

THE KNOWLEDGE OF NURSING STAFF ON EMPLOYING CARDIOPULMONARY RESUSCITATION IN KEEPING WITH THE MOST RECENT GUIDELINES

Magdalena Lach^{1A,B,C}, Magdalena Staszkiwicz^{2A,D,E,F}, Lucyna Ścisło^{2E}, Małgorzata Paplaczek-Serednicka^{2F}, Judyta Pluta^{2E}

¹Faculty of Health Sciences, Jagiellonian University Medical College, Krakow, Poland

²Department of Clinical Nursing, Institute of Nursing and Midwifery, Faculty of Health Sciences, Jagiellonian University Medical College, Krakow, Poland

Authors' contribution:

A. Study design/planning • B. Data collection/entry • C. Data analysis/statistics • D. Data interpretation • E. Preparation of manuscript • F. Literature analysis/search • G. Funds collection

Address for correspondence:

Dr Magdalena Staszkiwicz
Department of Clinical Nursing
Institute of Nursing and Midwifery
Faculty of Health Sciences
Jagiellonian University Medical College
Krakow, Poland
e-mail: baranmagdalena@gmail.com

SUBMITTED: 22.11.2023

ACCEPTED: 3.01.2024

DOI: <https://doi.org/10.5114/ppiel.2023.136175>

ABSTRACT

Introduction: Sudden cardiac arrest is a medical condition during which the mechanical activity of the heart is stopped, which results in arresting blood circulation in the entire body. Having diagnosed sudden cardiac arrest, one should commence cardiopulmonary resuscitation as soon as possible. The nursing staff should know the management algorithms involved in both the basic and advanced resuscitation procedures. Every 5 years, the European Resuscitation Council publishes guidelines presenting the most recent knowledge on resuscitation procedures. The objective of the report was the evaluation of the knowledge of nursing staff involving cardiopulmonary resuscitation procedures to be employed in adult individuals in keeping with the most current guidelines of the European Resuscitation Council.

Material and methods: The authors employed the diagnostic poll method and the questionnaire-based technique. The employed tool was a questionnaire developed by the authors. The study was carried out from 2022 to 2023. The target group consisted of female and male nurses actively performing their jobs. The total number of subjects tested was 80.

Results: Most of the responders represented a low or average level of knowledge. Only 9% of the responders represented a high knowledge level. No significant correlation was observed between the level of knowledge and the education level, duration of employment, type and number of accomplished training and specialisation courses, and the number of courses offered by the employer.

Conclusions: In the nursing staff, the level of knowledge on employing cardiopulmonary resuscitation in adult patients is diversified, in the majority of cases being maintained on the medium level. Nursing staff should strive to bring their knowledge up to date.

Key words: knowledge, nurses, sudden cardiac arrest, cardiopulmonary resuscitation.

INTRODUCTION

Sudden cardiac arrest (SCA) is defined as cessation or significant impairment of the mechanical heart function. The patient does not react to stimuli, and her/his pulse measured in large arteries is not palpable. A characteristic finding in SCA is also apnoea or the so-called agonal respiration [1]. In keeping with the data reported by the International Classification of Diseases and Related Health Problems (ICD-10) of 2019, sudden cardiac arrest can be placed in the following categories of abnormalities: I46 – cardiac arrest, I46.0 – respiratory arrest with successful resuscitation, I46.1 – sudden cardiac death described in such a way, I46.9 – cardiac arrest, unidentified [2].

As can be seen from the majority of publications, the causes of sudden cardiac arrest may be defined as medical and non-medical, described otherwise as “probably cardiac” and “extra-cardiac”. If no other obvious cause of cardiac arrest is identified, usually heart-associated aetiology is assumed, with myocardial infarction, arrhythmia, or heart failure being the most common. These conditions are diagnosed in approximately 50-60% of all SCA cases. Identification of the cause of sudden cardiac arrest allows for a prompt reaction and a fast treatment implementation to prevent organ dysfunction and ensure the return of spontaneous circulation (ROSC) [3, 4]. The causes of sudden cardiac arrest may also be defined as primary, resulting from such heart diseases as acute

coronary syndrome, cardiomyopathy, or pulmonary embolism; secondary causes include a respiratory arrest, exsanguination, or multi-organ trauma.

Electrophysiological mechanisms underlying sudden cardiac arrest include ventricular fibrillation (VF), ventricular tachycardia (VT), asystole, and pulseless electrical activity (PEA). In cases when ventricular fibrillation or ventricular tachycardia are diagnosed, defibrillation may be employed. Asystole and pulseless electrical activity represent heart rhythms that are not to be defibrillated [1, 5]. Potentially reversible causes of sudden cardiac arrest should also be mentioned here. Such causes are divided into 2 groups and for the sake of simplicity are referred to as “the 4 Hs” (hypoxia, hypo-/hyperthermia, hypovolaemia, hypo-/hyperkalaemia, and other electrolyte abnormalities) and “the 4 Ts” (tension pneumothorax, tamponade, thrombosis, and toxins) [3, 6, 7].

Sudden cardiac arrest is among the main causes of death both in Europe and worldwide. In Europe as many as 350,000-700,000 SCA cases may occur annually. In most cases SCA is seen in individuals with hitherto undiagnosed circulatory system diseases [7, 8]. When we consider the causes of death in sick patients in Europe, sudden cardiac arrest is at the forefront, occupying third place. In their most recent Guidelines of 2021, the European Resuscitation Council (ERC) describes the epidemiology of sudden cardiac arrests dividing the cases into out-of-hospital cardiac arrests (OHCA) and in-hospital cardiac arrests (IHCA) [9].

To uniformise the questionnaire allowing for the comparative analysis of data collected in various European countries when the IHCA cases are reported, the updated Utstein protocol was published in 2019. Based on the said protocol, the annual European rate of IHCA was estimated as 1.5-2.8 cases per 1000 admissions. As in the case of OHCA, the percentage is also an estimate. Problems associated with IHCA reporting include differences in the DNACRP (do not attempt cardiopulmonary resuscitation) policy as well as logistics-pertaining problems, e.g. VF occurring in a patient during coronarography when defibrillation was promptly introduced – such patients are not reported to be included in the register [9].

The European Resuscitation Council was founded in 1988. Since 1989, the Council provides resuscitation standards for Europe and other countries. The Polish representative of the ERC is the Polish Resuscitation Council (PRC) established in 2001 [10, 11]. “The objective of the European Resuscitation Council is to protect the human lives through ensuring access to high-quality resuscitation to all citizens. This is achieved through publication of upgraded, scientific information-based European guidelines addressing prevention and treatment of circulatory arrests and life-threatening states” [12]. The initial Guidelines were presented in 1992 and included basic and advanced

resuscitation procedures. In 1994, the publication was amended to include the Guidelines for resuscitation procedures performed in children. The first international Guidelines were formulated in 2000 in cooperation with the International Liaison Committee on Resuscitation (ILCOR). In 2001, the ERC presented the summary of the Guidelines, and since that time the updated texts have been published every 5 years. In 2020, the guidelines of resuscitation management to be employed in COVID-19 patients appeared [12, 13]. The most recent Guidelines date back to 2021. They present major updates of the knowledge addressing resuscitation, showing the most recent scientific evidence-based guidelines. Importantly, the guidelines are not designed for medical staff only, but also for individuals employed outside health care institutions [10-12].

The objective of the study was the evaluation of the knowledge of professionally active nurses, the said knowledge addressing provision of cardiopulmonary resuscitation in adults in keeping with the most recent Guidelines of the European Resuscitation Council of 2021; the author also investigated what factors affected the level of the aforementioned knowledge.

MATERIAL AND METHODS

The authors employed the diagnostic poll method using a self-developed questionnaire [14]. The questionnaire consisted of 34 questions aiming at checking the level of knowledge of nursing staff with respect to performing cardiopulmonary resuscitation in adult patients in keeping with the most recent Guidelines formulated by the European Resuscitation Council in 2021. All the questions were closed-ended; 3 variants of the answer were provided with only one variant being appropriate and in keeping with the ERC Guidelines. The knowledge level was described as low, average, or high, depending on the number of correct answers offered by the study subjects. The final part of the questionnaire included 10 questions addressing the demographics of the studied person, among them gender, education level, characterisation of the ward where the subject was employed, duration of employment, and completed training courses. The final question addressed the degree to which the responders agreed with the given statements – the used method was the 5-point Likert scale. The statistical significance of the thus obtained dependencies was based on the significance level equalling 0.05. The Pearson chi-square test was used in the statistical analysis. The statistical calculations were done using the IBM SPSS Statistics 29 software.

The study was performed in the period of 2022-2023. The target group consisted of female and male nurses actively practicing their professional work. Eighty participants were studied; all of them know-

ingly and wilfully participated in the study. The participants were informed about the purpose of the study and its full anonymity. Completing the questionnaire was tantamount to the subject granting consent to participate in the study.

RESULTS

Eighty individuals participated in the study, including 65 females (81.3%) and 15 males (18.8%). Fifty-eight subjects completed their bachelor's degree studies (72.5%), 20 participants completed master's degree studies (25%), one subject completed a medical vocational school (1.3%), and one – a medical high school (1.3%). Forty-three subjects (53.8%) selected a surgical ward as their place of employment, while 37 individuals (46.3%) chose a non-invasive treatment ward. Duration of employment within 2 years was indicated by 52 individuals (65%); for 20 subjects (25%) the duration was between 3 and 10 years, the answer “between 11 and 25 years of employment” was selected by 6 responders (7.5%), and the lowest number – only 2 individuals (2.5%) – worked as nurses for longer than 26 years.

Responses to the question addressing the condition of a patient in whom cardiopulmonary resuscitation (CPR) should be started showed that 34 individuals (42.5%) provided a correct response marking the answer “does not react and does not breathe or breathes in an abnormal manner”. Thirty-six responders (45.0%) marked the answer “does not react, does not breathe, or breathes in an abnormal manner and shows no palpable pulse”. The lowest number of individuals – 10 subjects (12.5%) – marked the answer “does not react, does not breathe, and no palpable pulse is seen”.

In the following question, the responders were asked to mark the correct answer. Sixty-five individuals (81.3%) selected the correct statement, marking the answer stating that while performing CPR, both individuals who were not health care sector employees and health care sector professionals followed 30 compressions by 2 mouth-to-mouth rescue breaths. If, however, one had not been trained in CPR or for any other reason was unable to perform rescue breathing, CPR should be carried on solely using chest compression. The lowest number – a total of 2 individuals (2.5%) – marked the response stating that regardless whether one had or had not been trained, rescue breathing should be performed anyway, since a failure to do so was associated with legal consequences. Thirteen of the investigated subjects (16.3%) agreed with the answer which stated that individuals not associated with the health care sector should not perform rescue breathing at all in order to avoid complications associated with unskilful proceeding. The following questions addressed the case of the patient's chok-

ing. In the opinion of 61 responders (76.3%), the initial step taken in the adult patient who had choked was encouraging her/him to cough – and this is the right answer. Eleven subjects (13.8%) responded that the first step was hitting the patient 5 times between the shoulder blades, while 8 individuals (10%) regarded compressing the epigastrium 5 times to be the correct answer. In the following question the responders were asked in what case one might remove a foreign body that was causing an obstruction in the patient. Seventy subjects (87.5%) gave a correct answer choosing the response “only when the foreign body can be seen within the patient's oral cavity”. Eight individuals (10%) believed foreign body removal was possible at any time while attending to the patient, while 2 responders (2.5%) believed it could be done only if the patient had lost consciousness.

Responding to the question addressing the priority activity in the course of resuscitation, as many as 72 subjects (90%) selected the right answer describing the high-quality chest compressions with minimised stops in-between and an early defibrillation. Five respondents (6.3%) pointed to the answer which combined high-quality chest compressions with properly executed rescue breathing. The answer describing an early defibrillation and adrenaline administration in non-defibrillation rhythm was chosen by 3 individuals (3.7%). Slightly more than half of the responders (45 individuals, i.e. 56.3%) marked the right answer, which stated that the system was employed in hospitals in order to early identify critically ill patients or individuals at risk of their clinical condition being deteriorated. Twenty-eight responders (35%) believed the system was employed in the course of assistance offered by witnesses of the incident to establish the priority measure in such assistance.

The question addressing the issue of who should be authorised to summon the hospital resuscitation team in case there was a risk of the patient's health deteriorating was answered correctly by almost all the respondents (77 individuals – 96.3%), who selected the answer “each member of the team providing medical care to the patient”. The remaining responders selected the answer “managers of particular hospital units and supervisors of nursing staff”. The subsequent question addressed the knowledge of the standard number denoting a circulatory arrest employed by European hospitals. Less than half of the responders (39 individuals – 48.8%) marked the correct answer choosing the number 2222.

The question addressing the members of the hospital resuscitation team was answered inappropriately by a considerable majority of the responders; 66 subjects (82.5%) selected the answer stating that the team members might include physicians, nurses, or paramedics who had been employed for at least 2 years and completed the accredited course on ad-

vanced life support (ALS). A single individual (1.3%) marked the answer stating that the team members might be physicians, nurses, or paramedics who had been employed by a given hospital for 5 years. The correct answer stating that the team members might include individuals who had accomplished an accredited ALS course was marked by 13 responders (16.3%).

The subsequent questions addressed the knowledge on defibrillation. The first of them required the responder to identify the principal factor affecting the effectiveness of defibrillation; the appropriate answer (minimisation of time intervals between compressions before and after defibrillation) was marked by 62 individuals (77.5%). Fifty-eight subjects (72.5%) were of the correct opinion that during defibrillation, the oxygen mask should be removed from the face of the patient, similarly as the nasal cannulas, to eradicate the risk of ignition, while 69 respondents (86.3%) appropriately marked the answer to the question of positioning the electrodes selecting the anterolateral position. For the question on proper positioning of the lateral electrode, the correct answer (in the mid-axillary line) was chosen by 41 respondents (51.2%), while the remaining subjects selected erroneous answers: 20 responders (25%) marked the anterior axillary line, while 19 individuals (23.8%) chose the mid-clavicular line.

Fifty-three responders (66.2%) marked the correct answer to the question probing into the time of continuing pressing the chest after each defibrillator discharge (the said time is 2 minutes). Fourteen individuals (17.5%) marked the answer indicating one minute, while 13 respondents (16.2%) indicated 3 minutes. It should be mentioned here that more than one half of the respondents – 43 individuals (53.2%) – marked a wrong answer, which read “at least 200 J for the first discharge for the biphasic rectilinear and exponentially truncated wave and 150-200 J for the first discharge of the biphasic pulse wave”. The correct answers to questions addressing discharges were 150 J and 120-150 J, respectively, and were selected by 26 individuals (32.5%).

Answering the question about the sequence of increasingly more advanced procedures of opening the respiratory ways in the course of CPR (ang. cardiopulmonary resuscitation), 44 individuals (55%) selected the right answer, saying that one should start from the basic techniques and – depending on the skills of the rescuer – gradually proceed until effective ventilation was achieved, while endotracheal intubation should be performed by rescuers characterised by a high percentage of success in employing the procedure. Twenty-seven responders (33.8%) believed that endotracheal intubation should be performed by a person who had received appropriate training, while 9 subjects (11.3%) were of the opinion that opening

the respiratory ways should start with the most advanced techniques. In the case of the following question, exactly half of the responders (40 individuals – 50%) marked the correct answer, saying that in the course of intubation the time interval between chest compressions should not be greater than 5 seconds. Thirty-five of the investigated subjects (44%) marked the answer saying that the interval should not be longer than 10 seconds, while 5 responders (6%) selected the answer indicating less than 2 seconds. In the case of the question concerning the method confirming the proper positioning of the endotracheal tube, a majority of the respondents – 54 individuals (67.5%) – gave incorrect answers, indicating auscultation of the chest. The correct answer, i.e. checking the capnography chart, was chosen by 23 respondents (28.8%).

The subsequent question addressed the frequency of ventilation after the patient has been intubated or a supraglottic device had been introduced. The correct answer in this case was 10 breaths per minute, and this was selected by 41 subjects (51.2%), while 37 individuals (46.3%) responded “12 breaths per minute”. The remaining 2 respondents (3%) marked the answer “8 breaths per minute”. The following questions concentrated on medications to be administered in the course of resuscitation procedures. Answering the question on adrenaline administration observing the non-defibrillation rhythm, 55 responders (68.8%) selected the correct option, stating that 1 mg of adrenaline had to be administered as soon as possible after circulatory arrest had been noted. The remaining 6 individuals (7.5%) selected the response indicating the administration of 1 mg of adrenaline after the third defibrillation. Another question addressed the administration of adrenaline in keeping with the defibrillation rhythm. Here the number of the responders was similar as in the case of the previous question, since 54 individuals (67.5%) answered correctly, marking the answer describing administration of 1 mg of adrenaline after the third defibrillation. Nineteen subjects (23.8%) selected the answer indicating the administration of adrenaline as soon as possible after circulatory arrest, while 7 responders (8.8%) opted for administering adrenaline within 2 minutes after circulatory arrest.

Fifty-four individuals (67.5%) gave correct answers to the question on how often 1 mg of adrenaline should be administered in the course of CPR, selecting the option “every 3-5 minutes”, while 22 respondents (27.5%) selected the time interval of 2-4 minutes, and 4 responders (5%) – the interval of 4-6 minutes. Fifty-three individuals (66.3%) also gave correct answers to the question on dosage and administration of amiodarone in keeping with the VF/pVT rhythms, marking the options of administering 300 mg after 3 discharges and another 150 mg dose after 5 dis-

charges. Fifteen responders (18.8%) selected “300 mg to be administered as soon as possible after diagnosing circulatory arrest and another dose of 150 mg after 3 discharges”. The lowest number of subjects, i.e. 12 individuals (15%), opted for the answer indicating the administration of 150 mg after 3 discharges and another dose of the same magnitude after 5 discharges. The question addressing another medication that could be administered at the dose of 100 mg as substitution of amiodarone was answered correctly by 58 responders (72.5%), who selected lidocaine. The answers to this question also included atropine indicated by 19 subjects (23.8%) and diltiazem selected by 3 individuals (4%). Sixty respondents (75%) selected the correct answer to the question regarding situations when fluid therapy was indicated in the course of CPR – they marked the answer stating it was indicated only when hypovolaemia was the suspected or confirmed cause of circulatory arrest. Seventeen individuals (21.3%) believed fluid therapy was always employed in the course of CPR, while 3 subjects (3.7%) claimed fluid therapy could be employed in patients without confirmed chronic renal failure. In the case that ROSC was seen in the patient, the procedure consisted, among others, in employing 12-lead ECG and administering appropriate pharmacotherapy. Such an answer was marked by 14 responders (17.5%). Fifty individuals (62.5%) chose the answer saying that one should consider cessation of chest compressions to assess the cardiac rhythm and check the pulse. Sixteen subjects (20%) were of the opinion one should interrupt CPR and transfer the patient to the intensive care unit. Fifty-eight of the subjects (72.5%) believed the post-resuscitation care should start after permanent ROSC had been achieved, regardless of the location of the patient; this answer is correct.

The general level of the knowledge characteristic of the respondents was defined in 3 categories:

low, average, and high. The assessment was dependent on the number of correct answers given in the questionnaire in the part addressing the knowledge testing. The highest score achieved by the responders was 37 and the lowest was 14. The detailed distribution of the scores obtained in the entire knowledge test is illustrated in Figure 1.

As was indicated by the results of the questionnaire, 18 female and male nurses in the investigated group (22%) represented a low level of knowledge on employing resuscitation procedures in keeping with the most current ERC recommendations (14-21 correct answers), while 55 responders (69%) showed an average level (23-31 correct answers). Seven individuals (9%) demonstrated a high level of knowledge in the field in question (32-37 correct answers). Questions 35-37 were supplementary questions.

The subsequent analysis probed into the relationship between the state of knowledge of the nursing staff and administrative data describing the subjects. The level of education ($p = 0.963$) and duration of employment ($p = 0.655$) did not affect the nurses' level of knowledge on cardiopulmonary resuscitation in adults as described in the most recent ERC Guidelines.

The questionnaire included a multiple-choice question addressing specialisation courses. A total of 24.8% of the responders (19 individuals) completed a specialist course on “First aid in life-threatening conditions”. Eighteen responders (22.5%) admitted having completed a course on basic resuscitation procedures and management of patients with life-threatening conditions. Six respondents (7.5%) completed a course on basic elements of emergency medicine. The highest number of the respondents – as many as 44 individuals (55%) – completed the course entitled “Circulatory and respiratory resuscitation”. Thirty responders (37.5%) did not complete any of the above-

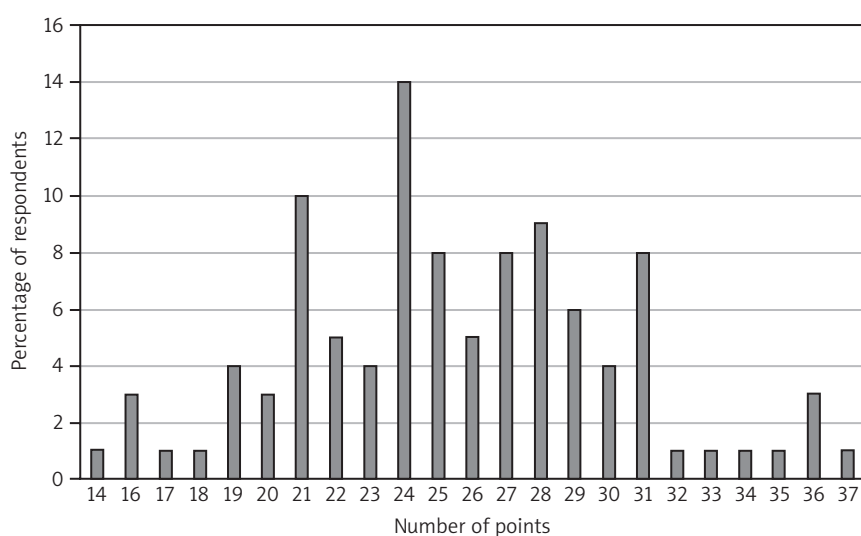


Figure 1. The distribution of points from the entire knowledge test

listed courses. Thirty-one individuals completed only one of the aforementioned courses, 7 completed 2 courses and another 7 completed 3 courses. Five individuals completed all the 4 courses. The number of completed courses did not significantly affect ($p = 0.766$) the knowledge of the nursing staff.

The responders were also asked about the number of nursing specialty courses they completed. Eleven individuals (13.8%) completed the specialty courses in anaesthesiology nursing and intensive care. Specialty courses in surgical, cardiac, internal diseases, geriatric, and long-term care nursing were completed by one person each (1.3%). Two individuals completed specialty courses in emergency nursing. Sixty-seven subjects (83.8%) did not complete any of the above-mentioned specialty courses. The questionnaire included a question about whether the employers of the nursing staff organised any courses on cardiopulmonary resuscitation in adults. More than a half of the responders (56.3%) admitted there were no such courses organised. Thirty-five individuals (43.8%) stated that such courses were offered.

The subjects were also asked whether they had become familiar with the most recent ERC Guidelines. As many as 72.5% of the subjects replied positively; in the case of the question of whether at any time they got to know the ERC Guidelines (e.g. those valid in previous years), 90% of the answers were positive.

DISCUSSION

The paper presents an evaluation of the knowledge of nursing staff on cardiopulmonary resuscitation in adult patients in keeping with the most recent Guidelines of the European Resuscitation Council issued in 2021, as well as the relationship between the state of knowledge and education, duration of employment, number of completed specialisation courses, and the number of training courses organised by the employers. As follows from the analysis, 22% of the investigated nursing staff members represented a low level of knowledge on performing resuscitation procedures in keeping with the most recent ERC Guidelines, 69% subjects showed an average level, and 9% demonstrated a high level of knowledge in this field. Similar results were obtained by Tomaszek *et al.*, who reported the nursing staff as demonstrating quite variable, but to a high degree, insufficient knowledge on cardiopulmonary resuscitation [15]. Already in the first question addressing the diagnosing of cardiac arrest, one could see a high percentage of erroneous answers (57.5%). This may be a consequence of the fact that earlier guidelines – apart from lack of respiration or abnormal respiration and absence of any reaction – also mentioned no palpable pulse. Nevertheless, numerous investigations confirmed the fact that a reliable pulse examination

performed in an emergency situation may be difficult or bothersome even for individuals who have been employed by health care institutions for many years [16]. Another cumbersome question concentrated on the track and trigger system, which was created with the aim of improving the reaction to in-hospital circulatory arrest, unifying the principles of in-hospital communication and simplifying the decision-making about calling specialist assistance if the patient shows noticeable health deterioration. Knowledge of the system should be emphasised, because it is the nursing team that stays with the patient most of the time and the team members have to promptly react to the patient's deteriorating health [17]. The predominance of incorrect answers was also seen in the case of the question that concentrated on the defibrillator energy value, where – even in the question itself – it was stressed that the said values had not changed since the ERC Guidelines were published in 2015. This observation may indicate that nursing staff are not very effective in upgrading their knowledge. In keeping with the Nursing and Midwife Profession Act (article 61, section 1), the representatives of the 2 professions are obliged to constantly upgrade their professional knowledge and skills [18]. Interestingly, a majority of the responders gave a positive answer when asked whether they had perused the most recent ERC Guidelines. More than half of the subjects admitted that no courses on the subject were offered by their employers, but in turn, in the part of the questionnaire devoted to learning the opinions of the responders, 50% claimed hospitals should organise courses and training in the field of ALS and BLS based on the ERC Guidelines. In another publication, Latos M. demonstrated that the fundamental factor affecting the quality of health care services was training, both in the field of procedures performed daily and in activities needing special authorisation (e.g. endotracheal intubation). The purpose of such a solution is to achieve full understanding of the performed procedures and secure complete involvement of the performing person. Latos M. emphasised the value of participation in simulations using various scenarios [19]. A significant factor that might be the subject of further studies is the frequency of courses and training activities offered by the employer and the amount of time nursing staff members have to spend on self-arranged education. In the present paper the author did not observe the provided responses to be affected by the education level, length of employment, specific character of a given ward, the number and type of courses and specialties. Similar results can be found in the publication by Mazur and Jadczyk, in which the investigation focused on the level of knowledge on basic resuscitation procedures among the nursing staff members. The authors proved that completing a course on cardiopulmonary resuscitation or not at-

tending such a course, as well as the time lapse from completing the training, did not affect the knowledge of the BLS algorithm [20].

CONCLUSIONS

More than half of the investigated professionally active female and male nurses demonstrated a low or average level of knowledge on performing cardiopulmonary resuscitation in adults in keeping with the Guidelines of the European Resuscitation Council 2021. A high level of knowledge was represented by 9% of the responders.

Among the investigated female and male nurses, the education level did not significantly affect the level of knowledge of ALS performed in adults.

The duration of employment did not significantly affect the nursing staff knowledge on cardiopulmonary resuscitation in adult patients.

No dependency was noted between the knowledge of the nursing staff and the specific character of the ward where they were employed.

No dependency was noted between the knowledge status of the nurses and the number and type of specialist and specialty courses they completed.

The number of courses and trainings organised by institutions employing the nurses did not significantly affect their knowledge on employing ALS in adult patients. A total of 50% of the responders claimed the hospitals should organise courses on BLS and ALS based on the guidelines formulated by ERC.

Disclosure

The authors declare no conflict of interest.

References

- Gajewski P (Ed.). *Interna Szczeklika. Medycyna Praktyczna*, Kraków 2019; 129-139.
- International Statistical Classification of Diseases and Related Health Problems 10th Revision. World Health Organisation. Retrieved from: <https://icd.who.int/browse10/2019/en#/> (access: 19.04.2023).
- Andersen LW, Holmberg MJ, Berg KM, et al. In-hospital cardiac arrest: A review. *JAMA* 2019; 321: 1200-1210.
- Chen N, Callaway CW, Guyette FX, et al. Arrest etiology among patients resuscitated from cardiac arrest. *Resuscitation* 2018; 130: 33-40.
- Kózka M, Rumian B, Maślanka M. *Pielęgniarstwo ratunkowe*. PZWL Wydawnictwo Lekarskie, Warszawa 2018.
- Lott C, Truhlar A, Alfonso A, et al. Zatrzymanie krążenia w sytuacjach szczególnych. Wytyczne Europejskiej Rady Resuscytacji 2021.
- Sosada K (Ed.). *Ostre stany zagrożenia życia w chorobach wewnętrznych*. PZWL Wydawnictwo Lekarskie, Warszawa 2016.
- Zawadzki A. *Medycyna ratunkowa i katastrof*. PZWL Wydawnictwo Lekarskie, Warszawa 2008.
- Grasner J, Herlitz J, Tjelmeland I, et al. Epidemiologia zatrzymania krążenia w Europie. Wytyczne Europejskiej Rady Resuscytacji 2021.
- Polska Rada Resuscytacji. Oficjalna strona. Retrieved from: <https://www.prc.krakow.pl/index.html> (access: 16.08.2023).
- European Resuscitation Council. Official website. Retrieved from: <https://www.erc.edu> (access: 16.08.2023).
- Perkins GD, Grasner J, Semeraro F, et al. Podsumowanie Komitetu Wykonawczego ERC. Wytyczne Europejskiej Rady Resuscytacji 2021.
- Kane AD, Nolan JP. Changes to the European Resuscitation Council guidelines for adult resuscitation. *BJA Educ* 2022; 22: 265-272.
- Lenartowicz H. *Metodologia badań w pielęgniarstwie*. PZWL Wydawnictwo Lekarskie, Warszawa 2010.
- Tomaszek L, Cepuch G, Turkanik E. Ocena wybranych czynników determinujących poziom wiedzy zespołu pielęgniarskiego w zakresie resuscytacji krążeniowo-oddechowej. *Anestezjologia i Ratownictwo* 2016; 10: 265-272.
- Olasveengen TM, Semeraro F, Ristagno G. Podstawowe zabiegi resuscytacyjne. Wytyczne Europejskiej Rady Resuscytacji 2021.
- Soar J, Bottiger BW, Carli P, et al. Zaawansowane zabiegi resuscytacyjne u dorosłych. Wytyczne Europejskiej Rady Resuscytacji 2021.
- Ustawa z dnia 15 lipca 2011 r. o zawodach pielęgniarki i położnej.
- Latos M. Obowiązki i kompetencje personelu pielęgniarskiego w wewnątrzszpitalnym NZK. *Pielęgniarstwo w Stanach Nagłych* 2017; 1: 24-28.
- Mazur R, Jadczyk M. Poziom wiedzy personelu pielęgniarskiego na temat podstawowych zabiegów resuscytacyjnych. *Pielęgniarstwo w Anestezjologii i Intensywnej Opiece* 2019; 5: 1-5.