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AUTOREFERAT

THE ROLE OF MEDICAL ASSISTANCE IN DETERMINING MEDICO-BIOLOGICAL DEGREE OF BODILY INJURY

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Content

ABBREVIATIONS USED

CC - Civil case

CP - Civil process

LH - Law on Health

LMI - Law on Medical Institutions

DMA - Diagnostic medical activity

PP - Pre-trial proceedings

CP - Clinical pathway

CMA - Curative medical activity

MBI - Minor bodily injury

ICD - International Classification of Diseases

IQHFD - International Qualification of Health Functioning and Disabilities

PC - Penal Code

CP - Criminal proceedings

CPC - Criminal Procedure Code

CCGN - Criminal case of a general nature

CCPN - Criminal case of a private nature

GP - General Practitioner

CC - Commercial case

NHIF - National Health Insurance Fund

NFA - National Framework Agreement

RTA - Road transport accident

WHO - World Health Organization

FME - Forensic medical expertise

MBI - Medium Bodily Injury

BI - Bodily injury

SBI - Severe bodily injury

TSS - Trauma scoring systems

I. INTRODUCTION

The rapid development of medicine in terms of diagnosis and treatment increasingly necessitates the need to reassess the role of medical assistance in cases of culpably caused health damage - bodily injuries..

Due to the wide variety of possible traumatic factors, bodily injuries are one of the most common causes affecting people's health, according to data from the World Health Organization (WHO). According to the National Statistical Institute (NSI), over the past five years in our country, the number of patients, hospitalized due to injuries and impacts from external factors, amounts annually to about 2,000 per 100,000 people.

Each patient with a bodily injury receives a certain type, quantity and quality of medical assistance, the significance of which in the forensic medical examination should be presumed to be ignored. This derives from the vaguely defined normative opinion imposed in practice, according to which, in order to determine the severity of a given trauma, it must be considered at the time of its infliction.

The guidelines given in this way lead to extremely conflicting opinions on individual cases, and not infrequently legal conclusions are reached, reducing the degree of bodily injury, due to the applied possibility of medical intervention to remove the consequences of the disability, without taking into account what actually also expresses what the public value of this aid.

The comparative analysis of the current regulations regarding the medical qualification of physical disabilities in the countries of the European Union (EU) shows that in Europe there is no uniform approach to their assessment, which implies compliance with rules related to the specific national organization of the process.

The regulatory framework in our country is also specific regarding this type of crimes against the person, but also without any change in the section on bodily harm in the Penal Code (PC).

The contradiction between the development of medicine and the regulatory framework in the section of bodily injuries is undoubtedly carried over into the specialized forensic medicine practice and literature.

Having established themselves as leading experts in Bulgaria, they consistently give different, often mutually exclusive, instructions for the qualification of individual types of trauma.

The lack of basic reference points logically leads to a judgment that is not always objectively medically supported, which in turn leads to unjustified discrepancies in judicial practice and serious consequences for society. Paradoxes are even reached when, in the case of complications arising

in connection with the trauma, the professional responsibility of the medical specialists who provided assistance in the course of the healing process is sought.

The outlined problem reveals the need for a change in the approach to the medico-biological qualification of bodily injuries and the development of medically based, objective criteria for qualifying the severity of injuries. An opportunity to mark similar criteria could be sought precisely in the provided medical care and without even entering into another collision with the existing regulations.

The present study presents an attempt to synthesize the indicator "medical assistance provided" for patients with bodily injury, with the aim of presenting to the legal authorities, on the one hand, the degree of favorable influence on the culpably damaged health and, on the other hand, the invested public, in particular, health resource for this.

II. GOAL, TASKS, HYPOTHESES

1. Goal

To assess the role of medical assistance in determining the medico-biological qualification of bodily injuries and to propose criteria and an algorithm for its reflection in forensic medical expertise.

2. Tasks

- To establish the volume and the way of reflecting the provided medical assistance in the qualification of bodily injuries in the forensic medical examinations based on written data for the period 2016-2020.
- To compare the severity of injuries and their medico-biological qualification as bodily injury with the volume of diagnostic and treatment medical assistance provided.
- To establish whether there is a discrepancy in the medico-biological qualification of bodily injuries, taking into account whether or not the medical assistance in the diagnostic and/or treatment plan and to what extent this discrepancy is.
- To outline the advantages and disadvantages of assessing the severity of injuries by applying different injury severity scales (trauma scoring systems).
- To propose criteria pointing to mild, moderate or severe bodily injury in medico-biological qualifications based on the most frequently reflected diagnostic and/or treatment activities in different types of trauma.
- To propose an algorithm for the reflection of medical assistance in SME in case of bodily injury qualification.

3. Hypotheses

- There is a significant contradiction in the forensic-medical interpretation of bodily injuries regarding the accounting of medical assistance.
- There is a possibility in the forensic medical practice, based on the analysis of the diagnostic and treatment activities after a physical injury, to derive criteria that serve to assess the severity of the trauma.
- The assessment of medical assistance in forensic medical expertise allows life-threatening or disabling injuries not to be assessed with a lower degree of physical injury due to the fact that functions or anatomical integrity have been medically restored.
- Reflecting the main diagnostic and treatment measures in each case of bodily injury can serve as a guide for the medico-biological qualifying sign.
- The indicators of medical assistance provided for bodily injuries can directly support the legal assessment of punishments and compensations, respectively, in criminal and civil cases..

III. MATERIAL AND METHODS

1. MATERIAL

Expertise's on written data for the period 01.01.2015-31.12.2020. (Table 1)

- *Forensic medicine clinic Hospital "Sveta Marina" EAD Varna;*
- *Department of Forensic Medicine at the Medical Center in Shumen;*
- *Department of Forensic Medicine at Hospital, Dobrich;*
- *Expertise's from other judicial districts, which became the subject of additional FME in the Clinic.*

The examined expertise's are part of the archive of the specified forensic medical units and have already been used as material in the relevant investigation or court decision..

year / *area*	*2016*	*2017*	*2018*	*2019*	*2020*	*total*
VARNA	218	225	217	240	228	**1128**
DOBRICH	236	201	206	187	182	**1012**
SHUMEN	255	181	155	158	219	**968**
OTHERS	32	30	35	37	38	**172**
total	**741**	**637**	**613**	**622**	**667**	**3280**

Table 1 Examined FMEs according to written data by year and judicial district.

2. METHODS

The main method used in the study is a documentary analysis carried out according to the following plan:

2.1. Criteria for selecting documents for analysis

- written examinations with assigned tasks for the qualification of BI
- type of appointment compared to the production phase - PP or CP;
- circumstances of the incident;
- qualification sign;
- degree of reflection of the medical assistance in them;
- cited medical documents

2.2. Scale for evaluating medical assistance in case of bodily injury

The second stage of the study is on the selected groups and is based on a proposed author's scale with specific indicators determining the medical assistance provided to patients with bodily injury and is divided into two parts - diagnostic and treatment. The scale was purposefully developed for the

specific study, and the choice of indicators was dictated by the specific features of the forensic medical expertise in the interpretation of medical assistance. For each section of the scale, there are five separate criteria, defined in four grades from 0 to 3. The maximum score is 15 for each of the two sections and 30 for the generalized version, respectively..

The Diagnostic scale summarizes FME-relevant indicators related to the initial medical interventions undertaken immediately after the trauma or usually in the first day or two after it. To facilitate and quickly obtain a numerical result, the criteria are presented in a table *(Table 2).*

The diagnostic part/Diagnostic Medical Activity - DMA

indicators	assessment	points	degrees
Clinical examination ***CE***		0	miss
		1	single, initial
		2	supplementary or advisory
		3	more than two advisory
Trauma Rating Scales ***Trauma scoring systems*** ***TSS***		0	miss
		1	one scale
		2	two separate ones
		3	more than two
Paralinical examinations ***PE***		0	miss
		1	basic pack/single
		2	advanced, targeted, controlling
		3	more than twice and two kinds
Image studies ***IS***		0	miss
		1	one species or one area
		2	two types or in two areas
		3	more than two types or in two areas
Apparatus research ***AR***		0	miss
		1	single study
		2	two different or control
		3	more than two different or control
Final assessment		**15**	= maximum value

Table 2 Scale for reporting diagnostic medical activity in FME.

The determinants included in the scale and the clarifications in order to increase the possibility of quick orientation and easy assessment are given in the extended part of the present work. The place in the table allocated for placing the selected figure is in the middle part for easy reflection and comparison between the individual criteria..

The second part of the proposed scale also includes five separate criteria aimed at providing treatment to victims of physical injuries *(Table 3).*

Therapeutic part / Therapeutic Medical Activity - TMA

indicators	*assesment*	*points*	*degrees*
Active resuscitation AR		0	miss
		1	assisted living. activity (up to 24 h)
		2	long-term maintenance of the railway
		3	maintaining a brain dead state
Hospital treatment HT		0	miss
		1	up to 3 days
		2	Up to 10 days
		3	more than 10 days or two wards
Operative intervention OI		0	miss
		1	restored wholeness without add. mat.(PST)
		2	recovery through synthetic and other mat.
		3	removal/replacement of organs and tissues
Medicaments therapy MT		0	miss
		1	two groups
		2	more than two groups
		3	multiple groups of medications
Rehabilitation and physical therapy RP		0	misss
		1	single therapeutic course
		2	two different ones
		3	more than two different or repeated
Assessment		**15**	= maximum value

Table 3 Scale for reporting the treatment medical activity in FME

The selection and grouping of the criteria allows the score of the two parts to be analyzed independently or in combination. We pay attention to the fact that the available information is contained in the medical documentation and the basis for using the scale as a whole or in its separate parts requires an assessment of each of its descriptors.

2.3. Statistical methods

A set of statistical methods for analysis and interpretation of the obtained data are applied, with a view to revealing the essence of the observed phenomena and their interdependencies. MS Excel was used for graphic analyses. Statistical analyzes were performed using the statistical package IBM SPSS for Windows, ver. 23.

The study was conducted according to a previously constructed two-stage scheme, including the selection of the material according to the set criteria, the separate and general assessment and the corresponding comparisons according to the medico-biological indicators of bodily injury *(Figure 1).*

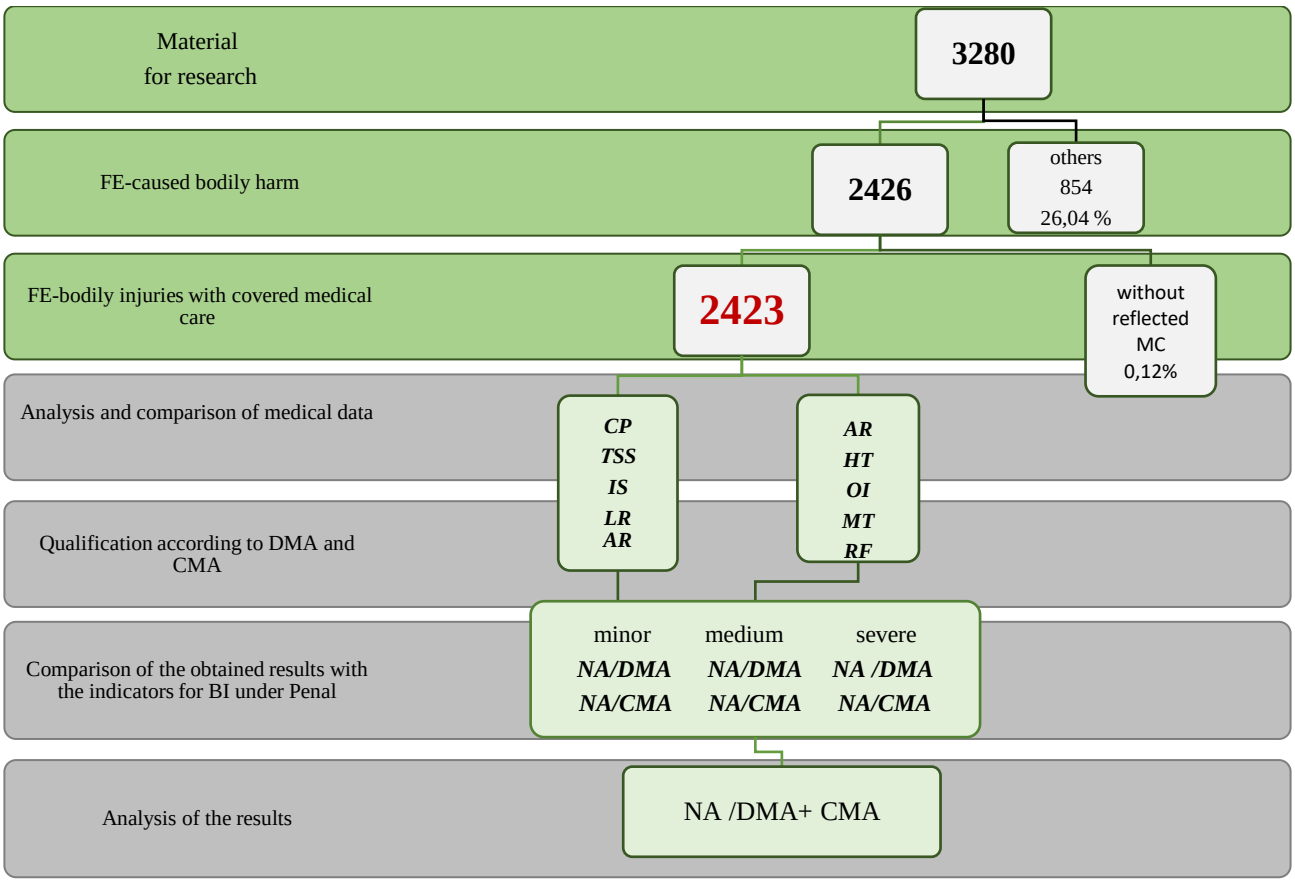

Figure 1 Scheme for conducting the study.

IV. RESULTS AND DISCUSSION

As an unlawful and culpably caused damage to health, the bodily injury is subjected to a medical and legal analysis, guided by a certain procedural order, containing mandatory measures and requisites. While consideration of the socially dangerous act of bodily harm from a legal point of view is normatively regulated, its medical part is devoid of uniform evaluation and interpretation criteria..

With the present study, an attempt was made to bring out the significant elements of the medical assistance reflected in forensic medical expertise already used in the process and its comparison with the medico-biological qualification signs for BI.

The study of the collected material went through the two successive stages of the proposed scheme, so the results of the first predetermined the final volume of documents for analysis. During the separate phases of the work, the results according to the selected criteria, the numerical evaluation of the indicators of the proposed scale and the corresponding comparisons were reported.

1. Selection of documents

The selection of documents for analysis was carried out according to the six selected characteristics.

1.1. Expertise on written data with assigned tasks for personal injury qualification.

In the process of work, observing the criterion, 2426 forensic medical examinations were differentiated, or 73.96% of the 3280 provided for analysis. *(Figure 2)*

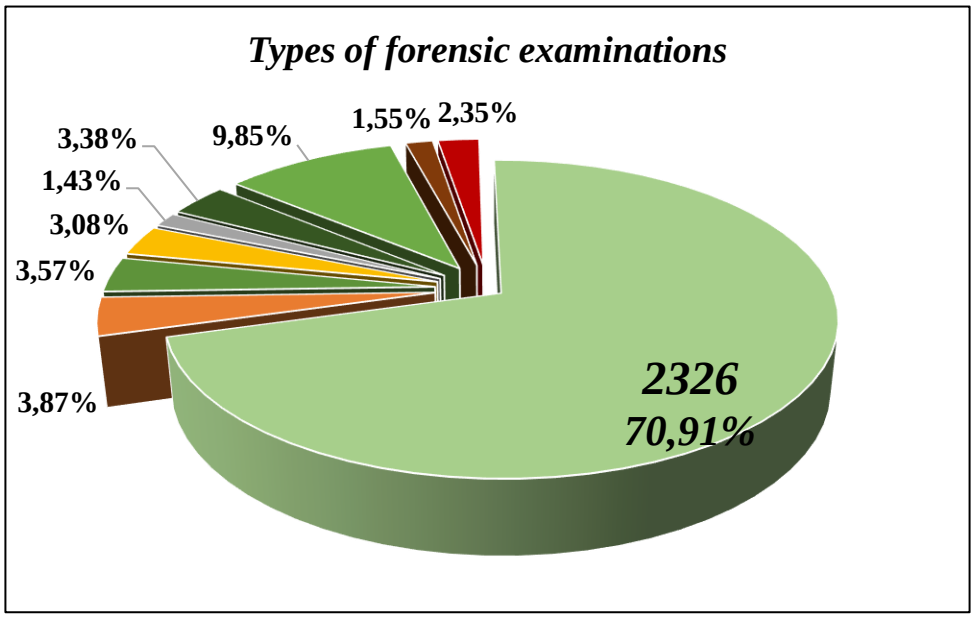

Figure 2 FME for BI vs. others by written data

The rest of the examinations, which do not contain questions about caused bodily harm, or 26.04% of all examined, refer to: determination of health status (3.87%); degree of alcohol intoxication

(3.57%); exposure to psychotropic substances (1.55%); sexual offenses (3.08%); additional examinations (3.38%); complex examinations (9.85%); to clarify the mechanism and causal relationship (2.35%); medical malpractice examinations (1.55%).

Regarding the significant predominance of the considered type of expertise, or for their designation as such, occupying first place among all types of FME according to written data, information can be found in publications of a limited number of authors, without specifying numerical and statistical indicators over the years, what is the share of those concerning bodily harm caused and generally the same is defined as more than 50%. Following the statistics from the presented annual reports of the Prosecutor's Office of the RB and the data from the NSI in the period under consideration, the share of bodily injuries as crimes against the person varies between 47.0% and 42.9%. The lack of official statistics on the types of expertise on a national scale can be interpreted in different directions and rather as a bad indicator, but in all cases the result is that expert activity, and in particular the medical one, remains unappreciated..

1.2. FME according to the phase of the proceedings – pre-trial or judicial

Following the document selection scheme, the 2,426 bodily injury examinations were divided by investigation phase in an overall ratio of pretrial to trial 84.63%:15.47% *(Figure 3).*

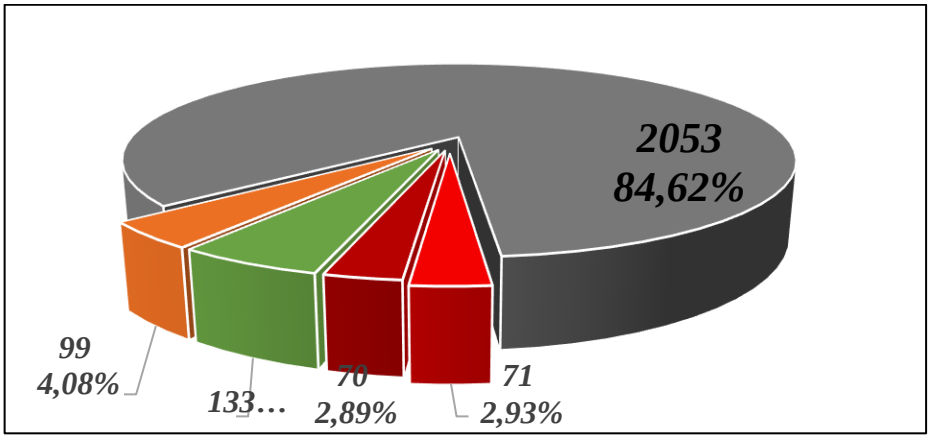

Figure 3 Distribution of FMEs by production

Due to the reason mentioned in the analysis of the material according to the previous criterion, it would not be possible to make a direct comparison between the results obtained by us and the publications of other authors. According to the indicators presented by the Prosecutor's Office, in 97% of the cases, pre-trial proceedings are started. This corresponds with our established percentage of experts appointed in the first judicial phase (85%) to the extent of confirming the relatively large share of expert activity in this phase of the proceedings. The results obtained by us give us reason to be categorical in this regard only for the group of commercial and criminal cases of a general nature, in

100% of which the medical documentation mentions a prepared expertise in the pre-trial proceedings. During their five-year follow-up, slight fluctuations in the number of FMEs with an increase in the share of those appointed by the Court were found, but this could not be accepted as a trend or to distinguish dependency. *(Figure 4)*

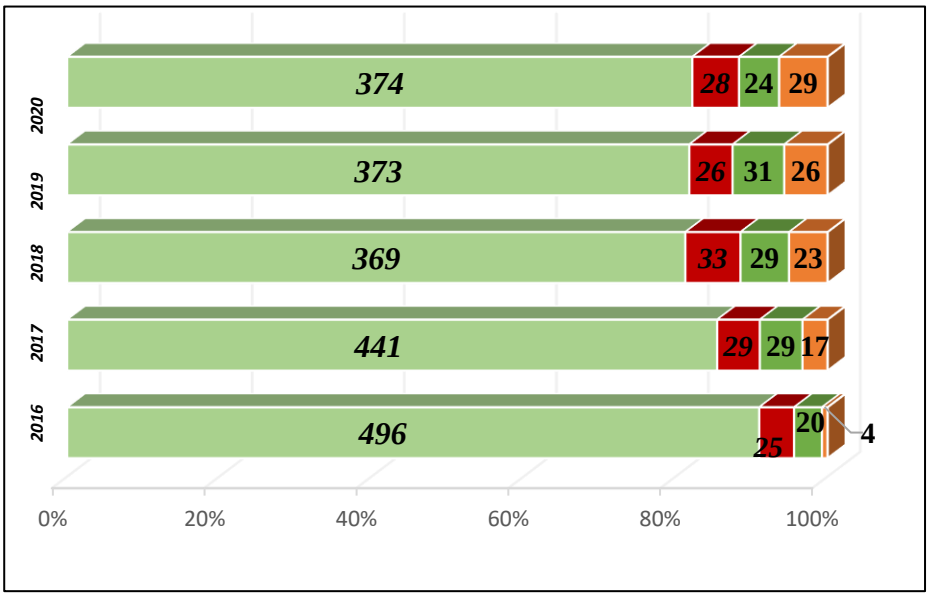

Figure 4 Correlation between FME by production and years

Over the course of the study, a significant increase in percentage terms was observed for the expertise assigned to commercial cases, the number of which increased sevenfold between the first and last year of the five-year period considered *(Figure 4)*.

1.3. Circumstances of the incident

According to the circumstances of the process accident causing bodily injury, the division of the material is into four groups: bodily injuries after transport accidents; bodily harm with intentional violation of bodily integrity - beating, incl. in the conditions of domestic violence, on hooligan motives, robbery self-government and in the conditions of other combined offences; bodily injuries in work accidents; bodily injuries such as accidents with injuries from poorly or improperly managed public grounds and buildings, injuries from stray animals, etc. *(Figure 5)*

The results obtained for cases of bodily harm divided into the groups described above can only be partially compared with published data, since there are no reports of such a distribution, and the available national statistics only have separate categories of those selected. The distribution presented here, compared with a publication from 2017, shows a higher percentage of examinations for bodily injury after traffic accidents. In our study, this share amounted to 41% of all personal injury examinations, while in the mentioned communication it was 27%. In our study, a variation of the

indicator compared to the others was found from 34% to 41%, with the highest value recorded in the last year of 2020..

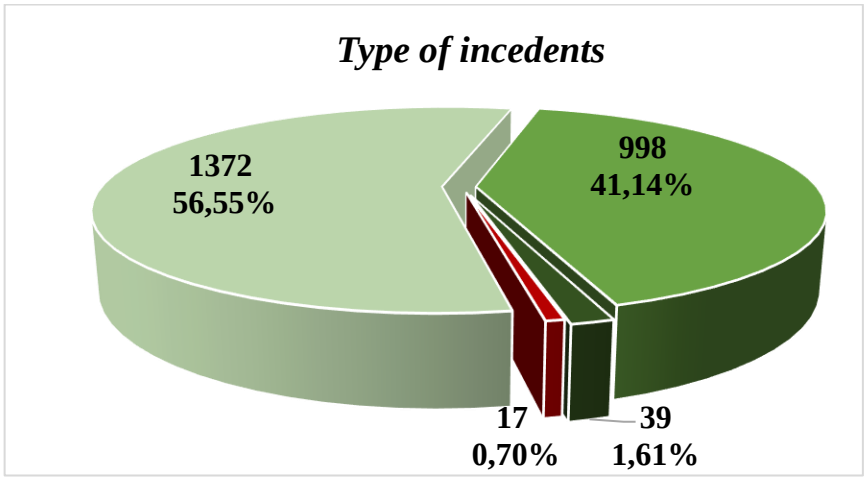

Figure 5 Distribution of FME for BI by incidents

According to information from the NSI and the Ministry of the Interior, in 2020 there is a 15% drop in road accidents, and from there also in those that are subject to an expert examination. For 2020, from the aforementioned sources, the reported decrease in the number of accidents, and in our study, an increase in the number of assigned expertise's with victims of this type of accidents is observed. A similar discrepancy is also observed at the beginning of the period under consideration.

In 2016, according to national statistics, the number of victims of transport trauma was the highest, and according to our analysis, the greater number of expert examinations for victims of road accidents were appointed in the following year, 2017. The difference in the ratios between the two large groups of incidents in 2016 to the almost approaching number of cases in 2020 of assigned expertise after transport accidents and other types of attacks is also visible. This supports our contention that the protracted timelines for proceedings affect at what point in the injury the medical assessment of the degree of bodily injury will be made. Here we should also take into account a group of cases in which an unfavorable outcome (death) occurred before the appointment of the expertise in the relevant proceedings, or they are legally qualified as "bodily injury leading to death". This group was analyzed and compared with other indicators in the next stage of the study. *(Figure 6.)*

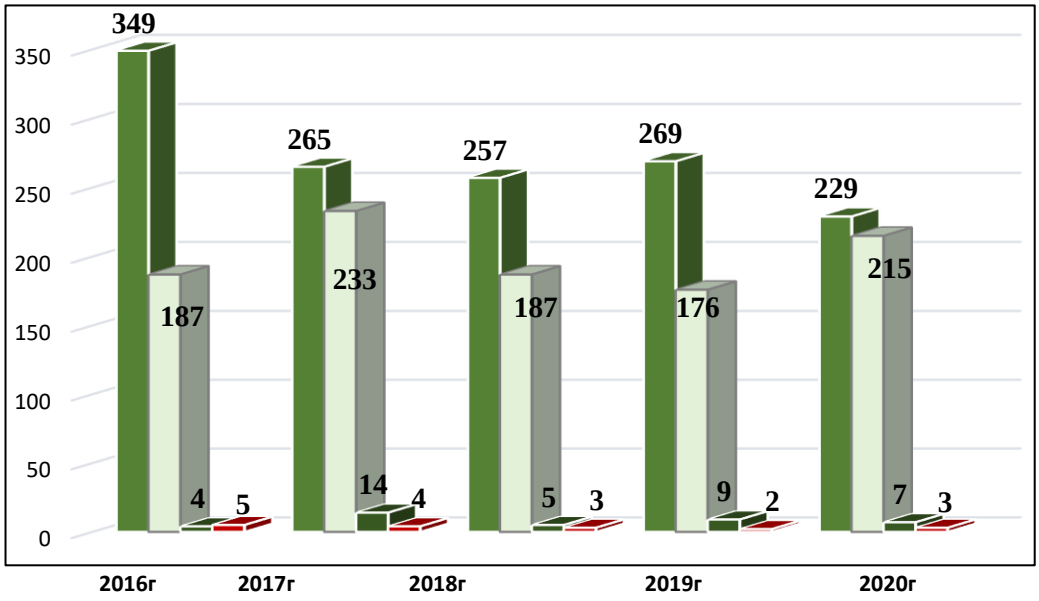

Figure 6 FME depending on the incident causing BI

1.4. Degree of bodily injury

The division into groups was made observing the three-level division of bodily injuries according to the Civil Code and depending on the medico-biological qualification criteria specified by the experts. The distribution of cases by grades showed the following result: *(Figure 7)*

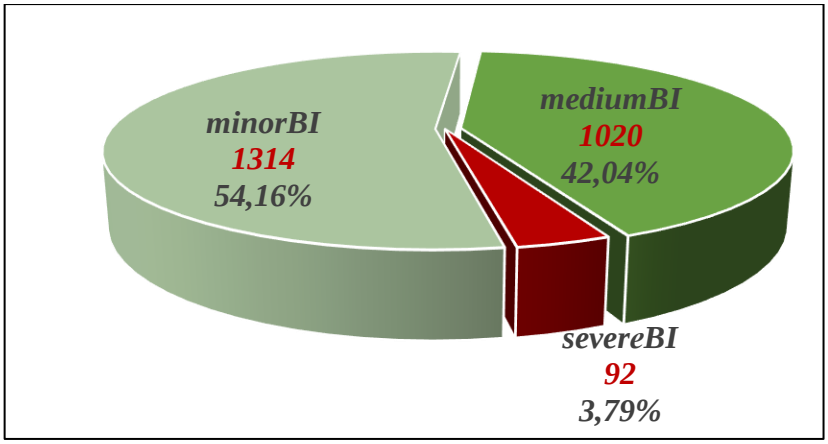

Figure 7 FME by degree of physical injury (mild, medium, severe)

Going into a more detailed analysis of the ratio between the three degrees of physical damage, we distinguished the categories by years. We found some fluctuations in the ratios between the three levels of bodily injury over the five years of the period under review, not to such an extent as to form a fundamental contradiction or a lasting trend in one direction or another. However, we cannot ignore the great fluctuations in the TTP group, which increases the number twice in 2017 and 2020 compared to the lowest reported for the period in 2016 - 2.39%. The interpretations of this dynamic are connected with many conventions, but we cannot help but point out, in addition to the legislative one,

another reason related to the hard-to-change stereotype of medical experts. In forensic medical practice, there is an unwritten rule according to which an indicator of serious bodily injury is extremely difficult to accept, unless it concerns those specifically mentioned in the texts of PC. Although the signs of severe bodily injury are considered to be more clearly defined, still their wording has not been changed for more than 50 years, which, in relation to the modern level of medicine, implies a rather different possibility of recovery even after injuries incompatible with life. This is very clearly seen in the divergent qualifications of the resulting crime of bodily harm given by medical experts. In the study published in 2015 for a number of examples with internal organ involvement, expert opinion split almost 50:50 between indicators of moderate and severe bodily injury, with little discrepancy reported regarding outcome after medical intervention.

The bodily injuries divided by degree were also grouped according to the qualifying sign for BI.

The figures for serious bodily injury, 92 cases, are distributed as shown in the following table. *(Table 4)*

year / **criteria**	***2016***	***2017***	***2018***	***2019***	***2020***	***total***	***% From SBI***
Prolonged disturbance of consciousness	0	1	1	0	2	4	4,34
Permanent blindness/ deafness	3	2	2	1	2	10	11,11
Loss of speech	1	0	0	0	1	2	2,22
Childbirth incapacity	0	1	0	0	0	1	1,08
Disfigurement, with involvement of a sense organ	2	1	2	2	2	9	9,78
Mutilation	1	3	3	2	3	12	**13,04**
Loss of kidney, spleen wing lung	2	2	4	2	4	14	**15,21**
Permanent general life-threatening	4	9	11	6	10	40	**43,47**
total / ***% from BI***	**13**	**19**	**23**	**13**	**24**	**92**	**3,79**

Table 4 ***Cases by qualifying signs for SBI***

The most frequently used qualifying sign for SBI was "permanent life-threatening general health disorder", followed by those for loss of a kidney or spleen and amputation of a leg or arm. In three of the cases (3.26%), two signs of severe bodily injury are specified, and almost every second (46.73%) has another qualifying sign from the groups of medium and light bodily injury.

In an analogous way, we divided the qualification signs used in the expert material into the cases with average bodily injury - 1020 cases. Their annual distribution and the ratios between them is indicated in the following table. *(Table 5)*

Table 5

year / criteria	2016	2017	2018	2019	2020	общо	% From MBI
Permanent impairment of vision and hearing		1	1		1	3	0,29
Difficulty in the movements of the limbs, body, neck	**154**	**192**	**147**	**121**	**104**	**718**	**70,39**
Permanent difficulty of the functions of the sexual organs	0	0	0			0	0,00
Broken jaw/knockout teeth	2	5	2	2	4	15	1,47
Disfigurement of the face and other parts of the body		1	1			2	0,20
Permanent disorder of health, not life-threatening		2	1			3	0,29
Temporarily life-threatening health disorder	**62**	**30**	**29**	**47**	**88**	**256**	**25,10**
Injuries penetrating body cavities	3	5	5	6	4	23	**2,25**
total / *% from BI*	**221**	**236**	**186**	**176**	**201**	**1020**	**42,04**

Distribution of MBI cases by criteria and years

As can be seen from the presented data, the criteria for average bodily injury, which are most often used to determine injuries from bodily injury, are in the group of permanently impaired motor functions, limbs or body. (70.39%) They are followed by those determined with life-threatening, amounting to ¼ of all (25.10%) and next larger group are penetrating injuries (2.25%). All other criteria, except jaw fractures and dental trauma equated to beating (1.47%), occur in less than 1%.

In order to comply with the single-count condition, we adopted a certain order of ranking the categories, driven by the danger to life. If the medico-biological indicators of life-threatening and difficult movements are present at the same time, the case is classified as life-threatening. We have placed penetrating injuries in body cavities as an "advantage" over hindered movement.

In all cases of multiple injuries, it is better to explain the extent of the trauma, the need for specialized medical care, the volume of operative interventions, the prognostic period of difficulty and recovery, the risk of complications, etc., than to list and add many qualifications signs.

In order not to ignore the severity of the trauma, since the multiple qualifications indicate just that, we have also grouped the cases presented by several signs of MBI into separate groups. *(Figure 9)*

The distribution in this way shows that the greater percentage (67.34%) of the cases classified as life-threatening are also accompanied by another trauma with the degree of MBI, which on

the one hand testifies to the critical condition of the patient, but on the other hand follows to suggest what treatment this patient needs to use the 50% chance of recovery without medical intervention, what is the interpretation of the conditions defined by this degree of BI.

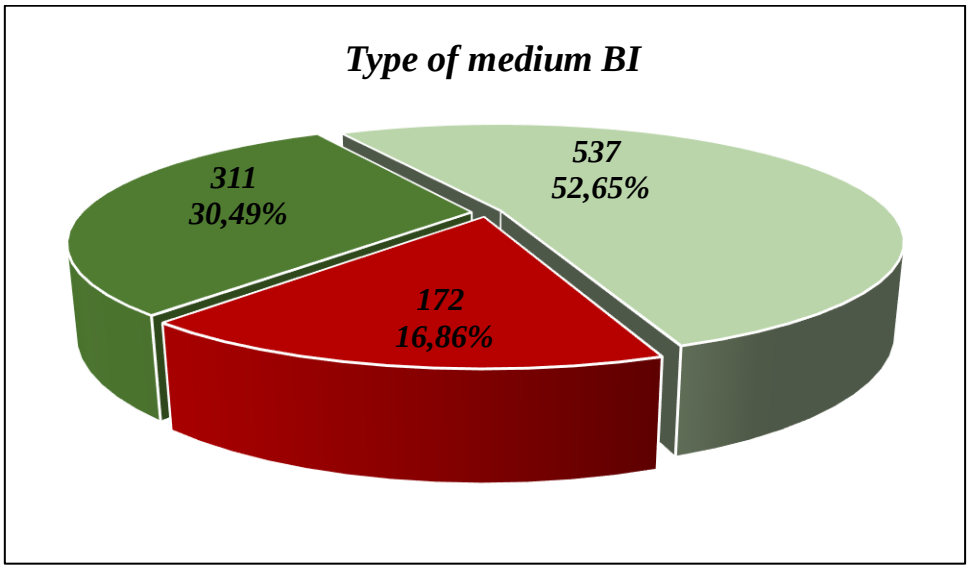

Figure 8 Distribution of cases depending on the number of awarded indicators

In 43.31% of the "permanent impairment" section, two or more affected functions are concerned, or in other words - for a period of more than a month, the victim cannot use two of the limbs or has a fracture of a limb and multiple ribs, vertebrae etc.

The limited ability to compare the results of our study with others led us again to the statistics published on convictions under the articles of personal injury. An average of 155 (775) convictions for bodily harm were reported in the three judicial districts of the northeastern region during the years under study, which compared with our results of cases with moderate and severe bodily harm (1002) does not show a large discrepancy in the detection rate indicated by the prosecutor's office for this type of crime - 70-72%. On the part of the forensic medical expert activity, no generalized counter-results can be indicated, due to the fact that it is not legally subject to reporting and control, and it also does not have its own organizational structure as a medical specialty.

year / criteria	2016	2017	2018	2019	2020	общо	% from minorBI
Temporary health disorder not life-threatening	235	215	173	202	190	**1015**	**77,25**
Pain and suffering	76	46	70	65	42	**299**	22,75
total / % from BI	**311**	**261**	**243**	**267**	**232**	1314	**54,16**

Table 6 Distribution of accidents from Minor BI by criteria

The cases qualified with signs of MinorBI-1314 (54.16%) were distributed by criteria as follows. *(Table 6)*

The methods for the selection of the documents applied so far have proven compliance with basic requirements regarding the information that should be contained in an expertise. When analyzing it, however, it is established that this is the information provided or requested through specific questions by the authorities appointing the expertise, i.e. the legal side of the expert process is respected. In the following phases we attempt to introduce the medical side of expertise.

1.5. Degree of coverage of medical assistance in forensic examinations

The separation of the expertise's according to this criterion comes down to whether in their general protocol part there is medical information reflected under some variant, such as quoted or retold specific medical documents. The result was eloquent - out of the 2,426 documents, only in 3 (0.12%) written data examinations did we not find the requested data. In these cases, a sign of bodily injury was indicated, probably due to the fact that an examination was required at a later stage, in which only the written reports of the eyewitnesses of the incident were used. The medico-biological indicator "pain and suffering" is indicated for the three case studies.

The insignificant number of cases identified by us in which no medical assistance was registered/provided is the definitive proof of the extent to which such assistance was available and provided for each person injured after bodily injury.

Thus, the final number of forensic medical examinations, which became the object of the study in the next stage of work, was determined.

These are 1423 separate documents, each of them describing the condition of an individual patient with bodily injury, and in the general part, at least one medical event - a clinical examination, some kind of research, surgical treatment, etc., or a complex of such is reflected activities during hospitalization.

To represent in the most general form the part of the information we need about the medical care provided, we used the already preselected criteria described as defined in the proposed two-component scale, without using the qualifying numerical score for the clinical examinations, for which we already have information that they are performed in 100% of patients.

The results for the medical activity, such as type and volume, were extracted only from the information reflected in the expert material for each of the cases, therefore they are an indicator of the degree of significance for the qualification of bodily injury. *(Table 7).*

BI% / year	Minor BI	%	Medium BL	%	Severe BI	%	total
2016	311	**57,06**	221	**40,55**	13	311	545
2017	261	**50,58**	236	**45,74**	19	261	516
2018	241	**53,31**	186	**40,97**	23	243	**452**
2019	267	**58,55**	176	**38,60**	14	267	456
2020	231	**51,10**	201	**44,18**	24	232	**454**
total	1311	**54,16**	1020	**42,04**	92	**3,79**	***2423***

Table 7 FME for the study after applying the selection criteria

Despite the criteria we selected, which are considered to be important in determining the BI indicator, we found that for some of them, no data was established as to whether they were conducted. This applies to both diagnostic and curative medical activities.

The number of reflected activities according to the ten criteria of diagnosis and treatment, for which it was categorically reflected that they were carried out in relation to all 2423 victims, is shown in the table *(Table 8)*.

criteria / years	СР	ПИ	ОИ	АИ	TSS	АР	БЛ	ОИ	МЛ	РФ	total МД	Patients with BI	average per patient
2016	545	290	462	443	351	20	286	338	423	82	**3240**	**545**	5,9
2017	516	340	442	462	398	9	295	322	444	67	**3295**	**516**	6,4
2018	452	337	375	391	336	15	257	254	393	94	**2904**	**452**	6,4
2019	456	324	361	365	314	10	229	265	353	92	**2769**	**456**	6,1
2020	454	376	338	402	344	20	220	204	354	132	**2844**	**454**	6,3
total	2423	1667	1978	2063	1743	74	1287	1383	1967	467	***15052***	***2423***	***6,2***

Table 8 Reflected medical measures

In total, the minimum number of individual types of medical procedures that have been carried out for the five-year period is 15,052. It can be seen that they are slightly more than six times (6.21) more compared to the number of patients with BI who sought medical help during the same period. In this case, we draw attention to the fact that MA is presented only as a type, without including the number of individual events. Another feature that will be discussed more widely in the next phase of the study is that a large number of the activities are focused on about half of the total number of patients, due to their different need for medical care according to the severity of the trauma they have received. The comparison of the indicators for the diagnostic part looks as follows: for the clinical

examinations (CE), we have already specified that for each patient there is at least one examination conducted or in 100%; paraclinical investigated (PI) were reflected in 1667 cases, i.e. in 2/3 of patients (68.79%); trauma assessment scales (TAS) were used in 2063 cases (84.14%); instrumental studies (IS) are 1743, or in 71.93% of cases; imaging studies (IS) were performed in 1978 patients (81.63%); the total number of diagnostic activities was 9874, or an average of 4 per patient with minor variations over the five years from 3.9 to 4.2. (Figure 10)

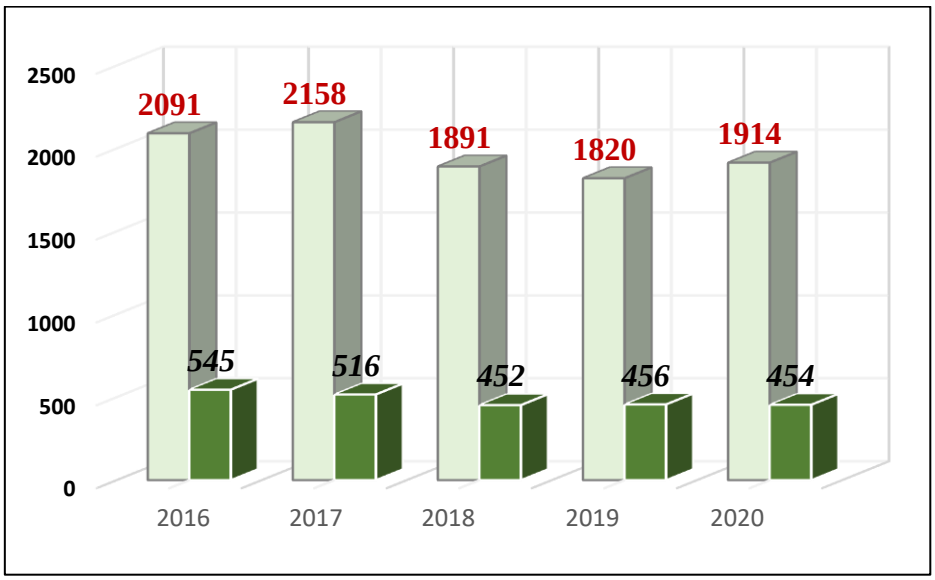

Figure 9 Correlation between DMA and BI patients

The treatment measures, presented in the same order, are in the following ratios: active resuscitation (AR) was performed for 74 patients (3.05%); hospital treatment (HT) was required in 1287, or in 53.11% of cases; operative interventions (OI) in outpatient and inpatient conditions were 1373, (56.66%); reflected medical treatment (MT) was for 81.80% (1967) of all cases; rehabilitation and physiotherapy (RP) procedures were reported 467 times or for 19.27% of the victims. In a pooled version, this activity was defined by 5178 counts, or at least 2 per patient, with an even narrower range of variation over years of 2.0 to 2.2. *(Figure 11):*

The comparative analysis between the two groups of activities at first sight determines a greater involvement of diagnostics on the part of medical intervention in general. Given the need to clarify the degree of anatomical and functional damage in the qualification of BI, it is completely understandable to pay more attention to the diagnostic activity..

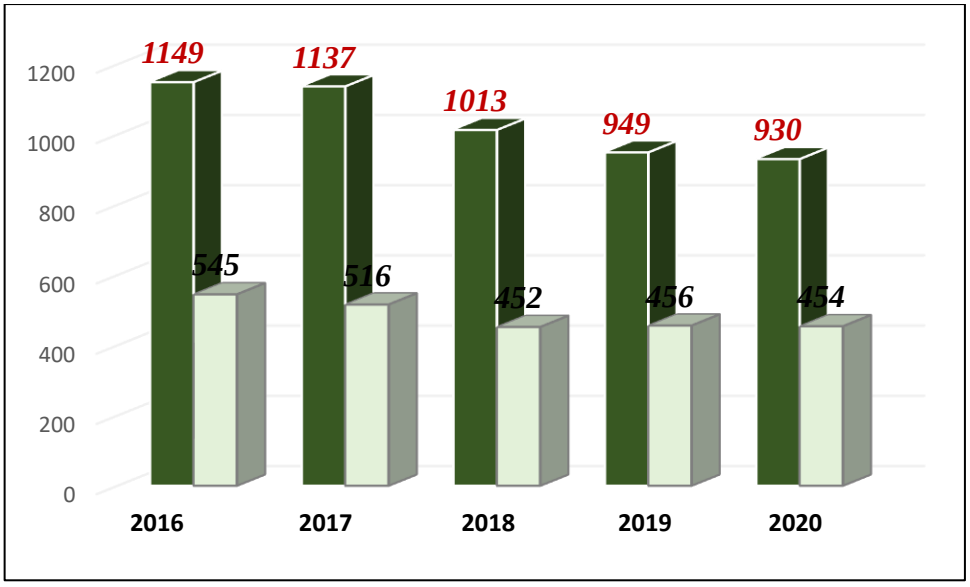

Figure 10 Correlation between TMA and number of patients with BI

However, in no case should the healing part be neglected, since it is more closely related to the severity of the injury and its duration. Injured persons may be required to apply almost the entire range of activities related to health care, as well as to appear in all types of medical facilities defined as such. The regulation by the NHIF requires that each activity be reported and calculated accordingly, which implies its detailed description in the medical documentation. This increases the expertise's ability to obtain a full volume of information regarding all diagnostic and treatment measures carried out for the victims. The presentation of this information in a certain order when considering cases with BI is extremely beneficial for the objectification of the degree and severity of the disability itself, as well as a guide to complications, prognosis for recovery and duration of impaired working ability. Once attached and described as materials, medical records become part of that evidence and can be used to clarify the circumstances at trial..

The next point in determining the degree of coverage of medical assistance is the way in which it is actually presented in the examinations.

1.6. Cited medical documents in the examinations

In medical examinations based on documents, simultaneously with the collected operational data and witness statements, the object of study is the provided medical documentation, the comprehensiveness of which depends on what volume will be examined and interpreted accordingly in the final part of the examination. The choice of how much of the information provided will be included as part of the examination remains with the doctor to whom it is assigned, with no statutory regulation for this.. In practice, the specific medical data that is cited in the protocol part is related to the essence of the questions asked and the expert determines those that he will need to justify his chosen qualification

for bodily injury. In the process of document analysis, taking into account to what extent the medical documentation is reflected in the examinations, we found that there is no deviation from the generally accepted structure of the FME and 100% of the cited data on diagnosis and treatment are located in different places in the part: "Important data for the expertise"..

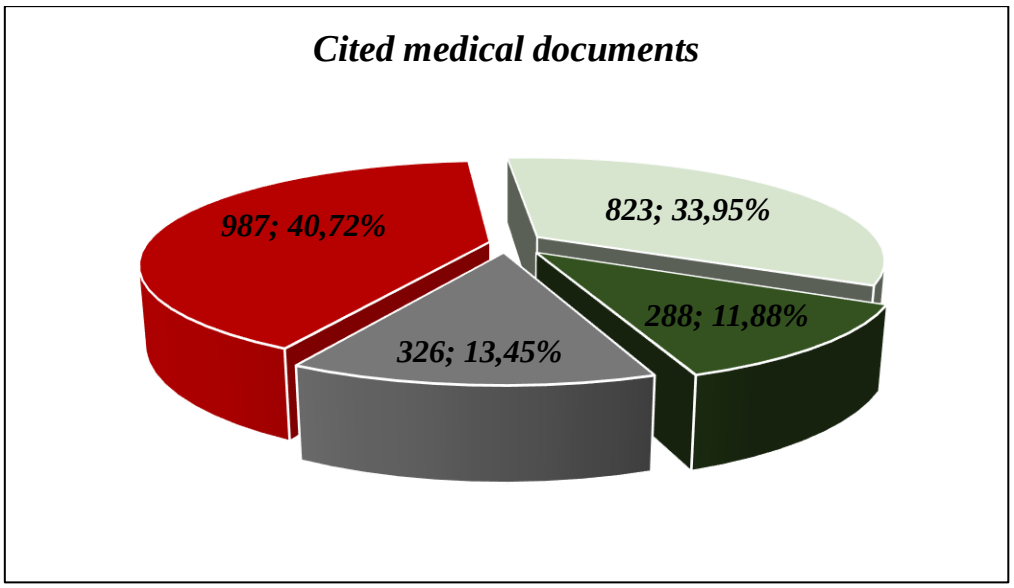

Figure 11 Location of cited medical documentation in FME

In 40.72% (987), a separate part was identified in the section, naming it differently, chosen by the expert: "medical data", "reviewed medical documents"; "medical part". In the rest of the examinations, the medical documents are included as sequentially listed evidence at the beginning (13.45%) or at the end (33.95%) of the presented written materials or without a specific order (11.87%), perhaps following the one from their place of binding in the case. *(Figure 12)*

The conclusion is that there is no unequivocal view in the forensic medical examination regarding the designated place, manner and order in which to present the medical information collected and applied during the proceedings. The form legally imposed by the Ordinance has been followed, without including a purely medical regulation, at least for practical convenience. The results of this in all cases are a disadvantage for the expertise, allowing the discovery of contradictions, different interpretations and comments or become a prerequisite for the appointment of additional and repeated expertises. Ultimately, the negative impact is on medical expertise as a whole.

The attempt to differentiate the medical documents with their specific names did not give the expected results, because the numerous diagnostic and treatment measures were described in different places, without it being clear from which document they were extracted as information. For the examined 2423 documents, we reflected the type of cited medical documents, dividing them according to the stages of the provided medical care. This division did not include 65 (2.68%) cases in which only

forensic medical examination was reflected as primary medical care. For the remaining 2,358 case studies, the cited documents were classified according to the two stages indicated.

In the case of emergency assistance, we rely on a limited number of documents, the majority of which are designed as forms. *(Table 9)*

year / ***medical document***	2016	2017	2018	2019	2020	total	***% of all with cited documents op primary care***
Slip for provided SMC	192	181	152	146	134	805	**34,13%**
Patient examination sheet in the EC	357	321	306	281	284	1549	**65,69%**
Additional review sheet In EC	183	162	149	137	158	789	**33,46%**
Blank laboratory tests	40	32	27	19	24	142	**6,02%**
Visual results research	197	180	161	169	163	870	**59,41%**
Prescription forms	21	17	14	9	10	71	**3,0%**
total	**969**	**876**	**795**	**752**	**763**	**4155**	

Table 9 Number of reflected documents from the stage of the emergency aid provided

The result of our research shows that in the examined expert opinions, these documents are included to varying degrees, from 3% for the results of laboratory tests to 66% for a review sheet in the EC. The follow-up of the subsequent medical care (hospital and outpatient, conditionally accepted by us as subsequent medical care, gives more complete information about the type of medical documents cited in the expertise *(Table 10).*

The analysis found that the cited information from the documents issued at the emergency aid stage is in a very abbreviated version. Each line of the primary medical documents contains data and specific indicators, which are an extremely valuable reference for the condition, for the volume and urgency of the initial medical actions, and from there for the severity of the traumatic damage immediately after the accident. Not infrequently, the specified forms remain the only medical documents attached as written evidence in the entire file. Including the data from the emergency or initial medical activity as a mandatory element in the algorithm of reflecting the medical assistance in the FME will contribute to the objectification of the indicated conditions and of importance for the objective expert conclusion.

years / documents	2016	2017	2018	2019	2020	total
Ambulatory sheet	142	150	147	149	139	727
Laboratory researches	34	41	29	37	26	167
Results of IS in OHC	87	72	56	59	62	336
Prescription forms	17	11	19	15	20	82
Hospitalization direction	20	21	22	27	30	120
Rehabilitation card	8	4	7	3	9	31
History of illness	112	104	99	87	90	492
Operational protocol	187	160	125	113	94	679
Anesthesiology sheet	**3**	**4**	**1**	**1**	**1**	10
Transfusion sheet	**1**	**2**	**2**	**1**	**2**	8
Discharge summary	279	292	254	230	208	1263
TEMC decisions	**24**	**19**	**23**	**27**	**21**	114
TOTAL	**914**	**880**	**784**	**749**	**702**	**4029**

Table 10 Reflected documents from the subsequent stages of diagnosis and treatment

In summary: in cases with data on emergency medical assistance provided at the scene of the accident, it is our duty to familiarize ourselves with the contents of one document, and in the conditions of the EC there are five documents *(Table 9).* A positive trend is the coverage of extremely complete information from Epacris, issued after hospital treatment. The mandatory twenty-three requisites that follow each epacrises require the inclusion of the almost complete content of the basic documentation that is kept during hospitalization "History of illness", accompanied by all the tests performed. For forensic medical practice, these data are of extremely great importance in connection with determining the various terms, pace and degree of recovery posed in the questions before the expertise. For comparison, we show the degree of coverage of the type of documents that are covered in the FME, albeit in isolated cases..

When it comes to hospital treatment, the Epacrises is the document that summarizes and almost completely replaces the other documents issued during this stage. There is no other part of the

hospitalization documentation to which such a significant place has been assigned, including the summary documentation from the DH, which occurs as a separate source of information in fewer cases.

When the diagnosis and treatment takes place in outpatient settings, we come across insufficient information on the part of submitted types of documents. Under these conditions, the main document issued is the "Outpatient List". On its own, this document should also contain information about the other tests performed, about the assigned therapy and the directions issued for other consultative examinations and highly specialized activities and procedures. This is the documentation by which the status of all non-hospitalization personal injury cases can be tracked. During the analysis of the documentation, 727 cases were reported, in which there is reflected information from this type of documents (ambulatory list), which makes it informative for the expertise regarding the medical assistance provided in outpatient settings. Secondly, the diagnosis at this stage is supported by the results of the imaging studies, indicated as separate documents in the expert material of 336 cases. All other possible documents were used as evidence in a small percentage of cases, possibly supporting or disproving certain traumatic injuries or conditions.

The analysis shows that the most frequently cited type of document is an emergency department patient review sheet, and the largest volume of information is obtained from epicrisis. Forensic certificates, whether they are the only or part of the medical records, are always reflected in full.

The results of the first stage of the study, grouped here in a general form, were decisive for the subsequent detailing of the medical information contained in the reviewed documents and made it possible to attempt to test the selected two-component scale.

. The second stage is entirely aimed at giving a point assessment for each of the selected medical activities as defined on the scale and their comparison with some of the categories already reported as numerical results

A direction for considering and introducing the selected criteria, which can assess the nature of the input diagnostic and treatment medical activity for the needs of the FME, was the type and volume of the medical information included as evidence. The division of activity into diagnostic and treatment plans also originates from the need for the expertise of certain medical documents and their interpretation. The principle for the selection of the determinants is also based on the content of the questions that are put before the forensic medical examination for bodily injuries. Following the proposed scheme in the process of extracting information, it is possible to track all possible stages and activities in the provision of medical assistance, and their reporting as carried out is in favor of the justification for the specifically selected indicator for BI. The proposed system allows evaluation of the medical assistance in the individual case, when the components of one section were not applied or were

not included as data in the relevant proceedings. It is necessary to clarify that the system is extremely narrowly specialized and should not be viewed as a means of determining compliance with the principles set out in the LH such as equality, timeliness, sufficiency and quality, which are subject to another type of analysis and interpretation.

2. Qualification according to the proposed scale - DMA and CMA

In the second stage of the study, the analysis was carried out in the form of a system (scale) presenting information through numbers. The proposed two-component scale is entirely practical, and when preparing it, we took into account the general advantages derived from any similar system, namely easy orientation in the indicators, quick assessment and calculation. As a specific forensic scale, we have used narrowly discipline-oriented determinants, enabling in the simplest version a quantitative result. The medical activity reflected in each examination was classified into two distinct groups, diagnostic and therapeutic. For the two categories of activity, information was sought so that a numerical index was indicated for each of the respective two groups of determinants.

Since the derivation of the indicators is based on a preliminary study regarding the most common medical information as evidentiary material and the most frequently asked questions in connection with the investigation of bodily injuries, the necessary information was purposefully discovered and marked with the corresponding numerical evaluation from 0 to 3. The total numerical assessment of the two components of the scale and, accordingly, the combined result of both were obtained through the used electronic tables (MS Excel).

Each of the selected criteria is assessed in two directions. First, whether or not it is reflected as a completed activity, and secondly, with the corresponding figure defining it. In parallel, for each studied document, the degree of bodily injury was also reflected with the defining indicator, the type of incident and the phase and type of proceedings. In order to trace dependencies, make comparisons and outline trends, the cases were distributed by year and only in individual cases by region.

2.1. Qualification of the diagnostic activity

The diagnostic part scale (DMA) contains five signs - clinical examination, assessment by scale (TSS), paraclinical studies, imaging studies and instrumental studies..

Clinical examination (CE)

The result of this review places the first stigmas serving as objectification in the selection of the medico-biological qualifying sign. This is the reason for our choice to stop at the clinical examination as the first criterion of the diagnostic activity. The digital indicator and the percentage of its value compared to the others is presented in the table below. *(Table 11)*

digital indicator % / year	p.0	%	p.1	%	p. 2	%	p.3	%	total	%
2016г.	**14**	2,56	**120**	22,02	**320**	58,72	**91**	16,70	545	100
2017г.	**10**	1,94	**99**	19,19	**296**	57,36	**111**	21,51	516	100
2018г.	**7**	1,55	**119**	26,33	**240**	53,09	**86**	19,03	452	100
2019г.	**12**	2,63	**116**	25,44	**247**	54,17	**81**	17,76	456	100
2020г.	**22**	4,84	**106**	23,35	**253**	55,73	**73**	16,08	454	100
total	**65**	2,7	**560**	23,27	**1356**	55,81	**442**	18,22	**2423**	**100**

Table 11 Score for clinical examination by degree and

The results of the table are eloquent for the participation of this type of medical activity as an evidentiary quote in the protocol part of the examination, and from there the corresponding conclusion about the importance of the examination in the qualification of bodily injury. In none of the reviewed cases was the coverage of an examination omitted, even when it concerns only a forensic medical examination. These are the cases assessed with p.0, 65 in number (2.70%), in which the expert assessment was given without any other examination than that of a forensic doctor being reflected. In an insignificant percentage of 0.16%, or in four cases, it was not noted under what conditions the initial examination was carried out, and the indirect indicators suggest examinations carried out at the scene of the accident by a CEMA team..

A minimum of 4,598 clinical examinations were performed on the 2,423 patients who suffered as a result of bodily injury, not counting the forensic examinations (65). According to the scoring we have chosen, a specific maximum number of reviews cannot be specified, due to their undetermined number behind the rating - 3p.

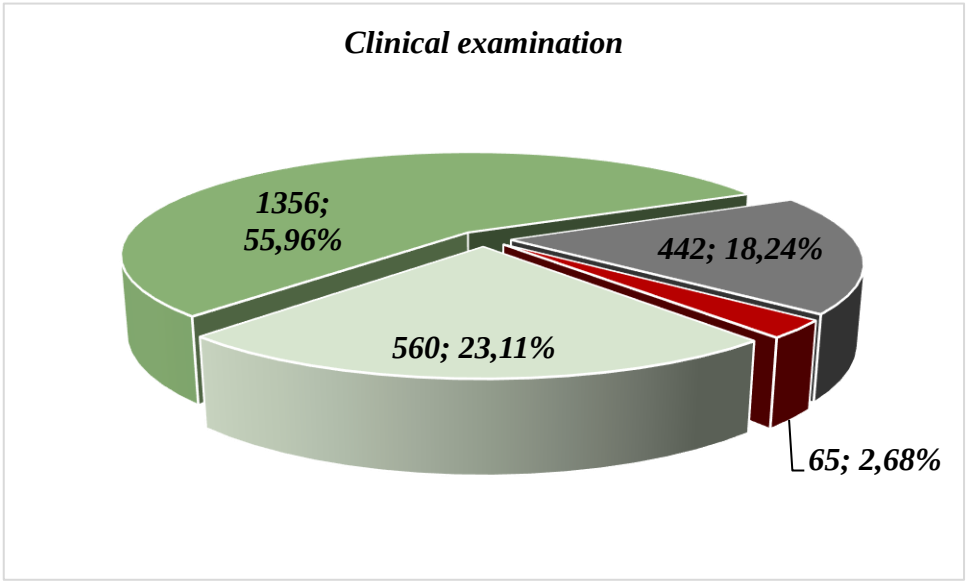

Figure 12 Proportional distribution according to the performed examinations

A scale figure of 1 point was reflected for 560 cases, amounting to 23.27% of all. 55.81% of the cases were evaluated with 2 points, which indicates that 1356 patients had two consultative examinations to establish their diagnosis after trauma. 442 (18.22%) were evaluated with 3 points, or those in which at least three examinations were performed. On average, for each patient there are almost two (1.89) clinical examinations, taking into account the above-mentioned feature at the maximum evaluation of the indicator.

Statistical data on the distribution of patients served by emergency outpatient departments shows that cases with trauma are combined into the group of other emergencies (suddenly occurring life-threatening conditions, injuries, poisonings, etc.), amounting to an average of about 80% in the years 2014-2020 according to the national strategy for the development of CEMA. There are no exact figures as to what part of them are the result of culpably caused injuries or other external influences, i.e. from a purely medical point of view, the resource used for these cases is also not taken into account.

We find it appropriate to indicate the relationship of the point score on this separate descriptor from the group of diagnostic activity to the degrees of bodily injury given as a qualification in the study material *(Figure 13).*

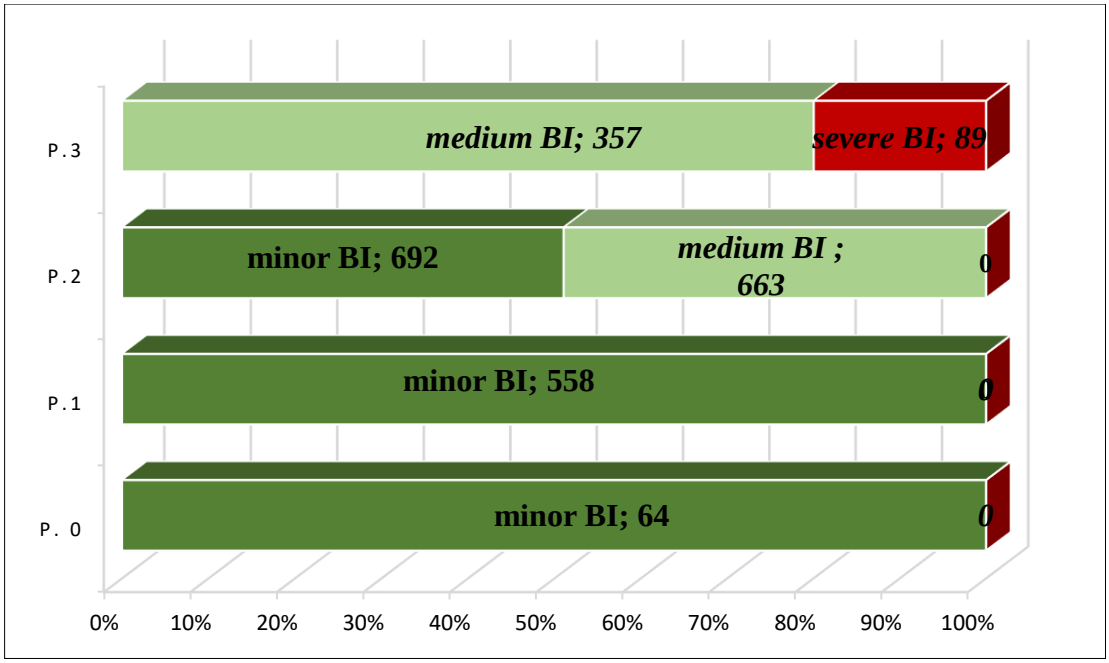

Figure 13 Relationship between clinical examination point score and degree of BI

It can be seen that none of the minor bodily injury cases were rated with the highest numerical index, and none of the severe bodily injury indicators were given a rating other than the highest. The evaluation of the indicator "clinical examination" does not create a difficulty in connection with the lack of information contained in the forensic medical examinations, which confirms its selection in this form as the main one for the scale.

The main documents cited in the forensic medical examinations that are used for the scoring are the emergency medical care record, the emergency department patient examination sheet, outpatient lists, epacrises and from the forensic medical certificates when they are the only medical document in the "Data section relevant to expertise“.

In favor of the study, it was found that the descriptor "clinical examination" can be used as part of the algorithm to reflect the medical activity without even having to step out of the stereotype of the practice at this point. It is recommended to fully reflect the information contained in the documents, which will allow the inclusion and evaluation of the other identified indicators to a similar extent.

Trauma assessment scales used – TSS

The scheme that reflects and visualizes the extent to which this indicator is included in the general part of forensic medical examinations is reflected in an analogous way. Here it is already established that the criterion cannot be evaluated for every single case of the examined material, but in 88.6% of it (Table 12).

digital indicator % / year	p.0	%	p.1 BI	%	p. 2	%	p.3	%	total	% the total number
2016г.	**20**	4,33	**290** *(61)*	75,97	**78**	16,88	**13**	2,81	462	84,77
2017г.	**3**	0,65	321 (75)	85,58	**61**	13,12	**3**	0,65	465	90,12
2018г.	**12**	2,98	**287** (89)	83,37	**46**	11,41	**9**	2,23	403	89,16
2019г.	**24**	6,17	**271** (78)	80,72	**47**	12,08	**4**	1,03	389	85,31
2020г.	**36**	8,43	**200** (70)	80,56	**44**	10,30	**3**	0,70	427	94,05
total	95	4,43	1369 **(374)**	56,50 (15,43)	276	11,39	32	1,32	**2146**	**88,57**

Table 12 Evaluation by criterion TSS

With the possibilities offered by the multitude of systems for assessing the traumatic state accepted in practice, the proportion of cases in which the scale was used twice is extremely low, 11.39%, and only in 32 cases (1.32%) the use and on more than two types of rocks. However, we consider the possibility of evaluating a total of 682 cases (28%) based on the information provided in the FME as a good indicator in the direction of the use of TSS in the examinations for bodily injuries.

The formation of this type of evaluation, for used scales, as a separate criterion in the present study was also necessary for a purely narrowly specialized reason. Since the forensic medical judgment does not find a place in the clinical diagnostic and treatment part, and it is the main one in the medico-biological legal qualification, we believe that the qualification of a given injury according to the indicators of mild, moderate and severe bodily injury could also be equated to the others used point estimates, which in their larger percentage are also strictly specialized. In this way, the qualification given and cited in the protocol part of the examinations, as a result of a forensic medical examination, we consider to be fairly accounted for the diagnostic part of the medical assistance belonging to this indicator. However, the forensic medical judgment, formulating the qualifying sign of bodily injury according to the requirements of the PC, could not be replaced by any of the other selected parameters covering the medical activity. In forensic practice, the addition of even one scale rating with a numerical expression is extremely beneficial for objectification. As an indisputable example of this is the most commonly used Glasgow scale. Through it, one of the most controversial medico-biological indicators according to our PC – a health disorder temporarily dangerous to life, referring to the presence of an unconscious state, receives its decision already at the visit of the CEMA team, if a GCS assessment has

been carried out in the file. In favor of the expertise, an objective criterion remains available and there is no need to analyze conflicting witness statements and provide a purely medical decision to the investigating authorities. Not up-to-date judicial practice regarding the indicator of temporary danger to life allows to credit testimony of witnesses who describe indicators such as opening, closing eyes, breathing, etc., while back in 1974 the authors of the scale gave the opportunity to the physician's judgment is taken into account when describing a comatose state. A similar assessment could be made even in the course of preparing the expertise when examining the medical documentation. The identified certain symptoms, clinical indicators or research results allow the expert to independently carry out the classification on a given scale with the help of his objectification, the indicators of which are also found in the data from the cited documents. *(Appendix 4)*

Forensic medical practice in the country does not yet include various quick assessments in favor of its narrowly specialized research, although the presented documentation contains indicators for almost all of the known and applied scales.

In the course of our study, due to the small number of trauma assessment systems used, we reflected each one by type, and in addition, their use as a percentage of cases. We must point out that our condition for not including the forensic qualification in the scoring for p. 2 and p. 3 is to establish exactly what is the degree of indication of the other systems used in practice. Thus, we find that the number of cases in which scales other than GCS (r.3) were used is only 32 These are 4 cases of thermal trauma, in which the use of the VOVI and ABSI systems is presented as an additional examination during the examination, in 9 cases the ASA anesthetic risk assessment is highlighted and in the remaining 19 the AIS assessment is indicated. The cases evaluated with p. 2 are exclusively for two-time assessment by GCS - 92.7%, while in the rest of this group there is a combination of GCS and anesthesiologic risk assessment (3.9%) and GCS with AIS (3.2%). Information for reporting the determinant in the study was found in the cited documents: the emergency care record, the patient examination sheet in the CO, epicrisis, anesthetic sheets and the forensic medical certificate..

The conclusions drawn in connection with the analysis of the TSS indicator chosen by us give us the reason to propose as an additional section in the document examinations to add one that exists in some of the other types of medical examinations - "Conducted research analysis and studies and their results" . This would be the appropriate place where the point assessment will be calculated and presented and the corresponding comparisons will be made on different scales in favor of objectification of the conclusion and the selection of a specific medico-biological indicator of bodily injury.

Imaging Studies (IS)

The results of imaging studies are a mandatory element of the materials provided for the preparation of the forensic medical examination. Providing the very image of the injury should be as mandatory a moment, as no less necessary in the expert process are the imaging studies through which the traumatic injury is rejected. The chosen way of reflecting the performed imaging studies in research material showed to what extent this indicator is important not only for the diagnosis of the trauma, but also for the medico-biological qualification of the bodily damage. *(Table 13)*

digital indicator % / year	p.0	%	p.1	%	p. 2	%	p.3	%	FME with reflected OI	% of the total number
2016г.	**16**	3,35	**245**	51,26	**176**	38,81	**41**	8,58	478	87,70
2017г.	**23**	4,95	**216**	46,45	**180**	38,71	**46**	9,89	465	90,12
2018г.	**26**	6,48	**156**	38,91	**159**	39,65	**60**	14,96	401	88,72
2019г.	**30**	7,67	**167**	42,72	**148**	37,85	**46**	11,76	391	85,75
2020г.	**53**	13,55	**167**	42,72	**131**	33,50	**40**	10,23	391	86,12
total	**148**	7,20	**951**	44,41	**794**	37,70	**233**	11,08	**2126**	**87,74**

Table 13 Imaging studies specified in FME

On average, 87.74% (2126) of cases contained data on imaging studies. Their reflection according to the accepted methodology of the scale and their distribution by groups is indicated in the table below. In the remaining percentage of the documents, or in the case of a total of 297 cases, there is no reflected information and it cannot be assumed with certainty whether or not an imaging study was performed. When comparing these cases with the degree of bodily injury, it can be seen that all of them refer to minor bodily injury, which does not exclude the possibility that an imaging study was not performed during the diagnosis of the injury. Provided that the number and stages of the imaging studies are reflected in detail in the FME, we believe that a large part of the group of cases evaluated with p.1 or p.2 will be evaluated according to our system with the highest result, but still here we rely on available, not assumed, information. Research results, supported by the imaging studies themselves, emerged as a mandatory element in the objectification of damage to bones, internal organs and tissues. Not familiarizing the expert with the specific imaging study would create prerequisites for incorrect interpretations, and hence unfounded qualifications for bodily injury. This applies exclusively to these disabilities, which are controversial not only as a visualization of the imaging study, but also as cases in forensic medical practice for the medico-biological sign used. Examples in this regard are fractures of small bones without dislocations, partial damage to soft tissues around the joint apparatus, etc., for which qualifications for various degrees of bodily injury under the PC are entered in the judicial practice.

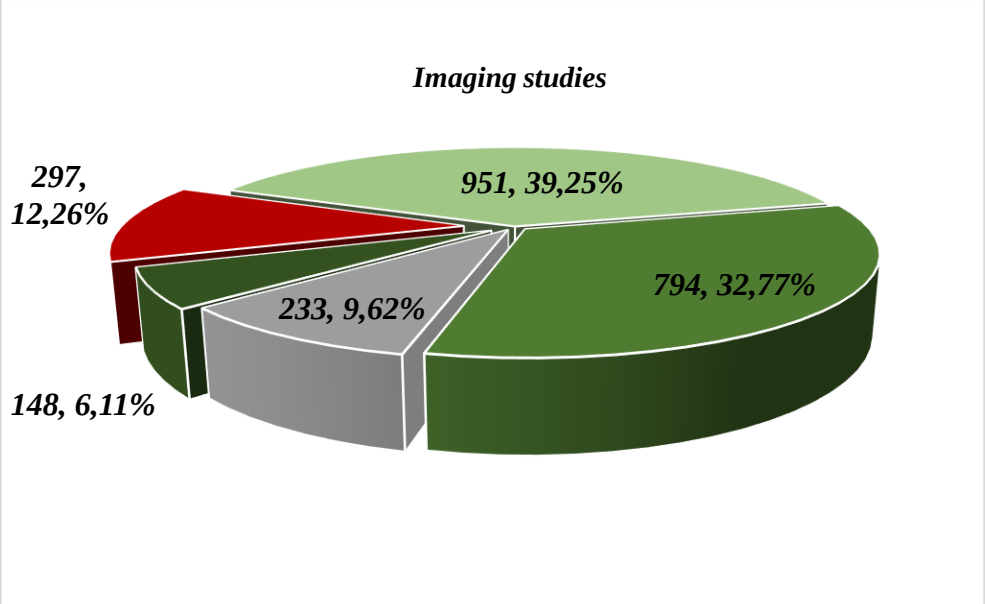

Figure 14 Distribution by point assessment of reflected and imaging studies in FME

The conclusion for this criterion from the diagnostic scale as an opportunity to complement the algorithm for reflecting medical care is that again there is a lack of a regulated way to include the study in the expertise data. An option for reflecting the examined imaging studies naturally exists, given the possibility of freedom of presentation of the data, but the solution is probably to accept the mandatory element of noting the act of examining the study, and if possible, include the image in the expertise. In the course of our work, it was found that only in about 1/5 of the cases, the type of imaging study, identification number and date of execution were reflected in the examinations, the result was quoted in full, and there were also single examinations with an included X-ray image of fractures of limbs and skull bones. In our opinion, it is more important to take into account the type and number of studies, their identifying data and the time when they were carried out, and not so much copying the image itself as photographic material, unless it is clearly visible and understandable to the other participants in the process..

Laboratory research (LR)

Data on performed laboratory tests, which can help to score the indicator according to the described scheme, are found in 1770 cases (73.05%) out of all 2423. For the remaining 26.95%, there is no information about performed LR, and indirectly it cannot be it was assumed whether such type of research was being ordered at all. *(Table 14))*

Among the indicators in the DMA of the scale, laboratory tests are the least represented when citing the medical data in the documentation. It is admitted that some of the victims may not have been assigned similar tests, but since this is not explicitly stated as in the case of these 103 cases evaluated with p.0, we should not award the corresponding points.

digital indicator % / year	p.0	%	p.1	%	p. 2	%	p.3	%	total	% points
2016г.	**24**	4,41	**157**	28,86	**112**	20,59	**21**	3,86	**314**	57,72
2017г.	**11**	2,13	**192**	37,21	**125**	24,22	**23**	4,46	**351**	68,02
2018г.	**21**	4,65	**194**	42,92	**121**	26,77	**22**	4,87	**358**	79,21
2019г.	**21**	4,62	**167**	36,70	**139**	30,55	**18**	3,96	**345**	75,83
2020г.	**26**	5,75	**188**	41,41	**156**	34,36	**32**	7,05	**402**	88,39
total	**103**	4,31	**898**	37,28	**653**	27,29	**116**	4,84	**1770** **2423**	**73,05** **100**

Table 14 Indicators for laboratory tests cited in FME

As can be seen from the results for the included documents by type in the first stage of the work, we reported that as a separate document laboratory tests were indicated 142 times in the stage of emergency care and in 167 cases in the subsequent medical care. Follow-up of stages of recruitment and examination help determine the prognosis and outcome of trauma and organ failure using, for example, physiological scales **EMTRAS (Emergency trauma score)** and **SOFA** (sequential organ failure assessment score), when the value of some laboratory parameters such as prothrombin time, PE in the first 30 minutes and the following 24 hours is of primary importance. Let's not forget that this criterion of the 3-point system should take into account the cases in which it is necessary to conduct other groups of studies, and this is directly related to the traumatic complications. The comparison between the value of this criterion and the degree of bodily injury caused is summarized by several dependencies between the results. In each case with a sign of moderate or severe bodily injury, the experts used an indicator for laboratory tests, which shows that this type of medical activity has a certain participation in the qualification. All cases without the possibility of evaluation are at the expense of those specified as Minor BI. Both in Minor BI and in MBI there are cases evaluated in three different ways with 0t, 1t and 2t respectively for mild BI and 1t, 2t. and 3t. for the average BI. The distribution according to the result is indicative only for MBI, because all cases are classified, namely 2.65% - with 3 points; 53.73% - with 2 points and 43.63% with 1 point. As with the Minor BI, there is no case evaluated with a maximum and a minimum value, respectively, in the average. In SBI we observe a maximum score of 3 points in 96.7% of cases and only three times a score of 2 points.

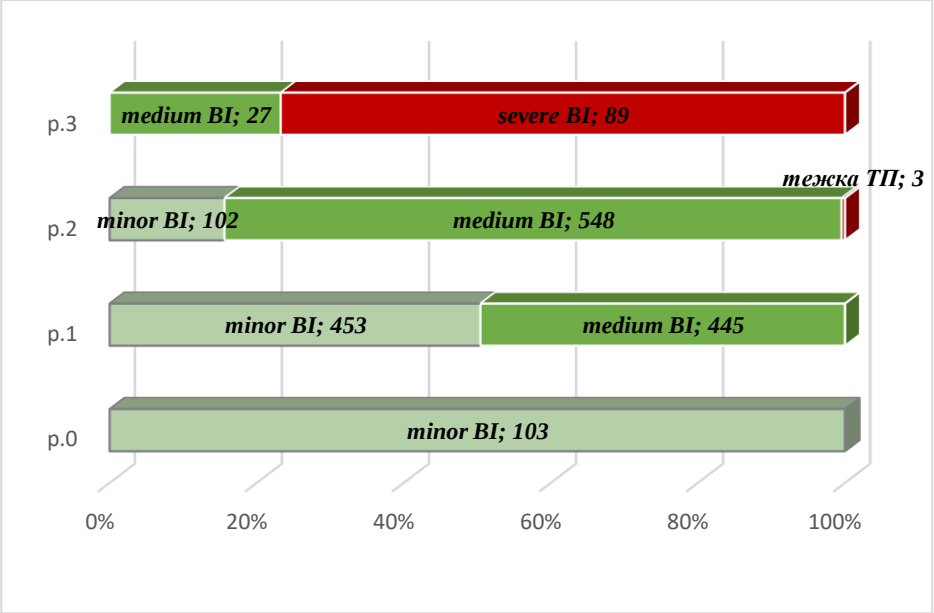

Figure 15 Comparison between the assessment of laboratory tests with the degree of bodily injury

Apparatus research (AR)

The reflection of apparatus studies as part of the medical documentation cited in the expert material was expected to be relatively poorly represented, but it turned out that for nearly 90% of the cases it was possible to obtain information and the possibility of a spot assessment. Once again, it turns out that forensic experts, supposedly abstracting themselves from medical activity, benefit from every single diagnostic event.

Digital indicator % / year	p.0	%	p.1	%	p. 2	%	p.3	%	total	% From everyone
2016г.	26	4,77	35	64,58	78	14,31	13	2,38	469	86,05
2017г.	3	0,58	39	77,13	61	11,82	3	0,58	465	90,11
2018г.	12	2,65	33	74,33	46	10,17	9	1,99	403	89,15
2019г.	24	5,26	31	68,85	47	10,31	4	0,88	389	85,30
2020г.	36	7,92	32	75,77	44	9,69	14	3,08	438	96,47
total	101	4,66	174	80,59	276	12,75	43	1,98	**2164** 2423	**89,31** 100

Table 15 Degree of tracing of the apparatus studies in the expert material

In the same order as with the previous indicators, the coverage of the apparatus studies is presented below. Following the scoring of the individual categories, it can be seen that only in 101 cases it was indicated that there were no indications for their implementation. This group also includes those

65 cases in which no clinical examination was performed.*(Table 17)* The largest part of the documents, in which the presence of an apparatus test (80.59%) is reflected, has the indicators of arterial pressure and Electrocardiogram or one of the two recorded, for which, as routine tests, we accepted to score them together.

Gaps exist in the reflection of the required multiple follow-ups of indicators, especially in emergency and outpatient medical care. The low percentage (1.98%) of enrolled studies of this type evaluated with the maximum number of points is partly explained by the relatively small number of trauma cases requiring instrumental studies from other groups. These are tests used most often in the evaluation of the qualification mark concerning the visual and auditory analyzer, in muscle and nerve damage and in rarer endoscopic tests, other than those accompanied by operative intervention. In all these cases, however, the results of the apparatus tests are included as mandatory evidentiary material, especially in the case of vision and hearing..

Despite the extremely simplified scheme for selecting indicators, it is practically not always possible to quickly orientate and evaluate in the way we have chosen. The difficulties are outlined in two directions. On the one hand, incomplete medical documentation, on the other hand, insufficient documentation. Giving a numerical score of 0 to each of the determinants was adopted in order to be able to summarize whether the specific medical activity was addressed in the data cited in the expertise.

The generalized analysis of the reflection of the five indicators of the diagnostic activity showed the weakest inclusion in the expert material of laboratory tests - in 73.0% of cases, followed by imaging - 87.74%, TSS - 88.5% and apparatus - 89, 3%. Clinical examination is reflected in 100%. The diagnostic activity of the system is reflected for each indicator in 62% of all cases.

According to the comparison between the qualifying sign and the final point assessment for each of the cases, a result was obtained, pointing to certain conclusions about the attitude to medical assistance depending on the degree of BI *(Table 16).*

The signs of minor bodily injury determined by the experts are scored according to the first component of the system with an indicator of 1 to 9 points. The largest part (23%) of them were rated with 5 points and almost the same volume (22.3%) with 4 points. The highest rated cases for MediumBI represent only 1.8%. For the average bodily injury, the scoring is also in such a wide range from 5 to 13 points with the highest number of cases 310 (30.4%) corresponding to 7 points. For all SBI victims, the diagnostic activity included in the examinations was evaluated according to DMA from 12 to 15 points, with the most numerous being those with 12 points (38.0%). The cases of the group of light and moderate physical damage, which collect the same number of points - from 5 to 9, show significant differences in relative shares, increasing oppositely to the lower score for MBI and to the higher score for MBI. *(Table 16)*

BI / points	MinorBI	% MBI	MediumBI	% MBI	SevereBI	% SBI	total	% from everyone
1	50	3,81					50	2,06
2	194	14,80					194	8,01
3	209	15,94					209	8,63
4	293	22,35					293	12,09
5	302	23,04	40	3,92			342	14,11
6	131	9,99	198	19,41			329	13,58
7	59	4,50	310	30,39			369	15,23
8	49	3,74	133	13,04			182	7,51
9	24	1,83	152	14,90			176	7,26
10			103	10,10			103	4,25
11			57	5,59			57	2,35
12			24	2,35	26	28,26	50	2,06
13			3	0,29	35	38,04	38	1,57
14					19	20,65	19	0,78
15					12	1,09	12	0,50
total / % From everyone	1311	54,1	1020	42,1	92	3,8	2423	100,00

Table 16 Distribution of cases depending on DMA assessment

The 5-point diagnostic activity corresponds to 3.9% of cases qualified with MBI indicators versus 23% for those with MinorBI. The points that are summed for the most numerous group of MBI (7 points, 30.4%) determine the diagnostic activity in 4.5% of cases with MinorBI. The maximum score for LTP according to this component of the scale (9 points) is obtained by 1.8% of patients with an indicator of MinorBI against 14.9% of those with an indicator of MBI. Duplicate point indicators for STP and SBI are in the groups rated with 12 and 13 points, where the ratio is 1:12 and 1:128 in favor of SBI respectively. It can be seen that the inclusion of medical assistance and, in particular, its diagnostic part is not only present in the FME, but its coverage also increases in parallel with the higher degree of bodily injury. This dependence provokes another comparison, namely a comparison between the aggregate result for the three degrees of BI, but only for those cases where it was possible to evaluate each determinant with points from 0 to 3. This applies to 1502 examinations, representing 62% of all surveyed. *(Table 17)*

Points / BI	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	total
MinorBI	50	135	109	127	160	10	54	36	20							
%	7,1	19,2	15,5	18,1	22,8	1,4	7,7	5,1	2,8							701
MediumBI					10	73	154	133	152	103	57	24	3			
%			82,7		1,4	10,3	21,7	18,7	21,4	14,5	8,0	3,4	0,4			709
SevereBI													76,9			
%								86,6				26 28,3	35 38,0	19 20,6	12 13,0	92
total	50	135	109	127	170	83	208	169	172	103	57	50	38	19	12	1502

Table 17 Distribution of the score in case studies with all DMA determinants reflected

The results here show that in the cases of MinorBI, the diagnostic assistance provided was not included in the examinations as relevant data in 610 of them (46.5%), while for MBI this applies to 311 cases (30.5%). In examinations with the SBI indicator, all components of the diagnostic part of the scale are included and can be evaluated in the specified order. In the case of MinorBI, it can be seen that 82.7% of the cases are limited to 5 points inclusive, respectively, those qualified as MBI in 86.6% are evaluated between 6 and 10 points, and in the case of severe bodily injury we have a total of > 12 points.

Given the diverse and contradictory opinions regarding the participation of medical assistance in determining the medico-biological signs of bodily injury, such an indicative result was not expected from the study. However, he is fully in support of the thesis that there is no way to determine and justify a qualifying feature without taking into account medical assistance.

When choosing the indicators and giving them a numerical dimension, it was no accident that we decided to take into account repeated actions and duration in order to cover the differences in the development of the post-traumatic condition and recovery, which most often takes place during two or three stages of providing medical assistance. Observing these possibilities, the indicators of the healing activity were also considered.

2.2. Qualification of the treatment activity CMA

Fully adhering to the only normative document in which the attitude to medical assistance is specified (Decree No. 3), namely not taking into account the favorable result of the treatment provided when assessing the physical damage, we indicate several moments of this activity, which we consider that there is no how not to be noted in the BI examinations and not to affect the qualification mark. Thus, the five criteria selected from the second section of the mentioned system are derived specifically from practice.

Active resuscitation (AR) is an extremely indicative determinant of the most severe disabilities, accompanied by a threat to life. This is a part of the medical activity that cannot be neglected when considering trauma incidents, and data for point assessment of the indicator according to the accepted scheme are available in 100% of cases. *(Table 18).*

digital indicator% / year	p.0	%	p.1	%	p. 2	%	p.3	%	total	%
2016г.	517	94,86	21	3,85	6	1,1	1	0,18	545	100
2017г.	492	95,35	18	3,49	4	0,78	2	0,39	516	100
2018г.	431	95,35	15	3,32	5	1,11	1	0,22	452	100
2019г.	437	95,83	13	2,86	4	0,88	2	0,44	456	100
2020г.	426	93,83	22	4,85	5	1,1	1	0,22	454	100
reflected AR / Conducted AR	2303	95,04	89	3,67	24	0,99	7	0,29	**2423** **120**	**100** **4,95**

Table 18 Degree of coverage of resuscitation measures in FME

We also used the criterion scoring for comparison with the given qualifying signs defining "life-threatening" as moderate and severe bodily injury, since we consider it medically inconceivable to wait for an opportunity for self-recovery and the registration of life-threatening symptoms is always followed by resuscitation measures.

There were 89 life-threatening cases where vital function was restored in the first 24 hours after the accident. To them, if we add those determined with 2 and 3 points, we find that in 120, or in three times more than those with the sign of SBI, the life-threatening condition was overcome thanks to medical help or the vital function was maintained with medical intervention. It turns out that 60% of the cases with a registered life-threatening condition were qualified with a sign of MBI, and also that in the majority of cases (176) determined with a temporary danger to life, no active help was provided to restore life function.

The obtained result of our system presented at the same time as a physiological scale already used in medical practice (REMS) determining the prognostic mortality in trauma would well substantiate the forensic diagnosis and hence the legal judgment. Since in order to accept a condition "threatening to life" it is necessary that the danger is manifested clinically with real life-threatening symptoms, why not use the volume of clinical diagnostic and treatment methods to justify the degree of damage..

Hospital treatment (HT). According to this descriptor, we have given a point assessment to all 2423 cases of the studied material, since this is an activity that is always reported and does not fail to be reflected in the FME. (Table 19)

Digital Indicator % / year	p.0	%	p.1	%	p. 2	%	p.3	%	total	%
2016г.	259	47,52	180	33,03	99	18,17	7	1,28	545	100,00
2017г.	221	42,83	157	30,43	129	25,00	9	1,74	516	100,00
2018г.	195	43,14	160	35,40	81	17,92	16	3,54	452	100,00
2019г.	227	49,78	143	31,36	73	16,01	13	2,85	456	100,00
2020г.	234	51,54	112	24,67	89	19,60	19	4,19	454	100,00
total	1136	46,88	752	58,43	471	36,59	64	4,97	2423 1287	100 53,12

Table 19 Degree of coverage of hospital treatment in FME

The table illustrates the distribution by categories and years of the considered period.

When collecting and scoring the data according to the criterion, cases were reported in which the refusal of hospitalization was declared in the medical documentation by the patients with a total number of 26. Although the specific conditions indicated by them were subject to hospital treatment, they were not included in the group of hospitalized patients and are rated with 0 points. according to the system, and 14 of the cases with refusal of hospital treatment were in the last year of 2020.

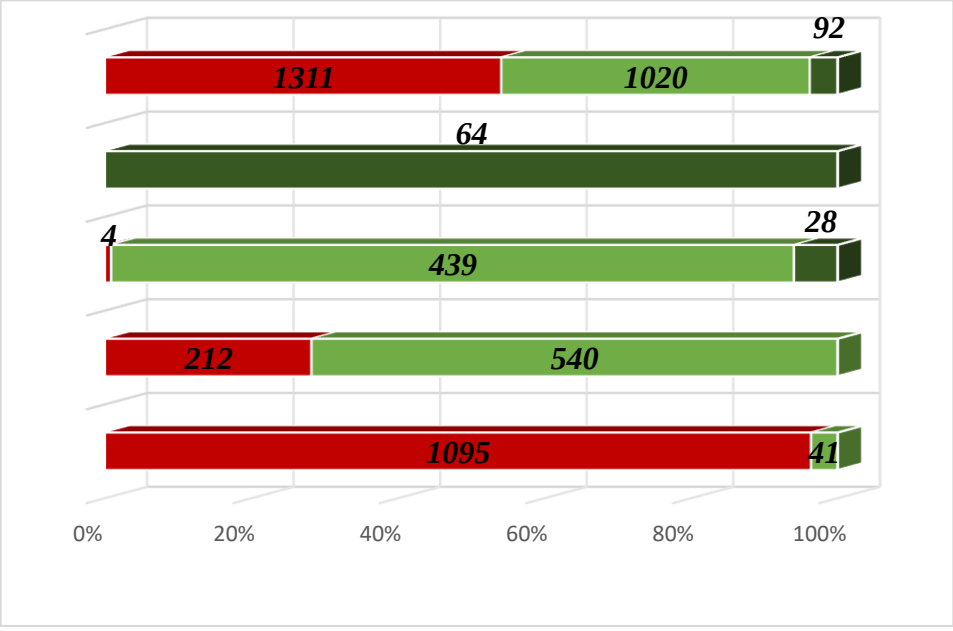

Figure 16 Dependence between HT and degrees of BI

The comparison of the results according to the criterion with the qualifying sign of TP is that hospital treatment was advocated in 16.5% of the cases with MinorBI and was not conducted in only 4% (41 cases) of those with MBI. Understandably, there is no accident victim who was not hospitalized. *(Figure 16).* There were only four cases of MinorBI, assessed on the 2-point scale, in which the hospital stay was longer than three days. We draw attention to these 41 MediumBI-eligible cases in which hospitalization was not undertaken, as some of them were patients who refused this type of medical activity. Cases with a declared refusal of treatment in a hospital environment are divided between the grades for BI in a ratio of 19:7 in favor of MediumBI, which also confirms the extent to which hospitalization as a medical activity is related to the degree of bodily injury.

Operative intervention (OI)

Operative intervention is another one of the criteria of the treatment activity chosen by us, for which there is reflected information in nearly 99% of the cases. In 1% of the examined material, or in 24 documents, it is not clear whether or not a surgical intervention was performed and this is explained by the above-mentioned reasons in connection with incomplete or illegible filling in of the medical documents from the primary emergency care, as not we can also rule out an omission on the part of the expert presenting the necessary information. When analyzing the data, it can be seen that operative assistance was required in 1383 (57.08%) patients injured after bodily injury. *(Table 20)*

digital indicator % / year	p.0	%	p.1	%	p. 2	%	p.3	%	total	%
2016г.	207	37,98	147	26,97	147	26,97	44	8,07	545	100
2017г.	194	37,6	157	30,43	134	25,97	31	6,01	516	100
2018г.	192	42,48	129	28,54	108	23,89	17	3,76	446	98,67
2019г.	184	40,35	154	33,77	97	21,27	14	3,07	449	98,46
2020г.	239	52,64	110	24,23	79	17,4	15	3,3	443	97,57
% total	1016	41,93	697	28,76	565	23,31	121	4,98	**2399** **1383**	**98,94** **57,08**

Table 20 Reflecting the operational interventions in FME

The distribution of the cases in relation to the given assessment shows that in 50.4% of all operative interventions it concerns a single intervention in which anatomical integrity was restored or immobilization was performed in the case of a bone fracture, without using additional materials and means as implants.

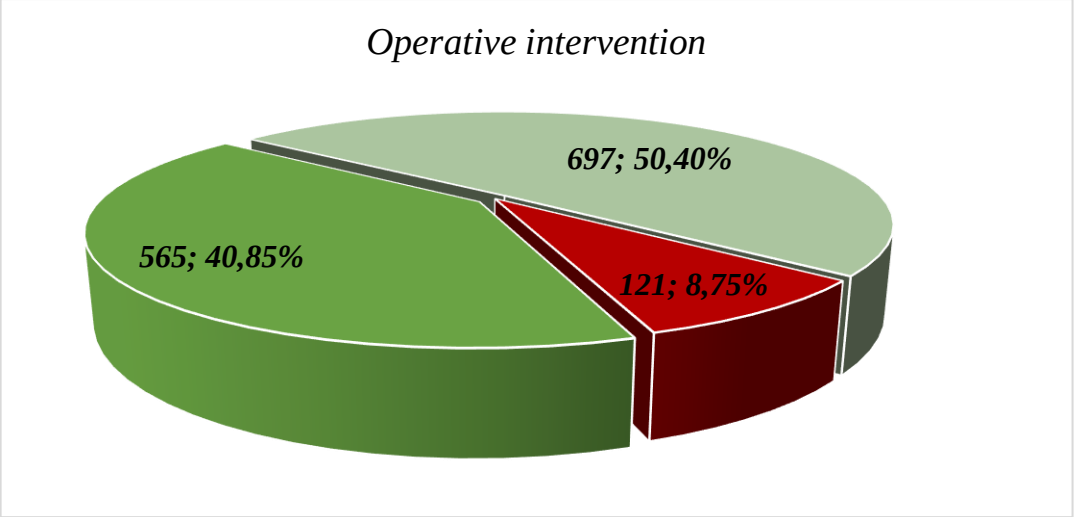

Figure 17 Distribution of cases with operative interventions

The second group, comprising 40.85% of all operated patients, underwent two different interventions and/or additional means were used during the treatment, and the cases with an indicator of 3 points should not be underestimated, in which it concerns operative interventions with removal/replacement of parts of tissues and organs. The very need to carry out such an intervention implies a disability that is insurmountable without medical help. However, the number of these cases (121) compared to the SBI cases (92) from the entire research material is sufficiently indicative of what percentage (23.9%) of the highly specialized medical care is not adequately accounted for in the interpretation of the qualifying sign for bodily injury. Even in cases where primary surgical treatment of a wound is concerned, data on surgical intervention are used to objectify the MBI indicator.

In the course of the conducted research, we report a positive trend for the complete filling of the documentation, often automatically electronically, which removes the difficulties of reading handwritten texts

Medicament therapy(MT)

Examining the MT criterion, we found that there is no way in FME to distinguish cases where no treatment was prescribed from those for which it was not indicated what treatment was undertaken. We only have a certain result for the 65 case studies in which no clinical examination was conducted and, accordingly, no treatment was prescribed. In such a case, we assume that 404 cases (16.68%) are in the group of those without assigned therapy. In the remaining 2019, the information entered in the examinations was sufficient to award the corresponding digital indicator. *(Table 21)*

Although all cases in which a criterion score could not be obtained qualified as MBI and were not hospitalized, available treatment information would benefit our main thesis that it is an essential element of medical care. Practically speaking, there is no trauma examination that does not end with prescribed treatment, even with one medication, therefore we believe that the determinant MT is essential and should be introduced as a mandatory element in the algorithm for reflecting medical care. The data from the medical therapy registered in the FME related to the qualifications for the individual

Digital Indicator % / *year*	**p.0**	**%**	**p.1**	**%**	**p. 2**	**%**	**p.3**	**%**	***total***	***%***
2016г.	83	15.23	179	32.84	213	39.08	70	12.84	462	84,77
2017г.	82	15.89	163	31.59	213	41.28	58	11.24	434	84,10
2018г.	73	16.15	120	26.55	206	45.58	53	11.73	379	83,84
2019г.	81	17.76	122	26.75	191	41.89	62	13.60	375	82,23
2020г.	85	18.72	107	23.57	201	44.27	61	13.44	369	81,27
total / ***%***	404 (65)	16,67	691	28,51	1024	42,26	304	12,54	**2019** **2423**	**83,32** **100**

Table 21 Medicament therapy included in FME for bodily injuries

degrees of physical damage shows some peculiarities. In contrast to all the criteria discussed so far, we find that from the cases with MBI, groups of all categories from 0 to 3 points are distinguished. This confirms the above conclusion that the appointment of drug therapy is practically a mandatory element of medical activity, but cannot serve as a discriminator regarding the degree of BI. More indicative in this regard are the results for severe bodily injury, each case with which was evaluated with the maximum number of points and for the average, where the cases evaluated with 2 points (81 %) and respectively 14.2% for 3 points and only 4.8% with 1 point, for which the probably appointed MT was not cited in the examinations. *(Figure 18)*

The diversity in the assessment of MT in individual cases with a qualifying sign for MBI provokes a comparison of these cases with the assessment of the other determinants under TMA. It turned out that all of them with an operative intervention (261), including all those hospitalized in this category (216), received a quick result for MBI of 2 and 3 points according to the MT indicator. It can be seen that MT is also reflected in FME for cases with MBI, when it comes to a higher degree of anatomical or functional damage. In summary, it is again seen that, as a separate criterion, drug therapy is part of the medical documentation used and is cited in 100% of cases with medium and severe bodily injury, as well as in 70% of those with mild bodily injury. The assessment of the MT would find practical

value in the FME in civil cases, where it is discussed as relevancy to the condition of the victim and as property compensation.

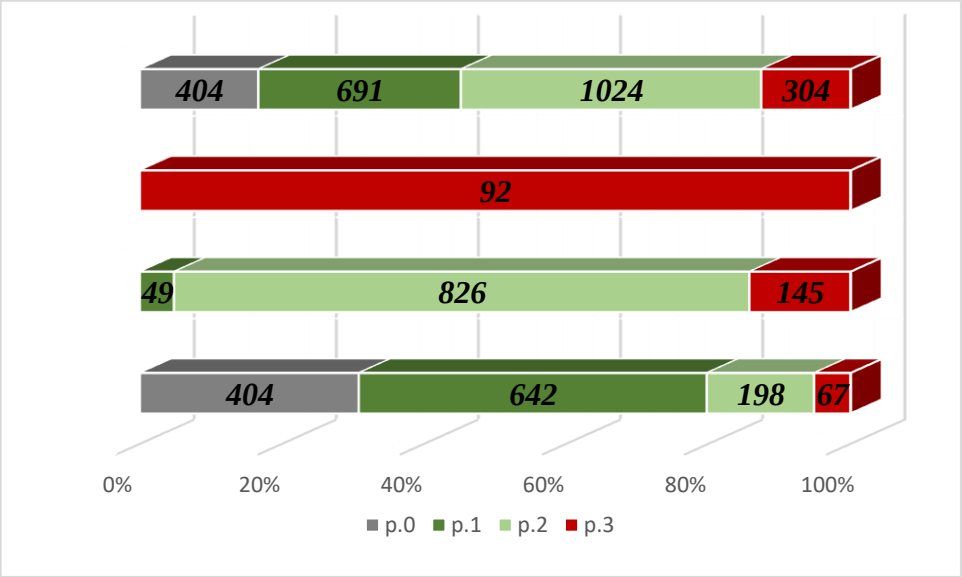

Figure 18 Medicaments therapy versus degree of BI

Rehabilitation and Physiotherapy (RP) The last indicator of the TMA system was selected as a separate one, despite the expected result of its study of significantly poor performance in SME two at 41.35% in the documentary material. *(Table 22)*

Post-survey expectations were far below the benchmark score. Added to the fact that the coverage of the activity has significantly increased in the last three years of the period under review, we can note that the determinant "rehabilitation and physiotherapy" finds its place in the algorithm that aims to cover the medical assistance.

digital indicator % / year	p.0	%	p.1	%	p. 2	%	p.3	%	FME With reflected RP	% of the total number of FME
2016г.	42	7,70	78	14,31	2	0,37	2	0	122	**22,38**
2017г.	39	7,55	63	12,21	2	0,38	2	0,38	106	**20,54**
2018г.	123	27,21	70	15,48	12	2,65	12	2,43	216	**47,79**
2019г.	129	28,29	68	14,91	12	2,63	12	1,75	217	**47,58**
2020г.	221	48,68	106	23,35	13	2,86	13	0,22	341	**75,11**
total %	554	**22,86**	385	**15,89**	41	**1,69**	22	**0,91**	**1002** **2423**	**41,35** **100**

Table 22 Reflected rehabilitation and physiotherapy in FME

In more than half of the cases, the fact that such an activity was not carried out was explicitly stated, which to some extent reflects a purposeful turning of the expert's attention to the activity. *(Figure 19)*

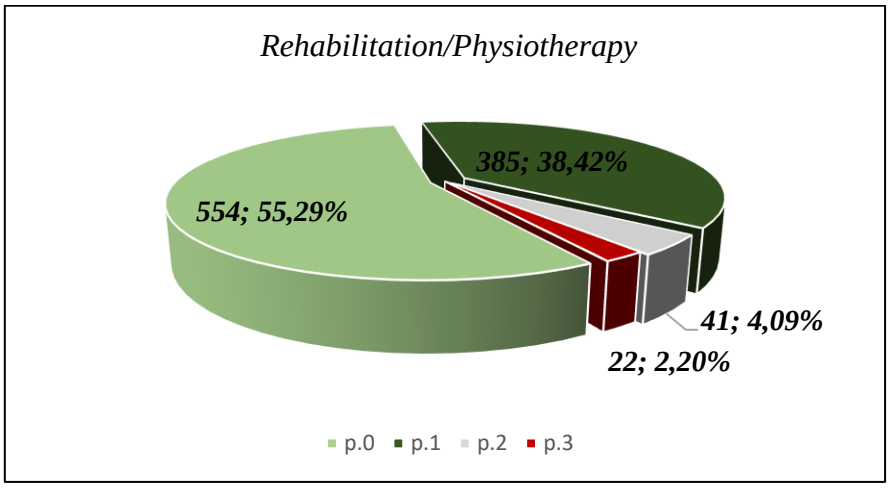

Figure 19 Distribution by point evaluation according to the RP criterion

The study did not allow us to indicate the participation of the RP in the remaining 1421 cases, and the reasons for not reflecting the activity in the FME could be a lack of information in the provided medical documentation or the early stage of appointment of the expertise, long before the need for rehabilitation arose. Questions to FME related specifically to rehabilitation are often encountered in civil and commercial cases, where the defendants point to the lack of RP as insufficient treatment and a reason for extending the period for recovery. Clarification of these questions is again required by the expert, and the answer directly depends on whether in the order of presentation of the medical documentation accepted by him there is a separate element reflecting this activity.

Analogous to the summary examination of the results of the first component of the scale, we also present those of the second - TMA. *(Table 23)*

Observing the obtained results, for three of the determinants, the medical documentation indicated in the FME was sufficient to be scored at 100%, at the fourth at 99%, then information about rehabilitation and physiotherapy was obtained for less than half of the cases, 41.35%. Adding the result of the study that in 301 cases (12.4%), evaluated with 0 points, the expertises paid attention to the fact that no treatment was performed, it seems that this part of the medical care is "the most underrated " activity in examining the cases with bodily injuries. lthough with a lower overall point result, the distinction between the degrees of bodily injury in relation to the medical activity carried out is again visible. With the qualifying sign for MBI, the numerical result of the scale is from 0 to 6 points, with the largest number of cases evaluated with one point -33.0%, and 83.22% of the cases are evaluated up to 2 points. Cases with MBI indicators score from 3 to 8, with almost equal numbers scoring 3, 4, and 5. With digital indicator 3 on the scale, there is a significant share of both cases with MBI (20.78%) and

those with MinorBI (11.52%).In the following digital categories, the difference is already significantly more pronounced in favor of MediumBI. The numerical assessment of the healing activity in SBI has indicators from 8 to 14 points, with an overlap in the ratio of 1:3.8 in favor of SBI only in the group with 8 points. The remaining high point results were awarded only to the cases with SBI, and unlike the results for DMA, not a single case was evaluated with the maximum score of 15 points.

BI / points	MinorBI	% MBI	MediumBI	% MBI	SevereBI	% SBI	total	% from everyone
0	**301**	**22,96**					**301**	**12,42**
1	**433**	**33,03**					**433**	**17,87**
2	**357**	**27,23**					**357**	**14,73**
3	**151**	**11,52**	**212**	**20,78**			**263**	**14,98**
4	**36**	**2,75**	**201**	**19,71**			**237**	**9,78**
5	**23**	**1,75**	**211**	**20,69**			**234**	**9,66**
6	**10**	**0,76**	**179**	**17,55**			**189**	**7,80**
7			**164**	**16,08**			**164**	**6,77**
8			**53**	**5,20**	**18**	**19,57**	**71**	**2,93**
9					**24**	**26,09**	**24**	**0,99**
10					**18**	**19,57**	**18**	**0,74**
11					**15**	**16,30**	**15**	**0,62**
12					**15**	**16,30**	**15**	**0,62**
13					**1**	**1,09**	**1**	**0,04**
14					**1**	**1,09**	**1**	**0,04**
15							-	-
total / % from everyone	**1311**	**54,1**	**1020**	**42,1**	**92**	**3,8**	**2423**	**100**

Table 23 Results of the point assessment of the treatment medical activity (TMA)

The results presented so far show the ratings of the scored indicators from the two components of the scale. FMEs in which no information was found for a given determinant to be awarded a numerical result in this case are equated to 0 points. The share of each of the assessed descriptors is presented schematically *(Figure 21)*

The comparison between the point evaluation of the medical assistance on the scale and the specific medico-biological qualification signs proved to be a confirmation of conclusions made by other authors about the serious differences in the opinions of the experts regarding the criteria related to the danger to life such as medium and severe damage.

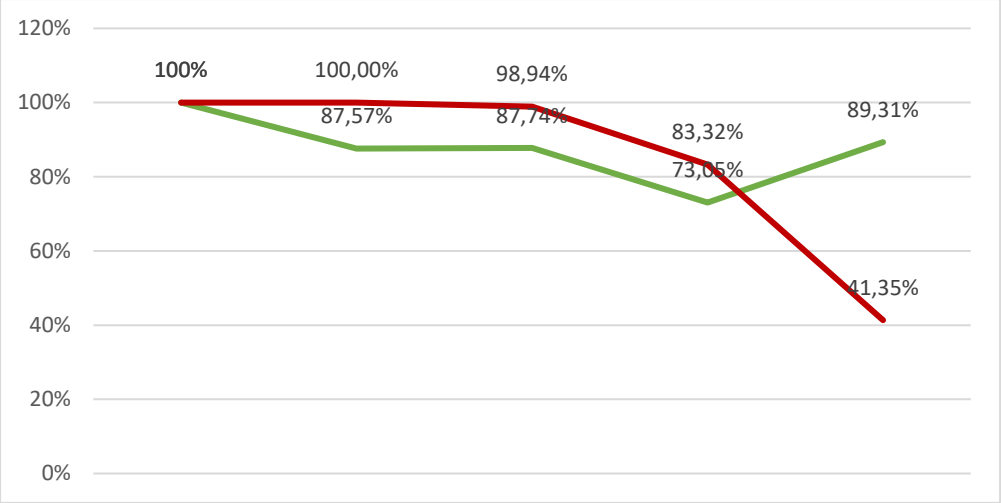

Figure 20 Share of the assessed indicators for DMA and TMA

2.3. Comparison of the degree of BI against the obtained total point evaluation

The medical activity included in the FME and evaluated on an accepted scale is grouped by category. The combined reporting of the indicators on the scale enables a clearer distinction between the degrees of bodily injury compared to the score, which turned out to have an extremely high indicative value. The present study related to the type of medical care provided to patients with bodily injuries overlaps with the conclusions of other publications regarding the medico-biological nature of danger to life in its legally defined temporary and permanent nature.

The summarized point result of the two-component scale is presented as follows *(Table 24)*

All cases with a qualifying sign for MinorBI are evaluated on a scale ranging from 1 to 10 points, with the largest percentage of them (18.5%) having an evaluation of 6 points. In the examinations with a specified MBI indicator, the assessment is from 8 to 18 points on the scale, with the largest group (14.3%) assessed with 13 points. From 19 to 27 points collects the medical assistance undertaken for injuries qualified as SBI, 30% of which are evaluated with 19 points.

It can be seen that the greater percentage (72.39%) of cases with MinorBI fall into the groups evaluated with ≤ 7 points. The most are the cases with MBI, which were given a total score of 13 points. There is no duplicative result in the final assessment of medical assistance in severe bodily injury with the other degrees. In the combined version of the system, we see that the larger groups shift to the lower point estimate for MinorBI and to the higher one for MBI, respectively, so they have an indicator outside of duplicates.

BI points	MinorBI	% MBI	MediumBI	% MBI	SevereBI	% SBI	total	% from everyone
1	31	2,36					31	1,28
2	88	6,71					88	3,63
3	128	9,76					128	5,28
4	99	7,55					99	4,09
5	152	11,59					152	6,27
6	238	18,15					238	9,82
7	213	16,25					213	8,79
8	150	11,44	50	4,9			200	8,25
9	127	9,69	111	10,9			238	9,82
10	85	6,48	106	10,4			191	7,88
11			116	11,4			116	4,79
12			109	10,7			109	4,50
13			146	14,3			146	6,03
14			131	12,8			131	5,41
15			82	8,0			82	3,38
16			68	6,7			68	2,81
17			57	5,6			57	2,35
18			44	4,3			44	1,82
19					28	30,43	28	1,16
20					20	21,74	20	0,83
21					8	8,70	8	0,33
22					5	5,43	5	0,21
23					4	4,35	4	0,17
24					9	9,78	9	0,37
25					12	13,04	12	0,50
26					5	5,43	5	0,21
27					1	1,09	1	0,04
28							-	-
29							-	-
30							-	-
total / %from everyone	1311	54,1	1020	42,1	92	3,8	2423	100

Table 24 Results of the overall assessment on the scale distributed by BI

Of particular interest is the comparison between 44 expert conclusions with indicators of average bodily harm (life-threatening) and a rating of 18 on the current scale, in 21 (47.7%) of which an adverse outcome (fatal outcome) occurred during treatment or recovery , or under the legal qualification "medium bodily injury leading to death. Since in almost half of these patients requiring the same amount of medical care the existing risk to life could not be overcome, is it appropriate to use the concept of "temporary danger to life" and is it possible to equate the degree of BI between the cases mentioned and the 87 rated with 14 or 15 points where complete recovery occurred. In the present study, danger to life as an indicator of bodily injury appears with a combined score of both scales 14, and the lowest respectively 9 from the diagnostic and 5 from the treatment, i.e. patients with a life-critical condition required at least two consultations, at least two imaging studies, at least a Glasgow Scale score, instrumental and paraclinical tests, or hospitalization and treatment And also, in an extremely high

percentage (89%) of cases with a danger to life, determined by law as temporary, it was overcome thanks to medical help..

The division into groups after the assessment on the scale is presented in the figure. *(Figure 21)*

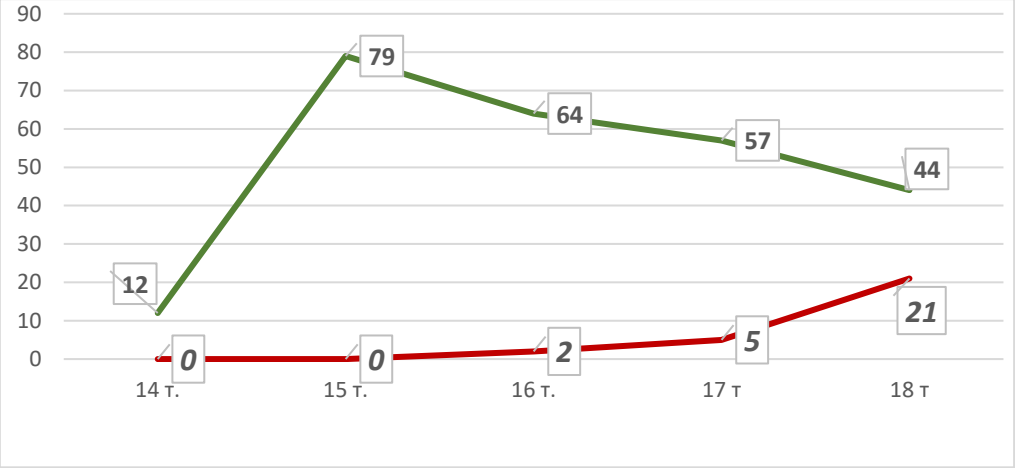

Figure 21 Assessment of life-threatening cases such as MBI and MBI with subsequent death

The group of cases defined as a SBI with permanent danger to life have an indicator according to the system above 19 points, and the largest percentage (27.5%) of them are evaluated with such a result. A fatal outcome (medium bodily injury with subsequent death) was recorded in 20.4% of the cases assessed with 16,17,18t. *(Figure 22)*

An analogous comparison for the SBI cases shows results revealing contradictions in the medical justification of the danger to life. In all 40 cases with the qualification "permanent general health disorder life-threatening (SBI), assessed on a scale of 19 to 26 points, deaths were 9 (22.5%), while in those qualified as moderate bodily injury, the percentage was 20.4%.

It can be seen that in the group with 19 points, for which the sum assessing the medical assistance is higher, there is a registered death outcome in only 1 patient, while the percentage of mortality observed in the 18th MBI assessment, for SBI, is reached in the cases with more than 20 points. From a medical point of view, the danger to life should not be graded, and only medical assistance can provide an opportunity to change the life-threatening condition. The proposed way of numerical evaluation of the rendered medical care could be used to aid the qualification, as a sum of ≥16 categorically defines danger to life. Taking into account that the cases with a temporary threat to life, assessed above the specified result, represent 97.6% of all with MBI, it can be quite reasonably argued that the largest volume of medical assistance is provided to patients with a real threat to life and its impact on the state cannot be ignored. The use of medical assistance as an objective factor influencing

the qualification for bodily injury will in itself require a rethinking of the concept of "temporary danger" as well.

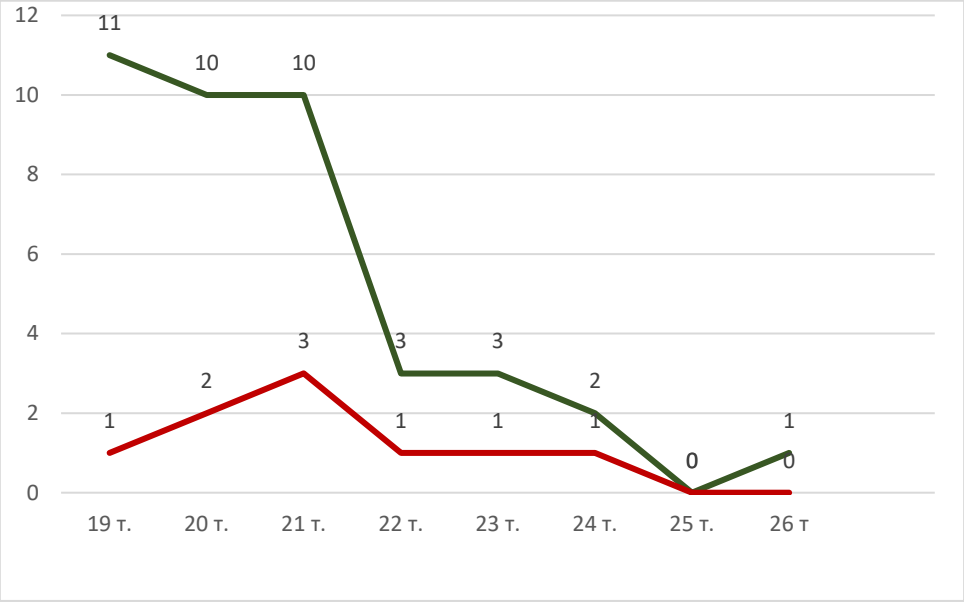

Figure 22 Assessment of life-threatening cases such as SBI and MBI with subsequent fatal outcome

Looking at the upper point limit for MBI, attention should be paid to the three groups scored with the lowest values of 8, 9 and 10 points, respectively, whose assessment overlaps with the cases assessed as minor bodily injury, or again a "controversial group" is outlined for grading and qualification. *(Table 25).* The analysis of the individual indicators confirms the existing contradictions in forensic medical practice at the moment. The medical documentation cited in the examinations allows for the evaluation of all indicators on the scale used, which undoubtedly shows that the results of the diagnostic and treatment measures were purposefully sought to support the justification.

BI / points	MinorBI	% MinorBI	MediumBI	% MediumBI
8	150	11,44	50	4,9
9	127	9,69	111	10,9
10	85	6,48	106	10,4
total	362	27,6	266	26,07

Table 25 Ratio in cases evaluated with the same number of points in MinorBI and MediumBI

The obtained results still mark the lines of demarcation between BI, given the ratio in the number of cases, but also outline the relationship between the severity of the damage and the volume of

the applied medical assistance. This is another argument in favor of the need to clarify MA in the qualification of BI.

Another feature traced in the course of the study, noticed already at its initial stage, is the expert attitude towards medical assistance depending on the proceedings for which the expertise was appointed *(Figure 23)*

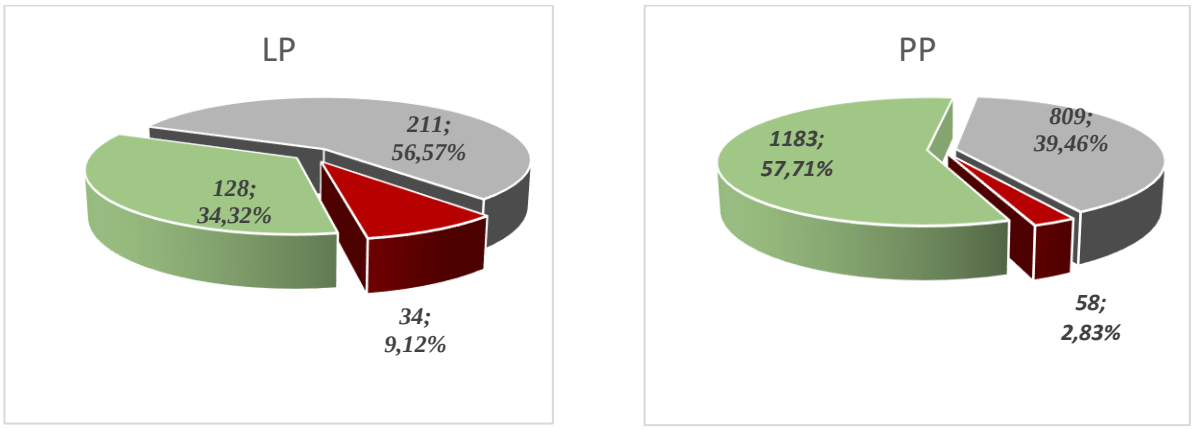

Figure 23 Comparison between the degrees of physical damage considered in FME by PP and СП

The difference in the relative shares of qualifications for the three degrees of physical damage in the different phases is understandable and acceptable, given the nature of the proceedings *(Figure 23)* Its comparative presentation in this case is aimed at basing the difference in the inclusion of the medical activity in the preparation of the examinations, and hence its impact on the qualification. The expected result for the relatively larger percentage shares of qualifications for moderate and severe bodily injury was confirmed, but not to such an extent for SBI, which in turn reduces the shares of awarded qualifications for this type of BI in the pre-trial proceedings. *(Table 26)*

BI / LP	Minor BI	% from the total number of the group	Medium BI	% from the total number of the group	Sever BI	% from the total number of the group	**total**	% from court proceedings
CCGN	5	7,04	61	85,91	5	7,04	71	19,03
CCPN	70	100,00	-	-	-	-	70	18,76
CC	53	39,84	68	51,12	12	9,02	133	35,66
CC	-	-	82	82,82	17	17,17	99	26,54
total	128	34,32	211	56,57	34	9,12	373	

Table 26 FME groups by type of LP and BI

For the group of expertises of the legal proceedings phase considered at this stage, it was established that the medical assistance was reflected in a sufficient volume to be able to receive the corresponding numerical evaluation on all indicators on the scale we used. These results once again show the participation of all medical measures in building the conclusion about the medico-biological qualification signs. The indicators of mild, moderate and severe TP indicated at the conclusion of these cases are indicated in the table. *(Table 27)*

BI / points	MinorBI	% MBI in LP	MediumBI	% MBI in LP	SevereBI	% SBI in LP	total	% from everyone in the group
1							-	-
2	2	1,56					2	0,54
3	4	3,13					4	1,07
4	17	13,28					17	4,56
5	11	8,59					11	2,95
6	21	16,41	79,69%				21	5,63
7	49	38,28					49	13,14
8	12	9,38					12	3,22
9	11	8,59					11	2,95
10	1	0,78	3	1,42			4	1,07
11			11	5,21			11	2,95
12			8	3,79			8	2,14
13			23	10,90			23	6,17
14			71	33,65			71	19,03
15			47	22,27	85,31%		47	12,60
16			39	18,48			39	10,46
17			4	1,90			4	1,07
18			5	2,37			5	1,34
19			-	-	4	11,76	4	1,07
20					3	8,82	3	0,80
21				79,41%	6	17,65	6	1,61
22					6	17,65	6	1,61
23					8	23,53	8	2,14
24					1	2,94	1	0,27
25					5	14,71	5	1,34
26					1	2,94	1	0,27
27								
28								
29					-	-	-	-
30					-	-	-	-
total / %	128		211	20,68	34	36,95	343	14,15
From everyone	1311	9,76	1020		92		2423	100

Table 27 Evaluation of MH in the case studies from LP

The obtained results showed a very clear differentiation of the medical assistance provided to the patients with different degrees of bodily injury, but even though all the criteria were evaluated for them, it still concerns the scoring of 14.15% of all examined examinations.

The possibility of reporting the full result is also partly due to the time in which the examinations in the LP are appointed, sometimes quite some time after the completion of the recovery period. For this reason, the proposed scale makes it possible to evaluate the indicators of the given appointments and recommendations. Consideration of a correction index is possible.

The proposal for a system that, in a short and simplified version, gives a digital dimension to the sum of diagnostic and treatment activities performed on patients with BI showed results that would definitely help the qualification.

The correlation between the obtained results with the point assessment of medical activities and degrees of bodily damage is presented in several variants. First of all, the range of points in which the cases with the corresponding BI degree are ranked is indicated. In the second plan, the figure of the point assessment obtained for the most numerous group (in %) of cases with the relevant BI is marked, and in the third option, the point interval with which more than 75% of the cases were assessed is indicated. *(Table 28)*

points of: / BI	DMA	the most numerous group	>75 %	TMA	the most numerous group	>75%	DMA + TMA	the most numerous group	>75%
MinorBI	**1-9**	**5** (23,0%)	**4-5**	**0-6**	**2** (27,23)	**1-2**	**1-10**	**6 (18,2%)**	**5-9**
MediumBI	**5-13**	**7** (30,4%)	**6-10**	**3-8**	**5** (20,78)	**3-6**	**8-18**	**13 (14,3%)**	**9-14**
SevereBI	**12-15**	**13 38,0%**	**12-14**	**8-14**	**9 (26,1)**	**8-11**	**19-27**	**19 (30,4%)**	**19-25**

Table 28 Summarized combined assessment by BI

Reflecting the two groups of DMA and TMA through the proposed criteria and in the defined algorithm would make it much easier to find the relevant information in the provided documents,

as well as give guidance for the collection and application of an optimal volume of medical documentation.

The built scale for evaluating medical care is also designed so that it is possible to include other indicators, give a weighting factor to some of them, and above all, it can be used both in its entirety and in its two separate parts for diagnostic and healing activity. It should not be accepted or paralleled between the criteria used to qualify the medical activity on the scale with the degree of fulfillment of the principles set in the normative timeliness, sufficiency and quality of the medical assistance, regulated by LH. The chosen method of evaluation does not indicate how adequate medical care was given to the patient, but rather refers to how well the forensic expert took into account all the medical procedures performed in his qualification..

Examining the presented way of evaluating medical care through a scale, it is appropriate to outline the advantages and disadvantages adopted in the study.

The advantages derive from the selected evaluation criteria. The condition that they should be presented in a generally accessible, comprehensible way for each of the parties is fulfilled given the sufficiently clear wording of the indicators included in the diagnostic and treatment part. Another useful point of the scale is the direct connection between its determinants and the main questions facing the examinations. The sequence of criteria follows the usual sequence of diagnostic and treatment measures undertaken for patients with bodily injury. Following the accepted evaluation algorithm increases the possibility of quick orientation when searching for certain documents and the indicators indicated in certain places in them. Last but not least is the easy option for calculating the four-point assessment of the five indicators in the two components of the scale.

Disadvantages when using the chosen system originate from the not always complete package of medical documents collected by the investigative authorities authorized for the purpose, and/or the inaccurate, unclear or incompletely labeled data. The main drawback that we assume, and which will probably be pointed out by any practicing expert, is the degree of objectivity of the data indicated in the medical documentation. The doubt about the information reflected in the medical documentation arises from the main shortcomings of the defined way of financing the medical activity in the country and the lack of connection between it and the effectiveness of the treatment as a final result. Often, in order to achieve a greater volume of diagnostic and treatment measures for traumatic conditions, a change in diagnosis is reached, especially if re-hospitalization is required within a month. In the briefly stated peculiarities of financing medical activity, the negatives of using the data indicated in the medical documentation for the benefit of the forensic medical examination and from there the assessment of the patient's objective condition and, accordingly, the punishment for the offender, are to some extent rooted. The definition of the medical activity through such a simplified numerical

expression would be considered as a disadvantage, which would probably evoke a parallel with giving it a quantitative dimension. In the system, for each of the criteria, there is an indicator 0 - accompanied by the indication that it should be accepted when the activity has not been performed. This should not be interpreted as an omission in the medical activity towards the patient, but as an indicator that there are no medical indications for the given activity to be performed. In connection with the highlighted hypothetical and real shortcomings, we dare to claim that in the selection of the criteria we aimed to take into account not specific clinical diagnoses, values and indicators, the result of the diagnosis or treatment, but specific facts. Most descriptors are reduced to whether an activity is required or not, whether it is performed or not, how often and for how long it is applied. We have repeatedly drawn attention to the fact that the point assessment obtained through the scale is a targeted support for the highly specialized forensic justification and qualification of BI.

The other main benefit commented upon in the construction of the system is that its components serve as an algorithm for reflecting the medical activity, which, with the presented schematic form and distinct delimiters, is extremely facilitated. The use and validation of narrowly specialized scales indicating a numerical index is an extremely illustrative moment in presenting the severity of impaired health in general. Close or overlapping scores from individual scales reinforces conclusions or resolves issues in controversial or borderline cases.

Without any claims of value and comparability with established scales, we define our proposed system as strictly specific, applicable only in forensic medical practice. The scope of application covers two groups of determinants diagnostic and therapeutic part, each of which can be supplemented.

The norm, which has not been updated for many years, from Decree No. 3/1979, that the assessment is made at the moment of causing bodily harm, and not at a later time, cannot be accepted that it is precisely the aid provided that is assessed only with the expression "possible occurrence" of changes that change or erase the effects." This was the main thing that motivated us in some way to visualize the activity and the extent of its participation in recovery after trauma.

Of course, the norms of the Law should be strictly followed, but they should also be clearly and precisely defined. The penal code with its texts mainly provides the framework according to which the impaired anatomical integrity and the degree of affected function should be assessed as a result of the damage suffered. Legislation provides us with opportunities for a number of by-laws and equivalent to such acts, which can be used for the purpose of normatively setting clearer criteria related to the qualification of BI. For example, if at the same time as the indicator "loss of spleen" other degrees of damage to internal organs are indicated, the qualification sign given by the expert will not be different in different parts of the country. Or if one of the most controversial criteria between mild and moderate

bodily injury - fracture of nasal bones - is included in a common criterion - fracture of facial bones, which is defined as MBI, it will not be necessary to interpret the degree of difficulty in a different way at each conclusion nasal breathing. And last but not least, the purpose of the study we are proposing - the assessment of the volume of medical assistance should also be in a certain section of the document structure with clearly specified criteria so that stages of the medical assistance provided are not missed.

However, let's not miss the fact that bodily harm is a socially dangerous act, and according to the PC: "Publicly dangerous is an act that threatens or damages the person, the rights of citizens, property, the legal order established by the Constitution in the Republic of Bulgaria or other interests protected by the right. This undoubtedly leads the reasoning in the direction of whether, in the socially dangerous nature of the act of bodily injury, the used health resource should not be considered in the group of disturbed social relations. Even if it does not acquire the status of "public interest protected by law", in the full sense of this concept, medical assistance in these cases should be indicated and described through all its indicators. The opportunity to do this is available to those who, through their special knowledge, explain the medico-biological processes and phenomena to legal authorities and society, i.e. forensic doctors. Although at the moment it is not easy to shift the focus of public opinion from "medical errors" in the direction of medical assistance, the attempt can start with the proposal to remove medicine from the group of activities "representing a source of increased public danger". In no case does this mean that it should not be legally regulated, but that the regulation implies not only responsibility, but also a fair assessment.

V. CONCLUSIONS

In the course of the implementation of the formulated tasks to achieve the goal and in the analysis of the results obtained from the studies, the following conclusions were summarized:

- There are no clear guidelines for assessing the impact of medical assistance provided to patients with culpably caused disabilities in the current criminal code and by-laws. The Ordinance regulating the conditions and procedure for the preparation of the forensic medical examination does not specify the type and algorithm for collecting, reflecting and analyzing the data related to the provided medical assistance.
- According to the generally accepted rules for carrying out legally regulated activities for the discipline of forensic medicine and deontology, there is no accepted medical standard, which leads to different opinions in the case of bodily injuries of the same type in degree, and from there to the imposition of contradictory judicial practice.

- Medical activity is the main factor influencing the recovery and improvement of the patient's condition after inflicting bodily injury, and as an affected public resource, it is in no way calculated when condemning socially dangerous acts.
- The results of a comparative analysis of some of the derived criteria show that in examinations with targeted questions about the type of medical assistance rendered, more severe qualifications for bodily injury are derived for disabilities of identical severity. A particularly pronounced trend in this regard is seen in the expert opinions on civil versus criminal cases, in favor of civil cases.
- The results of the study show in numerical terms the volume of the invested health resource in each investigated case involving bodily injury.
- The comparison between the results of the proposed two-component point assessment and the defined qualifying sign for bodily injury makes the scale applicable for assessing the degree of bodily injury according to the provided medical assistance.
- The diagnostic and treatment parts of the scale have the same accuracy in determining the degree of bodily injury, and their combined application is more indicative compared to each of them.
- The allocation of a separate section for medical documentation in the SME and compliance with a certain algorithm when citing it, such as its type and certain indicators, contributes to obtaining information about the volume, quality and effectiveness of medical assistance.
- The obtained results of the study of the medical assistance from a forensic aspect complement the objectification of the bodily injury as the degree of affected function and anatomical integrity and outline the main indicators of the algorithm of its reflection in the FME.

VI. RECOMMENDATIONS

- A change in the approach when considering the medical care provided to patients with bodily injury caused, both by forensic medical specialists and by lawyers.
- Introduction of a set of requirements necessary for the interpretation of medical assistance in the medico-biological qualifications of bodily injury with consideration of normatively established criteria.
- Creation of an algorithm for the reflection of medical assistance in forensic medical examinations concerning inflicted bodily injurie.
- On the basis of the results obtained during the study, it is possible to use a large part of the scales imposed in medical practice for the assessment of trauma, pain and psycho-emotional state, which give a quantitative dimension through numbers, percentages, defining verbal categories. All

of them orient the user to the reflection of a given phenomenon or impact on the individual and reflect the degree of influence on the final result and are in favor of objectification

- Giving a numerical assessment of medical care in a way proposed in the study makes reference to the qualifying sign of bodily injury with fairly clearly delineated frameworks.

  Indicators of minor bodily injury are evaluated according to DMA/TMA with 1 - 10 points

  Indicators of average physical damage are evaluated according to DMA/TMA with 8 - 18 points

  Indicators of severe bodily injury are evaluated according to DMA/TMA with 19 -27 points

- Changing or adding the medico-biological qualifying signs for the outlined disputed or borderline indicators, to be objectified through specific medical criteria for impaired integrity or affected function.

- Recommendation for adoption of consensus decisions regarding the most common contradictions in forensic medical expert practice in the interpretation of bodily injuries based on objective criteria arising from medical activity.

Through the eyes of modern times, with the rapidly growing development of medicine and with the ever-increasing demands of society, it is imperative to pay attention to that part of the medical activity, which is the connection between the units responsible for the observance of human rights and those in the service of his health.

VII. CONTRIBUTIONS

With a theoretical-cognitive nature:

- An analysis of the diagnostic and treatment measures included in the expert judgment, carried out in patients with bodily injury.

- Separate forensic medical criteria from the diagnostic and treatment medical activities have been derived, which are reflected in the selection of a medico-biological qualifying sign for bodily injury.

- A form has been proposed to give a numerical evaluation of the medical assistance applied in cases of culpably caused disabilities.

- For the first time in our country, an attempt is made to analyze the impact of the medical assistance applied in cases of culpably caused disabilities.

Of an applied-practical nature:

- An algorithm is proposed for reflecting the medical information in the process of preparing the forensic medical examination based on written data regarding the bodily injuries caused.
- An option for expanding the analysis of the medico-biological indicators in the investigation, criminal and civil process, in accordance with the modern development of medicine and by using trauma assessment scales, is proposed.
- It is recommended to reflect the elapsed period from the trauma to the time when the medico-biological qualification is given.
- Specific proposals have been made

In favor of FME - there is an opportunity for quick orientation in the volume of medical assistance provided with reference to the degree of qualification for BI;

In favor of the CP - when condemning the socially dangerous nature of the criminal act - bodily injury to point out the socially significant resource used by the health care to overcome the consequences;

In favor of the CP – objectification of claimed pecuniary and non-pecuniary damages related to medical assistance.

VIII. DISSERTATION-RELATED PUBLICATIONS AND PARTICIPATIONS

Gospodinova D., Kaisheva E. Dokov W. Different aspects of legal assessment of healthcare provision to road accident participants. 100 rokov ustavu sudneho lekarstva - Bratislava, 215-222, 2019

Gospodinova D., Dokov W., Kaisheva E. Opportunities for objective determining the case of death as a result of trauma or inadequate treatment. Folia Societatis Medicinae Legalis Slovacae 9 (2), 131-134, 2019

Gospodinova D., W Dokov, Kaisheva E. Analysis of the liabilitu in case of death after mechanical injury and medical treatment. Folia Societatis Medicinae Legalis Slovacae 9 (2), 84-88, 2019

IX. APPENDICES (to the dissertation)

Appendix No. 1 – Scale for reporting diagnostic medical activity

Appendix No. 2 – Scale for reporting the treatment medical activity

Appendix No. 3 – Numerical evaluation of medical assistance in relation to the qualifying signs of bodily injury

Appendix No. 4 – Scales for assessing the severity of trauma, applicable in forensic medical practice based on the information available in the medical documentation.

Appendix No. 5 - Pain assessment scales applicable in forensic medical practice based on information available in medical records