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Research article

Bioethical Aspects of Rehabilitation Clinical Practice: A Comparative Study between Opinions of Staff and Patients in Acute and Chronic Stage Departments

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Abstract

Objective: The goal of current study was to investigate the opinion of participants in rehabilitation process (academic staff, rehabilitation team and patients) - concerning their bioethical notions in the rehabilitation field and to realize a comparative evaluation of these perceptions in the early and long-term rehabilitation. Design of the study: Our randomized double-blind investigation was effectuated on 105 responders, divided into 5 groups (21 participants per group). All responders received a standardized test, containing the principles of the Declaration on Bioethics of UNESCO and the List of Bioethical topics. Results and Discussion: Many principles of the Declaration on bioethics are in close relationship with concerns of the physical medicine and rehabilitation clinical practice, especially: Human dignity and human rights, Autonomy; Consent; Equality and equity; Non-discrimination and non-stigmatisation (for patients with disability). From the list of bioethical topics, the marked most important issues were: Assisted suicide, Euthanasia, Human research, Neuroethics, Pain management. The members of the academic staff and the staff of PRM Departments consider as most important elements: Patient's consent, Autonomy, Human dignity, Research. Patients in early rehabilitation department marked as most important elements: pain management, rights to apply modern treatment and rehabilitation methods and devices, right to use modern technical aids, and the rights to choose the members of the rehabilitation team. For patients in chronic phase the significant items were: autonomy, home adaptation, rights to receive proper information, right to apply contemporaneous treatment methods and devices. All responders consider bioethics as an important link between rehabilitation and human values.

Introduction

Bioethics

For all medical doctors and health professionals, Bioethics is a development of the basic idea of the Hippocratic Oath "Primum non noscere" (the concept of "First Do Not Harm"). According definitions [1-3], Bioethics is the *"study of the ethical issues emerging from advances in biology and medicine"*. It is also moral discernment as it relates to medical policy and practice. It includes the study of values (*"the ethics of the ordinary"*) relating to different medical and biological scientific fields [4,5]. The origin of the term *Bioethics* is from Greek: *bios*, life; *ethos*, behavior. Fritz Jahr first applied it in 1926 in an article about a "bioethical imperative" regarding the use of animals and plants in scientific research. In 1970, an American biochemist Van Rensselaer Potter used the term for description of the relationship between the biosphere and a growing human population; and placed the foundation of the global ethics.

The Universal Declaration on bioethics and human rights [3], adopted by the General conference of UNESCO (Oct 2005), states the fifteen principles of bioethics, as follows (Figure 1): human dignity and human rights, Benefit and harm, Autonomy and individual responsibility; Consent, Persons without the capacity to consent; Respect for human vulnerability and personal integrity; Privacy and confidentiality; Equality, justice and equity; Non-discrimination and non-stigmatization; Respect for cul-

tural diversity and pluralism; Solidarity and cooperation; Social responsibility and health; Sharing of benefits; Protecting future generations; Protection of the environment, the biosphere and biodiversity.

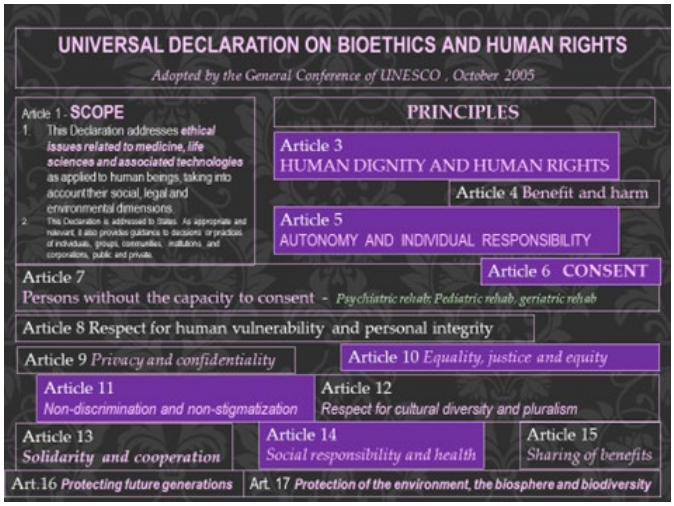

Figure 1. Universal Declaration on Bioethics and Human Rights, 2005.

The list of topics concerning bioethics [6-10] covers many areas of medicine and health care, including: Abortion, AIDS/HIV, Alternative healthcare, Alzheimer's, Animal rights, Artificial insemination, assisted suicide, body modification, contraception, cloning, cryonics, disability, DNA banking, Environmental issues, euthanasia, eugenics, genetics, healthcare allocation, human research, medical malpractice, mental health, nanomedicine, neuroethics, organ transplant, pain management, parthenogenesis, population control, procreative beneficence, Psychosurgery, Religious views, Reproductive rights, Sperm donation, Stem cells, Substance abuse, Surrogacy, Transhumanism, Vaccination and Xenotransplantation (Figure 2)

Figure 2. Bioethics Topics List.

Rehabilitation

Rehabilitation is a functional therapy, realized in acute and chronic stage departments of hospitals for active or for long-term care; by a multi-disciplinary multi-professional team (medical doctors, nurses, physiotherapists, occupational therapists).

The World Health Organization's (WHO) definition of *rehabilitation* is: "The use of all means aimed *to reduce the impact of disabling and handicapping conditions*, and at enabling people with disabilities to achieve optimal social integration".

The *World Report on Disability* of the World Health Organization and World Bank [11] defines the *goals of rehabilitation*: prevention and slowing the rate of loss of function; improvement, restoration or compensation of lost function; maintenance of current function. Modern rehabilitation has an i*ntegrative and holistic approach to the patient*, based on the *International Classification, disability and Health [ICF – 12]* and on clinical principles (Figure 3).

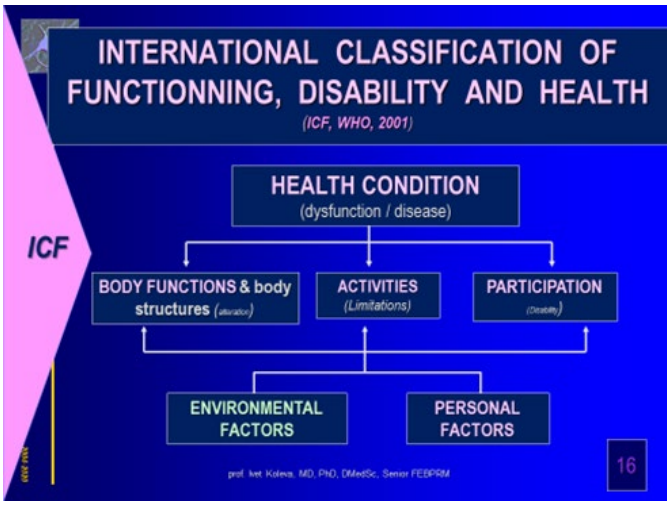

Figure 3. ICF.

The rehabilitation process according to the so-called rehabilitation cycle includes an assessment and definition of the (individual) rehabilitation goals, assignment to the rehabilitation program evaluation of individual outcomes.

The rehabilitation process is realized by a group of medical specialists and health professionals - the "Rehabilitation Team" (Figure 4).

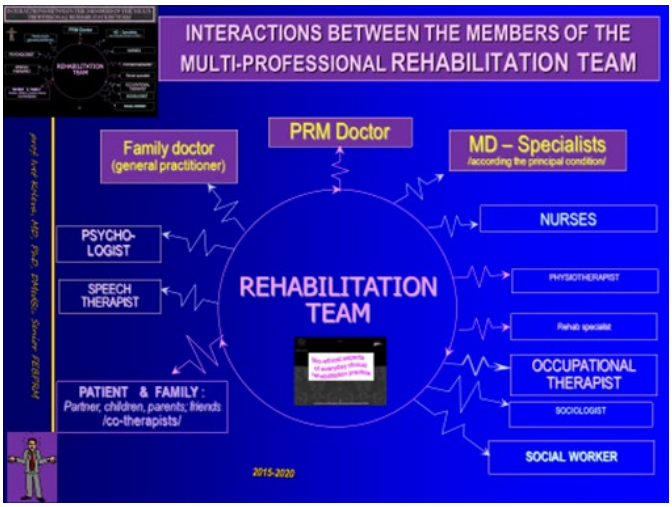

Figure 4. Members of the Rehabilitation Team.

Physical Medicine

According the Definition amended by the Council of the European Union of Medical Specialists [UEMS - 13]: "The medical act encompasses all the professional action, e.g. scientific, teaching, training and educational, clinical and medico-technical steps, performed to promote health and functioning, prevent diseases, provide diagnostic or therapeutic and rehabilitative care to patients, individuals, groups or communities in the framework of

the respect of ethical and deontological value. It is the responsibility of, and must always be performed by a registered medical doctor / physician or under his or her direct supervision and/or prescription."

According the White Book of the specialty Physical and Rehabilitation Medicine (PRM) and the corresponding definition of the UEMS - PRM Section and Board [14]: PRM is an "independent medical specialty, oriented to the promotion of physical and cognitive functioning, activities (including environment), participation (including quality of life) and changes in personal factors and environment. It is thus responsible for the prevention, diagnosis, treatments and rehabilitation management of people with disabling medical conditions and co-morbidity across all ages."

PRM is a "Medicine of Functioning", focusing on the improvement of functioning [15], and the role of International Classification of Functioning, disability and Health [ICF] is crucial. The number of chronic patients with invalidating diseases and conditions (predominantly of the nervous, motor and cardio-vascular systems) increases during last years. All these persons have somato-sensory, motor and/or cognitive dysfunctions and deficits (figure 5). Therefore, they need a complex rehabilitation programs, oriented to functional recovery and amelioration of their quality of life. In this process, the impact of PRM and rehabilitation is central.

Figure 5. Frequent dysfunctions and deficits in rehabilitation clinical practice.

The diagnosis in PRM is the interaction between the medical diagnosis and a PRM-specific functional assessment. Interventions in PRM are either provided directly by PRM physicians or within the rehabilitation team. They include a wide range of treatments, including medicines, physical therapies, exercises, education and many others. The principle of the rehabilitation "puzzle' is presented in figure 5. Outcomes of PRM interventions and programs, showed reduction of impairments in body functions, activity limitations, and impacting on participation restrictions, and also reduction in costs as well as decrease in mortality for certain groups of patients. The goal of PRM is prevention, treatment and rehabilitation.

In the clinical management of neurological and neurosurgical, rheumatological and traumatological, cardiological and cardio-surgical patients, the role of medical doctors – PRM specialists is central. Rehabilitation algorithm includes detailed functional evaluation (based on ICF) and synergic combination of physical modalities (movement, activities, mineral waters, electric currents, etc.). The "rehabilitation puzzle" (Figures 6 and 7) includes many natural physical modalities [water (mineral baths), air, sun, exercises, massage, manual therapy techniques (traction, mobilization, and manipulation); ergotherapy (work and activities)] and pre-formed physical modalities [electric currents, light, magnetic field, ultra-sound, etc.].

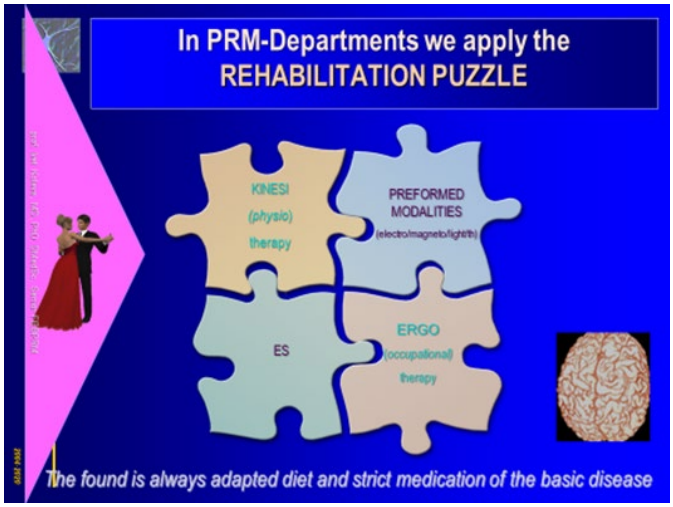

Figure 6. The "Rehabilitation Puzzle", applied in PRM Departments.

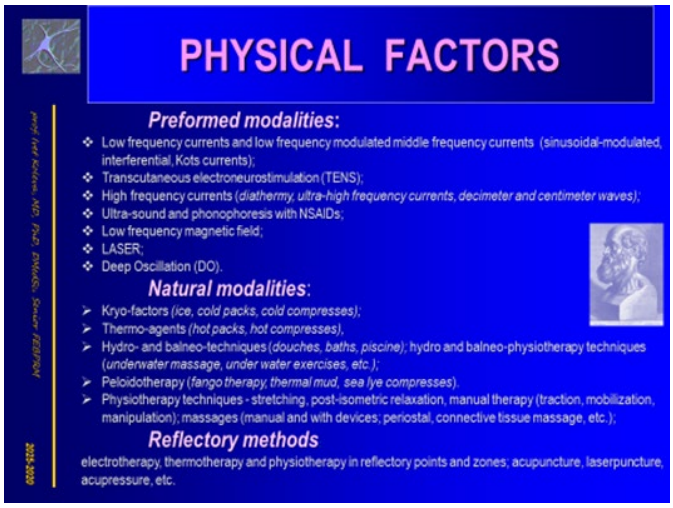

Figure 7. Physical modalities (physical factors).

The general rehabilitation algorithm includes one or two pre-formed modalities, one thermo- or cryo-agent, two or three physiotherapeutic procedures (including analytic exercises, post-isometric relaxation, stretching techniques, massage, etc.).

Our Investigation

Objectives

The goal of current study was to investigate the opinion of participants in rehabilitation process (academic staff, rehabilitation team and patients) - concerning their bioethical notions in the rehabilitation field and to realize a comparative evaluation of these perceptions in the early and long-term rehabilitation.

Design of the study - Material and Methods

Our randomized double-blind investigation was effectuated during last months on a total of 105 responders, divided into 5 groups (21 participants per group). All responders received a standardized test, containing the principles of the Declaration

on Bioethics and the list of bioethical topics. Responders were instructed to mark the fields, considered as very important, according their opinion.

The test was anonymous (inside the correspondent group), containing some personal data as: age (years - up to 25, 26-30 y, 31-35 y, etc), sex (male : female), diagnosis (for the patients groups and years of working as a specialist in the rehab field - for the staff). All patients were stationary patients (in-patients in the respective department - of early post-operative rehabilitation or of chronic stage rehabilitation). The distribution of responders is presented in next tables and figure. Table 1 contains information about the groups of responders. Table 2 presents the age of responders by groups. Figure 8 presents the responders distribution by sex (43 males : 62 females). Statistical analysis was performed with SPSS package (ANOVA and Wilcoxon).

Table 1. Distribution of responders – category of staff and patients

GROUPS		
Group 1 (gr-1)	***Academic staff***	1 professor, 3 associated professors, 3 head assistant-professors, 11 assistants, 3 PhD students
Group 2 (gr-2)	***Rehab staff in early rehab department***	3 medical doctors (MD) – specialists in Cardiology, Neurology and PRM; 1 MD – PRM trainee, 4 MDs-trainees in Cardiology; 5 nurses; 8 physiotherapists
Group 3 (gr-3)	**Patients in the early rehab department**	9 patients after neurosurgical interventions (2 after discal hernia, 3 for brain tumors, 4 for spinal cord injuries) 12 patients after orthopedic surgery of lower extremities (9 joint replacements and 3 metallic osteo-syntheses for fractures)
Group 4 (gr-4)	***Rehab staff in chronic stage rehab department***	4 medical doctors (MD) – specialists (one - in Cardiology, one – in Neurology and PRM, two – in PRM); 3 MD – PRM trainees, 5 nurses; 9 physiotherapists
Group 5 (gr-5)	**Patients in the chronic stage rehab department**	4 patients after neurosurgical interventions (2 for brain tumors, 2 for spinal cord injuries) 6 patients after orthopedic surgery of lower extremities (4 joint replacements and 2 metallic osteo-syntheses for fractures) 11 patients after cardio-surgery (4 coronaro-aortic bypass graft; 7 after coronary valve replacements)

Table 2. Distribution of responders - by age (in years - y).

Age (in years)	Gr-1	Gr-2	Gr-3	Gr-4	Gr-5	Total
Up to 25 y	2	1	-	2	-	5
26 – 30 y	3	4	-	3	-	10
31 – 40 y	10	8	4	9	1	32
41 – 50 y	4	5	1	4	4	18
51 – 60 y	2	1	2	2	6	13
61 – 70 y	-	2	5	1	5	13
71 – 80 y	-	-	6	-	3	9
Over 81 y	-	-	3	-	2	5
TOTAL	21	21	21	21	21	105

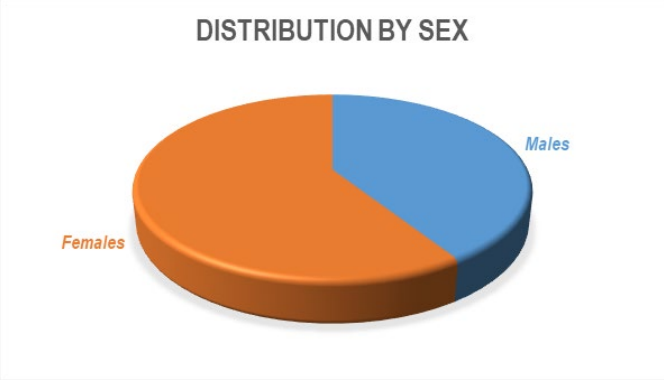

Figure 8. Responders distribution by sex (43 males : 62 females).

Ethical Aspects

The study was conducted with consideration for the protection of participants. Every participant was informed before the test of the rights to be anonymous, concerning the proper answers, inside of the group's responders.

Details of organization of the study, randomization and blinding

The investigation was realized by a multi-professional team; including: two medical doctors - specialists (one of them - specialist in Physical and rehabilitation medicine (PRM) and in Neurology; the other - specialist in Cardiology); three physiotherapists, with sub-specialization in the fields of Neurological, Orthopedic and Cardio-Rehabilitation respectively; and a specialist in Information technologies - for the statistical analysis. The mathematician had not information about patients' personal data and PRM complex; he had only investigations' results. The details of the series were revealed to investigators after the end of the study.

Results

For us, the primary endpoint was to realize an objective evaluation of patients' and staff information about bioethics and some bioethical principles. We obtained interesting results, concerning the difference in consideration of some bio-ethical issues - during comparison of concepts of staff and patients, and comparison of thinking of different types of patients - in the early and the chronic rehabilitation phase. Next figure 9 demonstrates the consideration of our patients and of our staff for the Universal Declaration on Bioethics and Human Rights of UNESCO. We can note that all responders respect these principles. Academic staff (gr-1) is totally informed and consider the principles. Rehabilitation staffs in PRM-Departments (gr-2 & gr-4) have specific respect to consider patients' consent and dignity, for the staff of the early rehab-Dpt (gr-2) - the equality is most important, for the staff of the long-term rehab Dpt (gr-4) - the non-discrimination to patients with disability is central. Patients responded by intuition, and according their personal believes: for these in acute care the most important is the human dignity and equal-

ity; for those in chronic stage – the informed consent and the non-discrimination.

In the next figure 10 we can observe main bio-ethical topics, significant for the staff in the rehabilitation field: Informed Consent, Dignity, Autonomy. Research is central only for the academics.

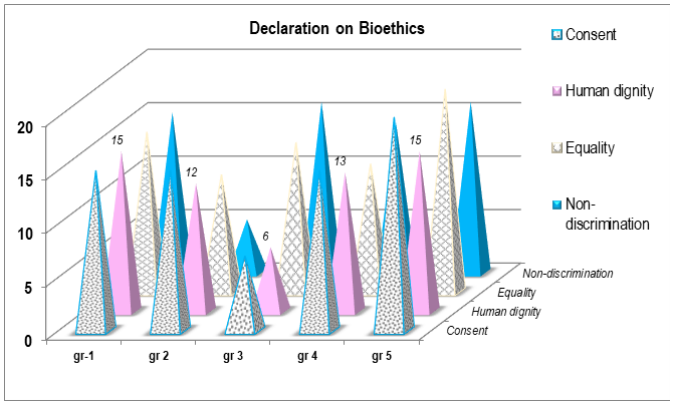

Figure 9. Consideration of principles of the Declaration on Bioethics.

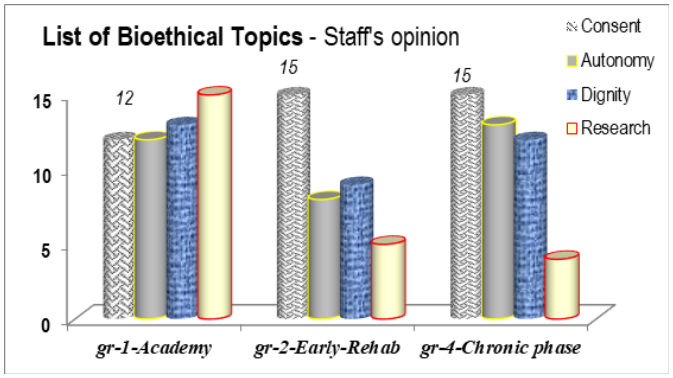

Figure 10. List of Bioethical Topics -Staff's opinion
(Comparison between academic staff and staff in Rehab Departments - early and chronic phase).

Patients' opinion is different (figure 11). In the PRM-Department for early rehabilitation (after neurosurgical intervention or after orthopedic surgery), patients consider as most important the fields of: *Contemporaneous treatment and rehabilitation methods*, Modern *technical aids*. Patients of the early rehabilitation department (gr-3) underline the fields: Pain management and Possibility to choose the members of the rehabilitation team. Patients of gr-5 (chronic rehab phase) highlight the importance of the topic: Autonomy and Home adaptation.

Discussion: PRM, Rehabilitation and Bioethics

Many principles of the Universal Declaration on bioethics and human rights of UNESCO (2005) are in close relationship with concerns of the physical medicine and rehabilitation clinical practice, especially: *Human dignity and human rights, Autonomy; Consent, Persons without the capacity to consent (Psychiatric rehab; Pediatric rehab, geriatric rehab); Equality and equity; Non-discrimination and non-stigmatisation (for patients with disability).*

From the list of bioethical topics, we can mark as most important issues: *Assisted suicide, Euthanasia, Human research, Neuroethics, Pain management. The members of the academic staff and the staff of PRM Departments* (early and chronic stage)

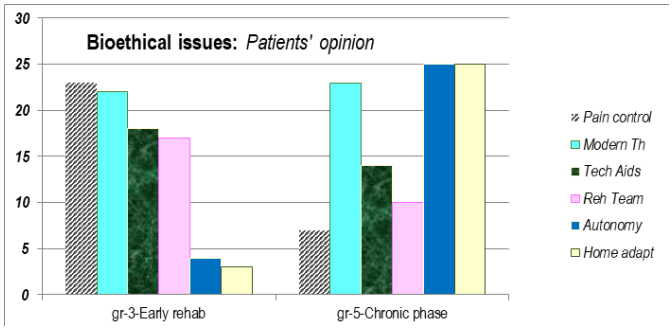

Figure 11. List of Bioethical Topics – Patients' opinion.
(Comparison between patients in Rehab Departments - early and chronic phase).

consider as most important elements: Patient's consent, Autonomy, Human dignity, Research. No significant differences between their opinions, with the exception of Research - important only for the academic staff.

The staff of rehabilitation departments underlined the necessity of regulation of the roles of every member of the rehabilitation team. We consider the potential utility of a clear definition of the fields of competence and the responsibility of the team members.

Patients in early rehabilitation department marked as most important elements: pain management, rights to apply modern treatment and rehabilitation methods and devices, right to use modern technical aids, and the rights to choose the members of the rehabilitation team.

For patients in chronic phase (long-term care and rehabilitation) the important items were: autonomy, home adaptation, rights to receive proper information, right to apply contemporaneous treatment methods and devices.

Patients from the age-groups 25 to 55 years consider as very important the rights of modern methods of rehabilitation, as virtual reality, robotic rehabilitation, proprioceptive stimulation and mirror therapy for stimulation of neuroplasticity.

Patients and staff of geriatric rehabilitation department answered predominantly: rights to receive adequate information (and certain prognosis), pain management, rights of technical aids and home adaptations, dignity and right of active or passive euthanasia.

Limitations of Our Study

Our study was carried out on a relatively small group of responders - staff and patients in early and chronic rehabilitation.

Future Directions

We consider that, in the future, investigators must observe the opinion of other types of rehabilitation staff, comparing the opinions of medical doctors - specialists, physiotherapists, ergotherapists, nurses.

Conclusion

For all medical doctors and health professionals, including staff in rehabilitation field, bioethics is the development of the basic idea of the Hippocratic Oath "Primum non noscere" (the concept of "First Do Not Harm"). Principles of Corpus Hippocraticum and some values of traditional Hippocratism are now-

adays applied in every branch of Medicine, including Physical medicine and Rehabilitation clinical practice. The Rehab-team and patients consider bioethics as an important link between physical medicine, rehabilitation and human values.

Abbreviations

ADL : activities of daily living; ET : ergotherapy; MMT : manual muscle test; OT : occupational therapy PRM : Physical and Rehabilitation Medicine; PT : Physiotherapy; QoL : quality of life; Rehab : rehabilitation UEMS : european union of medical specialists; Y : years

Consent

All authors declare that written informed consent was obtained from every responder before any test.

Ethical Approval

All authors hereby declare that the investigations and treatment of investigated patients have been approved by the appropriate ethics committee and have therefore been performed in accordance with the ethical standards laid down in the 1964 declaration of Helsinki.

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Author Contributions

Dr. Ivet Koleva and Borislav Yoshinov prepared the design, gathered the investigations and the final text of the article. Data collection was realized in the above-mentioned units, with the assistance of Dr Julieta Gerenova, Dr. Todor Dimitrov and Dr.Alexander Alexiev. Radoslav R. Yoshinov realized the statistical analysis and the figures with results.

Competing Interests

Authors have declared that no competing interests exists.

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