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**TÍTULO:** Agrupación de estudiantes de la Universidad Shiraz de Ciencias Médicas basada en variables clave de la esperanza de vida, la autoestima y el agotamiento académico.

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**RESUMEN:** El propósito de este estudio fue encuestar a los estudiantes de la Universidad de Shiraz de Ciencias Médicas basándose en variables clave de la esperanza de vida, la autoestima y el agotamiento académico. El método de investigación fue descriptivo-correlacional. Los resultados mostraron que no existe una relación significativa entre los grupos mencionados anteriormente y las características demográficas de los participantes. Teniendo en cuenta la alta correlación entre estas tres variables clave y sus impactos en el progreso social y académico de los estudiantes, se hace la necesidad de planificar para alternar y mejorar el estado de los estudiantes.

**PALABRAS CLAVES:** mencionados, agrupaciones, características demográficas, participantes.

**TITLE:** Student clustering of Shiraz University of Medical Sciences based on key variables of life expectancy, self-esteem and academic burnout

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**ABSTRACT:** The purpose of this study was to survey the students of Shiraz University of Medical Sciences based on key variables of life expectancy, self-esteem, and academic burnout. The research method was descriptive-correlational. The results showed that there is no meaningful relationship between the above-mentioned clusters and the demographic characteristics of the participants. Considering the high correlation between these three key variables and their impacts on social and academic progress of students, there is the need to plan for alternating and improving the status of students.

**KEY WORDS:** above-mentioned, clusters, demographic characteristics, participants.

**INTRODUCTION.**

Meeting the challenges of the period of education can provide resources for students to put pressure on them and endanger their health (Klainin-Yobas et al. 2016); therefore, paying attention to factors which can have a positive impact on the ability, learning and increase of students' psychological states and their subsequent psychological and psychological health is very important.

One of these positive psychological variables is life expectancy. Generally, hope is an essential and dynamic component of life that provides energy for the realization of goals and aspirations and is very strong support in difficult and stressful conditions of life (KhalediSardashti et al., 2018) and consists of understanding of people with regard to the ability to expand the solution in order to achieve goals and to protect motives (Tamadon and Askari, 2015). With hopes, it seems that problems can be tolerated in various stages of life, and can construct a meaningful life through struggling with problems (KhalediSardashti et al., 2018).

Life expectancy is a statistical index of how long the average lifespan in society is, or in other words, how many years each member of that community can expect to come. As health and health indicators improve, life expectancy will increase and hence, this indicator is one of the indicators for measuring progress and backwardness of countries (Ghara Zibaei et al. 2013). On the other hand, frustration undermines the skill of problem-solving in the individual, and also makes the people constantly evaluate their experiences negatively and incorrectly and to take worrying consequences for their problems (Nasiri et al. 2012). Therefore, even for students who are young and lively in the country, it can be very negative.

Self-esteem is also one of the most important variables affecting the health and development of individuals (Alizadeh et al. 2016). In fact, self-esteem is an important aspect of self-concept, which means the judgment of the individual about his value. In other words, in fact, we can say the degree and value that people attribute to themselves (Song and Lee, 2016; Hasibuan, Saragih, & Amry, 2018; Jenaabadi, 2012; Katilmis, Eksi & Öztürk, 2011).

Self-esteem has a variety of dimensions including social dimension (person's feelings as a person in relation to others), educational dimension (in accordance with the desired educational criteria), family dimension (individual's feelings about himself as a member of the family), and then, public self-esteem (self-assessment in all areas). Considering the great influence of self-esteem on the success or

failure of students of this variable, it is also one of the important factors that are worth studying in students.

Other important variables influencing on success or failure of students is academic burnout (Fowler, 20158). Academic burnout is a state of emotional exhaustion, pessimism about homework, lack of competence and efficiency. Students experience negative emotional excitement against chronic stress due to the lack of resources to perform their duties and assignments (Seif et al. 2017).

The high volume of students' homework creates emotional exhaustion and ultimately causes a background to academic burnout. Students involved with academic burnout are less skeptical about their homework, and therefore suffer from a sense of competence and low self-efficacy, and this problem may be generalized to other areas of their lives (Najafi et al. 2017).

Therefore, considering the role of key variables of life expectancy, self-esteem and academic burnout for students, and considering that there is a close relationship between these variables, identifying students who are not in a desirable position for these variables can be very important and sometimes even vital. According to the above, the current study has been conducted to cluster the students of Shiraz University of Medical Sciences based on key variables of life expectancy, self-esteem and academic burnout.

## **DEVELOPMENT.**

### **Methodology.**

This study was a descriptive correlational cross-sectional study. The statistical population of the present study was Shiraz University of Medical Sciences students who were selected randomly-clustered. In order to calculate the sample size and according to the fact that the minimum sample size suitable for correlational studies, is 300 people (Khadivi and Haji Nazari, 2014), the minimum sample size of this study is 300 people.

Finally, 309 questionnaires were entered into the analysis. Sample selection criteria for students of Shiraz University of Medical Sciences included informed consent and willingness to participate in the study, willingness to cooperate in completing the instruments and age range from 18 to 30 years. Exit criteria were age range over 30 years and not willing to cooperate in completing questionnaires. The following questionnaires were used to collect information:

✚ Demographic questionnaire including age, sex, marital status, field of study, term of education, parent's academic degree, place of residence, and ethnicity.

This questionnaire was prepared by researchers in this study.

✚ Miller's Hope Questionnaire.

This test consists of 48 aspects of hope and helplessness in which the materials contained are based on obvious and secret manifestations of behavior in hopeful or disappointed individuals. For each aspect that represents a sign behavior, the sentences are written thus: very opposite = 1, opposite = 2, indifferent = 3, agree = 4, strongly agree = 5. Each person obtains a score by choosing a sentence that is true about him. Numerical values are from 1 to 5 each. The sum of scores obtained is from 48 to 240 variables. The fifteen sentences are graded in reverse order, which are (11-13-16-18-25-27-28-31-33-34-38-39-44-47-48).

In a research that Ebadi et al. conducted on divorced women, the reliability coefficients of Miller's hopefulness scale were reported to be 0.91 and 0.87 using Cronbach's alpha, and the validity was 0.64, which indicates the questionnaire is valid (Ebadi et al. 2009) In the research of Alimoradi et al., the reliability coefficient of hope scale was 0.86 using Cronbach's alpha method, which indicates the desirable reliability of the questionnaire (Alimoradi et al. 2014).

#### ✚ Maslach Education Burnout Inventory.

This questionnaire was prepared by Schaufeli et al. in 2002 and has 15 questions including 3 dimensions of academic burnout (questions 1, 4, 7, 10, 13), academic unwillingness (questions 2, 5, 11, 14) and academic ineffectiveness (questions 3, 6, 8, 9, 12 and 15). The questionnaire was scored based on the Likert scale of 5 options (totally agree = 5, agree = 4, disregard = 3, disagree = 2 and totally disagree = 1) (Sheikholeslami et al., 2016).

The validity of the questionnaire has been confirmed by its creators using factor analysis method and also its reliability has been reported 0.77, 0.82 and 0.75 respectively by Bresó et al. 1997 (Breso et al., 1997). Sheikh-ol-eslami et al. in their research also obtained the reliability of the total score of the questionnaire by using Cronbach's alpha (0.81). Also, Hashemi et al. research results, (Hashemi Sheykhshabani et al., 2013), showed that the structural analysis of the confirmatory factor, both the three-factor model based on the findings of the main components analysis and based on the main constructive findings, is more fitted to the data than the one-factor model. The results of the internal consistency of the whole scale and its factors express the acceptable reliability of this scale.

The correlation between each scale and the total score which varied from 0.33 to 0.75 was significant. Correlation between academic burnout scale and its dimensions was significant with quality of learning experiences and self-efficacy. Therefore, it was concluded that according to the validity and reliability of the academic burnout scale, this scale can be used to measure academic burnout.

#### ✚ Coopersmith's Standardized Self-Esteem Questionnaire.

Coopersmith prepared his own self-esteem scale in 1967 for a revision on Rogers and DeMond Self-Esteem Scale. This scale has 58 phrases and the grading method of this test is binary, in the sense that in some phrases (4-8-9-14-19-20-27-28-29-33-37-38- 39-42-43-47). If the answer is yes, the score is one and if the answer is no then the score is zero and the rest of the statements are scored in reverse order. The subscriber's scale consists of 8 items (13-20-27-34-41-48-55), which is not scored, and

reflects the honesty of the individual in answering questions. If the person under study receives more than 4 of these subscales; then, the validity of the test will be low and indicates the defensiveness of the respondent while completing the questionnaire, which means the person's self-esteem score will not be actual, and accordingly the relevant data will not be included in the analysis.

Finally, the score range will be at least 0 and at most 50. A higher score indicates higher self-esteem. It should be noted that in order to describe the data, the mean of total self-esteem score of students as a criterion for determining whether self-esteem is low or high. This means that, based on the mean scores of self-esteems, the cut-off point is 25 and the lower score means lower self-esteem and higher score is equivalent to self-esteem (Shahbazi and Vazini taheer, 2013).

The validity and reliability of this questionnaire have been shown in various studies. In Shokrkon's study on male and female students of third-grade high schools in Tehran, the re-testing of this scale for male and female students was 0.90 and 0.92, respectively. The validity and reliability of the questionnaire in other studies have also been verified through content validity and re-test. For example, the reliability coefficient of self-esteem questionnaire in Zare's study was 0.79 (Zare et al. 2007).

In this study, Medoid was used to minimize the differences in the cluster. Also, in the present study, Silhouette index was used in Package to evaluate the optimal number of clusters and PAM clustering was performed in R.3.5.0 software package.

Medoid is an observation of a cluster that minimizes the dissimilarity in that cluster and partitioning around medoid (PAM) as one of the modern clustering methods offers two advantages than k-means clustering. First, PAM clustering allows inclusion of both qualitative and quantitative variables. Second, due to minimization of sum of dissimilarities, it is more robust to outliers.

Like k-means clustering, estimating the optimal number of clusters in PAM clustering is very important. In the current study Silhouette index in ---- package was used for estimating the optimal number of clusters and PAM clustering was performed in ---- package in R.3.5.0 software.

### Results and discussion.

Out of 309 medical students enrolled in the current study, about half of them were female (57.0%) and lived with their family (59.2%) and most of them were single (96.8%). Demographic characteristics of participants were summarized in (Table 1). Mean $\pm$  SD of self-esteem among medical students was 5.40 $\pm$  5.03 and mean score of burnout and life expectancy were 39.2 $\pm$  14.9 and 41.2 $\pm$  5.0 respectively.

Table 1. Demographic characteristics of participants.

Characteristic	Subgroup	Frequency (%)
Gender	Male	133 (43.0)
	Female	176 (57.0)
Age	$\leq 20$	195 (63.1)
	$>20$	114 (36.9)
Marital status	Single	299 (96.8)
	Married	10 (3.2)
Residence	With family	183 (59.2)
	Dormitory	111 (35.9)
	Other	15 (4.9)
Father education	$\leq 6$ years	1 (0.3)
	7-12 years	77 (29.4)
	$> 12$ years	231 (74.8)
Mother education	$\leq 6$ years	1 (0.3)
	7-12 years	104 (33.7)
	$> 12$ years	204 (66.0)
Individual's position among the children of the family	First	152 (49.2)
	Second	96 (31.1)
	Third	37 (12.0)
	Fourth and higher	24 (7.8)

Silhouette index determined 4 clusters as the optimal number of clusters for PAM analysis.

Partitioning around medoid revealed that self-esteem, life expectancy and burnout explained all the



variability among the clusters. Based on percent of discriminant power, self-esteem with 83.17%, life expectancy with 10.97% and burnout with 5.87% were identified as the only effective factors. Descriptive statistics of 4 clusters based on self-esteem, life expectancy and burnout were reported in (Table 2).

Table 2. Descriptive statistics of 4 clusters based on self-esteem, life expectancy and burnout.

Cluster name	Sample size	mean±SD of self-esteem	mean±SD of life expectancy	mean±SD of burnout
1	102	10.00± 0.00	43.48± 3.34	32.68± 14.44
2	95	0.15± 3.69	37.43± 4.55	47.14± 9.36
3	103	6.70± 1.62	43.20± 3.37	35.42± 12.42
4	9	-6.00± 3.74	31.00± 3.54	73.56± 8.54
<b>P-value (ANOVA test)</b>		<0.001	<0.001	<0.001

As shown in (Table 2), cluster 1 included 102 students with maximum score of self-esteem, low level of burn out and acceptable score of life expectancy (very good situation) and cluster 3 included 103 students with high level of self-esteem, low level of burn out and acceptable score of life expectancy (good situation). Moreover cluster 2 included 95 students with low level of self-esteem, moderate level of burnout and low level of life expectancy (bad situation). Finally, there were 9 students in cluster 4 which had very low level of self-esteem and life expectancy and were in the high level of burn out (very bad situation).

Our results showed that there was no significant association between aforementioned clusters and demographic characteristics of participants (results not shown).

## CONCLUSIONS.

Regarding the aim of this study, the investigating of the clustering of students in Shiraz University of Medical Sciences based on key variables of life expectancy, self-esteem and academic burnout, findings from statistical analysis showed that in three dimensions of life expectancy, self-esteem and burnout there are 4 different clusters that consist of the cluster No.1: students with a maximum self-

esteem score, a low level of academic burnout and an acceptable score of life expectancy (a very good condition); the cluster No.2: students with a low level of self-esteem, a moderate level of academic burnout and low level of life expectancy (bad condition); the cluster No.3: includes high-level students with self-esteem; Low level of academic burnout and acceptable score of life expectancy (good status); the cluster No.4: low levels of self-esteem and life expectancy and high levels of academic burnout (very bad condition). The results showed that there is no meaningful relationship between the above clusters and the demographic characteristics of the participants.

However, according to previous studies, there is a significant relationship between hope and burnout variables. For example, job security can increase academic motivation in students and lead to better academic performance and lower student burnout (Ajam Ekrami, 2014). In addition, the components of social participation, social support, and social cohesion directly contribute to higher education. In the study of indirect effects, it was also found that the two components of social protection and interpersonal relationships through increased self-esteem lead to higher hopes among students. Regarding this, psychologists believe that having high self-esteem and life expectancy is a sign of resilience and the mental and psychological well-being which are necessary for a healthy and successful life [Jalili et al., 2017]. These are consistent with the results obtained in this study.

On the other hand, the results of the research showed that there is a positive and significant relationship between students' hope and academic achievement. There is a positive and significant relationship between self-esteem and academic achievement of students. There is a positive and significant relationship between students' life expectancy and self-esteem. There is a difference between the mean scores of academic achievements for female and male students, and the academic achievement of females was higher than that of males. The results of simultaneous regression analysis showed that only hope component could predict academic achievement against academic burnout, which confirms the results of this study/

Finally, according to recent findings in similar studies, self-esteem has a direct and indirect effect on students' academic burnout. Self-esteem, through creating a sense of value, can overcome negativity and increase effort and reduce academic burnout and the stressful sources of education. On the other hand, reducing self-esteem can lead to the development of disabling factors and weaken the students' academic performance, resulting in inefficiencies, and consequently, higher educational burnout (Najafi et al. 2017).

Considering the research background and the results obtained in this study, we can confirm the relationship between the three levels of self-esteem, life expectancy and academic burnout due to multiple consequences in the student's academic life and future. Therefore, considering the high correlation between these three key variables and their impact on social uplift and academic level of students, the need to plan for improving the status of students in self-esteem clusters and low life expectancy and high academic burnout are displayed.

Also, considering the limitations of the present research, it is suggested to consider attention to other social factors, along with self-esteem, other roles of life expectancy (such as self-efficacy and self-concept: mediating variable), in future studies.

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