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ORIGINAL PAPERS

Medical studies, team roles and emotional intelligence

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Summary Background. Effective teamwork in medicine may contribute not only to the increase of job satisfaction, but also to a higher quality of patient care.

Objectives. The goal of the study is to investigate the differences between medical and nursing students, male and female, and as well as first and fifth year students in the context of: teamwork, level of emotional intelligence, stress and satisfaction with their chosen studies

Material and methods. 200 students took part in the research. Team roles were measured by Team Role Inventory; emotional intelligence was measured by Emotional Intelligence Inventory; stress and satisfaction were measured by a self-designed survey.

Results. Medical students presented higher levels of individualism, lower levels of emotional intelligence, as well as higher levels of stress related to their studies and higher satisfaction with the chosen studies. Nursing students were more focused on teamwork. Female students were more diligent, honest and systematic. No significant differences between the genders were found in terms of the level of stress or satisfaction. The style of cooperation involving intellect and knowledge was negatively correlated with emotional intelligence. During the course of studies, this specific style is diminished, while there is no change in the level of emotional intelligence. Conclusions. Emotional intelligence skills and the ability to cooperate were shown to be areas of deficit in the group of medical stu-

dents. It seems that more developed training on social skills is needed during medical education, which may be beneficial in the future relations of doctors with their patients and co-workers.

Key words: emotional intelligence, medical students, medical education, patient care team.

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Background

Family physicians cooperate in the treatment process not only with patients, but also with other clinical professions, such as medical specialists, nurses, physiotherapists, etc. Their psychological competency, such as communications skills and emotional intelligence, is as important as clinical experience [1, 2]. These skills can be acquired during training. Research data shows that family physicians with higher psychological competencies have fewer court cases [3].

Some research data presents a positive correlation between teamwork, job satisfaction [4] and a safe atmosphere at work in the medical profession [5]. We can assume that effective teamwork in medicine may contribute not only to the increase of job satisfaction, but also to a higher quality of patient care. There is evidence to suggest that teamwork differs in various medical specializations. Teamwork is rated higher among anesthetic teams compared with surgical and nursing teams [6]. Nurses displayed higher levels of teamwork when working with other nurses than when working with surgeons [7], but surprisingly, surgeons rated teamwork with other surgeons higher than nurses note among surgeons [8].

Social support connected with teamwork would also be crucial in the medical profession. Single individuals, when compared to those in relationships, tend to be more emotionally drained [9, 10]. Research results indicate that the workload, coupled with lack of support from co-workers, serves as a very forceful and independent variable of professional burnout [11, 12].

The term emotional intelligence is described as: "1) perceiving emotions in oneself and others, as well as in objects, art, stories, music and other stimuli; 2) facilitating thought to generate, use and feel emotion as necessary to communicate feelings or employ them in other cognitive processes; 3) understanding emotions to understand emotional information, how emotions combine and progress through relationship transitions and to appreciate such emotional meanings; and 4) managing emotions – the ability to be open to feelings and to modulate them in oneself and others so as to promote personal understanding and growth" [13].

An interesting fact is that female students are more positive about teamwork and display a more positive attitude to teamwork [14]. The results concerning the relationship between the level of emotional intelligence and gender in medical professions are contradictory [15, 16]; however, most research suggests that emotional intelligence is more developed in females [17].

Research data has suggested that emotional intelligence is connected with efficiency in medicine. A high level of emotional intelligence reduces emotional strain and positively correlates with a physician's job satisfaction [18, 19], quality of teamwork and a tendency to cooperate [20, 21]. What is more, emotional intelligence is directly related to patient satisfaction with medical treatment [22, 23]. Job satisfaction is also associated with some elements of emotional intelligence, such as: the ability to understand, name and identify emotions and the ability to diminish negative emotional states [24]. Health care managers with a higher level of emotional intelligence are more engaged in their work [25]. The nurses who score high in clarity and emotional repair report less stress, whereas those with high scores in attention to emotions experience greater levels of stress [26].

The idea of the development of emotional intelligence with age is confirmed in most studies concerning medical professions: medical doctors' level of emotional intelligence correlates positively with their age and experience [27]. What is more, medical graduates achieve higher levels of some aspects of emotional intelligence than those who are newly admitted to medical school [15].

Objectives

The goal of the study is to investigate the differences between medical and nursing students, male and female students, and as well as first and fifth year students in the context of: teamwork, level of emotional intelligence, stress and satisfaction with their chosen studies.

Material and methods

Institution

The Medical University of Gdansk, Poland, educates more than 6,000 undergraduate and postgraduate students, in Polish and English, in four faculties: Health Sciences, Medicine, Pharmacology and Biotechnology.

Medical and nursing training in Poland

Medical training in Poland lasts for six years and is divided into two years of mostly basic science, three years of clinical training and one year of internship, providing medical assistance under supervision, mainly in hospital settings. The graduates gain a license to practice medicine upon passing the Medical Final Examination. The test results determine whether or not further medical specialization will be possible.

Nursing training in Poland lasts five years and is divided according to the Bologna System. The graduates are awarded a bachelor's degree and obtain a license to practice nursing after completion of three years of studies. They may continue their education for a further two years and are then awarded a master's degree.

Participants

The study group consisted of 200 first and fifth year nursing and medical students. Before university lectures, all participants were asked to take part in the research by a neutral person who was not a teacher. The questionnaires were given to all individuals who provided their consent. They were informed that we were evaluating personality characteristics during medical studies. The mean age of respondents was 23.01 ± 2.61 years (70% female). The research group consisted of 60 nursing students (first year n = 30, fifth year n = 30) and 140 medical students (first year n = 65, fifth year n = 75).

Statistics

The variables are presented with mean and standard deviation. The statistical significance of differences between the two groups was processed with the t-Student test. The correlations were processed by Pearson's correlation coefficients. In all the calculations, the statistical significance level of alpha = 0.05 was used. Statistica 10 PL (license Medical University of Gdansk, Poland) was used for statistical analysis.

The research did not involve any handling of sensitive personal data or clinical procedures and, therefore no other special consent of Bioethics Committee of the Medical University of Gdansk (Poland) was required.

Measures

A set of the following instruments was applied to investigate the factors. Team roles were measured by Belbin Team Role Inventory; emotional intelligence was measured by Salovey

& Mayer's Emotional Intelligence Inventory; stress and satisfaction were measured by a self-designed survey.

1) Team roles

Team roles were assessed using the Polish version of the Belbin Team Role Inventory [28]. Use of the questionnaire allowed for the identification of individuals' characteristics and abilities as future team members. In the 'concept of team roles', Belbin singles out eight specific roles that are assigned to typical characteristics, positive aspects and possible weaknesses manifested in the context of group work [29].

- a) An 'Implementer' is described as a conservative, practical person who easily shapes plans into practical actions and can implement any agreed upon plans in a systematic and efficient manner. The strengths of this role include organizational skills, common sense and self-control. Their weaknesses include lack of flexibility and unwillingness to change and create new ideas.
- b) A 'Coordinator' is described as calm, confident, disciplined and highly focused on objectives. The 'Coordinator' supervises the achievements of the group and is able to effectively use the resources of the team. Moreover, he recognizes the strengths and weaknesses of the group as a whole, as well as for each individual member. The 'Coordinator' is not aggressive in his management style and is usually characterized by average intellectual and creativity abilities.
- c) A 'Shaper' is described as an energetic, dominant and challenging person, directing his attention directly to setting the goals and priorities of the group and prevent inefficiencies. The 'Shaper' wants to have an impact on group discussions and to see results quickly. At the same time, the 'Shaper' is prone to irritability, anxiety, competitiveness, provocation and sometimes arrogance.
- d) A 'Plant' is described as a dominant introvert. The 'Plant' possesses great imagination, intellect and knowledge. The 'Plant' creates new ideas and strategies, taking into account the key issues, pushing their vision of a solution on the basis of confrontation. His weakness may be a tendency towards distraction, ignoring important details, as well as criticizing the ideas of others.
- e) A 'Resource Investigator' is described as an extroverted enthusiast. The 'Resource Investigator' is communicative and curious. He examines, analyses and reports information about ideas, knowledge and activities outside of the team. He responds to new challenges and is a good improviser. Thanks to his communicational skills, the 'Resource Investigator' makes useful contacts beyond the group and acts as a negotiator. However, after the first wave of fascination passes, the 'Resource Investigator' quickly loses interest.
- A 'Monitor-Evaluator' is described as a careful, objective and rational individual, skillfully analyzing and evaluating problems, ideas and suggestions with the aim to prepare the group for making important decisions in a more efficient manner. The 'Monitor-Evaluator' lacks enthusiasm and the ability to inspire and motivate others.
- g) A 'Team Worker' is described as a gentle, sensitive and loyal member of a group who primarily focuses on the social aspect of the job. He supports the team, underpins morale, prevents conflicts, enhances cooperation and improves communication. His weakness is lack of decisiveness in critical situations and avoidance of conflicts.
- h) A 'Completer-Finisher' is described as a diligent, honest, orderly person who is set on the punctuality and quality of a particular result. However, when he pursues his goals, he sometimes tends to focus on irrelevant details, which other team members may perceive as creating unnecessary pressure [28–30].

2) Emotional intelligence

To assess the level of emotional intelligence, we used DINEMO – Emotional Intelligence Inventory, based on the May-

er and Salovey model [13, 31]. This tool is intended to measure the basic components of emotional intelligence, i.e. the ability to access individuals' and others' emotions, and the ability to respect and understand the functions of emotions. Both have been assessed on the basis of interpreting different situations by an individual, as well as his willingness to respond to them. The Inventory allows interpretation of the results on a general scale and two other scales: 'Others' – the ability to recognize, understand and respect other people's emotions, and 'I' – the ability to recognize and understand one's own emotions.

3) Stress and satisfaction

The level of stress and satisfaction from the chosen faculty was measured by a self-designed survey, based on the Cantril Scale method, where 1 means 'very low', and 10 means 'very high'. The questions were: "On a scale from 1 to 10 (1 – no stress, 10 – acute stress), mark the level of stress you've experienced due to your chosen studies" and "On a scale from 1 to 10 (1 – lack of satisfaction, 10 – great satisfaction), mark the level of your satisfaction with your chosen studies".

Results

Medical students manifested a significantly higher level of competencies typical for the 'Monitor-Evaluator' role and a lower level of competencies typical for the 'Team Worker' and 'Resource Investigator' roles in comparison to nursing students.

In terms of emotional intelligence, medical students achieved a significantly lower level than nursing students in all three analyzed dimensions: ',General score', 'I' and 'Others'.

Medical students assessed their level of stress associated with studying higher than nursing students. In terms of perceived levels of satisfaction with their chosen studies, medical students assessed their satisfaction significantly higher than nursing students (Table 1).

In terms of the team roles, female students were characterized by higher levels of competencies typical for the 'Completer-Finisher' role. In terms of emotional intelligence in two analyzed aspects: 'focus on others' emotions' as well as on the 'general level', female respondents achieved significantly higher levels than males. No significant differences between the genders were found in terms of the level of stress and satisfaction with the choice of faculty (Table 2).

Table 1. Differences between medical and nursing students in terms of: team roles, emotional intelligence, stress related with studies and satisfaction with the chosen studies			
Themselve, stress relate	Medicine	Nursing	Medicine vs Nursing
	n = 140	n = 60	df = 198
	M ± SD	M ± SD	t (p)
Team roles			
Monitor-Evaluator	(1) 11.33 ± 5.93	(6) 8.30 ± 5.07	-3.454 (0.001)***
Completer-Finisher	(2) 9.88 ± 5.72	(3) 9.83 ± 7.46	-0.045 (0.964)
Shaper	(3) 9.83 ± 6.80	(2) 10.52 ± 7.63	0.634 (0.527)
Implementer	(4) 9.78 ± 5.08	(1) 10.12 ± 4.29	0.444 (0.658)
Plant	(5) 7.60 ± 5.33	(7) 7.43 ± 5.02	-0.204 (0.839)
Coordinator	(6) 7.47 ± 5.22	(8) 6.20 ± 4.73	-1.619 (0.107)
Team Worker	(7) 7.01 ± 5.30	(4) 8.80 ± 6.20	2.075 (0.039)*
Resource Investigator	(8) 6.88 ± 4.47	(5) 8.42 ± 5.34	2.103 (0.037)*
Emotional intelligence			
General score	0.55 ± 0.13	0.63 ± 0.11	3.919 (0.001)***
1	0.57 ± 0.14	0.63 ± 0.15	2.815 (0.006)**
Others	0.56 ± 0.16	0.65 ± 0.12	3.711 (0.001)***
Stress	6.78 ± 1.82	4.58 ± 2.34	-7.146 (0.001)***
Satisfaction	8.04 ± 1.60	6.57 ± 2.04	-5.503 (0.001)***

^{*} *p* < 0.05; ** *p* < 0.01; *** *p* < 0.001.

Table 2. Differences between female and male students in terms of: team roles, emotional intelligence, stress related with studies and satisfaction with the chosen studies			
	Female	Male	Female vs Male
	n = 141	n = 59	<i>df</i> = 198
	M ± SD	M ± SD	t (p)
Team roles			
Completer-Finisher	(1) 10.46 ± 6.56	(4) 8.44 ± 5.32	2.100 (0.037)*
Shaper	(2) 10.23 ± 7.12	(3) 9.56 ± 6.91	0.621 (0.536)
Implementer	(3) 9.97 ± 4.68	(2) 9.67 ± 5.27	0.395 (0.693)
Monitor-Evaluator	(4) 9.91 ± 5.77	(1) 11.66 ± 5.88	-1.943 (0.053)
Team Worker	(5) 7.60 ± 5.80	(8) 7.42 ± 5.25	0.210 (0.834)
Plant	(6) 7.38 ± 5.44	(5) 7.94 ± 4.69	-0.692 (0.489)
Resource Investigator	(7) 7.26 ± 4.81	(7) 7.52 ± 4.77	-0.348 (0.728)
Coordinator	(8) 6.79 ± 4.89	(6) 7.81 ± 5.57	-1.294 (0.197)
Emotional intelligence			
General score	0.60 ± 0.12	0.53 ± 0.15	3.165 (0.002)**
1	0.60 ± 0.14	0.58 ± 0.16	0.539 (0.591)
Others	0.62 ± 0.14	0.50 ± 0.16	4.517 (0.001)***
Stress	6.01 ± 2.31	6.37 ± 2.01	-1.039 (0.300)
Satisfaction	7.46 ± 1.87	7.93 ± 1.83	-1.639 (0.103)

^{*} p < 0.05; ** p < 0.01; *** p < 0.001.

Table 3. Differences between first- and fifth-year students in terms of: team roles, emotional intelligence, stress related with studies and satisfaction with the chosen studies			
	First year	Fifth year	First vs Fifth
	n = 141 M ± SD	n=59 M ± SD	df = 142 t (p)
Team roles			
Completer-Finisher	10.15 ± 6.02	(4) 9.61 ± 6.50	0.607 (0.544)
Company Worker	9.99 ± 5.12	9.79 ± 4.62	0.293 (0.770)
Monitor-Evaluator	9.95 ± 5.59	(1) 10.85 ± 6.06	-1.097 (0.274)
Shaper	9.78 ± 6.57	(2) 10.26 ± 7.48	-0.486 (0.628)
Plant	8.74 ± 5.34	6.47 ± 4.91	3.124 (0.002)**
Team Worker	7.61 ± 5.90	7.49 ± 5.40	0.147(0.883)
Resource Investigator	6.72 ± 4.92	(5) 7.90 ± 4.61	-1.760 (0.080)
Chairman	6.52 ± 4.94	(6) 7.61 ± 5.21	-1.515 (0.131)
Emotional intelligence			
General score	0.58 ± 0.12	0.59 ± 00.14	-0.048 (0.962)
1	0.60 ± 0.15	0.59 ± 0.15	0.158 (0.874)
Others	0.60 ± 0.15	0.59 ± 0.16	0.420 (0.675)
Stress	6.07 ± 2.49	6.16 ± 1.97	-0.279 (0.780)
Satisfaction	7.69 ± 1.73	7.51 ± 1.98	0.683 (0.495)

^{*} p < 0.05; ** p < 0.01; *** p < 0.001.

Table 4. Emotional intelligence vs team roles, stress and satisfaction with chosen studies (correlation *r*-Pearson)

	Emotional intelligence			
	1	Others	General score	
Team roles				
Company Worker	-0.06	0.02	-0.07	
Chairman	0.11	0.06	0.12	
Shaper	0.07	-0.12	-0.02	
Plant	-0.20*	-0.09	-0.19*	
Resource Investigator	0.14	0.05	0.07	
Monitor-Evaluator	-0.03	-0.13	-0.07	
Team Worker	0.07	0.14	0.14	
Completer-Finisher	-0.08	0.03	-0.02	
Stress	-0.17 ^A	-0.07	-0.16 ^A	
Satisfaction	0.06	0.04	0.05	

 $^{^{}A}p < 0.10; *p < 0.05.$

A statistically significant difference occurred between the level of competencies typical for the 'Plant' role during the years of studies. Fifth-year students were characterized by lower levels of competencies typical for this role compared to first-year students (Table 3).

Most results do not show correlations between team roles, level of emotional intelligence, stress and job satisfaction in the studied sample. However, there is one important exception, which is the 'Plant' role. There is a statistically significant negative correlation between the 'Plant' role and emotional intelligence in two analyzed dimensions: 'General score', and 'I'. The higher level of competence associated with the role of 'Plant' means a lower level of emotional intelligence (Table 4).

Discussion

Medical students present behavior typical for the 'Monitor-Evaluator' role more often, but the 'Resource-Investigator' and 'Team Worker' roles are manifested less often in comparison with nursing students. It can be interpreted that medical students tend to be more objective and rational in teamwork and more able to analyses and evaluate certain problems or ideas. They are also more supportive as to accepting important decision made by the group.

Medical students are more capable of seeing a multiplicity of options and making accurate judgement calls. However, at the same time, they may lack the drive and ability to inspire others. They are also characterized by lack of enthusiasm and an inability to inspire or motivate others. They are more serious and calm, strategic and discerning. It needs to be highlighted that they also have a tendency to be overly critical. On the other hand, we can say that medical students, as opposed to nursing students, are less oriented to cooperate or maintain partnerships and are less focused on the relations within the group. They are also less loyal to their group. The social aspects of work related to conflict prevention and good communication seem to be less important to them. They are also less diplomatic in action and less willing to cooperate with other groups. Other studies referring to the attitude presented by medical students [32] and by other occupationally active respondents [33, 34] show similar results to those presented in our research.

Nursing students could be described as more extroverted and enthusiastic in teamwork. They reveal a higher level of communication skills and tend to be more interested in others. They seem to be more apt to respond to challenges and are better at improvising than medical students. They are also more co-operative, perceptive and diplomatic. What is more, they are used to examining, analyzing and reporting information on ideas, knowledge and activities outside of the team. Thanks to these communicational skills, they are skilled at networking outside the group and act readily as negotiators. However, when once the initial enthusiasm for a project passes, they may quickly lose interest. Furthermore, nursing students are more gentle, sensitive and loyal to the group. They are focused on the social aspects of the job and support the team, underpin morale, prevent conflicts, enhance cooperation and improve communication. Their weaknesses are lack of decisiveness in critical situations and the avoidance of conflict.

The medical students who took part in the research presented significantly lower levels of emotional intelligence than nursing students. Unfortunately, these future physicians mani-

Table 5. Differences between medical and nursing students		
Medical students	Nursing students	
Team roles Higher level of 'Monitor-Evaluator', i.e.: Careful, objective and rational. Skillfully analyses and evaluate problems, ideas and suggestions so as to better prepare the group for making important decisions. May lack enthusiasm and the ability to inspire and motivate others. Features: serious and calm, not revealing emotion, cautious. Positives: ability to evaluate, are practical and unsentimental. Possible weaknesses: may lack inspiration and the ability to motivate others.	Team roles Higher level of 'Resource Investigator', i.e.: Extroverted enthusiasts. Communicative and curious. Used to examining, analyzing and reporting information about ideas, knowledge and activities outside of the team. Thanks to these communicational skills, they are skilled at networking outside the group and readily act as negotiators. Features: extrovert, enthusiastic, communicative. Positives: ability to communicate with people, discovering new things and be able to respond the challenges. Possible weaknesses: once the initial enthusiasm for a project passes, they may quickly lose interest. Higher levels of 'Team Worker', i.e.: Gentle, sensitive and loyal to the group. Primarily focus on social aspects of the job. Support the team, underpin morale, prevent conflicts, enhance cooperation and improve communication.	
	Features: oriented towards being social, gentle, sensitive. Positives: empathy, the ability excite the 'spirit' of the group. Possible weaknesses: lack of decisiveness in crisis situations, conflict avoidance.	
Higher level of stress	Higher level of emotional intelligence	
Higher level of satisfaction with chosen studies	The ability to access personal emotions and those of others. The ability to respect and to understand the functions of emotions, assessed on the basis of how an individual interprets different situations and in what way are willing to respond to them. The Inventory allows interpretation of the results on a general scale and two other scales: 'Others' – the ability	

fested lower interpersonal skills than future nurses, especially in respect to their self-awareness, expressing emotions, as well as understanding and respecting the emotions of other people.

The results presented in this study leave little doubt that further exploration in this matter should be continued in future research, e.g. in the area of efficiency in the medical profession, the quality of teamwork, job satisfaction and patient satisfaction.

The research shows differences in terms of the levels of stress associated with studying and the levels of satisfaction with the chosen studies. Medical students presented higher levels of stress than nursing students, while at the same time declaring higher levels of satisfaction.

Higher levels of stress in medical students may have their roots in the higher pressure resulting from the field of study. Although medical students are exposed to more stress, they do, however, appear to be more satisfied with their studies than nursing students.

The presented study also shows differences in terms of the role of 'Completer-Finisher' in regard to the respondent's gender. Women's behavior is, to a greater extent, characterized by precision and diligence in the performance of tasks, but also in excessive conscientiousness and a tendency towards anxiety and tension. We note a higher level of emotional intelligence among females, as expected. This is consistent with a range of existing literature on the subject.

Taking into consideration the dynamics of team roles during studies, we can remark that there is important change only in the 'Plant' role. We can assume that medical university training diminishes the tendency to find own ideas and increases the avoidance of communication in cooperation. What is more, this style of cooperation, involving intellect, imagination and knowledge ('Plants'), was negatively correlated with emotional intelligence (Table 5).

Limitations of the study

The study presents some important aspects concerning medical and nursing students' cooperative skills. There are some weak points in the applied procedure. The results constitute a form of guideline for future research. However the par-

ticipants' tendency to positive self-presentation could be taken under the consideration as a disturbing factor. The implemented questionnaire does not provide the opportunity to answer this specific question, although there is the possibility to apply another procedure for resolving this problem. Additionally, this would be meaningful and useful to precisely comprise gender differences, taking into consideration a cross reference with groups of nursing and medical students. However, in our study group, this was not possible due to the significantly higher number of females as nursing students. An increase of male nursing students is an important topic for future projects.

Conclusions

to recognize, understand and respect other people's emotions, and 'I' – own emotions.

- The study reveals that medical students as co-workers are more focused on individual aspects of work than nursing students. Furthermore, medical students pay attention mainly to the management process, while nursing students are more oriented towards the social aspects of work.
- Emotional intelligence skills and the ability to cooperate are most likely to be areas for development in the group of medical students. They also declared higher stress, as well as higher satisfaction, in their studies.
- Female students in both groups pay more attention to details, which creates feelings of unnecessary pressure in their co-workers. Gender differences do not show any specific characteristics in terms of stress and satisfaction, while the choice of study creates such differences. Additionally, females present a higher level of emotional intelligence than males.
- 4. The higher the style of cooperation involving knowledge and avoidance of communication as a basic solution in team-working, the lower the level of emotional intelligence. During the course of studies, this specific style is diminished, while there is no change in the level of emotional intelligence.
- It would seem that more developed training on social skills is needed during medical education, which may be beneficial to medical professionals in their future relations with patients and co-workers.

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