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Personal, Familial and Social Factors Associated with Academic Failure in University Students: A Case-Control Study in Iran

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Abstract. The objective of the study was to identify the main personal, familial and social factors associated with the academic failure of Iranian students. This was a case-control study conducted in Semnan University. The case group consisted of the students who had failed academically and the matched control group was selected randomly from among the classmates of the students in the case group. The conditional logistic regression model was used for analysis at the 5% significance level. In the present study, 34 women (42.5%) and 46 men (57.5%) were interviewed as the case group and the same number of people were interviewed as the control group. Working part-time as a student (OR=6.78, P<0.001), higher levels of parents' education (OR=0.16, P<0.001), pre-existing psychiatric diseases (OR=5.67, P=0.029), interest in the major of study (OR=0.18, P<0.001), recent experience of stress (OR=4.14, P=0.009) and cigarette smoking/alcohol consumption (OR=3.31, P=0.022) were shown to be associated with academic failure respectively and independently. Identification of the conditions associated with academic failure in the students is the prerequisite to taking effective and timely measures. It is highly suggested to pay more attention to tertiary students who were less interested in their major of study, have recent experience of stress, working part-time as a student, lower levels of parents' education, and smoking or alcohol consumption in addition to screen and address pre-existing psychiatric diseases.

Keywords: Academic Failures; Students; Universities; Sociological Factors

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1. Introduction

Academic education plays an important role in the improvement of a country.

> "*Academic failure is characterized by difficulties in teaching school goals or to fail to obtain the fundamental skills of literacy*" (Ilhan, Ozfidan, & Yilmaz, 2019).

Perhaps the most important complication of academic failure is its influence on the student retention rate in the college. In other words, it makes the student unable to complete his or her study program due to failure to graduate in many situations (Aljohani, 2016).

Improving student academic accomplishments is of great importance. Defining the factors influencing the students' academic failure, and the timely identification of high-risk students can prevent the loss of money and manpower (Shakurnia, Tavalla, Aslami, & Elhampour, 2019). Psychologically academic failure not only leads to learner's low self-esteem but also causes stress to the parents (Alami, 2016; Kol, 2013). From a sociological point of view, there is also a strong relationship between academic failure and social problems (Pahlavan, Shojaei, & Salehi, 2018; Stadtfeld, Vörös, Elmer, Boda, & Raabe, 2019).

Entering university is an important event in everyone's life that causes different reactions in individuals depending on the psychological backgrounds and environmental features. Study in an academic environment makes the student gain new experiences of life. Separating from the past living environment, adapting to the new environment, changing the type of social communication, facing new problems and undertaking new duties, are considered some of the main relevant experiences affecting different aspects of students' lives (Kenny, 1990).

Academic failure is considered an important aspect of students' lives which depends to a large extent on their response to the new changes (Montgomery & Côté, 2003). Many students adapt themselves to new conditions quickly. However, in some cases entering university reveals individuals' weaknesses in characters or mental weaknesses or leads to an aggravation of effects of economic, cultural and social deprivations on their lives and this leads to the increase in students' level of concerns and failure in their academic performance (Kuh, Kinzie, Buckley, Bridges, & Hayek, 2006). In some cases, no effective and efficient adaptation is made and the student which finally results in inefficiency and failure of the student. Academic failure and its consequences in a vicious cycle not only lead to the underlying pathological reactions, but they also affect their general performance in individuals' life and social relations. Faults in interpersonal relations, aggression, apathy, desperation, physical symptoms, anxiety, depression, psychosis and even suicide are considered some consequences that can complicate the problem (Sarason, Johnson, & Siegel, 1978).

Although academic failure is not considered a psychiatric disorder by itself, its backgrounds and consequences may make the individual need consultation with a psychologist or psychiatrist. It is very important to prevent academic failure

and the relevant problems effectively and timely, and it is necessary to know the relevant background factors in the cultural background of the society to succeed in this regard.

Absenteeism, lateness and irregular college attendance are certain factors that are believed to be responsible for general poor academic performances (Alami, 2016). Numerous economic, social and family factors may affect academic failure. In many studies, it has been attempted to investigate these factors among the students (Dennis, Phinney, & Chuateco, 2005; Ghasemi, Hasanvand, & Valizadeh, 2014; Mahdion, Khatony, Abdi, & Jafary, 2016; Meftagh, 2017; Rahimi, Heshmati, & Moghaddam, 2014). The results of these studies show that some other factors such as age, gender, birth order, psychological backgrounds, socioeconomic level, level of interest and motivation in education, environmental factors at home and university, and the important and stressful events in life as well as the talent and attempt of the students are completely effective in acquiring knowledge and educational skills (Ebrahimzadeh, Ghorbani, Naserian, & Mardani, 2016). The results of a study conducted in Ahvaz University in Iran showed that in addition to some psychological health-related factors, having lower average grade at the high-school level and benefiting the quota in the exam for entrance to the university were the most influencing educational factors for poor academic achievement (Shakurnia et al., 2019). The findings of a study on the causes of poor academic performance among Omani students showed that while student-related factors have the highest impact on students' performance, teacher-related factors had the lowest effect (Alami, 2016). The results of a study in Hong Kong showed a mutual correlation between stress and academic failure among students (Lee, 2017).

So far, the scientific analysis of factors related to academic failure has been done based on different theoretical models using several analytical methods. The literature on low academic achievements and student retention is rich in the theoretical models that gained consideration among researchers. For a long time, the studies relied heavily on physiological views that emphasized the individual students' attributes and shortcomings. However, recent models and studies have been classified under more various categories; for example, psychological, sociological, organizational, environmental, interactional and economic (Aljohani, 2016). From a perspective, the factors involved in students' poor academic performance can be categorized into four major groups; student-related factors, teacher-related factors, family-related factors and some other factors including marriage, health problem, smoking, working while attending at college, friendships and transportation problem which can be named social-related factors (Alami, 2016).

From a methodological and statistical perspective, to predict the failure of students is a complex task (Attar & Kulkarni, 2015). Achieving a realistic analysis requires the use of correct statistical models. There are several methods for modeling. One of the most important and widely used methods for model building is the application of linear regression models (Jewell, 2003). The main advantage of these models is the simplicity both in execution and interpretation. There are more advanced and sophisticated ways to do this. They include algorithms used in data mining (Attar & Kulkarni, 2015; Sarra, Fontanella, & Di

Zio, 2019), path analysis (Loehlin & Beaujean, 2016), structural equations (Loehlin & Beaujean, 2016), causal models (Greenland & Mansournia, 2015), causal graphs (Greenland & Mansournia, 2015) and causal mediation analysis (Imai, Keele, & Tingley, 2010; Imai, Keele, Tingley, & Yamamoto, 2010). Each strategy has its advantages and limitations.

It is of special importance to identify these factors to the greatest and most exact possible extent to find the possible and feasible solution to identify early the students who are at the mercy of academic failure at the beginning and during their studies and to prevent their academic failure. The effective interventions in this regard can help the students achieve social success after graduation and use the sources of their courtiers optimally to invest in the higher education sector. Each of the previous studies in the country analyzed some of the risk factors of academic failure in students and they heavily have focused on psychological related factors. The present analytic study has been conducted to identify the main personal, family and social factors associated with academic failure of the students at Semnan University, Iran in a multiple model. In this study we want to answer the question of what factors can be associated with academic failure in students? Theoretically, the main emphasis in this study is on socio-familial related factors, and we have used linear models for statistical analysis avoiding unwanted complexity in implementation and interpretation.

2. Methodology

This is a case-control study in terms of methodology that was conducted in the first semester of the academic year 2018 at Semnan University. The cases were the students who had gone to the psychiatrist serving at the student consulting center of the university in the above-mentioned time interval at the discretion of the educational affairs office and due to their academic failure. For each subject of the case group one of his/her classmates of the same sex and major was selected randomly and included in the study as a control group subject. Another condition that had to meet in selecting the control group subject, as well as the conditions of sameness of sex and major, was that they had not experienced any academic failure before. All participants were asked to provide consent forms to participate in the study. The information was collected from the participants through interviewing and data gathering forms filled out by the participants. Each participant was interviewed separately by a well-trained interviewer. Each one of the students participating in the study was questioned about age, gender, birth order in the family, marital status, family income, benefiting the quota for admission to universities, education level, student's residency status, interest in the major of study, family income level, parents' education levels, working part-time as a student, pre-existing psychiatric diseases personally or in the family, cigarette smoking and alcohol consumption, an adequate period of sleep, the domesticity of students and recent experience of stress (including financial, emotional, illness, etc.) and the obtained information were recorded in a data-gathering form based on the answers. Considering the minimum of 20% difference between the case and control groups in terms of the relative frequency of the studied characteristics, the sample size was estimated to be at least 200 people (100 people in each group) using G*Power 3.1.9.2 software, with 95%

confidence and power. Participants in both groups were randomly selected according to the inclusion criteria.

The obtained data were analyzed in three phases. In the first phase, the particulars of the students in the two groups were reported and compared using the frequency table and the chi-square test. In the second phase, the characteristics with liberal p-value ($p<0.2$) were included in multiple conditional logistic regression model as well as the characteristics with significant p-value ($p<0.05$) and the relationship of each one of the characteristics with the dependent variable (academic failure) was assessed and reported using adjusted Odds ratio estimate. In the third phase, the reduced model was derived as the final model from the multiple model using a backward-LR approach and the ultimate interpretation was made based on it (Jewell, 2003). The employed software was STATA-11 and the level of significance was considered to be ($p<0.05$) for all tests.

3. Findings

In the present study, 34 women (42.5%) and 46 men (57.5%) were interviewed as the case group and the same number of people (with the same sex distribution) were interviewed as the control group. In each group there were 6 associate's degree students (7.5%), 68 bachelor's degree students (85%) and 6 master's degree students (7.5%). Among all 52 participants (32.5%) were 20 years old or less, 97 (60.6%) participants were 22-26 years old and the remaining participants were older than 25 years old. The frequency distribution of the students in terms of personal, family, social and educational particulars can be seen separately in table 1.

Table 1: Comparison of personal, family, social and educational characteristics of participants in the study in case and control groups

Characteristics		Count (%)			P[a]
		Control(N=80)	Case(N=80)	Total(N=160)	
Age(year)	≤20	24(30.0)	28(35.0)	52(32.5)	0.442
	21-25	52(65.0)	45(56.3)	97(60.6)	
	>25	4(5.0)	7(8.8)	11(6.9)	
Residence in the dormitory	No	42(52.5)	47(58.8)	89(55.6)	0.426
	Yes	38(47.5)	33(41.3)	71(44.4)	
Interest in the major	No	14(17.5)	36(45.0)	50(31.3)	<0.001
	Yes	66(82.5)	44(55.0)	110(68.8)	
Birth order	First	41(51.3)	45(56.3)	86(53.8)	0.147
	2nd	24(30.0)	15(18.8)	39(24.4)	
	3th	5(6.3)	12(15.0)	17(10.6)	
	Higher	10(12.5)	8(10.0)	18(11.3)	
Family income (million Rial)	<10	7(8.8)	8(10.0)	15(9.4)	0.036
	10-30	29(36.3)	45(56.3)	74(46.3)	
	30-50	24(30.0)	18(22.5)	42(26.3)	
	>50	20(25.0)	9(11.3)	29(18.1)	

Highest level of education in parents	Under High School	3(3.8)	17(21.3)	20(12.5)	<0.001
	High school and Bachelor	54(67.5)	58(72.5)	112(70.0)	
	Master and higher levels	23(28.8)	5(6.3)	28(17.5)	
Working part time	No	67(83.8)	39(48.8)	106(66.3)	<0.001
	Yes	13(16.3)	41(51.3)	54(33.8)	
Past history of psychiatric diseases	No	77(96.3)	65(81.3)	142(88.8)	0.003
	Yes	3(3.8)	15(18.8)	18(11.3)	
Family history of psychiatric diseases	No	78(97.5)	74(92.5)	152(95.0)	0.147
	Yes	2(2.5)	6(7.5)	8(5.0)	
Habits	Smoke	10(12.5)	14(17.5)	24(15.0)	0.003[b]
	Alcohol	0(0.0)	5(6.3)	5(3.1)	
	Both	2(2.5)	9(11.3)	11(6.9)	
	No	68(85.0)	52(65.0)	120(75.0)	
Marital status	Married	12(15.0)	13(16.3)	25(15.6)	0.527[c]
	Single	68(85.0)	65(81.3)	133(83.1)	
	Divorced	0(0.0)	2(2.5)	2(1.3)	
Benefiting the quota	No	67(83.8)	64(80.0)	131(81.9)	0.538
	Yes	13(16.3)	16(20.0)	29(18.1)	
Domesticity	Yes	8(10.0)	11(13.8)	19(11.9)	0.463
	No	72(90.0)	69(86.3)	141(88.1)	
Recent experience of stress [d]	Financial	12(15.0)	16(20.0)	28(17.5)	<0.001[e]
	Emotional	19(23.8)	27(33.8)	46(28.8)	
	Sickness	1(1.3)	11(13.8)	12(7.5)	
	Related to marriage	1(1.3)	6(7.5)	7(4.4)	
	Not stated	13(16.3)	11(13.8)	24(15.0)	
	No	34(42.5)	9(11.3)	43(26.9)	

[a] Chi-Square Test, [b] No habit versus stating any kind, [c] Single versus married/divorced, [d] In the past year, [e] No stress expressed versus stating any kind

As it can be seen in Table 1, there was some significant difference ($p<0.05$) between the two groups in 7 particulars namely interest in the major study, family income, parents' education level, working part-time as a student, pre-existing psychiatric disorders, cigarette smoking or alcohol consumption, and having a stressful experience over the past year. Although the independence of the two variables of birth order in the family and pre-existing psychiatric disorders in the family from academic failure could not be rejected, these two variables, as well as 7 above-mentioned characteristics (9 characteristics in total), were included in the multiple regression model considering the p-value in the liberal limit ($p<0.2$). The results obtained from fitting the initial multiple model and reduced model can be seen in table 2.

Table 2: Results of fitting of multiple initial and final reduced models of conditional logistic regression

Characteristics	Multiple model		Final reduced model			
	Adjusted OR	P	Adjusted OR	P	95% CI for OR	
					Lower	Upper
Interest in the major study	0.18	<0.001	0.18	<0.001	0.06	0.47
Family income	0.82	0.509	-	-	-	-
Parents' education level	0.17	0.001	0.16	<0.001	0.06	0.42
Working part time	7.12	<0.001	6.78	<0.001	2.44	18.79
Past history of psychiatric diseases	5.43	0.037	5.67	0.029	1.19	27.02
Family history of psychiatric diseases	3.31	0.318	-	-	-	-
Birth order	0.96	0.891	-	-	-	-
Recent experience of stress	4.02	0.015	4.14	0.009	1.43	11.97
Cigarette smoking/alcohol consumption	3.50	0.020	3.31	0.022	1.18	9.27

OR: Odds Ratio, CI: Confidence Interval

According to table 2, it can be seen that working part-time as a student (OR=6.78, P<0.001), higher levels of parents' education (OR=0.16, P<0.001), pre-existing psychiatric diseases (OR=5.67, P=0.029), interest in the major of study (OR=0.18, P<0.001), recent experience of stress (OR=4.14, P=0.009) cigarette smoking or alcohol consumption were the factors which were shown to be associated with academic failure respectively.

4. Discussion

Academic failure of students has been explained with a variety of individual and socioeconomic problems (Ibabe, 2016; Stadtfeld et al., 2019). According to the results of the present study, the factor of working part-time as a student showed the greatest connection with the academic failure such that the presence of this factor aggravated the academic failure of students by seven times which completely aligned with the previous evidence and studies (Mahdion et al., 2016). Working part-time as a student not only imposes some time limits on the students in doing the academic assignments effectively and makes them do the educational activities outside the hours of the classroom, but it can also make him stay away from the practical and theoretical lessons. Also, it may make them have a preoccupation with some issues other than their studies. One of the main reasons for working part-time as a student is the financial problems that

can be associated with the socioeconomic level of the students and leading an independent life as a student or having a married life. In this regard, two important determinant factors are the socioeconomic level of the students i.e. student's family income and parents' education level (Dehbozorgi & Mooseli, 2002), and the distribution of both these factors were significantly different between the case group and control group. However, they lost their significance in the ultimate model due to a high correlation. As for the marital status, although the number of single subjects in the control group was a little greater than that of the control group; since most of the students were single, no significant effect exerted by this factor on academic failure was reported. In this regard, it can be seen that the higher levels of parents' education, independent from other factors, show a significant connection with academic failure such that each increase in the levels of parents' education leads to an 83% decrease in student's academic failure. To explain this finding, it should be mentioned that higher levels of parents' education make the student enjoy greater proper support and guidance from their families. In terms of parental involvement in students' education, some studies indicated that parents can facilitate and promote their children's classwork (Dennis et al., 2005; Kol, 2013). Chen et al. have shown a large difference between students in high-income and low-income families in terms of academic failure. They found that the receipt of financial aid is related to narrowing the dropout gap between students from low- and middle-income groups, although overall the interaction between that and income is not significant. They showed that loans and work-study aid both have similar effects on student academic failure and drop-out across all income groups (Chen & DesJardins, 2008).

Pre-existing psychiatric diseases making the students 5 times more susceptible to academic failure, stands third among the factors shown associated with academic failure, and this result completely confirms the results of the previous studies (DeBerard, Spielmans, & Julka, 2004; Wang et al., 2014). Since the mental disorders can originate from genetic or environmental similarities among the family members, which may, on the other hand, affect the education quality of the students; in the present study, the pre-existing mental disorders of at least one member of the student's family, as well as those of student, were examined for which no significant relationship could be reported, though its relative frequency in case group was a little greater than that of the control group. Therefore, it can be concluded that the pre-existing mental disorders among the family members cannot be considered an important factor in the academic failure of the students as opposed to the pre-existing mental disorders of the students themselves.

The present study showed that being interested in one's major of study decreases the odds of academic failure by 80% confirming the results of the previous studies (Gump, 2004; Mahdion et al., 2016). Interest in the major of study makes the person try eagerly to acquire the knowledge and skills and provide the student with the motivation to achieve academic success. The results of the present study showed that the students who had experienced an important stressful event in their lives over the past year were four times more susceptible to academic failure such that odds of facing the type of stress just mentioned in the case group and control group were stated to be 88.7% and

57.5% respectively. The emotional stress, not related to marriage, has been stated as the greatest one among different types of stress while the financial stress has been stated to stand in line.

The results of a study based on the data from the NEURO-HIV Epidemiologic Study in Baltimore, Maryland, indicated that academic failure was associated with earlier alcohol initiation (Trenz, Harrell, Scherer, Mancha, & Latimer, 2012). In 2006, academic failure was significantly more prevalent among students who reported the use of chewing tobacco, bidis, or cigarettes, as compared with nonusers (Dhavan, Stigler, Perry, Arora, & Reddy, 2010). The study conducted by Rahimi et al. concluded that cigarette smoking led to the academic failure of the students (Rahimi et al., 2014). The result of the present study confirms the same point. In the present study, we have questioned the students about cigarette smoking, alcohol consumption, illegal use of drugs in general.

Causal inference is considered as an important goal of social science research (Imai, Keele, & Tingley, 2010). To achieve this, model building is required (Ranganath & Perotte, 2018). We used logistic regression to build our model. There is an extensive literature on model building for regression analysis, for all linear models, and logistic regression, specifically. In our analysis the approach was used model building was based on Hosmer and Lemeshow strategy declared by Jewell (Jewell, 2003). The main advantage of this method is its simplicity compared to more advanced models such as the causal mediation analysis. Causal mediation analysis is widely used across many disciplines to investigate possible causal mechanisms (Imai, Keele, Tingley, et al., 2010). It has been implemented within the framework of linear structural equation models in the social sciences. Such an analysis allows researchers to explore various causal pathways, going beyond the estimation of simple causal effects (Imai, Keele, & Tingley, 2010). In our study, not using novel methods such as causal mediation analysis should be considered as a limitation for causal inference.

Some previous studies focus on what institutional characteristics may contribute to conditions that reduce student academic failures and dropout risks. Evidence indicates that institutional expenditure on student services is negatively associated with student dropout behavior(Chen, 2012). In our study the variables related to the facilities available in the colleges have not been investigated and therefore cannot be judged. The previous studies in the country confirm that academic failure in male students is more common than female students (Ebrahimzadeh et al., 2016; Ghasemi et al., 2014). As a limitation, it should be mentioned that because the control group subjects were selected from the classmates of case group subjects and they have been matched in terms of gender, education level and major of study (and naturally to some extent in terms of age), it was not possible to examine the effect of these variables on academic failure. Of course, in the case group the number of male students was a little greater than female students and this difference can originate to some extent from the sex distribution of the students during the study. Another limitation of the present study is the limitation of the statistical population to one single university and not conducting a comprehensive examination of all factors that may affect the students' lives such as lifestyle, parents' jobs, etc. One of the strengths of the present study is that it has been conducted at a large

university offering many different majors of studies at different levels, though the study did not include the students studying beyond the master's degree level according to the regulations of the university.

5. Conclusion

Academic failure depends on some factors and conditions, and it is expected to be possible to take preventive actions by identifying and screening exactly those factors and conditions. Identification of the conditions associated with academic failure in the students is the prerequisite to taking effective and timely measures. The results of the present study showed that working part-time as a student, pre-existing psychiatric diseases, disinterest in the major of study, recent experience of stress and cigarette smoking or alcohol consumption are the main factors and indicators associated with academic failure, and it is suggested that they should be certainly noticed to identify early the students who are susceptible to academic failure. Based on the results of our study and in line with previous studies universities in the country are highly suggested to incorporate protective factors for students with a higher vulnerability that generate a resilient environment for student learning, adaptation, and retention. Some suggestions include quantitative and qualitative strengthening of student counseling centers, planning training along with practicing and applying related skills for students, identifying and removing the reasons for students' lack of motivation in university, the full introduction of college courses for high school students and helping them to choose the right field of education regarding interest and awareness, identifying and examining the reasons for student smoking or alcohol use, and helping students reduce their stress, especially helping them overcome financial difficulties and concerns.

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