Abstract:
In the past, patient safety has attracted attention. However, little of it has been focused on the social skills necessary for paramedics. The aim of this article is to both highlight this deficiency, as well as the importance of examining such social skills which are necessary for crews in the emergency medical services.

In this review, we present different terms described in the literature, and also the two most prevalent approaches: a non-technical skills approach and a competency approach.

The non-technical skills approach has its origin in aviation. Flin et al. (2003) defined non-technical skills as the cognitive and social skills that complement technical skills, and contribute to safe and efficient task performance. Non-technical skills are divided into three main categories: cognitive (decision-making and situational awareness), personal awareness (coping with fatigue and stress) and social skills (leadership, communication and teamwork). Each category includes basic elements and behavioral markers – examples of effective and noneffective behaviors.

The competency approach defines competencies as knowledge, skills, abilities and other characteristics or as a cluster of two or more these attributes (Marrelli, Tondora, & Hoge, 2005). Each competency is composed of behavioral indicators – specific descriptions of effective behavior (Calhoun et al., 2008). The literature describes three clusters of competencies: 1. cognitive competencies (system thinking and pattern recognition), 2. emotional competencies (self-awareness, self-management, emotional self-awareness, emotional self-control), 3. social competencies (social awareness, relationship management such as empathy and teamwork) (Boyatzis & Boyatzis, 2008).

In this article, we discuss the differences and similarities of both approaches and we focus on their critique. Nestel et al. (2011) criticized the term of non-technical skills and recommended using the term human factors because human factors positively define skills or behavior. According to the authors, while the term of non-technical skills is simplistic and inaccurate, human factors stem from a richer academic tradition. The model of non-technical skills can contribute to the development of negative attitudes and devaluation in that these skills cannot be learned, and the spread of attitudes that there are two broad, independent categories.

The critique of competency models is based on theoretical ambiguities. Some definitions describe competencies as a combination of knowledge, skills, ability and other characteristics (Campion & Odman, 2011) or as a summary of beliefs, motives, and attitudes needed for successful work (Chen & Naquin, 2006). Another critique is based on the lack of methodological rigour, and according to some authors (Ashworth & Saxton, 2006), the term of competence ignores wider human qualities and focus on the measurement of performance according to predetermined standards.

Despite the advantages and disadvantages of both approaches, the urgency of this topic in Slovakia is emphasized by the increasing number of publicized cases of medical failure. While there are general categories of non-technical skills and competency models for healthcare professionals (such as nurses and doctors), there is a lack of studies which focus on paramedics. According to Glavin and Maran (2003), specific methods cannot always be transferred from one culture to another. It is not possible to take a specific training package and replace the word nurse or physician with the word paramedic. It is necessary to develop a theory of human skills (or competencies) and to identify job-specific skills for the position, and related behavioral markers. Additionally, the knowledge of social skills in emergency medical services is important for preventing errors and dealing with critical situations.

Key words: Social skills. Competencies. Non-technical skills. Paramedics.
Introduction

The labour market and high-paying jobs both require and value social skills. These social skills are mostly required in high-risk industries such as aviation (Monfries, Moore, Monliies, & Moore, 1999), the oil industry (Moffat & Crichton, 2015) or medicine (Flowerdew, Brown, Vincent, & Woloshynowycz, 2012), where serious errors can cause permanent injury or pose life-threatening harm. Focusing on medicine, statistics have shown a lack of social skills among healthcare providers. The data from European countries indicate that the human factor (including social skills) causes 8 – 10% of errors in medicine and healthcare. The UK has reported 850,000 adverse events annually (about 10% of hospital admissions), while similar results in 2005 were shown in national studies in Spain, France, and Denmark (WHO, 2019). Deming (2017) found that social skills are necessary mostly in jobs with non-routine situations.

Uramatsu et al. (2017) analyzed 71 fatal medical accidents in Japan between April 2010 and March 2013. The results showed the following causes of death: non-technical skills in 34 cases (46.6%), the progression of disease in 33 cases (45.2%), and technical causes in 2 cases (5.5%). In 2 cases no consensus was reached on the cause of death. Isik, Bayin, & Ugurluoglu (2016) analyzed 116 cases of errors in Turkish healthcare between 2012 and 2015. They found that 40.5% of errors were caused by the negligence of providers. 74.1% of them were caused by physicians, 11.2% occurred in state hospitals and the medical team was responsible for 6% of errors. 51.7% of errors lead to death and 25% of errors lead to permanent damage or disability.

There are no statistics of errors caused by human factors in Slovakia, but statistics and studies from other countries highlight the importance of social skills in the prevention of death and errors by healthcare providers, and in managing non-routine situations. Therefore, it is important to know which social skills are key (for prevention and everyday work) and find ways of effectively developing them in healthcare professionals.

The study originates from the previous lack of research into the social skills of paramedics, with the aim of this paper to emphasize the importance of exploring such social skills. We introduce two main approaches to exploring social skills; the comparison and the critique of these approaches. We also discuss the possible practical implications.

Approaches to understanding and exploring social skills in health care

Social skills can be defined as skills which allow an individual to interact and behave appropriately in a social context (Little, Swangler, & Akin-little, 2017). In the literature, we can see a theoretical ambiguity of terms describing social skills, such as competencies (McClelland, 1973; Rainsbury, Hodges, Burchell, & Lay, 2002), employability skills (Cotton, 1993), generic skills (Stasz et al., 1993), transferable skills (Shankar, Mishra, Shenoy, & Partha, 2003), behavioral skills (Murphy, Nestel, & Gormley, 2019), non-technical skills (Flin et al., 2003) or human factors (Nestel, Walker, Simon, Aggarwal, & Andreatta, 2011). The National Centre for Vocational Education Research (2003) described synonyms as generic skills, core skills, key skills, common skills, key competencies, employability skills, basic skills, transferable skills, or workplace know-how.

Despite the theoretical ambiguity, the terms are based on two main approaches that define and explore social skills: 1) non-technical skills and a paradigm of naturalistic decision-making and 2) a competence approach.
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Non-technical skills and paradigm of naturalistic decision-making.

Naturalistic decision-making (NDM) can be defined as making decisions in a real environment. The central aim of NDM was studying situations which were characteristics of the following features: ambiguity, uncertainty and dynamic settings, the real reaction of participants, multiple players, vague goals, time stress, and organizational constraints (Klein & Klinger, 2008). The NDM research was based on macrocognition in comparison with microcognition. Microcognition is cognitive processes investigated under laboratory conditions (Warner, Letsky, & Cowen, 2007), while macrocognition indicates a descriptive level of cognition performed in the natural environment. The following processes are the key macrocognitive processes: naturalistic decision-making, sense-making, planning, and re-planning, problem-solving, coordination, and situational awareness (Klein et al., 2003).

Non-technical skills can be considered as one of the macrocognitive structures. The attention focus on non-technical skills started in 1979 when NASA presented studies about the causes of errors in civil air transport. The results showed that the main reason for errors is a lack of effective management (Christian & Morgan, 1987). The reaction to these studies led to focusing on the human factor in the different fields to promote teamwork, training, and prevent human errors (Orasan & Fisher, 1999). Flin, O’Connor, and Crichton (2008) created general core skills – non-technical skills and defined them as a set of interrelated behaviors, cognition, and attitudes, which facilitate accomplishing tasks. In general, non-technical skills can be divided into three main categories: cognitive (decision-making and situation awareness), personal (managing stress and coping with fatigue), and social (communication, teamwork, and leadership). Each category involves the main elements and behavioral markers – examples of effective and noneffective behaviors. Behavior markers are defined by Klampfer et al. (2001) as observable behavior, which contributes to the substandard or excellent performance in the work field. Flin et al. (2008) described two stages in creating the taxonomy of non-technical skills:

1. stage: identification skills and behavioral markers which have an impact on safety and effective performance
2. stage: revision of the list and organization of the taxonomy

The authors also described the different methods used for identifying non-technical skills, such as an interview, observation (directly or videos from simulations), an analysis of the incident-reporting system or questionnaires. The identified skills are used mostly for the training or in the assessment.

In recent years, there has been an increasing interest in non-technical skills in health care. Previous studies have primarily concentrated on non-technical skills for surgeons (Yule, Flin, Paterson-Brown, Maran, & Rowley, 2006), resuscitation teams (Andersen, Jensen, Lippert, & Østergaard, 2010) or physicians in the emergency department. There have also been quite a few studies (Kilner, 2004; Von Wyl, Zuercher, Amsler, Walter, & Ummenhofer, 2009) examining non-technical skills for paramedics. Shields and Flin (2013) offered a literature review of seven articles, which included non-technical skills used by paramedics. However, the authors didn’t recommend redesigning existing tools, because they involve specific behaviors for a team or a group of professionals. Some of the non-technical skills can be similar at the category level (such as communication and teamwork that are necessary for health care professionals), but we need to identify specific skills at the element and behavioral markers for paramedics in Slovakia.
Competency approach and competency modelling

The institutionalized use of competency is connected with McClelland (1973). The first competency model was based on the requirement of the U.S. Department of Foreign Service because traditional tests (intelligence tests and knowledge tests) didn’t predict the effectiveness of junior officers (Megahed, 2018). According to McClelland (1998), intelligence is not a good predictor of success, and he drew attention to the competencies that could be identified and then taught to others. By this, studies (Mirabile, 1997; Talbot, 2004; Andersson & Jonasson, 2017) have tried to identify competencies across industries, such as aviation (Walter, 2000), and the army (Tian, Miao, Yang, & Xu, 2009), but also across industries that are not high-risk, such as human resource management (Ulrich, Brockbank, Yeung, & Lake, 1995). We can define competencies as the knowledge, skills, abilities, and other characteristics (Campion et al., 2011) or as a cluster of two or more these attributes (Marrelli et al., 2005). Each competency is composed of behavioral indicators – observable examples of behavior on the job (Calhoun et al., 2008). Rainsbury et al. (2002) categorized competence in hard skills (or technical skills) and soft skills. Spencer and Spencer (1993) described technical skills as a minimum level necessary to be able to perform a job at the basic level. Soft skills are affective and behavioral and are connected with an emotional quotient by Daniel Goleman. The literature describes three clusters of competencies: cognitive competencies (system thinking and pattern recognition), emotional competencies (self-awareness, self-management, emotional self-awareness, emotional self-control), social competencies (social awareness, relationship management such as empathy and teamwork) (Boyatzis & Boyatzis, 2008).

Spencer & Spencer (1993) described the development of the competency model in the following six steps:

1. defining criteria of effective performance – evaluation by supervisors, data as profits, productivity, evaluation by employees or customers.
2. sample size - mostly groups such as professionals, managers, supervisors. The focus is on high-performance employees because they have knowledge of effective performance (Marrelli et al., 2005).
3. data collection – competency models use a minimum of two different methods for collecting data (Spencer & Spencer, 1993).
4. data analysis and development of competency model
5. validation of competency model – this stage includes second data collection (behavioral interview, tests, assessment centre) or involves experts, who revalidate the model base on the first list of competency (Spencer & Spencer, 1993).
6. application of competency model – competency models are used for the selection, training or development of employees (Marrelli et al., 2005), career development, rewarding and support of employees through defining levels of competence (Campion & Odman, 2011).

In practice, 10-30 competencies are usually sufficient to describe the competencies required for successful performance (Graber, Rothwell, & William, 2010), and they are summarized in the competency models. In health care, competency models were developed for jobs such as nurses (Kvas, Seljak, & Stare, 2013), physicians (Lim, Han, Hong, & Kang, 2016; NHS, 2010), management and leadership of hospitals (Calhoun et al., 2008) or healthcare professionals in general (Stefl, 2008). Models were also developed for paramedics in the UK (Von Vopelius-Feldt & Benger, 2014), for emergency medical technicians in Taiwan (Chang, Tsai, & Williams, 2018) or emergency medical students (AlShammari, Jennings, & Williams, 2018).
Most previous competency models for paramedics involve common categories of social skills (communication skills, leadership, teamwork), but the findings of key social skills are not similar. This may be due to the different methodologies, but also to differences in the health care systems (health care system and paramedic preparation vary across countries). To our knowledge, no research has been carried out on competencies for paramedics in Slovakia. To address these gaps it is essential to identify social skills and competencies for paramedics that are specific for emergency medical services in Slovakia.

In the previous section, we described two approaches most prevalent in literature. In the next section we want to offer a critique, but also describe the similarities between both approaches. We also want to highlight that our aim is to clarify the approaches and show both their problematic and common parts which is necessary to consider before choosing a particular approach.

**Similarity of approaches**

We use the terms skills and competencies as synonyms because of the similarity of approaches. Similarity concerns several aspects: 1. origin, 2. definitions and divisions, 3. the focus is on behavior, 4. methods, 5. stages of creating skills/competencies and 6. the use of non-technical skills and competency models.

The origin of non-technical skills can be found in aviation and is connected with the fact that one of the main reasons for incidents is the human factor (Christian & Morgan, 1987). Gradually, the non-technical skills approach has spread to other high-risk occupations (such as medicine and the oil industry) to increase safety and prevent human error. The competency approach arose because despite a rigorous selection criterion (such as intelligence tests, tests of knowledge, and graduating from prestigious universities), employees still failed and these criteria did not guarantee an effective performance (McClelland, 1973). Compared to the non-technical skills, the competency approach has a broader use because, in addition to high-risk industries, it has spread to other professions.

The similarity is also visible in the definitions of concepts. Non-technical skills can be defined as a set of interrelated behavior, cognition, and attitudes which allow for accomplishing tasks (Flin et al., 2008), while competencies can be understood as skills, knowledge, abilities or other characteristics necessary for effective performance (Campion et al., 2011). The non-technical skills approach defines, in addition to the basic skills, behavioral markers as well, while the competency approach uses the term behavioral indicators. Both of them describe observable examples of effective and ineffective behavior. Competencies and non-technical skills are focused on behavior and are based on the idea that skills/competencies are trainable and can be developed.

Another similarity is the division. Non-technical skills involve three main categories: cognitive, personal, and social skills; while competency involves cognitive, social, and emotional competencies.

We also noticed a similarity in the methods. The competency approach uses an interview (especially the critical incident technique), which is also used in non-technical skills studies (Rutherford, Flin, & Irwin, 2015; Yule et al., 2006). Both approaches use observation and questionnaires – especially in the validation of the results. The competency approach uses subject expert matter as the source of primary data or/and in the revision of the created list of competencies (Campion et al., 2011). In some studies of non-technical skills (Parker et al., 2013; Rutherford, Flin, & Mitchell, 2012), the authors used subject expert matter to the revision of primary taxonomy.

Both approaches are used for the training and development of employees, but also assessment.
While these approaches are considered as the two main approaches in the literature, some authors (Nestel et al., 2011; Stevens, 2013) offer critical perspectives. We describe the critique of approaches in the following section.

**Critique of approaches**

Nestel et al. (2011) criticized the term of non-technical skills and recommended using the term *human factors* because it defines skills or behavior in a positive sense. According to the authors, the term of non-technical skills is inaccurate and simplistic, while the term *human factors* stems from a rich academic tradition. The discipline of human factors is currently part of the postgraduate medical curriculum. Human factors, such as communication, decision-making, situational awareness, are linked to each aspect of clinical practice, are dependent and have a specific role and context. The authors also mentioned that the view of skills being technical and non-technical is problematic because using a model of deficits can contribute to the development of negative attitudes and devaluation; implying that these skills cannot be learned and that we have two broad, independent categories.

The critique of the competency approach is mainly based on theoretical ambiguity. Some definitions describe competency as a combination of knowledge, skills, abilities, and other characteristics (Campion et al., 2011) or attitudes, beliefs, and motives that enable successful performance (Chen & Naquin, 2006). So, when we use the term competency, it is not meant with theoretical exactness. Another critique relates to the lack of methodological rigour. In general, many competency models are not focused on the validation process and assessment of reliability (Stevens, 2013).

Another critique of competency models is the simplify of complex tasks and development of the idealistic model of behavior. According to Bolden and Gosling (2014), it offers an illusory promise to rationalize and simplify the processes and assumes that skills are always observable and trainable. This critique is connected with the measurement of performance according to predetermined standards. The term of competence ignores wider human qualities and notions of knowledge and understanding which are integral to education (Ashworth & Saxton, 2006). We need to agree on the critique of definitions of competence (ambiguity of term). However, it is possible to implement some measures. Researchers can improve the psychometric quality of a model by using multiple methods and/or interpreting the data by multiple researchers. It is also appropriate to consider an employee and job in a broader context. Sandberg (2000) proposes an interpretative approach to competence. According to the author, competence is not seen as consisting of two separate entities but, instead, a worker and work form one entity. The researcher should focus also on employees as well as on a job at the organizational and institutional level because they influence each other and are inseparable parts of the job.

**The reason for identifying the social skills necessary for emergency medical services in Slovakia**

The need for education in healthcare is based on the negative impact on human suffering and financial expense. A lot of studies (Leonard, Graham, & Bonacum, 2004; O’Daniel et al., 2015) indicate that communication and teamwork are necessary for patient safety. For example, the management of intensive care units or emergency medical services is different every day, depending on the crew and the difficulty of the situation. Social skills are not involved in the curricula and regulations for paramedics or they are described very vaguely. The curriculum of a state education program for vocational education at secondary school level (2011) describes competencies such as empathy, assertiveness, prosocial behavior, coping with stress and fatigue, self-control, self-regulation, and ability to cooperate (p. 18). However, these skills are
described without the specification of behavior. The advantage of non-technical skills and competency models is that they focus on a specification of behavior.

In Slovakia, far too little attention has been paid to the social skills necessary for paramedics. A few studies focused on cognitive skills and emotional self-regulation of paramedics. Harenčárová (2017) identified the strategies which are used by paramedics to manage uncertainty. Sedlár (2018b) reported that intuitive strategies were most frequently used in routine situations, in contrast, deliberative strategies were used more in non-routine situations. Adamovová and Halama (2013) described relevant and irrelevant emotions in critical situations. Kamhalová, Halama and Gurňáková (2013) studied the relationship between affect regulation styles and decision-making in health-care professionals. Sedlár (2018a) identified errors related to emergency medical services physicians’ skills and factors which contribute to the errors. He revealed various errors related to communication (aggressive communication or ineffective information change) or leadership (poor planning or lack of cooperation between team members).

What still has not been found is a systematic attempt to identify important social skills. Furthermore, there is no taxonomy or set of paramedics’ social skills. It would be valuable to identify relevant social skills for paramedics to develop a behavioral taxonomy and rating system similar to those now used by anaesthetists, surgeons, and other clinicians. This behavioral taxonomy could be established in the curriculum and prepare students for their future jobs. Moreover, the identified social skills should be used for the development of a training syllabus and evaluation tools. This would be a benefit for the paramedic profession, but more importantly for the safety of patients.

**Using simulation to develop social skills for paramedics?**

Currently, some education processes do now exist, and the aim is to improve social skills in healthcare professionals. In recent times there has been a broad acceptance of simulation in healthcare education (Jacob, 1990; Lewis, Strachan, & Smith, 2012). Simulation is seen as an effective educational strategy that may provide an effective way to increase patient safety, decrease the incidence of error and improve clinical judgment (McGaghie, Issenberg, Petrusa, & Scalese, 2010). Simulation is still a relatively new educational strategy in healthcare education, and the evidence base for simulation is comparatively small. Supported by the evidence from simulation-based medical education, there are many positive findings that we may draw upon. For example, Marshall et al. (2009) found an improvement in communication in 17 teams of final-year medical students after simulation interventions. The other studies showed significant improvement in communication (Sweeney, Warren, Gardner, Rojek, & Lindquist, 2014; Winkelmann et al., 2016), teamwork (Crichton, Moffat, & Crichton, 2017; Paull et al., 2013) or leadership after simulations. In a meta-analysis, McGaghie and Issenburgh (2011) compared the effectiveness of traditional education methods to simulation-based medical education. Their results showed, that simulation-based education is superior to traditional education methods. In contrast, some studies (Hobgood et al., 2010; Ravert, 2004) found little significant differences in effectiveness between simulation and other modern education strategies such as high-fidelity simulation and low-fidelity simulation, video records with discussion, and didactic lectures. According to Lewis et al. (2012), modern education methods such as interactive case study discussions are more interactive compared to traditional didactic methods such as a lecture. This could be a clue for organizations with limited resources which can’t afford simulation training.

While it would be very easy to dismiss simulation, due to the relative lack of evidence as to its effectiveness, what is clear from reviews is that simulation can provide a safe and controlled
environment so that the participants are able to make mistakes, correct those mistakes in real-time and learn from them, without fear of compromising patient safety (Lewis et al., 2012).

Conclusion

There are several reasons for studying social skills for paramedics. Firstly, paramedics are exposed to dynamic and dangerous situations where patients have to be managed, often with life-threatening injuries or illness. Secondly, there are other factors which make paramedics prone to errors, such as unstable teams, complexity, interdependencies, and proximity to danger. It is necessary to understand social skills and develop training to improve these skills which are essential for an effective performance and safety culture. Till now, there has been discussion about the social skills and competencies necessary for surgeons, nurses, or other healthcare providers, but there has been a lack of studies involving the identification of social skills and competencies for paramedics. According to Glavin and Maran (2003), one cannot just adopt the word doctor and replace it with the word paramedic. The work environment is different in the operating room and it has an impact on adopted behavior. Future research should, therefore, concentrate on the investigation of understanding errors caused by ineffective communication, teamwork and leadership in emergency medical services. Analysis of critical incidents as well as studies of behavior during routine work can reveal which workplace behaviors positively or negatively influence job performance and adverse events. A further study could investigate critical incidents and routine situations by using interviews with paramedics and observation of critical incidents. Future studies should also assess how the system of health care contributes to human errors. Certainly, individual behavior must be analyzed and addressed, but unless the system issues are similarly identified, healthcare systems remain at risk of safety incidents. These findings would allow us to understand social skills and behavior in a broader context.

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