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A comparative assessment of functioning of Basic and Specialised Medical Emergency Teams belonging to the Independent Public Complex of Healthcare Centres in Staszów

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Abstract

Creating a medical emergency system is a long-lasting and demanding process. It requires experience and the cooperation of a range of environments: medical, administrative, and political ones. In the development of system solutions in medical rescue and emergency medicine in Europe the main role is played by two systemic patterns: French-German (FSG) and Anglo-American (AAS) ones. The names of the aforementioned systems originate from the countries in which these ideas were born and shaped. Currently, most medical emergency systems in the world are a combination of solutions derived from these particular models. A common feature of both systems is to provide emergency assistance in accidents and injuries, as well as in sudden cases of falling ill. The differences relate mainly to the degree of using basic and advanced life-saving procedures at the scene of an accident [1].

Keys words: Medical rescue; emergency medical service; medical rescue activities

INTRODUCTION

A prerequisite of an effective cooperation of several units of a medical rescue system with other emergency services is the possibility of maintaining a permanent communication between teams and coordination of their activities by a dispatcher. A modern medical rescue in the world is a relatively new discipline that has been only several dozens of years old. Although about a hundred years have passed since the Cracow Voluntary Rescue Association was constituted on June 6, 1891 which is assumed to be the first constituted Emergency Medical Services in Poland, it is only the recent years which have witnessed that the system of medical rescue has been intensively developing. The system of medical rescue in Poland bases on similar systems in western European countries, mainly the AAS model. Currently, we do not possess a fully effective system as yet. An issue of a partial withdrawing a medical doctor from pre-hospital assistance and replacing them by a licensed medical rescuer is causing a lot of controversies in the Polish society. Additional problems are the lack of financial resources channelled to developing the chain of Hospital Emergency Wards (HEW), accoutring the wards in modern pieces of equipment, and introducing a reliable system of communication. Despite these impediments, medical rescue and emergency medicine in Poland has been developing strongly. It is optimistic that in the society itself the level of interest of providing the first aid increases, let alone the medical rescue at the universities is gaining popularity among high school graduates, therefore the system of medical rescue in Poland has great conditions and wide perspectives of development [2].

Assumptions and targets of the thesis

The main premiss of managing the subject is own research interest associated with the subject of functioning of Basic and Specialised Medical Emergency Teams and the lack of scientific study referring to the comparision of both these types of teams. Thusly, knowledge obtained in here can be used in any practical activities in the interest of increasing the level of quality of medical services and the safety of patients.

The main objective of thesis

The purpose of the undertaken research is a comparative assessment of functioning of Basic Medical Emergency Teams and Specialised Medical Emergency Teams with a specific regard to their attitude towards and handling a patient during interventions and completing medical records.

Research issues

Is preparing and completing medical records of the "Card of Medical Rescue Activities" (CMRA) by Basic and Specialised Medical Emergency Teams comparable?

Detailed issues:

Is functioning of Basic Medical Emergency Teams and Specialised Medical Emergency Teams comparable in terms of:

1. what decisions how to handle a patient are taken?
2. the assessment of a patient's condition?
3. the number of actions undertaken during an intervention in an injured person concerning cases of falling ill and injuries?
4. treatment that is most commonly implemented?
5. the incidence of attaching an ECG printout to a CMRA?

Research hypotheses

1. Functioning of Basic Medical Emergency Teams and Specialised Medical Emergency Teams is comparable in regards to an assessment of an injured person during an intervention.
2. Basic Medical Emergency Teams much more commonly make an evaluation of pareses and paralysis in an injured person than Specialised Medical Emergency Teams.
3. Both Basic Medical Emergency Teams and Specialised Medical Emergency Teams function similarly in regards to implemented actions and decisions concerning further handling and treatment of a patient.
4. Both Basic Medical Emergency Teams and Specialised Medical Emergency Teams during an intervention concerning becoming ill and injuries transport patients to HEWs rather than react at the scene.
5. Both Basic Medical Emergency Teams and Specialised Medical Emergency Teams implement more actions during interventions in patients with injuries than during interventions in patients who become ill.

Material and methodology

Research data has been obtained from outgoing records of Medical Emergency Teams belonging to the Independent Public Complex of Healthcare Centres in Staszów. Research data concerns interventions of the period from July 1, 2014 to September 31, 2014. Research data has been depleted of interventions cancelled by a dispatcher, interventions in which no injured person has been found at the scene, and interventions connected with interhospital transport. Having regard to the aforementioned criteria, 389

Cards of Medical Rescue Activities of Basic Medical Emergency Teams and Specialised Medical Emergency Teams have been selected, being archival hospital records. The permission of the management of the Independent Public Complex of Healthcare Centres in Staszów to have an insight into medical records in research aims was obtained prior to the commence of the research.

Methods, techniques, and research tools

In our research, an analysis of medical records of Cards of Medical Rescue Activities (CMRA) of the Basic (B) and Specialised (S) Medical Emergency Teams (MET) has been used. Each Card consists of 5 categories filled in by the head of B or S teams.

I category (medical reconnaissance) - the description of an incident in the form of a note, ticking a column in the field "The place of an incident", writing in the code of the team, writing in the number of an illness/accident-related ambulance trip

II category (examination) - ticking appropriate boxes, columns, and the diagram, and a brief description of a patient's condition

III category (diagnosis) - a written description of the diagnosis and recognition

IV category (a patient's treatment) - actions taken (selected from listed ones), medicines and medical products applied provided with their names, dosage, and the way of application, presumptive recommendations in writing, any comments of the head of the team in writing

V category (a patient's personal data and a patient's transfer) - filling in personal data of a patient, National Health Fund (NHF) identification, Personal ID Number, ticking in either Admission or Rejection in the box "The decision of the Medical Facility", the date and time of the transfer of a patient, the date and time of the decease and the signature if necessary, the head of the team's stamp, the type of the team (B or S), time of providing assistance.

Categories II and IV hereby have been a subject of a comparative analysis in regards to an execution of medical rescue activities conducted by and filling in Cards of Medical Rescue Activities made by Basic Medical Emergency Teams and Specialised Medical Emergency Teams.

Statistical methods used in the thesis

All data has been collected and preliminarily analysed in the Excel Worksheet. An analysis of acquired data has been conducted by means of the Statistical Package StatSoft, Inc. v.12. (2014). STATISTICA (Data Analysis Software System).

The following statistical methods have been used for the verification of hypotheses:

1. for every variable strength and proportion in every group was calculated
2. the Chi-square test has been used to determine the differences between compared groups.

$p < 0,05$ has been assumed as statistically significant.

Preliminary results

389 illness/accident-related ambulance trips of Medical Emergency Teams have been analysed, therein 195 of Basic Medical Emergency Teams, and 194 of Specialised Medical Emergency Teams.

Selected Tables show the activities undertaken by Medical Emergency Teams based on categories II and IV.

Table 1. Assessment of pupils.

Type of intervention	Team	Pupil assessment		No pupil assessment		p
		N	%	N	%	
Illness	**Basic**	157	95,15	8	4,85	0,163
	Specialised	158	91,33	15	8,67	
Injury	**Basic**	29	96,67	1	3,33	0,421
	Specialised	19	100,00	0	0,00	

Table 1 presents the comparison of the incidence of the assessment of pupils performed by Basic Medical Emergency Teams, and Specialised Medical Emergency Teams in interventions as regards illnesses and injuries.

During interventions as regards illnesses Basic Medical Emergency Teams performed the assessment of pupils in 157 cases (95.15%), whilst Specialised Medical Emergency Teams performed the assessment of pupils in 158 cases (91.33%), whereas during interventions as regards injuries Basic Medical Emergency Teams did not perform the assessment of pupils in one case only what constitutes 3.33% of all interventions of these teams. Specialised Medical Emergency Teams performed the assessment of pupils in all cases of their interventions.

There were no statistically significant differences between the incidence of the assessment of pupils of an injured person between Basic Medical Emergency Teams and Specialised Medical Emergency Teams as regards an illness (p=0,163) or an injury (p=0,421).

Table 2. Reading arterial pressure

Type of intervention	Team	AP reading		No AP reading		p
		N	%	N	%	
Illness	**Basic**	152	92,12	13	7,88	0,019
	Specialised	169	97,69	4	2,31	
Injury	**Basic**	30	100,00	0	0,00	0,069
	Specialised	17	89,47	2	10,53	

Table 2 presents the comparison of the incidence of reading arterial pressure performed by Basic Medical Emergency Teams, and Specialised Medical Emergency Teams in interventions as regards illnesses and injuries.

Analysing all interventions as regards illnesses it can be concluded that Basic Medical Emergency Teams during 152 interventions, what constitutes 92,12% of all cases, read arterial pressure in a patient, whereas Specialised Medical Emergency Teams during 169 interventions, what constitutes 97,69% of all interventions of these teams, read arterial pressure in a patient.

During all interventions as regards an injury, Basic Medical Emergency Teams read arterial pressure in 100% of cases, whereas Specialised Medical Emergency Teams read arterial pressure in 17 cases (89,47%).

There were no statistically significant differences between the incidence of reading arterial pressure of an injured person between Basic Medical Emergency Teams and Specialised Medical Emergency Teams as regards an injury (p=0,069), however there were statistically significant differences as regards an illness (p=0,019).

Table 3. Assessment of symptoms

Type of intervention	**Team**	**Assessment of symptoms**		**No assessment of symptoms**		**p**
		N	**%**	**N**	**%**	
Illness	**Basic**	87	52,73	78	47,27	0,007
	Specialised	116	67,05	57	32,95	
Injury	**Basic**	15	50,00	15	50,00	0,366
	Specialised	12	63,16	7	36,84	

Table 3 presents the comparison of the incidence of the assessment of symptoms performed by Basic Medical Emergency Teams, and Specialised Medical Emergency Teams in interventions as regards illnesses and injuries.

Basic Medical Emergency Teams during all interventions as regards illnesses assessed symptoms in 87 cases, what constitutes 52,73% of all cases, whereas Specialised Medical Emergency Teams assessed symptoms in 116 cases, what is 67,05% of all cases.

During all interventions as regards an injury, Basic Medical Emergency Teams assessed symptoms in 15 cases, what constitutes 50% of cases, whereas Specialised Medical Emergency Teams assessed symptoms in 12 cases (63,16%).

There were no statistically significant differences between the incidence of assessing symptoms of an injured person between Basic Medical Emergency Teams and Specialised Medical Emergency Teams as regards an injury (p=0,366), however there were statistically significant differences in assessing symptoms as regards an illness (p=0,007) in favour of Specialised Medical Emergency Teams.

Table 4. Examination of abdomen

Type of intervention	**Team**	**Abdomen examination**		**No abdomen examination**		**p**
		N	**%**	**N**	**%**	
Illness	**Basic**	157	95,15	8	4,85	0,163
	Specialised	158	91,33	15	8,67	
Injury	**Basic**	29	96,67	1	3,33	0,739
	Specialised	18	94,74	1	5,26	

Analysing all interventions as regards illnesses it can be concluded that Basic Medical Emergency Teams during 157 out of 165 interventions, what constitutes 95,15% of all cases, examined an abdominal area in a patient, whereas Specialised Medical Emergency Teams during 158 interventions examined an abdominal area in 158 cases, what constitutes 91,33% of all interventions of these teams.

During all interventions as regards an injury, Basic Medical Emergency Teams examined an abdominal area in 29 cases, what constitutes 96,67% of all cases. Specialised Medical Emergency Teams examined an abdominal area in 18 cases (94,74%).

There were no statistically significant differences between the incidence of abdominal examination performed by Basic Medical Emergency Teams and Specialised Medical Emergency Teams as regards an illness (p=0,163) or an injury (p=0,739).

Tabela 5. Assessment of heart sounds

Type of intervention	**Team**	**Assessment of heart tones**		**No assessment of heart tones**		**p**
		N	**%**	**N**	**%**	
Illness	**Basic**	125	75,76	40	24,24	0
	Specialised	161	93,06	12	6,94	
Injury	**Basic**	20	66,67	10	33,33	0,021
	Specialised	18	94,74	1	5,26	

Analysing all interventions as regards illnesses it can be concluded that Basic Medical Emergency Teams during 125 out of 165 interventions, what constitutes 75,76% of all cases, performed the assessment of heart sounds in a patient, whereas Specialised Medical Emergency Teams during 161 performed a similar operation, what constitutes 93,06% of all interventions of these teams.

During all interventions as regards an injury, Basic Medical Emergency Teams performed the assessment of heart sounds in 20 cases, what constitutes 66,67% of all cases. Specialised Medical Emergency Teams performed the assessment of heart sounds in 18 cases (94,74%) of all cases in an injured person.

There were statistically significant differences between the incidence of performing the assessment of heart sounds by Basic Medical Emergency Teams and Specialised Medical Emergency Teams as regards an illness (p=0,000), as well as an injury (p=0,021).

Table 6. The treatment of a patient during an intervention

The treatment of a patient	**Illness**				**Injury**			
	Team				**Team**			
	Basic		**Specialised**		**Basic**		**Specialised**	
	N	**%**	**N**	**%**	**N**	**%**	**N**	**%**
M	61	36,97	59	34,10	4	13,33	1	5,26
S	91	55,15	104	60,12	23	76,67	18	94,74
I	3	1,82	4	2,31	-	-	-	-
PS	10	6,06	2	1,16	-	-	-	-
P	0	0,00	1	0,58	3	10,00	0	0,00
N	0	0,00	1	0,58	-	-	-	-
K	0	0,00	2	1,16	-	-	-	-

(M - a patient remained on the spot

S - a patient transported to Hospital Emergency Wards (HEW)

I - a patient transferred to others

PS - a patient transported to a psychiatric hospital

P - a patient transported to a paediatric hospital

N - a patient transported to a neurological hospital

K - a patient transported to a cardiological hospital).

For Basic Medical Emergency Teams and Specialised Medical Emergency Teams, as regards an illness or an injury of a patient, the most frequently undertaken action was to transport a patient to Hospital Emergency Wards. During interventions as regards an illness Basic Medical Emergency Teams in 91 cases (55,15%) transported a patient to Hospital Emergency Wards, whereas Specialised Medical Emergency Teams transported a patient to Hospital Emergency Wards in 104 cases, what constituted 60,12% of all cases of interventions of those teams. As regards interventions in case of an injury of a patient Basic Medical Emergency Teams in 23 cases (76,67%) transported a patient to Hospital Emergency Wards, whereas Specialised Medical Emergency Teams transported a patient to Hospital Emergency Wards in 18 cases, what constituted 97,74% of all cases of interventions of those teams.

Table 7. Provision of ECG

Type of intervention	**Team**	**ECG examination**		**No ECG examination**		**p**
		N	**%**	**N**	**%**	
Illness	**Basic**	75	45,45	90	54,55	0
	Specialised	48	27,75	125	72,25	
Injury	**Basic**	6	20,00	24	80,00	0,150
	Specialised	1	5,26	18	94,74	

Comparing the incidence of the provision of ECG in patients by Basic Medical Emergency Teams and Specialised Medical Emergency Teams as regards an illness or an injury, we conclude that Basic Medical Emergency Teams during interventions as regards an illness performed an ECG examination in 75 out of 165 cases, what constitutes 45,45% of all cases, whereas Specialised Medical Emergency Teams performed an ECG examination in 48 cases, what constitutes 27,75% of all cases.

During interventions as regards an injury, Basic Medical Emergency Teams performed an ECG examination in 6 cases, what constitutes 20,00% of all cases. Specialised Medical Emergency Teams performed an ECG examination in 1 case out 19 of all interventions, what constitutes 5,26% of all cases.

Discussion

In an attempt to answer the question if and in what degree the differences between diagnostic and therapeutic actions of Basic Medical Emergency Teams and Specialised Medical Emergency Teams do exist, 389 Cards concerning interventions of the period from July 1, 2014 to September 31, 2014 have been analysed. The aforementioned analysis has been undertaken in view of an opinion expressed by some authors that Basic Medical Emergency Teams are appointed to all types of notifications so that help is provided in the shortest possible time [3,4]. However, such an activity of medical dispatchers, in view

of disparities in legitimation (a medical rescuer or a nurse as opposed a medical doctor), can potentially have significant consequences and implications in special and specific clinical cases [5]. Nevertheless, it is of crucial importance to determine what actions should be taken to improve the quality of a diagnostic process performed by Medical Emergency Teams and end it in making a proper diagnosis. The consequence of making a correct and proper diagnosis is a decision of implementing a particular form of treatment and possibly the necessity to transport a patient to Hospital Emergency Wards [6].

One of the most significant elements of diagnostic procedures, being a basis to make a proper diagnosis, is to do a bona fide physical examination and an examination of symptoms in a patient. Information acquired from a patient themselves, and from witnesses of an incident at times, about accompanying symptoms, their intensity, chronic diseases, medicines taken and so on is the preliminary stage to a proper rescue action [7]. With this end in view, in order to facilitate memorising, a SAMPLE scheme has been developed. Using this acronym, even when being under the influence of much stress when performing rescue activities, a rescuer is capable of determining the most significant facts connected with the incidence and the case history of a patient. Information obtained in this way linked with the ability to assess typical symptoms of medical conditions provides critical indication that makes further diagnostic proceeding on the spot easier. In several cases it also serves as the initial step to place the correct diagnosis [8].

Conclusions

1. During all interventions as regards an illness, Specialised Medical Emergency Teams comprehensively assessed the state of the patient on the grounds of symptoms more frequently. In the treatment of a patient with an injury Basic Medical Emergency Teams assessed injuries more often than Specialised Medical Emergency Teams.
2. The most commonly taken action of both Basic Medical Emergency Teams and Specialised Medical Emergency Teams as regards interventions concerning becoming ill and injuries is to transport patients to Hospital Emergency Wards.
3. Basic Medical Emergency Teams in comparison to Specialised Medical Emergency Teams performed and implemented overall more actions during interventions in patients with injuries than during interventions in patients who become ill.

**** Two Cards were excluded from the study for having effectuated all the research data it was concluded that these two Cards concerned patients who deceased during an intervention and provision of medical rescue activities by Medical Emergency Teams, and Tables and data included in them refer to only alive patients (389 Cards analysed, 387 Cards included in the study).***

Namely, 2 Cards refer to cases of the decease during performing Medical Rescue Activities when patients were alive and Medical Emergency Teams were completing medical documentation, however the intervention culminated indetermination of the decease and the cards were rejected accordingly. Data excluded and did not concern evident deceases and cancelled ambulance trips - such Cards were rejected.

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