

Knowledge of the in-hospital resuscitation algorithm among medical staff of selected hospital departments.



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ABSTRACT

INTRODUCTION: The hospitalized patient has a potentially greater chance of surviving sudden cardiac arrest compared to pre-hospital conditions. This, however, requires proper preparation of medical personnel who should recognize and treat reversible causes of cardiac arrest. The authors make an attempt to assess the state of knowledge of doctors, nurses and paramedics in the field of in-hospital resuscitation algorithm.

MATERIAL AND METHODS: The study was conducted in 2018 among medical staff of hospitals in central Poland. To determine the relationship between variables, the Chi-square test and one-way Kruskal-Wallis variance analysis were used. The results were considered significant at $p < 0.05$, and values of $0.05 < p < 0.10$ were considered significant only at the level of statistical tendency.

RESULTS: Sixty people participated in the study (20 women and 40 men). The average work experience was 3.7 years (SD = 2.6). The leading places of work were: Hospital Emergency Department (50%), Internal Medicine Department (9%), Surgical Ward (8%), Intensive Care Unit (8%). The average test result for all respondents will reach 73.6% (doctors: 100%, paramedics: 74.6, nurses: 56%). There was no correlation between the result and the sex of patients ($p = 0.622$), workplace ($p = 0.107$), seniority ($p = 0.063$). There were significant differences between particular occupational groups ($p = 0.01$).

CONCLUSIONS: The highest level of knowledge in hospital resuscitation is provided by doctors, and the lowest level of nursing staff. Adequate lifelong learning in the field of advanced life support for medical staff should be implemented in order to improve the quality of healthcare services provided to healthcare entities.

KEY WORDS: Intra-hospital circulatory arrest, resuscitation, medical personnel, advanced life support, ALS

INTRODUCTION

When mechanical heart failure ceases, sudden cardiac arrest (SCA) results in cerebral hypoxia, which can eventually lead to death. The guidelines of the European Resuscitation Council in 2015 put particular emphasis on the use of rapid reaction systems and in-hospital care for a patient who is at risk of developing cardiac arrest. Early diagnosis of deteriorating health is an important element in the survival chain of the patient because only 20% of people with evidence of intra-hospital cardiac arrest survive discharge from the hospital [1-3]. The European Resuscitation Council recommends that the strategy be based on the following factors:

- Training of medical personnel;
- Patient monitoring and early diagnosis of deteriorating health;
- A call for help system;
- Effective response or "prevention chain" [4].

It is assumed that cardiac arrest in a hospital setting is not an abrupt phenomenon [5]. Patients usually show slow symptoms of the deteriorating condition of basic vital signs. These symptoms may go unnoticed by medical personnel, and treatment that is too late may not be sufficient [6-8]. The most common rhythms during in-hospital cardiac arrest are the pulseless electrical activity (PEA) or asystole, i.e. the non-defibrillation rhythms [9]. Fast and effective treatment helps to minimize the risk of cardiac arrest. The literature confirms the significant increase in nosocomial cardiac arrest survival in the United States, where appropriate systems have been implemented [10].

The aim of the study is to evaluate the level of knowledge among medical personnel regarding the management of in-hospital emergency cardiac arrest. The results may point to issues requiring the immediate lack of staff knowledge to improve the quality of performed resuscitation procedures.

MATERIAL AND METHODS

The study was conducted in 2018. The study group consisted of sixty people, including paramedics, nurses, and doctors working in hospital wards in central Poland. The research tool was an original questionnaire containing 15 questions. Ten of them are sociodemographic questions and the organization of resuscitation activities in the workplace, the remaining five are test questions in the field of in-hospital cardiac arrest. The test results were expressed in the form of arithmetic means and average standard errors. To determine the relationship between variables, the Chi-square test and one-way Kruskal-Wallis variance analysis were used. The results were considered significant at $p < 0.05$, and values of $0.05 < p < 0.10$ were considered significant only at the level of statistical tendency.

RESULTS

The test group

Sixty people participated in the study (20 women and 40 men). The average internship was 3.7 years ($SD=2.6$). Representatives of three medical professions were distinguished: doctors ($n=5$), nurses ($n=10$), paramedics ($n=45$). The vast majority of respondents work in the Hospital Emergency Department (50%). The remaining group declared work at: Internal diseases ward (9%), Surgical Ward (8%), Intensive Care Unit (8%). The remaining 25% of respondents are employees of cardiological, paediatric, laryngological and urological departments. Over half of the respondents (57%) confirmed that they had been trained in prevention and / or response in the event of in-hospital cardiac arrest. Most of the respondents (65%) also testified that in the past two years she had been a witness to in-hospital cardiac arrest. The self-assessment of the study group confirms that the vast majority (77%) assess their knowledge and skills of cardiac arrest recognition and implementation of resuscitation procedures at a high level.

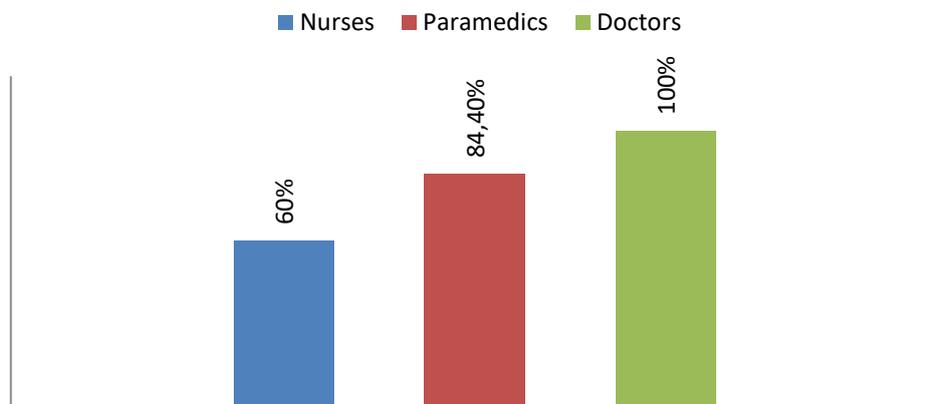
Hospital ward equipment

The room in which patients from the "risk group" are placed to continuously monitor their vital functions is located in the branches among 75% of the respondents. The vast majority of hospital departments (95%) have a manual or automatic defibrillator available to all medical personnel. In-hospital resuscitation algorithms in the printed version are located in 80% of the departments on which the examined persons work.

Analysis of the level of knowledge

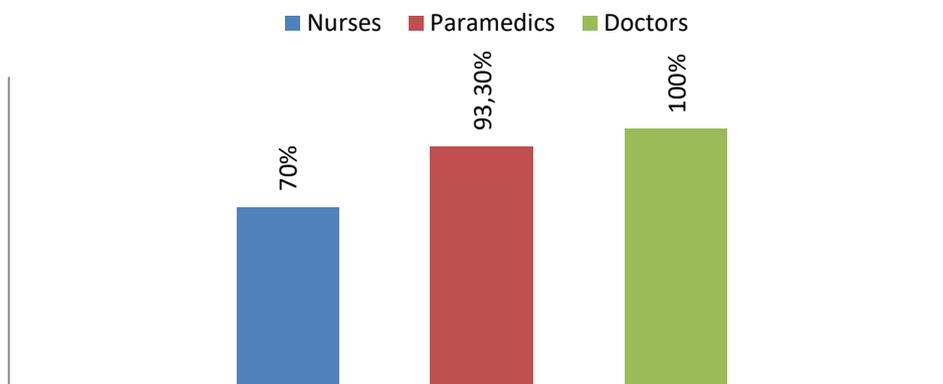
The final result of the test among all respondents reached an average of 73.6% (doctors: 100%, paramedics: 74.6, nurses: 56%). Five issues including the in-hospital cardiac arrest algorithm were analysed in detail. The average of the correct answers obtained in the question about the rhythm diagnosis in the ECG recording for ventricular fibrillation (VF) was 81.7% (SD = 38.7). The exact distribution of the correct answers is shown in Figure 1.

Figure 1. Correct interpretation of the VF rhythm depending on the profession



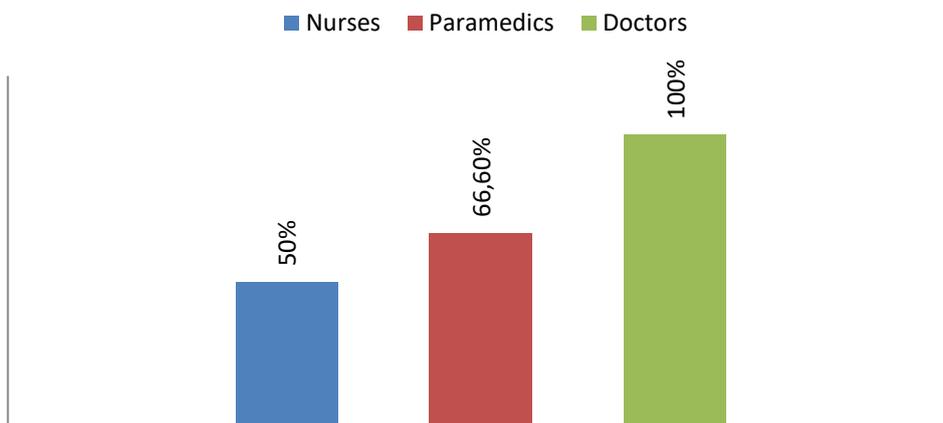
The average of the correct answers obtained in the question about the rhythm diagnosis in the ECG record with ventricular tachycardia (VT) was 90% (SD = 30). The exact distribution of the correct answers is shown in Figure 2.

Figure 2. Correct interpretation of the VT rhythm depending on the profession.



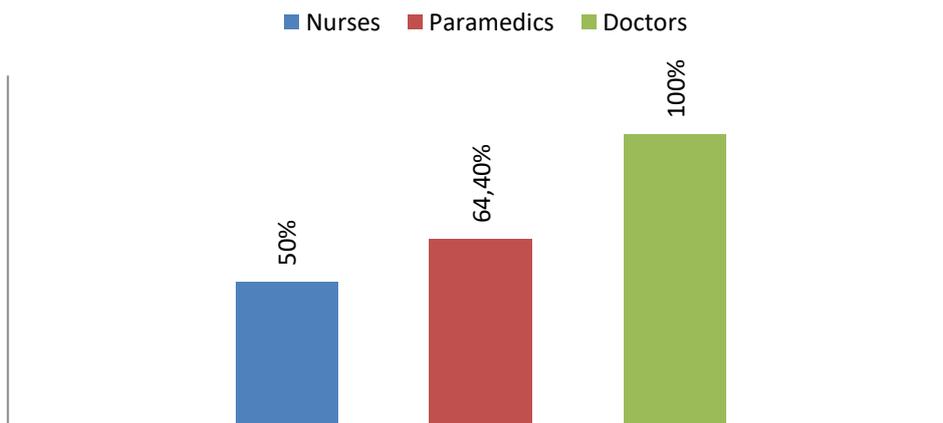
The average of correct answers obtained in the SCA procedure in the PEA mechanism was 66.7% (SD = 47.7). The exact distribution of the correct answers is shown in Figure 3.

Figure 3. Correct procedure in the case of SCA in the PEA mechanism depending on the profession.

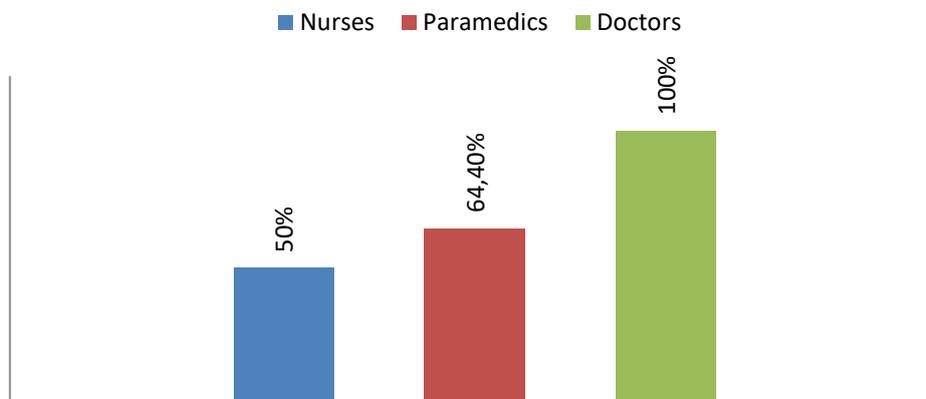


The average of correct answers obtained in the question about the energy of the first defibrillation in SCA was 65% (SD=47.7). The exact distribution of the correct answers is shown in Figure 4.

Figure 4. Correct determination of defibrillation energy depending on the profession



The average of correct answers obtained in the question about adrenaline in the SCA with the initial rhythm of VF / pVT was 65% (SD=47.7). The exact distribution of the correct answers is shown in Figure 5.

Figure 5. The correct pharmacological treatment in the SCA depending on the profession.

The statistical gender dependence on the test result (χ^2 test) was 2.625 for $p=0.622$. There was no statistically significant dependence of the workplace on the result (χ^2 test = 23.472 for $p=0.107$). A significant result at the level of statistical tendency was obtained in the χ^2 test, analysing the dependence of the completed training over the last two years on the average test result (7.999 for $p = 0.092$). The statistical dependence of the seniority on the test result was 14,817 for $p=0.063$ (χ^2 test). When assessing intergroup differences as a result of the test for individual professions, statistically significant differences ($p=0.01$) were found in a one-factor Kruskal-Wallis variance analysis. In post-hoc tests, significant differences were found between the level of knowledge of doctors and paramedics ($p=0.02$) and between the level of knowledge of doctors and nurses ($p=0.01$). Between the result of the test of paramedics and nurses, there were differences at the level of statistical tendency ($p=0.09$).

DISCUSSION

A patient who will experience in-hospital emergency cardiac arrest should have a better chance of survival than in pre-hospital conditions. The presence of medical staff and diagnostic and therapeutic facilities enables the implementation of effective resuscitation. The condition is to recognize the reversible causes of cardiac arrest and to properly prepare the medical staff of all hospital departments to conduct advanced CPR. The study was aimed at an attempt to assess the state of knowledge of paramedics, nurses and doctors working in the hospital.

Knowledge of the in-hospital resuscitation algorithm among medical personnel can be considered satisfactory due to the obtained average rating (3.68 to 5.0) reaching 73.6%. The best respondents coped with the diagnosis of the VT rhythm (90%), and the worst with matching the energy of defibrillation and the supply of adrenaline during resuscitation (65%). No significant dependence of the test result was found in relation to the internship, place or profession. It can be considered that the main determinant of the respondent's assessment is his / her knowledge from the university and the one he / she acquired during the professional work. In addition, there is also the same personality type that has a decisive impact on whether after completing education, these people acquire additional knowledge in the framework of compulsory or voluntary training, such as various types of congresses or seminars.

Considering the whole test, doctors have the highest knowledge (100%). Significantly lower result was obtained by paramedics working in the branches (74.6% of correct answers). The last and at the same time the lowest rated professional group are nurses. The average of correct answers at the level of 56% is definitely too low. It should be noted that this professional group has the longest contact with hospitalized patients. They should be able to recognize and be able to react in the event of a life-threatening condition.

In this group, it would be necessary to start training in the field of management of in-hospital cardiac arrest as soon as possible. According to the ERC 2015 guidelines, everyone working in health care should be trained in providing assistance in cardiac arrest, as well as provide for appropriate professional development [11].

CONCLUSIONS

Hospital staff have the equipment and algorithms used during sudden cardiac arrest. The level of knowledge in the in-hospital SCA reaches 73.6%. Physicians have the highest level of knowledge, while the lowest is the nursing staff. Adequate lifelong learning in the field of ALS (advanced life support) for medical staff should be implemented in order to improve the quality of health services provided to healthcare entities.

Disclosure statement

No potential conflict of interest was reported by the author's.

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