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Professional paper

STRATEGY TO IMPROVE QUALITY IN EMERGENCY MEDICAL SERVICES: FROM ASSESSMENT TO POLICY

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The aim of this paper was to present the strategic approach applied for improvement of quality in emergency medical services (EMS) in the Republic of Macedonia. This approach was accomplished through three stages: (I) assessment and recommendations for policies; (II) development of innovative evidence-based programmes; and (III) policy implementation. Strategic assessment of EMS was performed by applying WHO standard methodology. A survey was conducted in 2006/2007 on the national level in fifteen general hospitals, four university hospitals, and sixteen pre-hospital EMS. The overall evaluation was based on a hospital emergency department (ED) questionnaire, information on the general characteristics of the pre-hospital dispatch centre, review of ED medical records, and the patient questionnaire. The key findings of the assessment showed that EMS required extensive changes and improvements. Pre-hospital EMS was not well-developed and utilised. Hospital EDs were not organised as separate divisions ran by a head medical doctor. The diagnostic and treatment capacities were insufficient or outdated. Most of the surveyed hospitals were capable of providing essential diagnostic tests in 24 h or less. There was no follow-up of the EMS patients or an appropriate link between the hospital EDs and primary health care facilities. The main findings of the assessment, recommendations, and proposals for action served as the basis for new policies and integrated into Macedonia's official strategy for emergency medical services 2009-2017.

KEY WORDS: *emergency medical treatment, national health policy, pre-hospital emergency health care*

Emergency medical services (EMS) are integrated within the health care system and are obliged to respond to medical emergencies, which include diagnostic and medical treatment procedures, medical transport, and inpatient service (1). Timely, organized, functional, and effective EMS is a public health priority with increasing demand. If the emergency medical response is not on time, it can cause irreversible and severe health harm or even death (2, 3).

In the Republic of Macedonia, EMS is organized in accordance with the Health Care Act (4-6). Within the new Health Care Act from 2012 (6), the EMS network is defined at all levels of health care: primary (MD office, polyclinic, health centre, and centre for emergency medical services), secondary (out-patient EMS), and tertiary level (hospital EMS). In the health centres, EMS is a part of the department of general practice and provides health care in cases of emergency as well as home treatment. Centres for EMS provide

short-term pre-hospital emergency health care for patients with emergency conditions as well as home treatment. They undertake measures of reanimation and intensive care on-site and during transport to the closest appropriate health organization, where medical treatment and rehabilitation are provided. Hospital EMS provides specialised consultative care, diagnostics, and treatment (6).

Macedonian compulsory health insurance is based on solidarity and equity and provides the right to basic health care to all patients, including uninsured persons and foreign citizens (7, 8).

The health organizations that provide EMS are obliged to be at service 24 h a day, providing all necessary drugs and sanitary materials. They are obliged to refer patients seeking emergency medical treatment to other health organizations and arrange their transportation and medical care until admission. The health centre has to provide space, medical equipment, health personnel, and other conditions for EMS, fulfilling the minimum standards set in relevant regulations (9, 10). There is a defined set of medical interventions that a physician or team undertake in case of emergency care. EMS are organized and provided based on the number of inhabitants (space, equipment, and teams) (11).

The lack of a comprehensive strategy for EMS in Macedonia initiated a need for policies to improve existing conditions (12). Within the framework of the Biaanual national agreement 2006-2007 with the World Health Organization (WHO), the Ministry of Health and the Institute of Public Health (IPH) conducted a strategic assessment of Macedonian EMS (13).

The aim of this paper was to present the strategy applied for improving the quality of EMS in Macedonia, which was accomplished through three stages: (I) assessment and recommendations for policies; (II) development of innovative evidence-based programmes; and (III) policy implementation.

METHODS

Data collection

The EMS strategic assessment was conducted by the IPH in 2006/2007, applying WHO standard methodology (13). The survey was conducted on a nationally representative sample of fifteen general hospitals (Strumica, Veles, Gevgelija, Gostivar, Debar, Kavadarci, Kicevo, Kumanovo, Struga, Bitola, Kocani, Ohrid, Prilep, Tetovo, and Shtip), four emergency centres and sixteen pre-hospital EMS (Shtip, Kocani, Gevgelija, Strumica, Tetovo, Gostivar, Kicevo, Debar, Ohrid, Struga, Veles, Kumanovo, Bitola, Prilep, Kavadarci, and Skopje).

The overall evaluation was based on four assessment tools (13, 14): emergency department (ED) questionnaire, information on the general characteristics of the pre-hospital dispatch centre (DC), ED medical records, and patient questionnaire.

Using the ED questionnaire, data on the number of patients, management of patients**,** clinical practice guidelines, medical charts, human resources, general characteristics of the hospital, diagnostic capacities of the hospital, and organizational chart were gathered. This information was collected by direct observation and personal interviews with the heads of the EDs and head nurses.

Data on the general characteristics of the DC in the pre-hospital EMS included general information, human resources, and an organizational chart.

Using medical records at the ED, basic data on the emergency outpatient departments of the hospitals was collected (i.e., age, gender, symptoms, referral, and release). This information was gathered from the records of the departments and encompassed records registered in one week (from 12 am 19 June to 12 pm 25 June, 2006). Using the patient questionnaire, data regarding general information (age, gender, and place of residence), time of arrival, symptoms, symptom onset, prior medical consultations for same symptoms, referral, and release were collected.

A total of 1,457 questionnaires were filled out by ED nurses through direct interviews with randomly selected patients. For 3,316 patients, data were extracted from the medical records of the ED.

Survey limitations

The survey did not include obstetrical emergencies (except cases of stomach pains), since obstetrics/gynaecology wards have separate EDs. In some cases, information on patients was not recorded in the general records, as they were not standardized or completed. During the interviews with ED health personnel, some indicated that most cases deemed as “not severe” were not even recorded.

RESULTS AND DISCUSSION

The assessment survey of Macedonian EMS served as screening and provided enough information for

laying out foundations for a programme to strengthen it at the national level (13).

Organization, structure, and human resources in hospital EDs

Our findings point to many problems with regard to organisation, structure, and human resources in hospital EDs. All of the hospitals lacked a clear organisational structure that could show how the ED functioned, and thus there was no clear division of roles and responsibilities. Instead they functioned according to a work plan (calendar) that included information on the timetable and name of the person working and the phone numbers of the health personnel.

In general, hospital EDs were not organized as separate divisions, physically located within the hospital, and ran by the head MD responsible for the overall management of emergency services. In most hospitals, there was no real ED/centre and urgent cases were examined and triaged in the on-duty clinic, the clinic initially contacted by the patient, or by the pre-hospital EMS. All urgent cases were entered into special registries.

Even in Skopje, the Macedonian capital, there was no unique emergency centre and EMS was provided mostly in the ED of surgery, cardiology, and toxicology clinics of the local Clinical Centre.

Almost all of the EDs did not have an emergency physician in their organizational structure.

Professional training

Lack of appropriate training was one of the critical concerns of the ED. As many as 67 % of staff who worked in EDs had over 5 years of experience in emergency departments, 11 % received formal training (more than 1 year) specifically focused on medical emergencies, and 22 % had little education. Clinical practice guidelines in the EDs (advanced life support, basic life support, management of hypertension, etc.) existed only in the EDs of some hospitals and university clinics for surgery, toxicology and cardiology, while other hospitals did not have any guidelines. The creation of a standardized emergency medical care system with previous and on-the-job trainings of health providers should lead to better knowledge and improved practices as well as consequently to a better quality of care provided to users (1, 2).

Records (medical charts and logbook)

Records on patients in the EDs were sometimes poor and incomplete. Data needed to be standardised in order to assist hospitals and ED heads to produce information that could be used to make evidence-based decisions. The lack of professional mechanisms of assistance (flow-charts, algorithms, etc.) can be explained with the lack of tradition in the area of emergency medicine. Emergency medicine is a new discipline in many countries and has gained substantial credibility as a separate specialisation.

We observed inconsistencies between different ED departments. Often there was more than one out-patient registry where patients were recorded (acute cases, chronic cases, scheduled patients, emergency cases), which was a serious problem that required going through the diagnoses using the ICD 10 method (WHO International Statistical Classification of Diseases and Related Health Problems 10th Revision) (15, 16). The standardization of record-keeping in EMS was needed to gather information vital for the improvement of the quality of EMS (6, 17).

Number of patients

Only seven hospitals reported their total number of patients consulted in EDs in 2006: Gostivar with 7,200 patients (19.7 per day), Debar 938 (2.5 per day), Kumanovo 21,338 (58.4 per day), Bitola 13,158 (36.0 per day), University Cardiology Clinic 15,677 (42.9 per day), University Toxicology Clinic 8,171 (22.4 daily), University Surgery Clinic 21,886 (60 per day). In general, the hospitals that served a larger population had a workload of more than 30 cases per day. The survey data showed that the EMS was underused and that immediate efforts needed to be undertaken to make them effective (6, 17-19).

Characteristics of the hospitals

Almost all hospitals were lacking neurosurgery and acute psychiatric units, whereas emergency observation was present in 6 EDs. Intensive care and coronary units were present in almost each hospital, in 15 and 13, respectively (Table 1). Severe patients that needed neurosurgery interventions were transferred immediately to the University Surgery Clinic (neurosurgery) that was the only centre to offer such services. Acute psychiatric patients were either treated for acute symptoms in the ED or were immediately referred to a specialised psychiatric hospital. Even larger hospitals such as those in Veles, Strumica, and

Table 1 *Hospital services linked with EMS*

Health care organisation	Emergency Observation Unit		Intensive care		Coronary Unit		Neurosurgery Department		Acute Psychiatric Department	
	YES	No. of beds	YES	No. of beds	YES	No. of beds	YES	No. of beds	YES	No. of beds
Strumica	-	0	+	4	+	6	-	0	-	0
Veles	-	0	+	6	+	6	-	0	-	0
Gevgelija	-	0	+	2	-	0	-	0	-	0
Gostivar	+	5	+	5	+	8	-	0	-	0
Debar	+	4	+	4	+	5	-	0	-	0
Kavadarci	-	0	-	0	+	2	-	0	-	0
Kicevo	-	0	-	0	-	0	-	0	-	0
Kumanovo	-	0	+	6	+	3	-	0	-	0
Struga	-	0	+	2	+	6	-	0	-	0
Bitola	+	4	+	8	+	8	+	0	+	0
University Cardiology Clinic	+	7	+	0	+	17	-	0	-	0
University Toxicology Clinic	+	4	+	12	-	0	-	0	-	0
University Surgery Clinic	+	6	+	24	-	0	+	24	-	0
Kocani	-	0	+	6	+	2	-	0	-	0
Ohrid	-	0	+	6	+	9	-	0	-	0
Prilep	-	0	+	8	+	10	-	0	+	4
Tetovo	-	0	+	8	+	12	-	0	+	18
Total:	**6**		**15**		**13**		**2**		**3**	

Prilep did not have an emergency observation unit/ room and all severe cases were referred directly to specialised departments.

Availability of 24-hour services and diagnostic capacities

All of the interviewed ED heads of the general hospitals reported consistent availability of 24-hour services at their general trauma surgery, obstetrics, and paediatrics departments. The diagnostic and treatment capacities of the EMS were insufficient or outdated. Most of the surveyed hospitals had limited capacity to provide essential diagnostic tests in 24 h or less. However, not all hospitals had the capacity to administer important lifesaving tests such as blood electrolytes and gas analysis, echocardiogram (ECG), and most importantly, in six cases there was no 'oxygen monitor' available (Table 2). In order to ensure quality, the introduction of appropriate diagnostic tests and their 24-hour availability is necessary (6).

Structure and organization of pre-hospital EDs/DCs

We found discrepancies in the number of interventions provided by different pre-hospital emergency services – dispatch centres (Table 3), which ranged between 16.8 per 1000 residents in Gevgelija to 70.2 per 1000 residents in Veles. There were discrepancies in the number of interventions provided by different pre-hospital EDs, which indicated that the demand and use of these EMS were different. This could have been influenced by the use of hospital EMS.

As reported, in almost all EDs except for Skopje, no specific protocols were used and there was no system for keeping telephone records. Computerized records existed only in the EMS/DC in Ohrid, Skopje, and Struga. A plan for crisis reactions was reported only in Kicevo. Sunday was reported as the day with the highest number of calls in most EMS/DCs, while the number of calls in the selected week varied from 19 in Kocani to 166 in Kumanovo.

Table 2 *Capacity of EMS to provide the essential diagnostic tests, in 24 h or less in hospital EDs*

Diagnostic test	**Blood chemistry (BC + Gly + Azo)**			**EGA**			**Cardiac Enzymes**			**ECG**			**Ultrasound (general)**			**Ultrasound (obstetrics)**			**Echo cardiogram**			**Defibrillator**			**O_2 monitor**			**Cardiac monitor**			**X – ray**		
Availability	**24**	**<24**	**N/A**	**24**	**<24**	**N/A**	**24**	**<24**	**N/A**	**24**	**<24**	**N/A**	**24**	**<24**	**N/A**	**24**	**<24**	**N/A**	**24**	**<24**	**N/A**	**24**	**<24**	**N/A**	**24**	**<24**	**N/A**	**24**	**<24**	**N/A**	**24**	**<24**	**N/A**
Strumica	+	-	-	+	-	-	+	-	-	+	-	-	+	-	-	+	-	-	-	-	+	+	-	-	-	-	+	+	-	-	+	-	-
Veles	+	-	-	+	-	-	+	-	-	+	-	-	+	-	-	+	-	-	+	-	-	+	-	-	+	-	-	+	-	-	+	-	-
Gevgelija	+	-	-	-	-	+	+	-	-	+	-	-	+	-	-	+	-	-	+	-	-	+	-	-	-	-	+	-	-	+	+	-	-
Gostivar	+	-	-	-	-	+	-	+	-	+	-	-	+	-	-	+	-	-	-	-	+	+	-	-	+	-	-	+	-	-	+	-	-
Debar	+	-	-	-	-	+	+	-	-	+	-	-	+	-	-	+	-	-	-	-	+	+	-	-	+	-	-	+	-	-	+	-	-
Kavadarci	+	-	-	-	-	+	+	-	-	+	-	-	+	-	-	-	-	+	+	-	-	+	-	-	-	-	+	+	-	-	+	-	-
Kicevo	+	-	-	-	-	+	+	-	-	+	-	-	+	-	-	+	-	-	-	-	+	+	-	-	-	-	+	-	-	+	+	-	-
Kumanovo	+	-	-	-	-	+	+	-	-	+	-	-	+	-	-	+	-	-	+	-	-	+	-	-	+	-	-	+	-	-	+	-	-
Struga	+	-	-	-	-	+	+	-	-	+	-	-	+	-	-	+	-	-	+	-	-	+	-	-	+	-	-	+	-	-	+	-	-
Bitola	+	-	-	+	-	-	+	-	-	+	-	-	-	+	-	+	-	-	-	+	-	+	-	-	+	-	-	+	-	-	+	-	-
University Cardiology Clinic	+	-	-	+	-	-	+	-	-	+	-	-	+	-	-	+	-	-	+	-	-	+	-	-	+	-	-	+	-	-	+	-	-
University Toxicology Clinic	+	-	-	+	-	-	+	-	-	+	-	-	+	-	-	+	-	-	+	-	-	+	-	-	+	-	-	+	-	-	+	-	-
University Surgery Clinic	+	-	-	-	-	+	+	-	-	+	-	-	+	-	-	-	-	+	-	-	+	+	-	-	+	-	-	+	-	-	+	-	-
Kocani	+	-	-	-	-	+	+	-	-	+	-	-	-	+	-	+	-	-	-	+	-	+	-	-	-	-	+	-	+	-	+	-	-
Ohrid	+	-	-	+	-	-	+	-	-	+	-	-	+	-	-	+	-	-	+	-	-	+	-	-	+	-	-	+	-	-	+	-	-
Prilep	+	-	-	+	-	-	+	-	-	+	-	-	+	-	-	+	-	-	-	+	-	+	-	-	-	-	+	+	-	-	+	-	-
Tetovo	+	-	-	-	-	+	+	-	-	+	-	-	+	-	-	+	-	-	+	-	-	+	-	-	+	-	-	+	-	-	+	-	-
Total:	**17**	**0**	**0**	**7**	**0**	**10**	**16**	**1**	**0**	**17**	**0**	**0**	**15**	**2**	**0**	**15**	**0**	**2**	**9**	**3**	**5**	**17**	**0**	**0**	**11**	**0**	**6**	**14**	**1**	**2**	**17**	**0**	**0**

Functional mobile units existed only in the Skopje EMS/DC. Most of the ambulance cars (52 %) were older than 7 years, while 51 % needed repair. Although the reliability of the used ambulance cars was low, new vehicles were distributed at the time of survey and we expect that this will contribute to improvements to the quality of EMS transportation.

Human resources

In the Macedonian EMS/DC, 189 full-time MDs and 243 full-time nurses/medical technicians were employed (Table 4). Among the health care personnel, no part-time work contracts were reported.

Use of emergency services

Review of ED medical records was difficult in many cases, since information was not recorded in the general registry and was drawn from different registry books or departments such as the ED registry, statistics office, and morgue or directly from patient cards. The average workload of 33.8 patients per day demonstrated the very low utilization of EMS. There were differences in workloads between hospitals, as noticed in the survey results (Table 5). This number ranged between 5.4 patients per day in the Tetovo hospital and 98.1 patients per day in Prilep hospital. The low average workload observed in this study was still higher than the workload of 21.7 patients per day reported for Albania (14). The differences in the workload could have been the result of the different age and pathology of the patients, but also the poor data quality (13).

Distribution of EMS users by age, gender, and place of residence

Based on the interviews, we have established that more than half of the patients (52.37 %) were adults between 19 and 60 years of age, while 24.71 % of the patients were over 60. Since emergency cases with children in most hospitals were taken to paediatric departments, small children from this study comprised only 3.77 % and infants 1.99 % of the total number of patients. The results acquired by reviewing ED medical records were almost identical. A total of 54 % of patients were adults, 25 % elderly, and about 20 % children, infants and youth. Females represented 44.06 % of the patients, and males 53.4 %.

Our results have shown that men prevailed among EMS users. Similar results for gender distribution of patients were found in the Albanian EMS survey (14). Furthermore, the distribution of users by age, which indicated more than half of adult patients, and 24.7 % elderly patients was also similar to Albania (61.1 % adults and 20.9 % patients older than 60) (14). The similarity between our findings and those from Albania indicate a considerably high utilization of ED services by patients living outside urban areas and demonstrate the importance of EMS as well as increased demand for such services (14). Among the interviewed patients, almost half (47.7 %) lived in a town, while 48.25 % lived in rural areas, whereas about 19.01 % lived more than 30 min of driving away.

Type of transport that patients used to reach the EMS

Figure 1 provides more detail on the type of transportation. It was striking to learn that ED ambulances were used for transporting patients in only 6.88 % of cases. More than half of the patients (58.45 %) arrived at the hospital by car (Figure 1). The very infrequent use of ambulances was similar to previous reports (12, 15). This can be explained with the poor infrastructure of the dispatch centers and EDs and poor technical condition of the ambulances. Unequal distribution of ambulances in Macedonia could also be a factor, as reported previously (16).

Distribution of work over 24 hours

Table 6 reports findings regarding the distribution of work in EDs over 24 hours, based on data collected from patient interviews. Most of the cases in the ED (69 %) were concentrated within the time frame from 08:00 am to 08:00 pm (Table 6). The finding that most cases in the ED were concentrated within the aforementioned period determine the EMS as more of a daily outpatient service (“ambulatory”) than a true provider of urgent care.

Overview of symptoms reported as reasons for requesting EMS

The range of pathologies encountered in the EDs was very diverse. Based on the answers of the respondents, the leading causes of admission to the ED were abdominal-urinary symptoms (21.21 %), cardiac symptoms (18.53 %) and general trauma (18.33 %) (Figure 2). Similar results were obtained by analysing records, with unspecified (general) trauma as the leading symptom with 22.20 % of cases seen in the ED, followed by abdominal-urinary

Table 3 *Coverage and reported number of interventions in pre-hospital EMS*

Area	Population covered	Number of interventions (on-site) in 2005	Number of interventions (on-site) in 2005 per 1000 residents
Kocani, Zrnovci, Cicinovo, Oblesevo	51.000	900	17.6
Veles, Gradsko	90.000	6.325	70.2
Ohrid, Debarca	65.000	3.496	53.8
Skopje and the region	600.000	32.099	53.5
Bitola	120.000	5.500	45.8
Kicevo, Makedonski Brod	70.000	1.317	18.8
Kumanovo, Nagoricane, Lipkovo	140.000	6.760	48.3
Struga	60.000	2.814	46.9
Strumica and the region	100.000	3.368	33.7
Tetovo	120.000	3.135	26.1
Kavadarci, Rosoman	42.000	2.877	68.5
Prilep	120.000	2.599	21.7
Shtip	60.000	2.966	49.4
Gevgelija, Dojran	40.000	672	16.8

Table 4 *Human resources in pre-hospital EDs*

Area	MD	Nurse
Kocani, Zrnovci, Cicinovo, Oblesevo	7	10
Veles, Gradsko,	12	18
Ohrid, Debarca	12	16
Skopje and the region	61	68
Bitola	18	19
Kicevo, Makedonski Brod	10	8
Kumanovo, Nagoricane, Lipkovo	8	15
Struga	5	10
Strumica and the region	12	17
Tetovo	10	16
Kavadarci, Rosoman	6	8
Prilep	15	16
Shtip	6	12
Gevgelija, Dojran	7	10
Total	**189**	**243**

symptoms (21.05 %), and cardiac diseases (14.48 %).

Similar symptoms in EMS users were reported in Albania (14). The most frequent symptoms in both countries were abdominal-urinary (21.2 % *vs.* 23 %). In Macedonia, a slightly higher percentage of cardiac symptoms (18.5 % *vs.* 16 %) was found. However, our findings differed when compared to the EU where chest pains were reported in 22 % of cases, respiratory distress in 18 %, and stroke in 6 % (14).

Onset of symptoms reported as reasons for requesting EMS

Based on the patient interviews, the symptoms which were the leading causes of their admission to EMS started in the last 12 h in 52.23 % of the cases (Figure 3). The results regarding the onset of symptoms that lead the patients to seek help from the EMS is in line with the general purpose of EDs.

Utilisation of other services prior to visiting EMS

Almost half of the patients (44.7 %) skipped primary health care and went directly to EMS facilities. In general, emergency medical care, compared to primary health care (PHC), was perceived by the users as more rounded and diverse, with better diagnostics and treatment. According to what was reported by the ED personnel, these visits might have been even more frequent than observed in this survey. In fact, they were often considered *"ambulatory visits"* and not even recorded in the ED records.

Referral system

According to the interviews, 30.75 % of patients were dismissed after visiting the ED and a relatively high percentage of 29.65 % of patients were admitted, while 12.01 % were under observation for 24 h. About

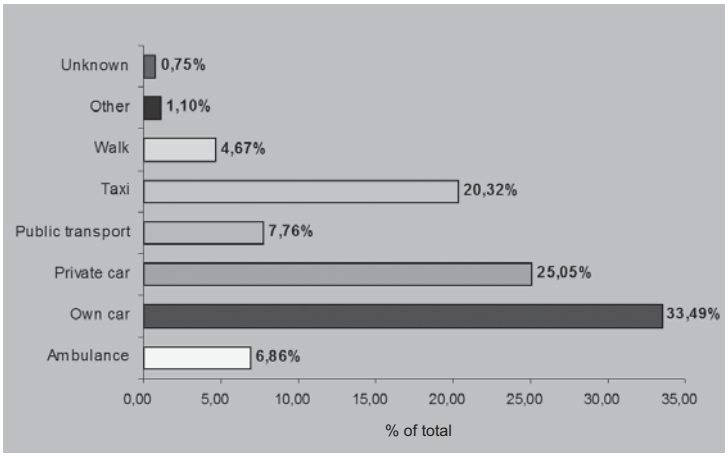

Figure 1 *Type of transport that patients used to reach the EMS*

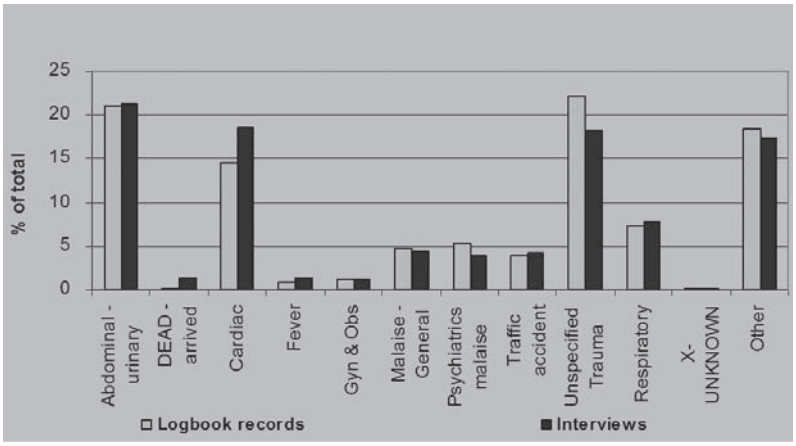

Figure 2 *Overview of the symptoms which were leading causes of patients coming to the EMS*

15.92 % of patients in the EDs were referred to PHC services and 9.61 % to another hospital. The data from the ED records indicated a lower percentage of admitted patients (17.7 %), while a higher percentage of patients were reffered to PHC (26.2 %) (Figure 4).

Policies and implementation

The results from the assessment (13) were discussed on a workshop with various stakeholders such as the Ministry of Health, University Clinical Center, hospitals, EMS personnel, Association of Emergency Medicine, and WHO EU Regional and Country Office. The conclusions and recommendations were considered by the Macedonian Government and used as a basis for the development of policies and subsequent intervention, integrated in the strategy for emergency medical services improvement in Republic of Macedonia 2009-2017 (17) and later in the new Health Care Act (6).

Efforts to strengthen EMS in Macedonia have also received a considerable boost from the adoption of World Health Assembly Resolution WHA60.22 on trauma and emergency care services which called on governments and WHO to increase their efforts to strengthen services for medical emergencies specifically for the design of "quality improvement programmes" (3, 18).

The following actions have been set as priorities for intervention: (i) developing a network of integrated EMS; (ii) setting up a basic package of services and emergency medical assistance that will be delivered to the public free of charge and according to national standards; (iii) equipping the EMS with adequate tools for effective diagnostics and treatment; (iv) developing tools for early and accurate decisions in diagnoses and treatment (clinical protocols, algorithms, triage, etc.) in the main pathologies of emergency care; (v) setting mechanisms for ensuring effective quality control; (vi) opening emergency medicine residency programmes

as a separate specialisation within schools of medicine, while creating opportunities for on-job training; (vii) capacity building in management and organisation of EMS; and (viii) creation of a network of EMS managers who can develop an integrated plan of development.

The primary objectives of the strategy for EMS improvement (17) were: (i) improvement of the provision of health services and improvement of the final outcome of patients; (ii) provision of equal coverage on the national level; (iii) redistribution of total expenses aimed at reallocating them closer to the patients; and (iv) provision of improved information to the population about the availability of EMS services and their optimal usage.

The National Strategy Action Plan was developed for the purposes of the implementation (19) and the following activities have been accomplished:

• *Emergency medicine residency programme* as a separate medical specialisation has been developed and introduced with a by-law on specialisations (20).

• *Provision of equal EMS coverage:*

The establishment of EMS services within health organizations in all populated places, aimed at improving the availability of EMS with optimal resources. As many as 69 new completely equipped ambulance vehicles have been provided by the Ministry of Health in November of 2012 (5).

The establishment of regional emergency centres in several Macedonian cities will provide a higher level of EMS efficiency and resolve a large amount of issues pertaining to urgent conditions. These centres were established in major cities such as Skopje, Bitola, Shtip, and Tetovo within existing in-patient institutions.

The establishment of a first-level emergency centre in Skopje to put an end to the segregation of emergency centres. According to the description of the workload

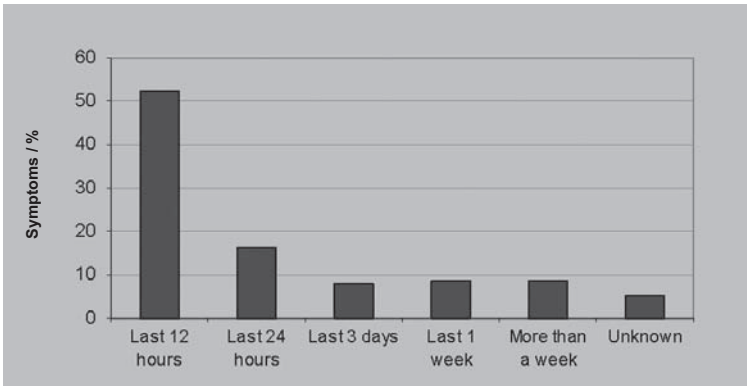

Figure 3 *Start of symptoms*

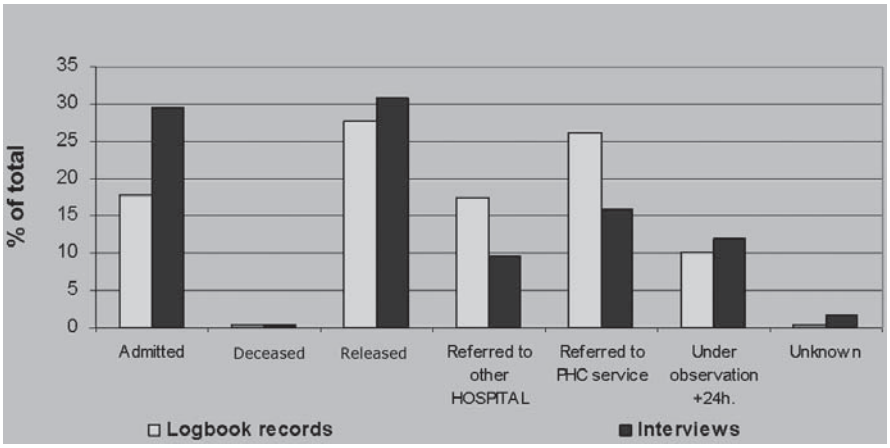

Figure 4 *Refferals from hospital EDs*

at this type of institution, the tertiary level of health care should deal with scientific and research activities, education, and resolving the most complex medical issues. That is the main reason for insisting on a strict selection of patients to be treated in this kind of urgent centre. Therefore, it is essential that patients who will be admitted in this centre, and previously processed through the system of pre-hospital emergency medical centres, be triaged either from pre-hospital emergency medical centres or at other lower levels of hospital emergency medical centres. This centre was established on 18 August 2010 as University Clinic for traumatology, orthopaedics, anaesthesia, reanimation, and intensive care.

Activities to be accomplished

• *Redistribution of total expenses*

The introduction of a double-ranked system of pre-hospital emergency medical centres is imperative, because it will lead to an increased number of teams providing emergency medical care, without significant increases of expenses. According to WHO recommendations, one vehicle per 25,000 to 30,000 inhabitants is the standard. Introduction of such a double-rank system would relieve teams of work overloads and increase alertness. This activity will be implemented by the end of 2014 (17, 19).

• *Improved information dissemination to the population:*

The implementation of the European unique call number 112 on the national level and establishing an adequate communication network would improve efficacy and lead to better health care. The development of call centres throughout Macedonia, the introduction of the 112 system as a unique call number, and maintaining adequate communication support (including GPS) should be made one of the primary goals. This activity will be implemented by the end of 2014.

CONCLUSIONS

The key findings of this assessment showed that EMS required extensive changes and improvements. The assesment survey provided enough information for policy intervention and setting objectives for strengthening emergency medical services. It also provided important recommendations that were used by the Ministry of Health for policy implementation aimed at improving the quality of care provided in the EMS and the working conditions of EMS providers.

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Table 5 *Use of ED services per hospital in the period 19 June to 26 June, 2006.*

Hospital	Frequency / week	Frequency / day	%
Bitola	238	34	7.18
Debar	41	6	1.24
Gostivar	367	52	11.07
Kumanovo	245	35	7.39
Ohrid	334	48	10.07
Prilep	687	98	20.72
Skopje - Cardiology	142	20	4.28
Skopje - General surgery	464	66	13.99
Skopje - Internal medicine	132	19	3.98
Skopje - Special surgery clinic	184	26	5.55
Shtip	172	25	5.19
Strumica	77	11	2.32
Tetovo	38	5	1.15
Veles	195	28	5.88
Total	**3316**	**474**	**100.00**

Table 6 *Distribution of work in EDs during the 24 h*

Hospital	00:00 - 04:00		04:00 - 08:00		08:00 - 12:00		12:00 - 16:00		16:00 - 20:00		20:00 - 24:00		Total
	N	%	*N*	%	*N*	%	*N*	%	*N*	%	*N*	%	*N*
Bitola	16	13.33	5	9.26	17	4.86	18	5.49	22	7.14	28	9.43	**106**
Debar	6	5.00	1	1.85	19	5.43	27	8.23	34	11.04	13	4.38	**100**
Gevgelija	3	2.50	10	18.52	16	4.57	26	7.93	17	5.52	25	8.42	**97**
Gostivar	12	10.00	3	5.56	13	3.71	26	7.93	19	6.17	23	7.74	**96**
Kavadarci	2	1.67	1	1.85	5	1.43	10	3.05	4	1.30	7	2.36	**29**
Kocani	7	5.83	1	1.85	8	2.29	25	7.62	46	14.94	18	6.06	**105**
Kumanovo	29	24.17	8	14.81	10	2.86	12	3.66	17	5.52	32	10.77	**109**
Ohrid	2	1.67	5	9.26	15	4.29	18	5.49	12	3.90	9	3.03	**61**
Prilep	8	6.67	4	7.41	5	1.43	15	4.57	20	6.49	50	16.84	**102**
Skopje - cardiology	11	9.17	3	5.56	18	5.14	17	5.18	34	11.04	20	6.73	**103**
Skopje - general surgery	8	6.67	1	1.85	15	4.29	17	5.18	17	5.52	19	6.40	**77**
Skopje - internal medicine	4	3.33	-	0.00	20	5.71	25	7.62	23	7.47	19	6.40	**91**
Skopje - special surgery clinic	-	0.00	7	12.96	66	18.86	13	3.96	1	0.32	1	0.34	**88**
Shtip	-	0.00	2	3.70	45	12.86	15	4.57	12	3.90	5	1.68	**79**
Strumica	6	5.00	1	1.85	30	8.57	25	7.62	10	3.25	7	2.36	**79**
Tetovo	4	3.33	-	0.00	46	13.14	28	8.54	14	4.55	15	5.05	**107**
Veles	2	1.67	2	3.70	2	0.57	11	3.35	6	1.95	6	2.02	**29**
Total	**120**	**100**	**54**	**100**	**350**	**100**	**328**	**100**	**308**	**100**	**297**	**100**	**1,457**

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Sažetak

STRATEGIJA ZA UNAPREĐENJE KVALITETE U HITNIM MEDICINSKIM SLUŽBAMA: OD PROCJENE DO MJERA

Cilj je ovoga rada predstaviti strategiju primijenjenu na unapređenje kvalitete hitnih medicinskih službi u Makedoniji. Strategija je obuhvatila tri koraka: (I) procjena i preporuke, (II) osmišljavanje unapređenja zasnovanih na stvarnim podacima te (III) implementaciju mjera. Strateška procjena hitnih medicinskih službi provedena je primjenom standardne metodologije Svjetske zdravstvene organizacije. Tijekom 2006. i 2007. provedeno je ispitivanje u petnaest općih i četiri sveučilišne bolnice te u šesnaest izvanbolničkih hitnih službi. Cjelokupna evaluacija zasnovana je na rezultatima upitnika što su ih ispunili osoblje i pacijenti bolničkih odjela hitne službe, na podacima o općenitim značajkama izvanbolničkog hitnog centra i na pregledu medicinskih podataka odjela hitne službe. Prema najvažnijim rezultatima procjene, makedonske hitne službe zahtijevaju temeljite promjene i unapređenja. Izvanbolnička hitna služba bila je zastarjela i nedovoljno razvijena. Bolnički odjeli hitne službe nisu bili organizirani kao odvojene jedinice kojima upravlja ovlašteni specijalist hitne medicine. Dijagnostički i prostorni kapaciteti ustanova bili su nedostatni ili neuređeni. U većini bolnica uključenih u ispitivanje obavljala se samo osnovna dijagnostika unutar 24 sata, ili manje. Status pacijenata nije se naknadno pratio niti je postajala kvalitetna komunikacija između odjela hitne službe i ustanova primarne zdravstvene zaštite. Rezultati procjene, preporuke i prijedlozi za djelovanje poslužili su kao osnova za nove mjere i ugrađeni su u službenu strategiju Republike Makedonije za hitne medicinske službe 2009. – 2017.

KLJUČNE RIJEČI: *hitna medicinska služba, izvanbolnička hitna medicinska služba, nacionalna strategija zdravstva*

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