

Original Research Article

The relationship between personality type and the academic achievement of medical students in a Saudi medical school

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ABSTRACT

Background: The significance of understanding one's individual personality is crucial to performance in study and at work and to one's communication with others. This study aims to evaluate the distribution of personality types amongst medical students and to study the relationship between each personality type and academic achievement.

Methods: This cross-sectional study was used. Total of 414 medical students from King Abdulaziz University in Jeddah participated. Data was collected by using validated DiSC assessment questionnaire. Data were entered by electronic questionnaire. A chi-square test was used to analyze the data.

Results: A total of 148 (36%) students belonged to C personality type. A total of 102 (24%) belonged to D type. The S type was found dominant amongst 127 (31%) students. Finally, 37 (9%) of the students conformed to the I type. A chi-square test was conducted to assess the relationship between academic achievement and DiSC assessment which revealed no significance P value (0.08).

Conclusions: The highest percentage of medical students conformed to the C personality type, whilst the lowest percentage showed a tendency toward the I personality type. These results would be helpful for the undergraduate students or high school graduate in which some of them may have the belief that only certain kind of personalities would fit appropriate in the medical field or succeed. We recommend for further studies to be carried out using the DiSC model on students from other specialty rather than medical field, as engineering, to see their personality type. This may help students in freshman year to choose a specialty that suit their personality type.

Keywords: Personality type, DiSC, Medical student achievement

INTRODUCTION

Two significant, interdependent elements contribute to the performance of medical students and physicians in their study, training, and practice. The first element involves a group of cognitive capabilities that usually manifest themselves as intellectual abilities, such as achievement on exams requiring recall of factual knowledge and assessment of declarative information.

The second element, frequently identified under the rubric of non-cognitive or personal qualities, incorporates components including personality attributes, behavior, values, interests, and other personal qualifications.¹

The significance of understanding one's individual personality is crucial to performance in study and at work and to one's communication with others.² The relationships in the workplace, at school, and at home,

play a key role in our achievement in form of marks and satisfaction. On the other hand, interpersonal dynamics and characteristics vary within relationships, turning a blind eye to personality patterns can cause disagreement and disappointment that is might lead to considerable influence on our academic accomplishment.²

According to the American Psychological Association (APA), personality is defined as individual variations in characteristic patterns of intellectual thinking, feeling, and acting. The APA also points out that the study of personality concentrates on two broad areas: one related to understanding individual variances in specific personality features and the other related to appreciating how the various parts of an individual form a collective whole.³ Based on and consistent with this definition, a modified definition of personality which is suitable for medical education is 'a configuration of characteristics and behavioral tendencies that comprise an individual's unique features, developed based on a combination of several interacting elements such as constitutional predisposition, rearing environment, quality of early attachment relationships, interpersonal and critical life event experiences, social and cultural environment as well as formal and informal education.'^{1,2}

Several different tests are used to assess personality type as well as to determine a person's characteristics and in what manner those characteristics influence individual performance. According to our reading of related literature in medical education, 14 different tests have been used to assess personality in relation to students' or physicians' performance. In particular, five of these tests have been applied much more often in medical education studies: the 16PF Questionnaire, the California Psychological Inventory (CPI), the NEO Personality Inventory (NEO PI-R), the Jefferson Scale of Empathy (JSE), and the Myers-Briggs Types Indicator (MBTI).¹

One commonly used personality test is the DiSC personality test. DiSC is an acronym that stands for the four elements of personality type that it measures: dominance, influence, steadiness, and conscientiousness. In 1928, American psychologist modeled the basic form of the DiSC test after four human behavioral styles. This model was based on his application of research on human emotions and expounded on his theory that people demonstrate their emotions through actions using four behavioral types. His DiSC theory has been translated into 17 languages in 55 countries across the world.^{4,5} Whilst DiSC is used in many fields, according to our search of the relevant literature, it is not used in medical education to assess the personalities of medical students or physicians as it relates to their performance.

In 1956, DiSC assessment has been constructed as a checklist of adjectives which can be used by people to describe themselves.⁶ These adjectives included dominance, influence, steadiness, and conscientiousness. Dominance, as the term suggests, is related to directness

and control. Dominant people enjoy taking responsibility.⁷ Influence is associated with a friendly personality, open to other people and usually practicing effective social skills. Influencers enjoy collaborating in groups and relating to others.⁷ Steadiness is found in the personalities of people who take a consistent, steady approach to life. They play a supportive role and exercise a genuine interest in the problems and feelings of others.⁷ Conscientiousness, the final adjective of the four, describes a critical thinker who is detail-oriented, organized, and concerned with accuracy. Conscientious people value structure and need time and information to make decisions.⁷

The particular strength of the DiSC profile is that it offers users an improved sense of when and why it is crucial for them to adjust their behavior or approach to make a successful connection with others. When a person gains the ability to understand his or her own interpersonal style, he or she can more effectively interact with others whose own DiSC patterns may be quite different.^{8,9} DiSC studies are applied in multiple areas, often dealing with the associations between DiSC behavioral patterns and leadership, commercial performance, job satisfaction, job anxiety, and organizational effectiveness.^{8,9} Moreover, it has been demonstrated to be an effective and reliable assessment of personality. In 1997, the reliability and validity of the DiSC personality profiling model has been described.¹⁰ Measurement of its test-retest reliability showed a strong correlation between the two test results, indicating the DiSC test can be considered reliable. Likewise, DiSC's criterion-related validity was assessed and also showed a strong correlation.¹⁰

In the field of education, different studies have utilized many personality tests. The first study has been conducted in 1953, By using the minnesota multiphasic personality inventory (MMPI) test to examine the gap between the best and the poorest medical students' personality types.

In the field of education, different studies have utilized many personality tests. In 1953 by using the MMPI test to examine the gap between the best and the poorest medical students' personality types, the first study of personality types in education has been conducted.¹¹

Another researcher investigated the use of personality and attitude tests in predicting the academic performance of medical and law students in order to illustrate a variety of personality characteristics.¹²

In addition, studies in other fields have used the DiSC model as the main assessment method. In 1986, researchers reported that most female entrepreneurs are characteristic of the dominant personality category.¹³ The DiSC has also been used in the medical field to assess the performance of obstetrics and gynecology residents. It was found that residents who are successful at performing administrative tasks, giving safe patient care, and

achieving high scores on examinations have a DiSC score that is high in dominance and conscientiousness, but lower in steadiness and influence.¹⁴ Likewise, the DiSC assessment was applied in the nursing field in a study conducted in South Korea to demonstrate the relationship between behavior styles and medication errors due to a human factor made by nurses.¹⁵ Yet another study administered the DiSC test to dental patients to increase their rate of compliance with a treatment plan and to improve patients' behavior to ensure their optimal health.¹⁶

Thus, the DiSC test plays an essential role in people's ability to learn more about themselves and others, in creating effective teams, in providing a general overview of the ways people think, act, and interact, and in increasing awareness of how to adjust individual behavior to maximize performance. However, despite an extensive literature search and to the best of our knowledge, no past research used the DiSC personality test in relation to the academic achievement of medical students, nor have past studies dealt with the relationship between DiSC personality profile and the grade point averages (GPA) of medical students. Therefore, This study aimed to evaluate the distribution of different personality styles amongst medical students objecting to study the relationship between each DiSC and academic achievement which measured by GPAs of medical students at King Abdulaziz University (KAU).

METHODS

Research design and participants

This was an observational, cross-sectional study included male and female medical students in their second to sixth years (i.e., after completion of their freshman year). We included participants from all medical years. The survey was sent to 611 students to participate in this study and only 414 (67.7%) Answered the questionnaire. The study included 414 medical students between their second and sixth years who participated during July 2017.

Data collection method

The questionnaire was a standardized, well validated questionnaire. The quality of the DiSC assessment questionnaire has been confirmed through assessment of its validity and reliability.¹⁰ All questions were completed and submitted anonymously. Students were given 6 weeks to provide an electronic reply. Students received 2 reminder emails about the survey during this period. It is a self-administered questionnaire that comprises two parts. The first part includes questions about personal and socio demographic factors. The second part is the DiSC assessment tool consisting of 12 questions, each of which has four answer options. The participant's task is to select the one option that most closely describes him- or herself and the one that least describes him/her. The responses to this second part of the questionnaire were entered to the

DiSC Personality Testing website.¹⁷ KAU uses a five-point grading scale to determine GPA, with the following method of grade classification. Grade A+, A, B+, B, C+, C, D+, D and F represent GPA value (4.76-5.0), (4.51-4.75), (4.10-4.50), (3.51-4.00), (3.10-3.50), (2.51-3.00), (2.10-2.50), (1.10-2.00) and (0.00-1.00) respectively.

Study setting

The study was conducted at KAU in Jeddah, Saudi Arabia, during July 2017. The faculty was established in 1975 and has 22 departments. Its student population numbers approximately 1,900 across its male and female sections. Jeddah is one of the largest cities in Saudi Arabia, located in the western region, on the coast of the Red Sea. All the questions were completed and submitted anonymously. Students were given a period of 6 weeks to the electronic reply. They received 2 reminder emails about the questionnaire during this period.

Data analysis

Data were coded, checked, and entered into SPSS version 22. For categorical variables, including academic year, DiSC personality type and gender were described using frequencies. While continuous variables including GPA was described using mean and standard deviation. To develop inferential statistics, t-tests were conducted, and the chi-square was calculated to assess the association between the categorical variables (gender, DiSC type, and academic grade). For all statistical tests, p values less than 0.05 were considered significant.

RESULTS

Female participants numbered 220 (53%), while 194 participants (47%) were male. Within this sample population, 37 (8.9%) of the students were in their second year, 97 (23.4%) were in their third year, 120 (29%) were in their fourth year, 107 (25.7%) were in their fifth year, and 53 (12.8%) were in their sixth year. The distribution of each DiSC personality type according to academic year of the participant is shown in Table 1.

A total of 148 (36%) of the participants belonged to the C personality type, comprising 80 females and 68 males. The D personality type comprised 102 (24%) participants, including 55 females and 47 males. A total of 127 (31%) participants belonged to the S personality type, including 72 females and 55 males. Finally, 37 (9%) participants belonged to I personality type, comprising 13 females and 24 males (Figures 1).

Amongst the female participants, the largest percentage (35.1%) belonged to the C personality type, while the least common personality type was I, at 12.4%. Similarly, the personality type most common to the male participants were C (36.4%), and the least common were I (5.9%).

Table 1: Qualitative vs quantitative discrete data represented in the distribution of DICS types related to 414 medical student academic year, KAU, 2016–2017.

Academic year	Dominance (%)	Influence (%)	Steadiness (%)	Conscientiousness (%)
6 th	17 (32.1)	1 (1.9)	21 (39.6)	14 (26.4)
5 th	25 (23.4)	7 (6.5)	33 (30.8)	42 (39.3)
4 th	31 (25.8)	12 (10)	34 (28.3)	43 (35.8)
3 rd	18 (18.6)	9 (9.3)	33 (34)	37 (38.1)
2 nd	11 (29.7)	8 (21.6)	6 (16.2)	12 (32.4)
Total	102(24)	37 (9)	127 (31)	148 (36)

Table 2: Qualitative vs quantitative discrete data represented in descriptive frequency of DiSC personality types distribution across GPA grades categories for 414 medical students, KAU, 2016-2017.

GPA Grade	Dominance (%)	Influence (%)	Steadiness (%)	Conscientiousness (%)
A+	21 (20.6)	4 (10.8)	20 (15.7)	34 (23.0)
A	20 (19.6)	6 (16.2)	22 (17.3)	31 (20.9)
B+	39 (38.2)	11 (29.7)	50 (39.4)	52 (35.1)
B	19 (18.6)	13 (35.1)	25 (19.7)	26 (17.6)
C+	2 (2.0)	2 (5.4)	8 (6.3)	3 (2.0)
C	0 (0)	1 (2.7)	0 (0)	0 (0)
D+ and D	1 (1)	0 (0)	2 (1.6)	2 (1.4)

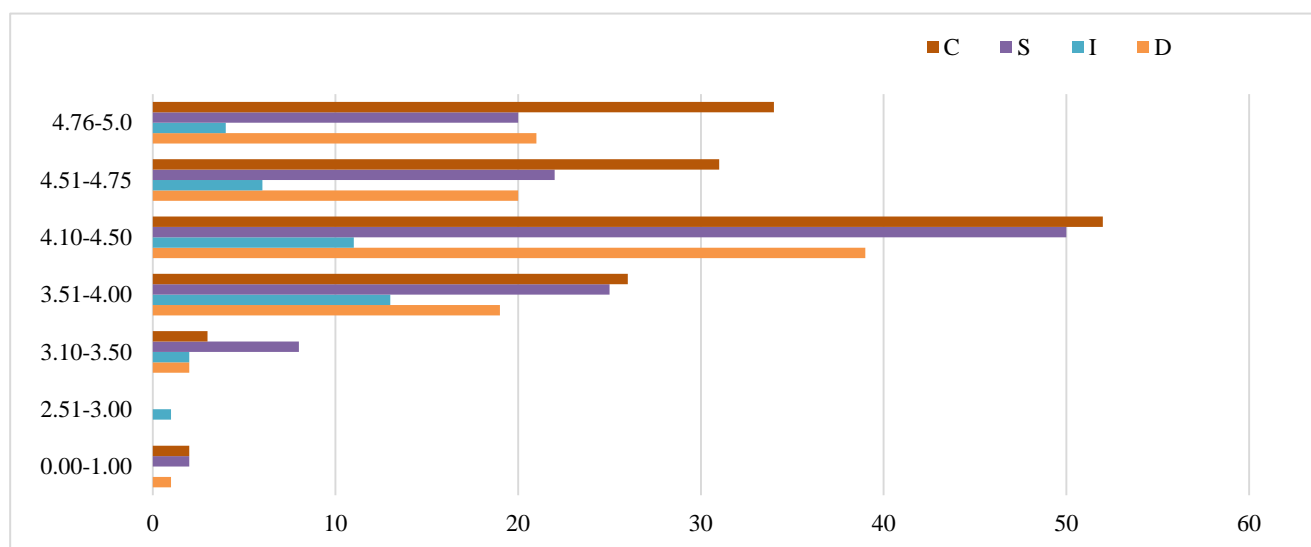


Figure 1: Descriptive percentages of DISC distribution among GPA categories for 414 medical students, KAU, 2016–2017.

In terms of GPA, amongst the total sample of participants, 152 (36.7%) had 4.10-4.50, 83 (20%) had 3.51-4.00, 79 (19.1%) had 4.51-4.75, 79 (19.1%) had 4.76-5.00, 15 (3.6%) had 3.10-3.50 average, 1 (0.2%) had 2.51-3.00, and 5 (1.2%) students were 0.00-1.00.

The distribution of grades across the DiSC personality styles of the medical students is shown in Table 2.

A chi-square test was conducted to assess the relationship between GPA category and DiSC assessment, revealed no significant association. Another chi-square test was conducted to assess the association between gender and

DiSC assessment. Likewise, it revealed no significant result.

DISCUSSION

This study aimed to evaluate the distribution of different personality types and to study the relationship between each DiSC personality type and academic achievement, as measured by GPA, amongst medical students at KAU.

These results indicate that the highest percentage of medical students is characterized by a compulsion to be compliant and conscientious and to avoid trouble at all

costs. They find security only in order and in rules and concepts that do not change arbitrarily or without warning. People of the C personality type often assume a passive role in a hostile environment. This can be a distinct disadvantage because their passivity is often based in a lack of confidence. Likewise, another disadvantage is that C types can become lost in the details of work and fail to see the bigger picture.¹⁸

An analogue to the C component of the DiSC test is the conscientiousness factor of the Five Factor Model (FFM), which is commonly used for personality assessment in the field of medical education. In total, the FFM includes the factors of openness, conscientiousness, extraversion, agreeableness, and neuroticism. In turn, the factor of conscientiousness includes elements such as dutifulness, striving, achievement, order, self-discipline, and competence. Many of these components could be used as predictors of medical students' academic performance in terms of study and training in both the pre-clinical and clinical years.¹

Interestingly, amongst 176 nurses in a study conducted by Mun and Hwang, the majority of the nurses belonged to the I personality type, whilst the minority of nurses belonged to the C and D types. In contrast, we found that the minority of the medical students belonged to the I type, representing the minority in our study. Influential people are optimists, prefer to be active, have influential personalities, and enjoy being around people. Being accepted by others is important to them, as is trusting others and forming lasting relationships.¹⁹

Amongst our sample of medical students, 127 belong to the S personality type. These individuals are known for being supportive or steady, accommodating, and humble. They do not seek challenges, but face life changes. They tend to be patient and work at a steady pace to achieve their goals. They are always prepared in advance for any future changes, dislike pressure situations, and want their accomplishments to be appreciated by others. An analogue to the S personality type of the DiSC test is the empathetic quality studied in the Jefferson Scale of Empathy (JSE). It includes the following personal qualities: understanding, communication skills, cultural and ethnic sensitivity, teamwork, collaboration, and professional ethics, all qualities that would seem essential to the practice of medicine and improving students' and physicians' performance.¹

Finally, in this study, 102 students were found to belong to the D personality type. Dominant people are not afraid to take risks or face challenges. They are blunt, direct, and sometimes rude. In addition, they are demanding of themselves and others and become bored easily. Thus, they prefer change and having adventures.¹⁸

In this study, the majority of personality types amongst the medical students was C and the minority was I. In contrast, the study of 176 nurses, the majority of the

nurses belonged to the I personality type, whilst the minority of nurses belonged to the D types.¹⁹ In another study done in South Korea of 171 dental hygienists, the most personality type was I and the least type was D. Finally, amongst 847 naval aviation students, the most personality style was C and the least personality style was S.^{20,21}

In terms of how personality type affects the learning and practice of medicine, medical students must be capable of a high level of critical thinking, attentive to detail, and concerned with accuracy. These qualities help them address medical cases appropriately and benefit their patients. Which also allow medical professionals to efficiently review medical articles in a manner that enables them to conduct, appraise, and add something new to the literature. For all the reasons mentioned in previous sentences it might make sense in which we found most of medical student belonged to the (C) personality type.

On the other hand, the lifestyle of medical students is very different from that of other students, particularly during their first year of medical school. The demands on their time are strenuous: assignments to be completed, research to be conducted, and exams to be prepared for. Their stressful environment requires them to develop strong time management and prioritization skills to adapt to life in medical school. All of these factors could have an influence on the social life of medical students, making them more isolated and giving them little time for contact with friends or family. This dynamic could explain why we found such a small number of our sample fitting in to the I personality type.

In the current study, we examined the relationships between the variables of DiSC personality type and gender and DiSC personality type and GPA. The associations were evaluated by a chi-square test. The chi-square test was also conducted between the regrouped GPA variable and the DiSC personality type variable, and it showed no significant association ($p=0.120$). This lack of association could be explained and influenced by many factors: not all medical students had the same GPA in their first year in medical school, as they had in the end of the pre-medical year. In addition, the intense competition for highly desirable specialties put students in a stressful situation resulting in students getting a different GPA according to their performance in this year prior to medical school. And, because the questionnaire was self-reported, we must also consider that some medical students were reluctant to share their actual GPA. Finally, the lack of association could be explained by the fact that, in our faculty, the male and female medical students teaches by different faculty members who have their own ways for subject's transmission and teaching in separate manner from each other's, which might influence the performance of their students and, in context, their GPA.

This study showed that there is no association between the academic performance of medical students and their personality type. However, a study conducted by Puccio, showed a statistically meaningful relationship between personality traits and cognitive performance.²² Our chi-square test was conducted between two qualitative variables: the DiSC personality type variable and the gender variable, which showed no significant association ($p=0.137$). This result could be explained by the fact that personality is a multifactorial variable, affected by cultural issues. In addition, male and female medical students at KAU come from all different regions of the Kingdom of Saudi Arabia. Which can remove any variation in DiSC personality type.

Limitations of the study

Although the study achieved its objectives, some unavoidable limitations were encountered. First, the study was conducted during the summer vacation. Students who had finished their sixth year had already begun their internship year. This could explain the lack of cooperation we received from some of these students as well as the small number of sixth-year students who participated. Second, we did not include in the survey the assessment of other factors (such as sleep hours, socioeconomic background, co-morbidity, motivation and interest to study medicine) that could have an effect on the outcome (GPA) because it took more time to fill the questionnaire in the pilot study before constructed the final approved survey, hence, we got a low response rate. Therefore, we simplified the survey and focused only on the DiSC assessment as it is our primary goal and achieved a higher response rate from the participants. We recommend to study the effect of other variables on the GPA in association with DiSC assessment in future studies.

CONCLUSION

The results of our study suggest that the most dominant personality type amongst medical students at KAU is the C type, which describes someone who is a critical thinker, conscientious, detail-oriented, organized, and concerned with accuracy. On the other hand, the least common personality type found amongst the students was the I type. Further, we found no relationship between gender or GPA with personality type. These results would be helpful for the undergraduate students or high school graduate in which some of them may have the belief that only certain kind of personalities would fit appropriate in the medical field, or succeed, this study shows that there is no association between the performance & the student gender, personality type. We think that it can refute these beliefs that present among junior students in certain societies and give them evidence-based information for future research.

We recommend for further studies to be carried out using the DiSC model on students from other specialty rather

than medical field, as engineering, to see their personality type. This may help students in freshman year to choose a specialty that suitable for their personality type.

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