

## Analysis on Convergent Factors related to the Hopelessness of Health College Students

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**Abstract**— This study investigates the convergence relationship of factors related to hopelessness among some health college students to identify the advantage of data analysis in the field of health care. The questionnaire was conducted using an unregistered self-administered questionnaire for 214 students from a college located in J area from October 1, 2018 to October 31, 2018. The hierarchical multiple regression analysis shows the following results. The hopelessness of respondents turned out to be significantly higher in following groups: a group in which academic burnout is higher, a group in which anxiety is higher, and a group in which psychosocial stress is higher. The results show explanatory power of 43.3%. And this indicates that the efforts to decrease academic burnout, anxiety, and psychosocial stress are required to decrease hopelessness among health college students. These results can be used to guide college life counseling to lower hopelessness among health college students. It is also expected to be used for efficient data analysis of health problems. Further research requires the development of sophisticated data analysis techniques and procedures that can be used more efficiently in health care.

**Keywords**— Convergence, Health college student, Hopelessness, Academic burnout, Anxiety, Psychosocial stress

### 1. INTRODUCTION

The government and related agencies continue to make efforts to efficiently plan and implement policies to promote the health of local residents. In the health sector, the project's validity is verified by viewing the program's output as utility or effect rather than currency, so identifying cause and effect on health problems is an important means to improve the efficiency of health projects. A multidisciplinary cause of health-related problems requires a methodology to analyze data and explore causes through scientific methods. Therefore, this study identifies analysis in health care by measuring the variables of causes and results of health problems with a certified measure with proven reliability and validity and by utilizing statistical analysis tools such as t-test, ANOVA and hierarchical multiple regression analysis. As a health issue, the factors of the subject are academic burnout, anxiety, and psychosocial stress that affect the hopelessness of health college students. And the causal relationship of hopelessness and these factors was determined by statistical data analysis.

Hopelessness is the thought that one cannot change the negative future, and when it is prolonged, it appears to be an important psychological determinant that can lead to mental and physical disabilities[1][2]. Hopelessness is a predictor of the occurrence of a serious mental problem, and as hopelessness increases, the will to solve difficult problems which individuals are facing will decrease, and it will give rise to negative emotions such as cynicism and pessimism, eventually leading to a lower quality of life[3]. For that reason, it is necessary to interact with the environment surrounding individuals, and put efforts on lowering the level of hopelessness so that one may develop social adaptability to lead a healthy life.

When hopelessness persists for a long time, it seems that college students majoring in health science will lack the ability to plan ahead and tense up, which will lead to serious mental problems[4]. In terms of psychosocial health, hopelessness has been investigated as a factor affecting college students' physical, mental, social, family and academic activities in relation to the problem of internet addiction[5]. The hopelessness of college students was found to be positively correlated with sleep problems and interference with normal daily activities, and negatively correlated with adaptation to changes, patience and control, and positively correlated with thoughts of suicide. It was suggested that the effort to reduce college student's hopelessness could be a psychiatric intervention to prevent morbidity[6].

College students majoring in health science are under increasing pressure with regard to their academic and career path to acquire professional qualifications and secure job competitiveness due to innovative development in healthcare, and increased demand for high-quality job competency in hospitals[7]. In line with the trend of internationalization of medical services, support and provision of

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more advanced practical English education to improve the ability to communication in foreign languages is also increasing the academic burden of college students in the health sector[8]. Excessive academic stress due to on-the-job training in hospitals and preparation for national exams can lead to mental problems such as depression, anxiety and valuelessness. However, there is a lack of voluntary efforts to overcome them, which can disrupt social life after graduation as well as in school, and there is a lack of social interest in them[9]. For college students majoring in health science, national exams for obtaining various qualifications and licenses, and working-level English lessons to improve the job competency for internationalized medical services may create a gap between an individual's career goals and reality, make it increasingly difficult to bridge the gap, create anxiety about reality, academic burnout, and daily stress, and increase hopelessness that thwarts any hope for the future.

College students' academic burden has a positive function of triggering academic wills and motivating them, but heavy academic pressure causes physical burnout, and academic burnout. And the students will experience the academic problem of learning incompetence. This can lead to psychological and emotional states such as maladjustment and tension, which can serve a negative function that causes anxiety[10][11]. College students' academic burnout and anxiety can cause cynicism and exhaustion in their studies, and also lead to a failure to adequately and flexibly respond to threatening objects that are not clearly recognized. As a result, they may manifest themselves as psychological and physical symptoms and increase psychosocial stress[4][9][11][13]. College students' academic burnout, anxiety and psychosocial stress may lead to mental and physical discomfort and defects, aggravating the state of hopelessness, i.e. decline in enthusiasm, a feeling of helplessness, an inappropriate response to reality and a failure to prepare for a changed future. It seems urgent to investigate related factors that can lower hopelessness.

In previous studies, the hopelessness of college students majoring in health science was reported to be related to emotional problems such as depression, helplessness and valuelessness[4][12][14], and the association between academic burnout and anxiety of college students was analyzed[10][11][15], and college students are said to experience psychosocial stress, i.e. being exposed to physical and mental pressure, in the absence of a response suitable for unclear objects and threatening situations[4][7][10]. The association between the psychosocial stress and hopelessness of youths was suggested[2], and it was suggested that college students' hopelessness was linked to psychosocial stress and to serious emotional and psychological problems[1][3][5]. Similar to this, existing studies suggest that it is possible to reduce anxiety, psychosocial stress and hopelessness by managing academic burnout, and to reduce the hopelessness of college students majoring in health science, it implies a two-track approach of intervention and management efforts to manage academic burnout, anxiety and psychosocial stress. Previous studies suggest that individual factors, such as academic burnout, anxiety and psychosocial stress, are related to hopelessness, but there are few studies that analyzed the convergent relationship among these factors in college students' hopelessness.

Therefore, the purpose of this study is to identify the advantages of data analysis in health care and to identify the convergent relationship among academic burnout, anxiety, psychosocial stress and hopelessness of college students majoring in health science. Also, this study will provide basic data that can be used for college life and academic counseling and guidance to reduce the hopelessness of college students majoring in health science who are faced with such problems as anxiety and psychosocial stress due to increased academic burden and increased demands for employment competitiveness. In addition, the analytical methodology presented in this study can be used to develop more efficient data analysis techniques and procedures that can be utilized in the health care field.

## 2. ANALYSIS METHOD

### 2.1 ANALYSIS TARGET

The G\*Power 3.1 program [16] was used to calculate the appropriate number of samples for analyzing factors related to hopelessness among health college students. In this program, significant levels of .05, effect size .15 and power .95 for t-test, ANOVA, and multi-regression analyses were calculated as critical F 1.68, and the minimum required number of samples was 208. The survey targets 300 people who exceed the appropriate number of samples calculated in case of poor response. At the randomly selected college located in J area, 300 randomly selected health college students were surveyed. The 241 questionnaires were retrieved(80.3%) and the data were analyzed by 214 people, with the exception of the 27 poorly responded questionnaires. The survey period was from Oct. 1, 2018 to Oct. 31, 2018. We tried to keep the research ethics in the following ways. The surveyor visited the health department of the college and explained about the right to reject the questionnaire to the random person, the process of preparing the questionnaire, the protection of the data, and the purpose and contents of the survey. At this time, the self-registration questionnaire was distributed only to health college student who agreed to fill

out the questionnaire. The documents were completed at the site under monitoring and retrieved immediately.

## 2.2 ANALYSIS TOOL

As shown in Table 1, The survey was conducted with 14 questions as general characteristics, 15 questions of academic burnout, 21 questions of anxiety, 18 questions of psychosocial stress and 20 questions of hopelessness. The academic burnout without cut off point was divided into low and high groups based on the median value and was compared with the hopelessness in t-test.

The general characteristics were gender, age(yrs), religious status, family life satisfaction, school record, relationships with friends, school life satisfaction, drinking status, smoking status, regular eating, regular exercise, daily average sleep time, hobbies and leisure activities, and subjective health status.

The scale for measuring academic burnout was based on the MBI-SS(Maslach Burnout Inventory-Student Survey) of Schaufeli et al., and the Korean version 15 items [18] that were adapted, modified and validated were used. This scale consists of five items of exhaustion, four items of cynicism and six items of inefficacy. The score is from 15 to 75, and the higher the score, the higher the academic burnout. The Cronbach's  $\alpha$  value, which is the internal reliability, was .902.

The scale for measuring anxiety was based on Beck et al.[19]'s Beck Anxiety Inventory (BAI), which was translated and validated using 21 questions [20][21]. The score is from 0 to 63, and the higher the score, the higher the anxiety. The Cronbach's  $\alpha$  value, which is the internal reliability, was .922.

The psychosocial stress was based on GHQ(General Health Questionnaire)[22] and the PWI-SF(Psychosocial Well-being Index Short Form) was used as a scale that was reconstructed to fit the domestic situation and proved its validity. The score is from 0 to 54, and the higher the score, the higher the psychosocial stress. The total PWI score was divided into positive wellbeing group with 8 points or less, moderate distress group with 9 points or 26 points, and severe distress group with 27 points or more [23]. The hopelessness was compared in ANOVA. The Cronbach's  $\alpha$  value, which is the internal reliability, was .907.

The hopelessness was measured by using 20 items [25] of the hopelessness scale which was reconstructed based on the BHOP(Beck Hopeness Scale)[24]. The score is from 0 to 20, and the higher the score, the higher the hopelessness. The Cronbach's  $\alpha$  value, which is the internal reliability, was .884.

TABLE I. The number of questions, range of score, cronbach' $\alpha$  and explanation of used scale

Scale Sub-domains	Number of questions	Range of score	Cronbach' $\alpha$	Explanation
Academic burnout	15	15-75	.902	
Exhaustion	5		.899	MBI-SS(Maslach Burnout Inventory-Student Survey)[15,16]
Cynicism	4		.920	
Inefficacy	6		.915	
Anxiety	21	0-63	.922	Becky Anxiety Inventory (BAI)[17,18,19]
Psychosocial stress	18	0-54	.907	PWI-SF(Psychosocial Well-being Index Short Form)[20,21]
Hopelessness	20	0-20	.884	BHOP(Beck Hopeness Scale)[22,23]

## 2.3. ANALYSIS PROCESSING

The data were processed using IBM SPSS Statistics(ver 23.0). The comparison of the hopelessness according to general characteristics, academic burnout, anxiety and psychosocial stress of the subjects was verified by t-test and ANOVA. In order to categorize age(yrs) and daily average sleep time, which are variables that represent the general characteristics, age was divided into 21 years, the average daily sleep time was less than 7 hours, 7 to 8 hours, and more than 8 hours. To identify the control variables and independent variables affecting the hopelessness, hierarchical multiple regression analysis was conducted with variables that showed significant relationship in t-test and ANOVA as independent variables and hopelessness as dependent variables. At this time, family life satisfaction, school record, relationships with friends, school life satisfaction, drinking status, smoking status, regular eating, regular exercise, hobbies and leisure activities, and subjective health status, which are the control variables of

categorical type that showed significant difference in the hopelessness, were converted into dummy variable. The significance level of hypothesis test was  $p < .05$

**3. ANALYSIS RESULT**

**3.1. HOPELESSNESS BY GENERAL CHARACTERISTICS**

As shown in Table 2, the average hopelessness of the subjects was  $5.13 \pm 4.75$  from 0 to 20 points, hopelessness by general characteristics was significantly higher for those with low age, unsatisfactory family life, poor school record, bad relationships with friends, unsatisfactory school life, and poor subjective health status. Other than that, gender, religion, drinking, smoking, regular meals, regular exercise, daily average sleep time, hobbies and leisure activities did not show significant difference with hopelessness.

Table 2. Hopelessness by General Characteristics

Variables	N(%)	Hopelessness(BHOP)
		Mean±SD
Age(yrs)		
<21	134(62.6)	5.77±4.79
21≤	80(37.4)	4.05±4.52
t(p-value)		2.593(.010)
Family life satisfaction		
Satisfied	206(96.3)	5.00±4.65
Dissatisfied	8( 3.7)	8.38±6.48
t(p-value)		-1.984(.049)
School record		
Good	44(20.6)	3.32±3.90
Medium	142(66.4)	5.25±4.71
Bad	28(13.1)	7.36±5.24
F(p-value)		6.649(.002)
Relationship with the friend		
Good	201(93.9)	4.94±4.61
Bad	13(6.1)	8.90±6.24
t(p-value)		-2.606(.010)
School life satisfaction		
Satisfied	187(87.4)	4.60±4.49
Dissatisfied	27(12.6)	8.78±4.99
t(p-value)		-4.456(<.001)
Subjective health status		
Good	153(71.5)	4.23±4.30
Bad	61(28.5)	7.38±5.11
t(p-value)		-4.574(<.001)
Total	214(100.0)	5.13±4.75

**3.2. HOPELESSNESS BY ACADEMIC BURNOUT, ANXIETY AND PSYCHOSOCIAL STRESS**

Table 3 compared the hopelessness of the subjects according to their academic burnout, anxiety and psychosocial stress. The group with high academic burnout had significantly higher hopelessness, and the group with high exhaustion, cynicism and inefficacy in the sub-areas had significantly higher scores. The group with high anxiety had significantly higher hopelessness, and the group with high psychosocial stress had significantly higher hopelessness.

Table 3. Hopelessness by Academic Burnout, Anxiety and Psychosocial Stress

Variables(Total score)	N(%)	Hopelessness(BHOP)
		Mean±SD
Total Academic burnout(MBI-SS)		

Low group <sup>§</sup>	104(48.6)	3.09±3.54
High group	110(51.4)	7.06±4.96
t(p-value)		-6.766(<.001)
Exhaustion		
Low group	92(43.0)	3.72±4.25
High group	122(57.0)	6.19±4.85
t(p-value)		-3.888(<.001)
Cynicism		
Low group	98(45.8)	3.03±3.65
High group	116(54.2)	6.90±4.87
t(p-value)		-6.472(<.001)
Inefficacy		
Low group	107(50.0)	3.32±3.73
High group	107(50.0)	6.93±4.99
t(p-value)		-5.971(<.001)
Anxiety(BAI) <sup>  </sup>		
Normal	195(91.1)	4.79±4.55
Mild anxiety	8( 3.7)	7.50±5.16
Moderate anxiety	6( 2.8)	6.17±5.46
Severe anxiety	5( 2.3)	13.20±4.14
F(p-value)		6.340(<.001)
Psychosocial stress(PWI-SF) <sup>¶</sup>		
Positive wellbeing	22(10.3)	1.55±3.19
Moderate distress	118(55.1)	4.22±3.90
Severe distress	74(34.6)	7.62±5.21
F(p-value)		22.246(<.001)
Total	214(100.0)	5.13±4.75

§ : Low and high group classified by the median score of each variable.

||: Anxiety were divided into four groups, normal(<22 of BAI score), mild anxiety(22≤ BAI score ≤26), moderate anxiety(27≤ BAI score ≤31) and severe anxiety(32≤ of BAI score).

¶: Psychosocial stress were divided into three groups, positive wellbeing(<9 of PWI score), moderate distress(9≤ PWI score ≤26) and severe distress(27≤ of PWI score).

### 3.3. FACTOR TO INFLUENCE HOPELESSNESS

In Table 4, hierarchical multiple regression analysis was conducted on four models to understand the explanatory power of independent variables on the hopelessness of the subjects.

Model I was found to have high hopelessness and explanatory power was 22.2% when the general characteristics were put into the regression model as age was lower, school record was worse, relationship with the friend was worse, school life satisfaction was lower, and subjective health status was worse. In Model II, as a result of putting academic burnout into the variables put into Model I, the higher cynicism and inefficacy, which are the sub-areas of academic burnout, the higher hopelessness, and 33.8% of hopelessness was explained as the variables put into Model II. In Model III, as a result of putting anxiety into variables put into Model II, the higher anxiety, the higher hopelessness, and variables put into Model III explained hopelessness by 40.1%. In Model IV, as a result of putting psychosocial

stress into variables put into Model III, the higher psychosocial stress, the higher hopelessness, and variables put into Model IV explained hopelessness by 43.3%.

In the above model, academic burnout increased 11.6%, anxiety increased 6.3%, and psychosocial stress increased 3.2% of explanatory power. There was a high relationship in the order of academic burnout, anxiety and psychosocial stress in hopelessness. After reviewing the regression model, we found that the Durbin-Watson value was 1.929, so there was no autocorrelation, and the Variance Inflation Factor value was from 1.067 to 1.989, which was judged to be not multicollinearity.

Table 4. Hierarchical Multiple Regression of Selected Variables on Hopelessness

Variables	Model I		Model II		Model III		Model IV	
	B	t	B	t	B	t	B	t
Age(yrs)	-0.425	-2.484*	-0.415	-2.576*	-0.264	-1.685	-0.229	-1.493
Family life satisfaction <sup>§</sup>	2.108	1.303	1.694	1.121	0.81	0.557	0.849	0.599
School record <sup>§</sup>	1.638	2.175*	0.112	0.149	0.32	0.447	0.347	0.497
Relationship with the friend <sup>§</sup>	2.987	2.120*	3.147	2.385*	2.829	2.245*	2.661	2.164*
School life satisfaction <sup>§</sup>	2.541	2.711**	1.327	1.483	1.343	1.574	1.02	1.217
Subjective health status <sup>§</sup>	2.583	3.936**	1.892	3.006**	1.068	1.706	0.662	1.064
Academic Burnout(MBI-SS)								
Exhaustion			0.066	0.942	-0.014	-0.203	-0.08	-1.155
Cynicism			0.184	2.063*	0.191	2.238*	0.162	1.943
Inefficacy			0.254	3.720**	0.23	3.517**	0.151	2.228*
Anxiety(BAI)					0.157	4.616**	0.13	3.819**
Psychosocial stress(PWI-SF)							0.124	3.376**
Constant	11.221		5.575		2.581		2.093	
F	9.851		11.567		13.577		14.011	
R <sup>2</sup>	0.222		0.338		0.401		0.433	
R <sup>2</sup> change	0.222		0.116		0.063		0.032	
Adjusted R <sup>2</sup>	0.2		0.309		0.371		0.402	

VIF min=1.067, max=1.989 Durbin Watson=1.929

§ : Dummy Variable, \* : p<.05, \*\* : p<.01.

#### 4. CONSIDERATION

This study attempted to analyze statistical data on factors related to hopelessness of health college students and to identify the advantages of data analysis in health care. The data analysis results are as follows. The average score of the hopelessness of the college students majoring in health science was 5.13±4.75 from 0 to 20 points, which was higher than the average score of 4.57±4.58 of the middle school students[2], suggesting that the academic burnout, anxiety and psychosocial stress of the health college students increased the hopelessness and that the hopelessness of the college students majoring in health science was a desperate problem in psychological and emotional mental health.

In general characteristics, the college students majoring in health science' hopelessness showed significant differences in age, family life satisfaction, school record, relationship with friends, school life satisfaction and subjective health status, but there was no difference in gender, religion, drinking, smoking, regular eating, regular exercise, daily average sleep time, hobby and leisure activities.

The results of the previous studies[4] that the female health college students had emotional difficulties in unsatisfactory family life group, poor school record group, bad relationship with friends group, unsatisfactory school life group, and poor subjective health status group were similar to those of college students majoring in health science. The analysis [10] that the gap between ideal and reality of college students is confirmed in age, family life satisfaction, school record, relationship with friends, school life satisfaction and subjective health status is similar in the hopelessness of college students majoring in health science. The point that women's depression level is high in gender was not confirmed in the hopelessness, which means that women are highly sensitive to the difference between reality and ideal, but attitude and will to change that they see their future negatively are not related to gender. When the result of the high hopelessness of the group with low age or low satisfaction with family life was seen, it was necessary to support and mediate resources to manage hopelessness considering age and home environment. The group with low school record, relationship with friends, and school life satisfaction

showed high hopelessness, so the hopelessness of college students majoring in health science was considered to be effective in professional intervention by educational counseling guidance of college. Health is closely related to hopelessness of college students majoring in health science, so it was shown that the joint efforts of home and college will be effective in the health management to lower hopelessness.

Therefore, it was estimated that the development of counseling materials and active intervention to lower the hopelessness through the management of age, family life, school record, friendship, school life and health care of college students majoring in health science are required.

The results of this survey were similar to those of previous studies[10][11][15] on the relationship between academic burnout and hopelessness. The development of the health care field, the increase in job skills, the burden on academic and career[7], the strengthening of foreign language competence[8], the increasing academic burden[4] of the health-related curriculum, the cynicism and inefficacy of academic performance and the exhaustion of academic maladjustment seemed to be related to the hopelessness that weakens the will to change the future.

The point that the higher anxiety, the higher the hopelessness[7][10], was similar in the analysis of this survey, and the mental anxiety caused by inappropriate response to unclear objects and situations was linked to the hopelessness level. The lack of elastic defense against the dissonance of the surrounding environment caused psychological and physical symptoms, which were judged to increase the hopelessness of college students majoring in health science.

The correlation between psychosocial stress and hopelessness was confirmed in this study. Psychosocial stress caused by physical and mental pressure of college students majoring in health science was considered to be linked to hopelessness. It was estimated that the academic burden and anxiety due to the development and changing employment conditions of healthcare technology increased psychosocial stress and increased the hopelessness of college students majoring in health science.

Hierarchical multiple regression analysis was conducted to identify the explanatory power of independent variables affecting the hopelessness of college students majoring in health science. In the general characteristics of Model I, the lower age, the worse school record, the worse friendship, the lower school life satisfaction, the worse subjective health condition, and hopelessness was significantly higher. In the academic burnout of Model II, the higher cynicism and inefficacy, hopelessness was higher. In the psychosocial stress of Model IV, the higher psychosocial stress, hopelessness was higher, and the explanatory power of these variables was 43.3%.

In particular, the explanatory power was increased by 11.6% for academic burnout, 6.3% for anxiety, and 3.2% for psychosocial stress, which showed that academic burnout was more related to hopelessness than psychosocial stress and anxiety. The college students majoring in health science' hopelessness was highly related to academic burnout, anxiety and psychosocial stress in order. In the existing survey of individual factors, the higher academic burnout[10][11][15], anxiety[7][10], psychosocial stress[1]-[3][5], the higher hopelessness, which was similar to this study. The relationship between psychosocial health status and hopelessness of college students in the humanities and natural sciences was similar in the college students majoring in health science.

The results of this survey suggest that it is necessary to manage academic burnout, anxiety and psychosocial stress as preventive factors in order to reduce the hopelessness of college students majoring in health science. In the case of academic burnout, counseling guidance that helps students to see their academic achievement positively, to achieve their academic goals in a planned and step-by-step manner, to increase their confidence, and to develop their will to resolve academic pressure can reduce the hopelessness of college students majoring in health science. It was shown that intervention efforts by experts who support the overcoming of psychological inconveniences such as unclear subjects and situation maladjustment and unfavorable tension could reduce the hopelessness of health college students. Also, it was considered that educational support to reduce stress that may cause physical and mental symptoms is necessary.

This study is based on a cross-sectional small sample of some college students majoring in health science at a specific point of time, so there is a limit to extend the results to the whole college students majoring in health science[26]. Also, the measurements of academic burnout, anxiety, psychosocial stress and hopelessness used in this survey analysis were conducted by the self-based method of the subjects, so it is not possible to exclude the risk of response bias. However, this study has significance in that it combined individual factors related to the hopelessness of college students majoring in health science to examine the relationship between academic burnout, anxiety, psychosocial stress and hopelessness. Further research requires the development of sophisticated data analysis techniques and procedures that can be used more efficiently in health care. We believe that analysis of various variables that can affect hopelessness for health college students with large sample sizes is necessary in further studies. We also

believe that continuous investigation into negative or positive mental health problems such as depression, stress, and happiness that health college students may have is necessary[27]-[29].

## 5. CONCLUSION

This study analyzed the relationship among the academic burnout, anxiety, psychosocial stress and hopelessness of some college students majoring in health science to identify the advantages of data analysis in health care. The survey was conducted on 214 college students majoring in health science randomly selected from a college in J area from October 1, 2018 to October 31, 2018.

College students' hopelessness was significantly higher in the groups of lower ages, the groups dissatisfied with family life, the groups with poor school records, the groups with poor relationship with friends, the groups dissatisfied with school life, and the groups with poor subjective health. In the hierarchical multiple regression analysis, college students majoring in health science showed higher hopelessness when they had higher academic burnout, anxiety and psychosocial stress, and the explanation power of all these variables was 43.3%.

Therefore, it is necessary to come up with a way to provide intervention and resources for the convergent factors of academic burnout, anxiety and psychosocial stress that affect hopelessness, and to use it for college life counseling and guidance to lower the hopelessness of college students majoring in health science. It is also expected to be used for efficient data analysis of health problems. Further research requires the development of efficient statistical analysis techniques and procedures for analyzing data in health care.

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