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ORIGINAL ARTICLE

Evaluation of health management department students' attitudes towards scientific research and critical thinking

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Abstract

In this study, it was aimed to evaluate the critical thinking dispositions of health management students in terms of various variables and to examine the relationship between their attitudes towards scientific research. Within the scope of this cross-sectional and descriptive study, 239 students studying in the health management department of a foundation university were reached. The data were collected through a questionnaire using the "Attitude Towards Scientific Research Scale" and "Critical Thinking Disposition Scale" and it was determined that the scales used were reliable and normally distributed. It was determined that there was a significant relationship between the critical thinking dispositions of health management students and the sub-dimensions of their attitudes towards scientific research. In addition, in the difference analysis, it was determined that there was a significant difference between the critical thinking dispositions of the students according to the gender variable and there was no significant difference between the variables of class level, taking scientific research courses, reading scientific publications and the purpose of using the internet. Studies aimed at developing students' critical thinking skills can also positively increase attitudes towards scientific research. In this direction, it is important to use strategic tools such as socratic inquiry, collaborative learning, concept mapping, case studies and problem-based learning, to encourage students' active participation in research projects, and to actively implement mentoring programs throughout their education life to raise mindsets focused on scientific research and critical thinking.

Keywords: Scientific research, critical thinking, health management, attitude

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Introduction

One of the basic behaviors of human beings is to know nature the universe and understand the events they contain. The process of acquiring and understanding knowledge is among the activities that continue in the individual's daily life with a subjective quality [1]. Science is the most important and valid tool for acquiring knowledge. Knowledge is a belief that is true and has been sufficiently documented [2]. The search for knowledge and understanding, intertwined with scientific knowledge, research and understanding of science, forms the basis of intellectual discovery and progress among various disciplines [3]. Scientific research, on the other hand, is a systematic path followed to find and reveal something. Scientific research is a systematic study carried out to discover an unknown subject or factors, to develop what existing knowledge to provide a solution to a specific problem and to establish concepts, theories or laws [2].

Scientific research can be described as the cornerstone of scientific and technological developments. In this context, it would not be wrong to say that the most economically and socially powerful countries of the 21st century are the countries that follow and produce scientific and technological developments and that they owe this success to scientific research [4]. With the developments experienced over time, the methods of acquiring knowledge and the types of valid information have changed. Indeed, individuals are expected to have different characteristics that will adapt to this flow of information. It can be said that individuals of the 21st century information society should be people who can think scientifically and have a positive attitude towards scientific research. A scientific attitude is a thought and behavior that facilitates problem solving, knowledge generation, research and learning [5]. It is known that individuals with high attitudes towards scientific research are critical, free from prejudices, sensitive to the problems around them and willing to solve them [6]. They take into account ideas other than their own and value opinions while looking for solutions. Indeed, scientific attitudes affect the individual's mindset and ensure their individual success and development.

In other words, it is seen that scientific attitudes include many characteristics such as being open to different ideas, approaching events with a skeptical approach, not having a fear of failure, accepting the possibility of making mistakes and benefiting from the literature. Raising individuals with these characteristics is among the common goals of all developing and developed societies [7]. At this point, countries attach particular importance to raising these individuals who will support economic, social and cultural development. In fact, developing scientific behavior and attitudes of individuals and transferring their positive benefits to social life is one of the main objectives of the education system [8].

On the other hand, for a profession to become professional, it is also important to transfer theoretical knowledge obtained as a result of scientific research to practical application [9]. In addition, the professionalization process includes not only learning information; it also includes the ability to work collaboratively, think creatively, access technology-supported information, and critical thinking skills that will be effective in making correct and useful decisions [10]. Critical thinking is a developmental skill that directs individuals to analyze information, evaluate sources, and make conscious decisions based on evidence [11]. Critical thinking is among the basic cognitive skills that a qualified individual possesses [12]. Students should be well-educated in being aware of what they learn during the education process, questioning the information they learn, predicting where they can use the information, and applying theoretical knowledge by reflecting it into practice. The acquisition of these skills can be possible by instilling critical thinking awareness in students through the education system [13]. Revealing the differences between evidence and claims, ensuring and testing information security, being able to sort through raw data, being aware of prejudices, and using language correctly and effectively are among the skills of the critical thinking process. Instead of raising individuals who accept the information given without questioning, researching and testing its reliability in the modern understanding of education, it is essential to raise individuals who know what, why and how to learn, who question the accuracy of the information they learn and who contribute to the production of new knowledge. In this direction, one of the most fundamental tasks of the contemporary education system is to provide society with individuals who have critical and scientific thinking skills [14].

Considering all these factors, the aim of this study is to evaluate the critical thinking dispositions (CTD) of the students of the Health Management Department in terms of various variables and to examine the relationship between their attitudes towards scientific research (ATSR). First, the introduction section mentions the importance of the subject and its place in the literature. Then, the method of the study, data collection tools and analysis process are explained. The findings section presents the relationships between students' critical thinking tendencies and their attitudes towards scientific research and statistical analyses. Finally, in the discussion and conclusion sections, the findings are evaluated by comparing them with the literature and suggestions are presented.

Materials and Methods

Research Type, Universe and Sample

This study is cross-sectional and descriptive and was applied to Istanbul Medipol University, Health Management Department students studying between 2021-2022. The population of the study consists of 552 students of the Department of Health Management studying during the study period. Accordingly, the sample size was calculated as at least 227 students in line with the 95% confidence interval using the Raosoft web base [15]. A total of 239 samples were reached in the study.

Data Collection Tools

The data of the study was collected through a questionnaire. The questionnaire consists of three parts. The first part included questions indicating the socio-demographic characteristics of the students, the second part included the "Attitude Towards Scientific Research Scale (ATSR-S)", and the third part included the "Critical Thinking Dispositions Scale".

The *"Attitude Towards Scientific Research Scale (ATSR-S)"* was developed as a 5-point Likert-type scale consisting of 4 factors and 30 items [4]. Exploratory and confirmatory factor analyses were conducted to assess the validity of the scale. Internal consistency (*Cronbach's alpha*) and stability level (test-retest method) were calculated to test the reliability of the scale. The factors of the scale were determined as unwillingness to help researchers, unwillingness to help research, positive attitude towards research, and positive attitude towards researchers.

"Critical Thinking Disposition Scale (CTD-S)" is a 5-point Likert-type scale consisting of 26 items [16, 17]. Exploratory and confirmatory factor analysis was conducted to test the validity of the scale. The reliability of the scale, Cronbach-alpha reliability coefficient and stability level were calculated for the whole scale and its sub-dimensions. The factors of the scale consist of the concepts of foresight, cognitive maturity and innovativeness.

Variables of the Study

The scores obtained from the "ATSR-S" and "CTD-S" represent the dependent variables of the study. Gender, grade, taking a scientific research course, frequency of reading scientific publications and the purpose of using the internet constitute the independent variables of the study.

Research Hypotheses

H_1: There is a statistically significant difference between students' sociodemographic characteristics and their CTD.

H_{1a}: There is a statistically significant difference between students' gender and CTD.

H_{1b}: There is a statistically significant difference between students' taking scientific research courses and their CTD.

H_{1c}: There is a statistically significant difference between students' purpose of using the internet and their CTD.

H_{1d}: There is a statistically significant difference between students' grade levels and their CTD.

H_{1e}: There is a statistically significant difference between students' frequency of reading scientific publications and their CTD.

H_2: There is a statistically significant relationship between students' critical thinking dispositions and their attitudes towards scientific research.

H_{2a}: There is a statistically significant relationship between students' unwillingness to help researchers, which is a sub-dimension of the ATSR-S, and their CTD.

H_{2b}: There is a statistically significant relationship between students' unwillingness to help research, which is a sub-dimension of the ATSR-S, and their CTD.

H_{2c}: There is a statistically significant relationship between students' positive attitude towards research, which is a sub-dimension of the ATSR-S, and their CTD.

H_{2d}: There is a statistically significant relationship between students' positive attitudes towards researchers, which is a sub-dimension of the ATSR-S, and their CTD.

Analysis of the Study

The IBM SPSS 25.0 statistics program was used during the analysis of the study. First, descriptive statistics for the participants were calculated. Then, the suitability of the variables for normal distribution was tested. For the suitability for normal distribution; *Kolmogorov-Smirnov* value, *Skewness-Kurtosis* (+2 and -2) value range and Histogram/Stem-and-Leaf-Plot/Q graphs were examined [18]. Accordingly, the suitability of the data for normal distribution was accepted. In the study, *Independent Samples T test* was used to analyze the difference between the two group means, ANOVA in more than two groups and correlation analyzes were used to test the relationships between the measurement variables.

Ethical Aspect of the Study

The Istanbul Medipol University Non-Interventional Clinical Research Ethics Committee approved the scientific and ethical suitability of the study with the decision numbered E-10840098-772.02-2618, dated 07/06/2021. This study was conducted in accordance with the ethical principles stated in the Declaration of Helsinki. All students participating in the study were informed about the purpose, method and voluntariness of the study and agreed to participate in the study by signing the 'Informed Voluntary Consent Form.' Participants were informed that they could withdraw from the study at any time and their privacy and personal data were protected.

Limitations of the Study

Since the study was conducted only in the Health Management department of a foundation university, the results may not be generalizable to all Health Management students. In addition, other factors that may affect students' critical thinking and attitudes (*e.g.*, family socioeconomic status, students' personal interests, etc.) were ignored.

Results

Reliability analysis was performed on the questions of the two scales used in the study. *Cronbach's Alpha* value of the CTD-S was calculated as 0.88 and that of the ATSR-S was calculated as 0.86 Both scales are highly reliable.

As illustrated in Table 1, the descriptive statistics for the 239 students in the sample indicate that 77% are male and 23% are female. Additionally, 46% of the students are in the fourth grade, 19.7% are in the third grade, 19.2% are in the first grade, and 15.1% are in the second grade. When the status of the students taking a scientific research course is examined, 62.8% have not taken a scientific research course, and 37.2% have taken at least one course. It is seen that the frequency of students reading scientific publications is distributed as 54.8% once a month, 20.9% never, 17.2% once a week, and 7.1% several times a week. When the students' purposes of using the Internet are evaluated, 57.7% responded as social media and 42.3% as finding information on a topic I am looking for.

Difference tests were conducted on the sociodemographic characteristics of the participants CTD scores in Tables 2 and 3.

Looking at Table 2, students' CTD differ statistically according to their gender ($t=2.12$; $p<0.05$). Thus, H_{1a} hypothesis was accepted. This situation can be explained by the fact that female students (3.89±0.50) have higher CTD

Table 1. Sociodemographic characteristics of students.

Variables	n	%
Gender		
Female	55	23
Male	184	77
Grade		
1st Grade	46	19,2
2nd Grade	36	15,1
3rd Grade	47	19,7
4th Grade	110	46
Taking a Scientific Research Course		
Yes	89	37,2
No	150	62,8
Frequency of Reading Scientific Publications		
Never	50	20,9
Once a month	131	54,8
Once a week	41	17,2
A few times a week	17	7,1
Purpose of Using the Internet		
Finding information on a topic I am looking for	101	42,3
Social media	138	57,7
Total	239	100

%: Percentage

Table 2. Independent Sample T-Test Results of the CTD-S according to gender, taking a scientific research course, and the purpose of using the internet.

Variables	Frequency(n)	X±Sd	*p*	t
Gender				
Female	55	3,89±0,50	0,035*	2,12
Male	184	3,73±0,49		
Taking a Scientific Research Course				
Yes	89	3,89±0,48	0,448	0,76
No	150	3,84±0,51		
Purpose of Using the Internet				
Finding information on a topic I am looking for	101	3,86±0,56	0,859	0,18
Social media	138	3,85±0,45		
Total	**239**			

*$p<0.05$

Table 3. ANOVA Test Results of CTD-S on scientific publication reading and grade level.

Variables	Frequency(n)	X±Sd	Statistics ANOVA
Grade			
1st Grade	46	3,89±0,52	
2nd Grade	36	3,90±0,47	F=0,248
3rd Grade	47	3,83±0,51	*p*=0,863
4th Grade	110	3,84±0,50	
Frequency of Reading Scientific Publications			
Never	50	3,82±0,45	
Once a month	131	3,81±0,46	F=1,979
Once a week	41	3,93±0,52	*p*=0,118
A few times a week	17	4,08±0,76	

than male students (3.73±0.49). When we look at another independent variable, which is taking a scientific research course, the difference between the averages is not statistically significant (t=0.76; $p>0.05$). Accordingly, the H_{1b} hypothesis was rejected. It was also determined that there is no significant difference between the variable of the purpose of using the internet and the CTD (t=0.18; $p>0.05$). Accordingly, H_{1c} hypothesis was rejected.

Looking at Table 3, there is no significant difference between participants' CTD means and

Table 4. Relationship between students' CTD and ATSR.

Sub-Dimensions of ATSR	CTD Pearson Correlation	CTD Sig. (2-tailed)
Unwillingness to Help Researchers	-,235	*p*<0,001
Unwillingness to Help Research	-,291	*p*<0,001
Positive Attitude Towards Research	0,502	*p*<0,001
Positive Attitude Towards Researchers	0,512	*p*<0,001

their class ranks (F=0.248; $p>0.05$). Hypothesis H_{1d} is therefore rejected.

Looking at another independent variable, the status of reading scientific publications, we find that there is no significant difference between the students' CTD means (F=1.979; $p>0.05$). Therefore, hypothesis H_{1e} is rejected.

Looking at Table 4, there is a negative (r=-0.24) and significant ($p<0.001$) correlation between the unwillingness to help researchers, which is a sub-dimension of the ATSR-S, and the CTD. Accordingly, hypothesis H_{2a} is accepted. As the CTD of health management students' increases, their negative attitudes towards research decrease significantly. On the other hand, there is a negative (r=-0.29) and significant ($p<0.001$) correlation between the unwillingness to help research, which is a sub-dimension of the ATSR-S, and the CTD. Accordingly, hypothesis H_{2b} is accepted.

As the CTD of health management students increases, their negative attitudes towards research decrease significantly. When the findings are examined, there is a positive (r=0.50) and significant ($p<0.001$) correlation between the positive attitude towards research, which is a sub-dimension of the ATSR-S, and the CTD. Accordingly, hypothesis H_{2c} is accepted. As the CTD of health management students increases, their positive attitudes towards research also increase significantly. On the other hand, there is a positive (r=0.51) and significant ($p<0.001$) correlation between the positive attitude towards researchers, which is a sub-dimension of the ATSR-S, and the CTD. Therefore, H_{2d} hypothesis is accepted. As the CTD of health management students increases, their positive attitudes towards researchers also increase significantly.

Discussion

This study was conducted to evaluate the critical thinking disposition (CTD) of health management students in terms of various variables and to examine its relationship with their attitudes towards scientific research (ATSR). Data obtained from 239 students were analyzed in the study and it was determined that there were significant relationships between the students' CTD and ATSR. In particular, it was observed that as the critical thinking disposition increased, positive attitudes towards scientific research also increased. In addition, it was determined that gender created a significant difference in critical thinking disposition, but variables such as grade level, taking a scientific research course, frequency of reading scientific publications and purpose of internet use did not create a significant difference. These findings show that strategies to develop students' scientific thinking skills can positively affect their approaches to scientific research. When the results of the study are compared with the literature, studies with similar results are identified.

In a study aiming to determine the critical thinking attitudes of university students, it was found that critical thinking attitudes differed according to gender [19]. Similarly, in another study that aimed to evaluate the CTD of students receiving doctoral education, it was stated that there was a significant difference according to gender [20]. It is stated that gender affects the development of critical thinking skills, and female students show higher average values in critical thinking compared to their male counterparts [21]. In another study, it was emphasized that there was a significant difference between the critical thinking scores according to gender [22].

A study in the literature states that the direct effect of participation in scientific activities on CTD is not significant and that other factors may play a more critical role in the development of these skills [23]. Similarly, in a different study conducted to determine the CTD of health managers, it is stated that there is no significant difference with the status of participation in scientific activities [24]. Another study emphasized that there is no significant difference between the status of students participating in scientific activities and their CTD [25]. In a different study, no significant difference was found between the levels of critical thinking according to their participation in scientific activities [26]. In addition, it was found that there was no significant difference in CTD scores according to students' purpose of being on the Internet [27,28].

As a matter of fact, there are also studies indicating that there is no significant difference between students' critical thinking levels and their grade levels. One study evaluated medical students and found no significant differences in critical thinking skills across various academic terms [29]. Similarly, another study highlighted that there was no significant difference in critical thinking skills among nursing students before and after their educational programs across various levels of education [30]. In another study supporting this opinion, no significant difference was found between their class levels and critical thinking scores [31]. In another study examining the nursing students' class levels and their CTD score averages, it was determined that there was no significant difference [25]. No significant difference was found between the critical thinking levels of the students and their status of following the publications [32]. On the other hand, there is also a study stating that the mean CTD scores of nurses who follow scientific publications more frequently are significantly higher [33].

When we look at the literature, it is stated that students' CTD positively affect their ATSR [34]. Another study, which aimed to determine the relationship between students' attitudes towards the research methods course and their CTD, found that there was a positive and significant relationship between their attitudes towards the scientific research methods course and their critical thinking skills [35]. Similarly, a different study found a positive and significant relationship between students' awareness attitudes towards research and developments and their CTD [36]. Another study stated that students with positive attitudes towards critical thinking had lower research anxiety and revealed a significant and negative relationship [19]. Other studies in the literature also show that there is a significant positive correlation between the CTD score and general research use and attitude [37].

Conclusion

This study was conducted to evaluate the critical thinking tendencies of health management students in terms of various variables and to examine their relationship with their attitudes towards scientific research, and it was determined that there was a significant relationship between the students' critical thinking dispositions (CTD) and the sub-dimensions of their attitudes towards scientific research (ATSR). In addition, in the difference analyses, it was determined that there was a statistically significant difference between the students' CTD according to the gender variable; however, there was no significant difference between the variables of grade level, taking a scientific research course, reading scientific publications and the purpose of using the internet.

When the data obtained from this study and the research results in the literature are considered as a whole; it can be stated that the students' CTD affects the ATSR. Indeed, developing positive ATSR and increasing their CTD among the students in the health management department are very valuable in terms of preparing them for the dynamism and challenges of the health sector. In this direction, an enriching learning environment can be created by using effective strategies available in literature to cultivate scientific research and critical thinking-oriented mindsets. Strategies such as Socratic questioning, collaborative learning, concept mapping, case studies and problem-based learning encourage critical thinking among students. In fact, a culture of questioning and critical analysis can be created among students by using these strategic tools. In order to increase positive ATSR, it is important to encourage students' active participation in research projects and to actively implement mentoring programs throughout their education life. Such practices can reduce students' unwillingness towards scientific research/researcher processes while also improving their research skills.

In addition, course content based on critical analysis of scientific articles can increase students' interest in research and support their positive attitudes. Renewing educational programs in this direction and adopting teaching methods that encourage critical thinking and scientific research will ensure that future healthcare managers are better equipped. Since this study is cross-sectional, it reflects the situation at a certain moment. Students' CTD and scientific research attitudes may change over time. For this reason, future studies including multi-criteria decision-making approaches can be planned to examine the effects on the education process in more detail and to determine which methods are more effective at which stage of education. In addition, in order to look at the issue from a different perspective and find an integrated solution, the attitudes and competencies of the teaching staff in encouraging critical thinking and scientific research skills can be examined. On the other hand, comparing the critical thinking and scientific research skills of students in different academic units and disciplines will also reveal how health management students are positioned in these skills. These suggestions will expand the scope of future studies to develop critical thinking and scientific research skills in health management education and provide a more in-depth understanding.

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Conflict of interest

There is no conflict of interest in this study.

Data availability statement

The full data set supporting the results of this study can be shared upon request.

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