Surgical skills of first aid among medical students of the University of Maribor

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Abstract

BACKGROUND: First aid skills are crucial for any medical student. The tasks of the first aid provider are to identify, evaluate and prioritize the need for first aid, to provide the best care in relation to their own competencies and to identify their own limitations and to seek additional assistance if necessary. To date, no study has been conducted to verify the implementation of surgical first aid skills among students during their studies. The purpose of the research was to verify that the students of the Faculty of Medicine in Maribor correctly practice surgical first aid skills.

METHODS: The prospective study included 64 students with active student status at the Faculty of Medicine, University of Maribor. The survey used a questionnaire to obtain information about the student (personal information, first aid contact outside of study, self-assessment of knowledge). The skills were tested with two simulations with surgical content, namely the simulation with the shin amputation and the simulation with the upper arm with severe bleeding. In the analysis of the obtained data, the results were analyzed in the SPSS program. Statistical differences were checked by one-way analysis of variance (ANOVA). In addition, we tested the statistical value with the Tukey HSD test.

RESULTS: A statistically significant difference in the performance of surgical skills were demonstrated ($F = 3{,}767$; $p = 0.029$). An additional Tukey HSD test shows that there are statistically significant differences in the performance of surgical skills between the 5th and 6th-year students and the 3rd and 4th-year students who performed the worst. However, there are no statistically significant differences between the 1st and 2nd year and 5th and 6th year.

CONCLUSIONS: At the simulations, in addition to recognizing the injury, we also required accurate care of the injury (amputation of the shin and upper arm). This requires manual skill and knowledge of the proper use and positioning of a compression bandage or an Esmarch tourniquet. It turned out that the students of the 3rd and 4th year solved the simulations with less attention to details and thus received worse results. We conclude that the 1st and 2nd-year students performed better due to the recently passed first aid exam, which also requires skills to help the injured in the practical part of the evaluation. Senior students are already regularly involved in the clinic and practice. The 3rd and 4th-year students find themselves in a part of the study where there is less care for the injured and therefore have probably achieved slightly worse results.

First aid, surgical skills, medical student, simulation training

I. INTRODUCTION

The most used definition of first aid is: “First aid is direct medical care received by an injured or suddenly ill person at the scene as soon as possible after an event performed with basic materials and improvisation, including improvised transport. It lasts as long, until professional help arrives.” (1). First aid is the initial care for an acute illness or injury. It can start in any situation. The tasks of the first aid provider are to identify, assess and prioritize the need for first aid, to provide the best care according to one's own competences and, if necessary, to seek additional help (2). The main purpose of first aid is to help the patient or injured person; in whichever way we try to define its concept (3). In short, first aid is a mandatory knowledge of both lay people and trained health professionals. The Health Care and Health Insurance Act states: "Everyone is obliged to provide first aid to an injured or sick person in an emergency according to their abilities and to provide them with access to emergency medical care." (4).

Thus, a healthcare professional must provide first aid in accordance with one’s professional qualifications even outside working hours. Failure to provide first aid is punishable under the Slovenian Criminal Code. An important criterion for legal consequences in case of inadequate providing of first care is the professional qualification of the person, so the doctor will bear the greatest responsibility (1). Article 130 of the Criminal Code of the Republic of Slovenia states: “Whoever fails to assist a person in imminent danger of death, even though he could do so without danger to himself or anyone else, shall be

punished by imprisonment for a term not exceeding one year" (5).

First aid is considered to be a basic minimum of knowledge, which a healthcare worker must acquire, ignorance or severe ignorance do not constitute an excuse for inappropriate intervention. It is important that we are prepared in advance for unexpected events (1). The Code of Medical Ethics addresses the issue of first aid in several articles. The responsibility of the doctor is best summed up in Article 2, which states: "In urgent medical cases, the doctor offers help to everyone.". Thus, there is little room left to discuss whether first aid knowledge is mandatory for a physician. As a professionally qualified person, he is obliged to help the injured or suddenly ill. Article 3 also emphasizes the exceptional importance of first aid: "A doctor has the right to conscientious objection. Accordingly, he may refuse treatment or other intervention if it contradicts his basic personal beliefs and conscience, but only if it is not a matter of urgent medical assistance." (6).

Advanced-level education for students should cover the knowledge, skills, and attitude needed to approach the suddenly ill. This can be achieved through prior literature in the form of manuals or online articles. The entrance colloquium is a welcome upgrade to previously given literature. This is followed by a theoretical repetition of the content, a practical demonstration, and a simulation exercise (7). In 2019 a comprehensive study was conducted with medical students from different faculties in which first aid questionnaires were distributed. 3732 medical students from 21 medical faculties were included in this research. The students participating in the research were in the first or fourth year. It was found that first aid knowledge differs among students of different years. Fourth-year students had better knowledge than first year students. There has been an improvement in first aid skills compared to previous years (8). In another study, it was found out that shorter first aid workshops can contribute to practical and theoretical knowledge. Such workshops can, in the long term, greatly improve the knowledge of first aid for medical staff who does not encounter such situations on a day-to-day basis (9).

The aim of our study was to conduct a similar study as Graham et al. (1994) among students of medicine at University of Maribor, Medical faculty to see what the state of medical knowledge among medical students was and to find potential ways to improve it.

II. Material and Methods

Our study was done among 64 medical students of the Medical Faculty of the University of Maribor. Medical students were invited to participate in our research via e-mail. In this way we covered the entire population of medical students of the Medical Faculty of the University of Maribor. At the time, it included 598 students. We tried to get at least 10 representatives of each year. The study included all of those who were willing to participate in the study and had active student status.

Our sample consisted of 10 (15.6%) 1st year students, 11 (17.2%) 2nd year students, 10 (15.6%) 3rd year students, 12 (18.8%) students 4th year, 11 (17.2%) 5th year students and 10 (15.6%) 6th year students.

To collect the data, we used two polygons where students had to show their first aid skills. We randomly divided students into two groups; each group faced one of the polygons. At the first polygon, students had to take care of wounded person with the amputation of the tibia, and at the second, they faced severe bleeding person resulting from a puncture in the upper arm artery. The casualties were played by medical students who were not included in the study.

Prior to the start, the tested subjects were given brief instructions and first aid equipment available to them. They had 10 minutes to show their skills.

The researchers assessed the students' actions with the help of assessment sheets, which were adapted from sheets for assessing the practical skills of volunteers at the first aid department at the Red Cross of Slovenia (10). These were divided into the main areas where we assessed patient approach, examination and care, post-initial care, and post-care measures. The main areas were further divided into individual measures that the candidate had to implement. For each measure taken, students received a certain number of points.

Participating students could score a maximum of 175 points at the polygon with knee amputation, and they could score a maximum of 155 points at the polygon with the upper arm injury. After the test was completed, we added up all the points and transform them into percentages.

The obtained data was edited using an Excel spreadsheet and SPSS. In addition to determining basic statistical values, we also used statistical tools such as one-way analysis of variance (ANOVA) and Tukey HSD.

III. Results

In the polygons used in our study we were trying to test students' ability to practically perform first aid skill associated with traumatic surgical injuries.

The group of 3rd and 4th year students proved to be, on average, the worst performing one, as they achieved an average of 44.2% (SD = 13.8%) of all possible scores in the performance of surgical skills. Slightly better results were achieved by a group of 1st and 2nd year students, who attained on average of 48.6% (SD = 14.7%) of all possible points. Significantly better knowledge of the first aid was shown by 5th and 6th year students, namely 55.6% (SD = 12.4%).

There was a statistically significant difference in the performance of surgical skills among the students according to their year of study ($F = 3.767$; $p = 0.029$). A closer analysis with the additional Tukey HSD test shows that there are statistically significant differences in the performance of surgical skills between 5th and 6th year students and 3rd and 4th year students who performed the worst in surgical skills. There are no statistically significant differences between 1st and 2nd year and 5th and 6th year. Because of this, we cannot conclude that 5th and 6th year students statistically

significantly showed the best results in performing surgical skills.

IV. Discussion

The results of our study are in line with other similar published studies pointing to improvement in first aid skills during the study of medicine which is explained to be associated with a practical exercise.

Our main objective was to observe both, students' identification of the injury and its complete care. We discovered that, beside theoretical knowledge complete care also required manual skills of the proper use and placement of a compression bandage or Esmarch bandage. It turned out that 3rd and 4th year students were the most negligent while solving the polygons and thus achieved poorer results. We conclude that 1st and 2nd year students performed better due to the recently passed first aid exam, which also requires the practical skills of first aid. On the other hand, senior students are already daily involved in clinical practice. Furthermore, the 3rd and 4th year students find themselves in the part of their studies where there is less of first aid in the curriculum, so they are likely to achieve poorer results in this area.

We found out that it would be important to enable students to renew their knowledge of first aid on yearly basis. This is especially important when it comes to surgical skills, as with the annual refresh of knowledge we could preserve practical skills as reported by Hamilton (2005).

Our findings on the need of frequent refreshment of skills are in line with many studies on the similar subject, describing the implementation of basic resuscitation procedures. The most noticeable finding of researchers dealing with knowledge of basic resuscitation procedures among medical students was to emphasize the importance of repeating and refreshing theoretical knowledge and resuscitation techniques among both medical students and laypeople participating in the studies (8,11,12).

Very same vas reported also by Gore et al. (2017). In their cross-sectional study from Vydehi Medical College, Bangalore, which was done among 150 medical students from the second, third, and fourth year, they were testing the knowledge of first aid. The study finds, that out of 150 medical students, who were participated in the study only 28, 7 % of the students were able to score 70 % and above, which means excellent knowledge. The knowledge of fourth year students was found to be better than those in the second and third year. The conclusion of the research is that students need additional education and training (13).

Based on literature reports and on our own findings we suggest that short first aid workshops which can help a lot when it comes to retaining practical and theoretical first aid knowledge. Such workshops can also strengthen long-term first aid skills for healthcare professionals who do not daily encounter such situations (9).

Going through the literature, we found out, that knowledge of the students' implementation of basic resuscitation procedures is assessed as incomplete. There are various ways how this can be improved. Among them is the frequent renewal of knowledge and technical skills. According to the results of a research of Hsieh at el. (2018), the best interval between two first aid courses turned out to be six months (14). Workshops do not need to be too extensive; perhaps a short repetition with a video or a short lecture is enough (15).

At the Medical Faculty of the University of the United Arab Emirates, they have a fairly successful first aid training course. They recognized the importance of training medical students in emergency medicine. Students are educated in this field from the first year onwards. They found in a study that students' knowledge and confidence in providing first aid after completing the course improved significantly. It should be noted that this research also found that students' theoretical knowledge and skills are closely related to knowledge renewal and the possibility of multiple skills renewal, which was also pointed out by students (16).

In the field of preserving and restoring knowledge from basic resuscitation procedures, there is an interesting study conducted among nurses in the United Kingdom. For the medical staff who participated in the study, it was considered that they do not often encounter patients in need of basic resuscitation procedures in their daily work. As a result, their knowledge in this area is insufficient when such situations arise. According to the findings of the research, it is recommended to repeatedly train on a manikin and renew skills with the help of real life scenarios. It is important that training imitates situations that medical staff may encounter on a daily basis. They also recommend that knowledge should be refreshed as often as possible, including through video content, which is a rapid and relatively effective way to refresh knowledge in this area (9).

We suggest that better use of existing methods of acquiring additional knowledge and skills during studies should be explored. One of such approaches is a simulation center and projects of the Medical Students Association of Maribor at the one described in this short paper. However, formalization of short refresher courses in a curriculum for medical students should be a final goal.

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