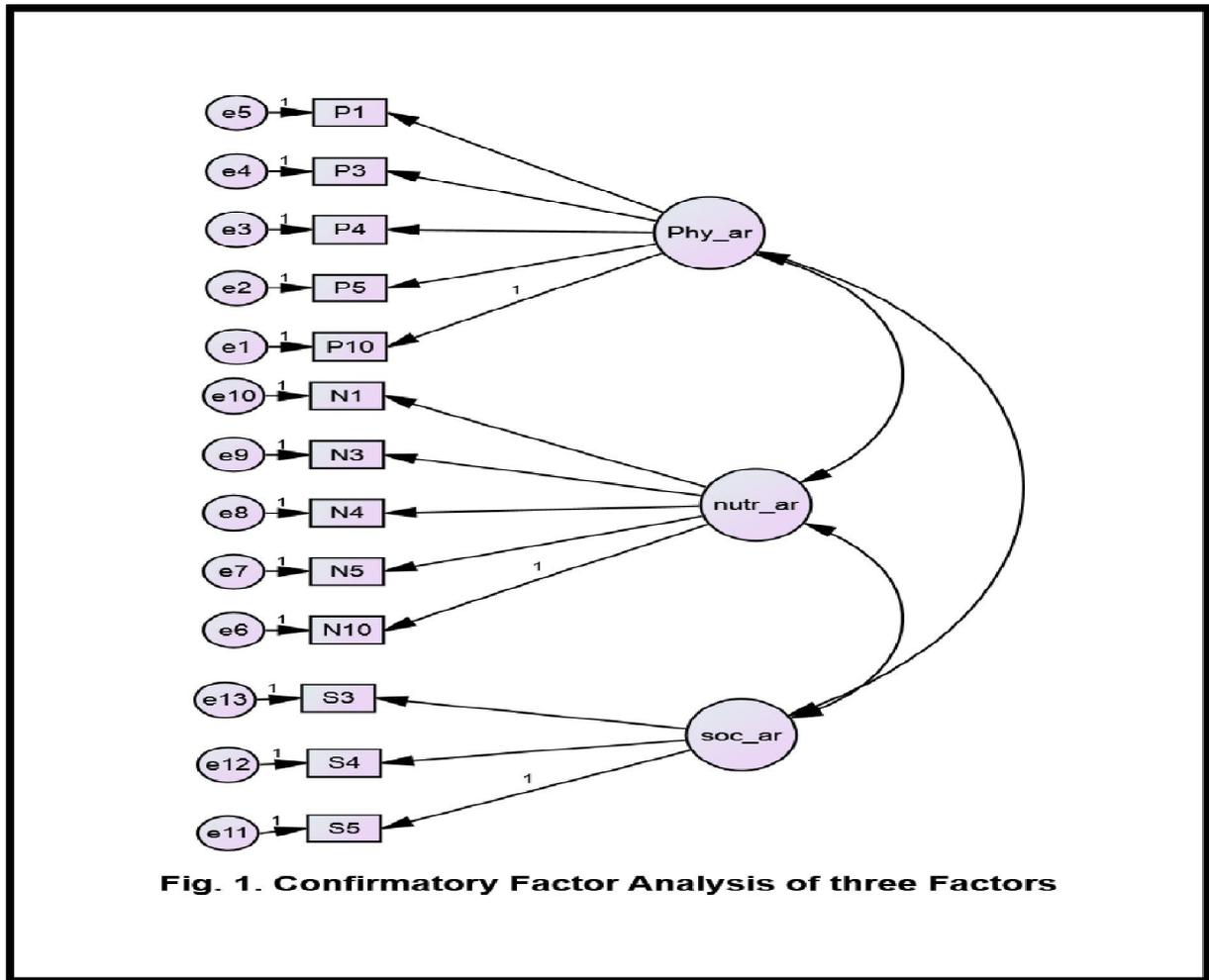
| Kaiser-Meyer-Olkin Measure of Sampling Adequacy and | Bartlett's Test of Sphericity                 | S1            | S2   | S3   | S4   | S5   | S6   | S7   | S8   | S9   | Total Variance explained (%) | Cronbach Alpha |
|---|---|---------------|------|------|------|------|------|------|------|------|------------------------------|----------------|
|   |   | Communalities |      |      |      |      |      |      |      |      |                              |                |
| .481  | Approx. Chi-Square 438.695, df 36, Sig. .000. | .164          | .006 | .893 | .676 | .789 | .098 | .002 | .129 | .336 | 34.380                       | .561           |
| .668  | Approx. Chi-Square .218.392, df 3, Sig. .000  | -             | -    | .918 | .767 | .820 | -    | -    | -    | -    | 83.512                       | .897           |

The Kaiser-Meyer-Olkin(KMO) Measuring Sampling Adequacy statistics (.481) indicates that the sample is adequate and the p value of Bartlett's Test of Sphericity statistics (0.000) indicates that the correlation matrix of the variable considered in the study is not an identity matrix. This indicate that the factor analysis can be done on the data. The results indicate that the communalities of S3, S4, and S5 was greater than .50 and the total variance explained of all the items were 34.380 % with an internal consistency of .561. Thus, only those items were retained whose communalities were greater than .50 and other were removed. In the second stage, the items like S3, S4, and S5 were once again check through data reduction procedure and it was found that the total variance explained was 83.512% with an internal consistency (Cronbach Alpha) of .897. Thus, for further study only three items were retained .

**Table:4 Convergent Validity**

| Construct            | Critical Ratio | Average Variance extracted |
|----------------------|----------------|----------------------------|
| Physical Wellness    | 0.808          | 0.570                      |
| Nutritional Wellness | 0.798          | 0.559                      |
| Social Wellness      | 0.907          | 0.768                      |

The above table reveals that the composite reliability (CR) of each constructs is more than 0.7 as well as greater than the average variance extracted. Further, average variance extracted (AVE) was greater than .50 which shows the convergent validity of the constructs.



**Fig. 1. Confirmatory Factor Analysis of three Factors**

### Discussion of Findings

Now-a-days physical education is gaining more popularity because the people are becoming more and more conscious about their physical fitness and the result is that we saw a large number of physical fitness centers through the country specially the metros. Although these centers are imparting knowledge in this field but majority of them are working just as business centers and nothing else.

Kelly(1955) in 1955 developed a personal construct theory which describes that rather than telling us what to think, tells us how to go about understanding what we think. According to Kelly, construing is not thinking or feeling but rather it is a process of discrimination taking place at any level of awareness, from verbal to intuitive thought, so that we may anticipate future events. Rebecca A. Zakrajsek & Sam J. Zizzi (Athletic insight website) made the first attempt at developing an instrument measuring coaches' attitudes toward sport psychology modified from Martin, Kellmann, Lavallee, and Page's (2002) Sport Psychology Attitudes-Revised (SPA-R) form. The Sport Psychology Attitude-Revised Coaches (SPA-RC) form was developed and examined through exploratory factor analysis (EFA) procedures. Results also showed initial support for the exploratory model, accounting for 38% of the total variance, with confidence (34%) as the most significant predictor of coaches' intentions, followed by stigma tolerance (3%), and expectations of the process (1%). Jones, Neuman et. al.(2001) The current study extends existing sport psychology research by developing a more comprehensive athlete attitudinal survey—the Sports Performance Inventory (SPI). A principal components analysis with varimax rotation performed on the original survey items resulted in an 83 item survey with six interpretable factors was used. Widmeyer, Brawley and Carron(1985) conducted a series of

studies for the development of an instrument to assess cohesion in sports teams. The questionnaire of 53 items was reduced to 24 items. The respective values for Cronbach's alpha for each of four scale were .74, .58, .78 and .61. Koehler(1989) developed and validated a questionnaire designed to assess habitual physical activity of the 6<sup>th</sup> graders were used to determine the content and format of the questionnaire. Finally a sample of 235 sixth grade students completed physical activity questionnaire, the AAPHERD health related physical fitness test and the revised Children's attitude toward physical education inventory. Pearson's Moment Correlations were used to determine the convergent validity examining the relationship between the PAQ and the health related fitness and attitude towards physical activity. Martin(1995) described the development and validation of the Children's Attitudes Toward Integrated Physical Education-Revised (CAIPE-R) inventory, an inventory designed to assess attitudes of children without disabilities toward including peers with disabilities in regular physical education. Construct validity using factor analysis, internal consistency, and test-retest reliability was determined on a sample of 44 sixth graders. Albert V. Carron, W.Neil Widmeyer, Lawrence R.Brawley(1985) developed an instrument which was fourfold. Factor analyses with oblique rotation revealed preliminary evidence for construct validity.

Generally we assess the physical fitness of a person from the task an individual has to perform in everyday life. Here also we note that apart from easy task of everyday life one has to face emergency tasks such as running for life in face of an attack that demands greater amount of strength, speed energy etc. One has therefore to prepare himself for such situations by following a regular programme of physical exercises. Such programmes can contribute to the general physical fitness of persons in life. In the present study for Physical wellness component items like P1: I exercise aerobically at least three times per week for 20 minutes or more, P3:I include warm-up and cool-down periods when participating in vigorous activities,P4:I engage in resistance-type exercises at least two times per week,P5:My physical fitness level is excellent for my age. P10. I keep records of the time, date and results of medical tests. For Nutritional component items like N1:I eat at least 3 to 5 servings of vegetables and 2 to 4 servings of fruits each day, N3:I limit my daily intake of dairy products to 2 to 3 serving, N4: My daily intake of meats, eggs and nuts is 2 to 3 servings, N5: I make a conscious efforts to choose or prepare foods low in saturated fat, N10: I avoid being eating. For Social wellness component items like S.3:I have friends at work or school with whom I gain support and talk with regularly, S.4: I am involved in school activities, S.5: I am involved in my community were only selected.

It is recommended that the other constructs should also be validated using a bigger sample size.

## CONCLUSIONS

Within the limitations of the study following conclusions were drawn based on the findings. The present study shows that five items of Physical wellness, five items of nutritional wellness and three items of social wellness explained the variance of more than 60%.

## RESEARCH IMPLICATIONS

The present study may help the researcher to use the instrument in Indian conditions. The presents may help to develop more relevant items for physical, nutritional and social wellness.

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