Analytic Hierarchy Process (AHP) of Factors Influencing on Sport Participation of High School Students

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ABSTRACT

The aim of the present study is analytical hierarchy process (AHP) of factors influencing participation of sport among high school students. 300 students were selected randomly in two groups of 150 high school boys and girls from Ajabshir city school. Measurable tool of the research questionnaire consisted of 30 questions in five areas: family individual, social, cultural, religious and economical questions that each question was in its own area and the participants were asked to choose one alternative among five alternatives. After analyzing of factor analysis to identify each of factors, another questionnaire was designed to compare each factor two by two. In this questionnaire, each hone of factors and sub-options were compared two by two, so that the precedence of each factor over any other factor was expressed by the numbers of 1 to 9. For example, if the precedence of family factors on individual factors was respondent 5, the precedence of individual factor was 1.5 in contrast to family factor. 60 students (30girls and 30boys) were chosen randomly from students at a higher level (teams in the region and province) who exercised and had higher average educationally the questionnaire was distributed for pair comparison among them. Preparation of graphs and central, distributed indexes was conducted in form of descriptive statistic. Gronbach’s’ alpha was used for final survey with internal consistency. Larger values of 0.7 indicates favorite reliability, medium reliability greater than values of 0.6, weak reliability grater than values of 0.5, unacceptable reliability less than values of 0.5 correlations among variables were investigated using Pearson’s correlation test. The positive sign indicates direct relationship and negative sign indicates the opposite relationship. Correlations between 0.5 to 0.0 is small, medium between 0.3 to 0.5, strong larger than 0.5. Exploratory factor analysis was used to classify the questions. We can confirm the validity of the questionnaire instruments if questions place in predefined structures. In this analysis, it was used from the method of finding the principle axis factoring (PAF) to extract the factors (structures) and the method Mile. Ablymyn rotation (with Delta zero) and (Kaiser normalization) for the rotation of components. These analyses were performed by the 16 spss software and it was considered meaningful level of 0.01 in test.

INTRODUCTION

Stability and durability of a healthy and dynamic society, undoubtedly depends on the health of the individual members. Exercise is an important factor in physical health and physical health has a positive impact in mental and physical health. In other words, exercise reduces stress and increases confidence. It also improves the nutritional and sleeping quality and reinforces the muscles and bones. Exercise is one way that people can over come on physical emotional, social and psychological stress resulting of living in today’s stressful world and turmoil. The results have been shown that people who engage in regular exercise, less than others in fact to
cardiovascular disease, they will suffer less stress, and they enjoy from more confidence. Theses people are more optimistic and are less depressed. Participation of students in sport activities more than any other extra curricular activity may improve education in high school level. They again self-confidence and ability to solve problems, they communicate with students, their parents, and teachers in the academic framework and they grow with respect to social. People’s motivations for participation in programs of sport are linked to factors such as social status, socioeconomic status, cultural status, family attitude, personal needs, training and publicity. Of course the effect of each of these factors is different with increasing participation. Since participation in recreational ports is done on a voluntary basis and is more free-time, so successful expansion of these programs require planners and politicians to participate with different incentives. Perhaps most importantly, they need to be aware of participation and the veseans for nonparticipation in programs of sport because motivation is the key to doing any thing and activity and can stimulate, reinforce, and guide people’s behavior or causes to be controlled or guided. Jordan in his research knows important factor of family and economy in student’s participation. Finely has reported factors such as school leadership, kind of decision-making and the cultural contradictions of school, Ma [10] factors such as thoughts, belief, and cultures, Dobosz [3] factors such as individual motives and student’s interests, Silliker and Quirk [15] external factors such as persuasion educators and success of individual in sport team as factors in participation of sport. Lesser researches have been conducted in this area and have often studied barriers for participation of girls and women and studied less factors such as participation of sports in high school students so the question is which are the factors that contribute to participation of sport in students of high school level and How is the priority of factors according to comparison of them two by two from point of students?

**Approach and outline the research:**

Selection of type of research depends on purpose of the research nature of the research, facilities of its implementation. Due to the nature and characteristics of the study and for achieving the objectives outlined in this study, this research is type of application, present and prospective and its data have been gathered with field-descriptive way. This study has attempted to identify factors of family, individual, social, cultural, religious and economic influencing on sport participation of high school students. Then these factors in the form of questionnaire have been compared by the selected respondents two by two the results of the study are factors such as location, time, and the time of collecting questionnaire. By disruptive variables for controlling the location of distribution of questionnaire, the researcher has attempted to distribute questionnaire in location with light, proper temperature and without noise pollution. The researcher has attempted to control disruptive variables of time and time of collecting data and provided for testes not to feel the competition while they are answering, they will be in free time, and they will be away from any anxiety and excitement. First, a brief explanation of the questionnaire has informed to testis about present research and classification of questions in different fields has tried to short the content of questionnaire. Meanwhile first, the way of filling in a questionnaire has been explained for participants so that unawareness of individuals from it doesn’t cause to disorder in responses.

**Statistic population:**

The statistic population of all students of high school level of Ajabshir city were boys and girls based on statistics obtained from department of education of Ajabshir city. They were 2245 participants.

**Sample:**

The number of samples based on population were 300 participants (1100 boy students and 1145 girl students) that they were divided into two groups of 150 boys and girls participating in the contest between classes, competitions, regional and provincial competition and they were chosen on the basis of Morgan’s sampling table in a stratified randomly way and in collaboration with physical education teachers.

**The instrument of measurement:**

The measurable instruments in this study of questionnaire by the researcher-made consisted of 30 question in five areas such as family, individual, social, cultural-religious and economical factors that each question was in its area. Family factors (6 question), individual factors (8 questions), social factors (5 questions), cultural-religious factors (6 questions), and economical factors (5 questions) have been considered. In the questionnaire, the response of each question was scored based on Likert scale scoring in five values. The participants were asked to mark one of their five choices. After exploratory factor analysis to identify each of the factors, another questionnaire was designed to compare each factor two by two. In this questionnaire, each pair of sub-options of factors were compared so that the precedence of each factor over any other factor was expressed with the numbers of 1 to 9. For example, if the precedence of family factor on the individual factor was respondence of number 5, the precedence of individual factor was 1.5 in contrast to family factor. 60 students (30 girls and 30 boys) randomly were selected among students who exercised in higher level (teams in the region and province)
and had a high average in education. Finally the questionnaire for comparison two by two was distributed among them.

Validation:
According to the study, measurable instrument of research is the questionnaire by researcher-made, therefore validation of questionnaire has been reviewed by the faculty of physical education and formal validity of content has been confirmed. Then it was applied among 30 students randomly and removed uncertainties. Such that it’s reliability on the alpha %87 was ideal. The calculations were performed by using spss software. (Part of questionnaire has been noted in appendix).

Mode of data collection:
The research after obtaining permission from the department of education in Ajabshir city attended in schools and distributed the questionnaire among testees in collaboration with physical education teachers. Regarding to letters of justification including each question, testees were asked to study questions and letter of explanation for each question very carefully and then to choose one of the alternatives’ and mark it. Finally they were asked to deliver their question and answer to the physical education teachers or deliver to researcher after answering the questions at the same time.

Statistical Methods:
For achieving the results of this research, it is the need for classification, summarization, and data analysis that it is presented in the form of descriptive and inferential statistical methods. preparation of diagrams, central and distributed indexes were conducted in the form of descriptive statistical methods. Cronbach’s alpha was used for final survey with internal consistency way. Larger values of 0.7 indicated ideal reliability, values larger than 0.5 weak reliability, values less than 0.5 unacceptable reliability. Correlations among variables in survey were investigated using Pearson’s correlation test. The plus sign indicates the opposite relationship. Correlations between 0.1 to 0.3 were small, between 0.3 to 0.5 medium, and larger than 0.5 strong. Exploratory factor analysis technique was used to classify the questions. If the questions place in predefined structures, we can confirm the validity of the questionnaire instruments. In this analysis, the method of principle axis factoring was used to extract factors and the method of Mile Finally rotation (with delta zero and Kaiser Normalization) was used for the components. These analyzes were formed by the software 16spss and considered meaningful level of 0.01 in test. Lisrel software was used for the theoretical model analysis of data. The programming model was performed for the model and the adequacy of model and the evaluation of relationship in this program was defined and the desired out puts of the program were achieved. Technique AHP (14) was used for prioritizing different aspects of the questionnaire in expert choice software.

Research finding:
The findings of index of KMO, Bartlett’s test and the percentage of variance were expressed. In table 1 the statistic value of KMO indicates meaningful level in Bartlett’s test and percentage of variance for each of different dimensions in the questionnaire. These indicators will review the adequacy of the factor analysis model. Based on the findings the adequacy model is confirmed for each of dimensions KMO>0.5 (Tinsley and Brown, 2000) and for Bartlett’s test P<0.05. the predicative power of the model based on the expressed variance is variant from 44.94% to 58.84% for different dimensions.

| evaluation of adequacy of the model | dimensions | KMO | Bartlett P | Percentage of expressed variance |
|-------------------------------------|------------|-----|------------|---------------------------------
| family                              | %64        | 0001< | 52/94      |
| personal                            | %61        | 0001< | 44/93      |
| social                              | %67        | 0001< | 58/53      |
| cultural                            | %65        | 0001< | 51/58      |
| economical                          | %69        | 0001< | 56/47      |

For validity of questionnaire, confirmed factor analysis, test of t, and Bartlett were conducted for evaluating the research questions and the results were presented. Results of confirmed factor analysis for confirming of the factor structure resulted of exploratory factor analysis.

<table>
<thead>
<tr>
<th>X2</th>
<th>X2/DF</th>
<th>GFI</th>
<th>AGFI</th>
<th>RMSR</th>
<th>RMSEA (95%CI)</th>
<th>CFI</th>
<th>NNFI</th>
<th>IFI</th>
</tr>
</thead>
<tbody>
<tr>
<td>472/83</td>
<td>1/48</td>
<td>%90</td>
<td>%87</td>
<td>%59</td>
<td>%4</td>
<td>%92</td>
<td>%91</td>
<td>%92</td>
</tr>
</tbody>
</table>
According to the values of presented indexes in table 2 for this model, Kido index was less than 5 (1/48) that confirmed the Barezesh model. Also the indexes of Barazesh IFI, CFI, GFI, NNFI, and CFI greater than 9/0, RMSEA less than 0/08, and values of index SRMR less than 0/10 confirmed the validity of this model. Although the index values of AGFI (0/87 < 0/9) didn’t confirm the validity of the model but their values were close to nominal values. As a result, this model has been achieved to a desirable level of Barazes. Index results of KMO, Bartlett’s test, percentage of expressed variance. Values of KMO in table 3, indicates meaningful level of Bartlett’s test and expressed variance by the model for each of the different dimensions in the questionnaire. These indexes will review the adequacy of the factor analysis model. Based on the findings the adequacy of the model is confirmed for each of the dimensions and for Bartlett’s test P< 0/05. Also the predictive power of the model based on the expressed variance is variant equal to 45/06% to 87% for different dimensions. Also according to Cronbakh’s Alpha, the reliability (internal consistency) of participation was high.

| Table 3: Results of index of KMO, Bartlett’s test, and percentage of expressed variance (indexes for survey of adequacy of the model). |
|-----------------|-----------------|
| **KMO**         | 0/707           |
| **Value of Kido index** | 204/520         |
| **Degree of freedom** | 10              |
| **Findings of Bartlett’s test p-value** | 0/000           |
| **Expressed variance** | 43/203          |
| **Cronbakh’s Alpha** | 0/87            |

*The results of precedence using technique of AHP:*

After identifying factors influencing on student’s activity participation through exploratory and confirmed factor analysis results, some of the questions removed because they didn’t have enough adequacy and a couple of factors influencing on sport participation of students were compared two by two. Then the weight average of each factor was calculated by expert choice software. After calculating of grant and index of ratio of adaptation, each of factors were prioritized. For his purpose, overall dimensions were compared by individuals with numbers of 1 to 9 two by two. Precedence of overall dimensions of factors influencing on student’s sport participation between girl and boy students of high school level. According to the adjustment of the ratio of consistency obtained less than 1/0, consistency is confirmed among ratings of dimensions. As a result they can be prioritized. So individual dimension was in the highest precedence, cultural dimension in lowest precedence and other dimensions were prioritized as shown in figure. In addition, the scores can be computed for each of the dimensions presented in front of them and so these priorities can be determined. For example, individual indexes approximately are important more than cultural dimension.

| Individual | %30 | 29/69 |
| Family     | %20 | 16/71 |
| Social     | %15 | 14/35 |
| Cultural   | %15 | 18/58 |
| Economical | %15 | 18/58 |

Consistency ratio 0/022

*Fig. 1-4: Percentage of scores and consistency ratio indexes of each factor in students.*

According to the values of presented indexes in table 2 for this model, as considered degree of freedom in Kido index was less than 5 which confirmed the Barazesh model. Also Barazesh indexes of IFI, CFI, GFI, NNFI, and CFI were greater than 9/0, RMSEA smaller than 0/08 and value of index in SRMR smaller than 0/10 which confirmed the validity of this model. Although index values of AGFI (0/87 > 0/9) didn’t confirm the adequacy of this model but their values were close to the nominal value of 0/9. As a result, this model has achieved to a desirable level of Barazesh.

*Discussion and conclusions:*

In the part of factor analysis, questions in questionnaire were ranked in five groups of family, individual, social, cultural, and economical by using of exploratory factor analysis and relations among questions of questionnaire were also examined. After ranking questions, the adequacy of the model was confirmed using Bartlett’s test and KMO index. Based on the findings of factor loadings, coefficients related to questions 7, 8 were less than 0/3 in individual dimension and question 6 in cultural dimension and some of questions were eliminated. Finally, confirming the factor structure resulting from exploratory factor analysis, confirmed factor analysis was used and at this point, because the relations between questions 3 and 5 family with family dimension and question 3 individual factor with individual dimension was not meaningful so these questions...
were eliminated and performance of model of confirmed factor analysis repeated. In the second stage of confirmed factor analysis, because the value of T was greater than 2.58 for all cases, all of these questions were meaningful in level of 0.01. In the second stage of exploratory factor analysis for summarizing the dimensions in dimension of participation, the adequacy of the model was confirmed by using of KMO index, Bartlett’s test, and percentage of expressed variance. Reliability of participation was desirable value with value of Cronbach’s Alpha of .87 and according to value of T> 2.58; these questions were in meaningful level of 0.01. According to the findings of this research, in part of prioritization with method of AHP, individual factors and social factors were important factors influencing on the sport participation of girl and boy students in high school level. Factors such as economic, family and cultural have allocated themselves the next precedence. Elhami conducted a study about barriers on participation of sports in students and findings showed that three factors of family, culture, and economy cause to decrease on participation of sport in students.

Jordan and Rahimi conducted a study about participation of sport among students’ findings of their study showed that family as an important factor plays an important role in rate of sport participation among students. On the other hand, social factors, appropriate facilities and as well as economic situation also play important role in participation of sport among students. The finding of this research doesn’t match with individual factor as first noted factor. However Hamtinezhad (7) showed with the results of his research about cause of male students’ trend in high school level to sport that important cause in trend of students to sport matches with having motivation and interest (individual factor). According to the findings of the research, all four factors related to family dimension have equal importance in sport participation of students. Family can play a role with respect to these factors in sport participation of students. These findings match with the findings of Fozeh’s research that he has noted family as important factor in participation of students in sport activities, the research findings of Jordan has noted family as the center of confident strength in sport participation of students, Hamtinezhad has noted athletic parents of students as important factor in their trend to sport activities. And finally it doesn’t match with Elhami’s research that he has noted objections of parents and pay attention to children’s study as barriers for sport participation of students. Based on the results of the study in individual dimension, feeling confidence in sport activities are as important factor, interest for gaining favorite fitness and interest for gaining skills as important factors in participation of sport among students. There are previous researches that each factor has known individual factor as a factor influencing in participation of sport. Hamtinezhad (7) has noted motivation as important factor in participation of sport in high school level among students. Naderian and Hashemi have noted gaining skill as important factor in participation of sport among people over 16 years. Serad and colleagues have noted gaining fitness as the third factor in participation of sport among high school students that all these findings is consistent with the findings of the researches has not noted confidence in sport activities as a factor influencing in participation of sport. This is probably due to lack of attention to psychological factors of individual factor in participation of sport but in the present research this factor has been considered as a factor and as important factor has been known in participation of sport among students in individual dimension. In social factor dimension, encouraging sport teacher as the most important factor and sport facilities in the community as the important factor from other factors have affected in participation of sport among students. These findings match with the results of Fozeh’s research that he has noted Coach as important factor in participation of sport among students in Kuala university. These findings also match with Siliker and Quirk’s research about participation of sport in sport of football among students that the research showed that if students in initial stage face with encouraging by coaches or succeed (winning) tea, they will have greater incentives to work longer. The results of the research by Lahsayizadeh and Jahangiri [9], Jordan, McNeal [11], Bazgir, Dadashi [2], Azabdaftaran, Ehsaniand et al. [1], Henderson et al., [7] and Roomza and Hoffman have all emphasized existence of sport facilities in community. In religious-cultural dimension due to difference in factors affecting in participation of sport among students of girls and boys, these factors were examined individually and the most positive attitude for athletes in community are in students of boys as the most important factor and having religious belief that encourage people to exercise. These findings match with results of Mirzakhani’s research that he has noted having encouraged religious beliefs to sport activities as one facilitated factor of sport. About factors affecting in participation of sport among girls in cultural dimension, two factors of positive incentive in community than athletes of girl and maintaining veil while engaging in athletic activities as important factors are of equal importance. Thus, according to research findings to increase participation of girls’ students in sport activities through cultural, the attitude of people in community and even attitude of people in family about sport leded girls towards sport. According to adheres of people in our community, we can step in development of participation of sport among girl students with regard of legal and Islamic principals and regard of veil in sport department. So it is necessary to have indoor sport hall in girls’ school according to the findings of this research. Sport equipment with low value, household financial capability and sport department fees with low value are next priorities of factors affecting in participation of sport among students. These findings match with findings of Elhamis’ research that he has noted sport participation, sport facilities with expensive value as factors affecting sport participation of girl students. Also these findings match with the results of Salami, Mirfattah, and Norouzians’ research that they have noted participation of sport
among women, family financial capability, and high fees of sport department as barriers for participation of women. Based on the results of this study, individual factor with approximately30% value is the most important factor among factors affecting on participation of sport among students that it affects in participation of sport among high school students. Existence of individual differences about interests’ aptitudes, and physical abilities are not secret for any one and it is only motivation that can move individual to satisfying his needs. Stimulating and motivating factors for fitness may result from internal will of person and may also result from external factors such as peer pressure toward fitness. Therefore, by strengthening in individual dimension of sport participation of students, we can proceed with existing of motivation through encouragement and informing about positive effects of sport on fitness of people. But in the context of social factors, we can pace usefully by using ideas like encouraging coaches, using of professional coaches, creating of professional sport departments in the community and education department in participation of students in sport activities. Encouraging coaches are important factors affecting individual dimension and it has caused motivation and interest of students toward different sport fields. Even it has been proud in notional and international levels.

The third factor in participation of students in sport activities is economical factor. This subject results from factors such as expensive sport equipment, high registration fees at sport department and financial problems of families that they can be considered barriers to sport participation. Family factors are the fourth priorities in sport participation of students. By given the fact that family is the first focus of support in children that it has a weak role in sport participation of students. According to the results of this study, cultural and religious factors have allocated themselves lost priority in sport participation. This subject is result from lack of culture and existence of religious and cultural constraints for participation of male and female students in high school level.

REFERENCES