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MAPPING AND CROSS-CHECKING INFORMATION REGARDING CLINICAL EVALUATION, DIAGNOSES AND PHYSIOTHERAPEUTIC INTERVENTIONS¹

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ABSTRACT

Objective: to describe the experience of developing an electronic health record in physiotherapy based on the International Classification of Functioning Disability and Health through the mapping and cross-referencing of clinical evaluation information, diagnosis and physiotherapeutic interventions.

Method: an experience report, organized in four stages: Theoretical development of the International Classification of Functionality; Theoretical development of evaluation in physiotherapy; Structuring of evaluation data, diagnoses and physiotherapeutic intervention; Computerization and systematized integration of data from clinical evaluation, diagnoses and interventions.

Results: the structure of the data was divided by systems of the human body. Thus, for the respiratory system, 15 evaluation topics, 145 diagnoses and 74 interventions were constructed; for the neuromusculoskeletal system, 37 evaluation topics, 132 diagnoses and 65 interventions were constructed; for the cardiovascular system, five evaluation topics, 23 diagnoses and five interventions were constructed and seven assessment topics, 21 diagnoses and one intervention were constructed for the gastrointestinal and renal systems. Thus, 64 evaluation items were constructed, 318 diagnoses based on the Functionality Classification and 145 physiotherapeutic interventions.

Conclusion: the mapping of information regarding physiotherapeutic evaluation, diagnoses and interventions to integrate an electronic physiotherapy records will make use of the International Classification of Functioning, Disability and Health safer and faster, allowing it to be applied in the hospital setting.

DESCRIPTORS: International classification of functioning, disability and health. informatics. Physiotherapy. Critical care. Electronic health records.

MAPEAMENTO E CRUZAMENTO DAS INFORMAÇÕES SOBRE AVALIAÇÃO CLÍNICA, DIAGNÓSTICO E INTERVENÇÕES DE FISIOTERAPIA

RESUMO

Objetivo: descrever a experiência para desenvolver um registro eletrônico em fisioterapia baseado na Classificação Internacional de Funcionalidade, Incapacidade e Saúde através do mapeamento e cruzamento de informações da avaliação clínica, diagnóstico e intervenções fisioterapêuticas.

Método: relato de experiência, organizado em quatro etapas: Aprofundamento teórico da Classificação Internacional de Funcionalidade; Aprofundamento teórico da avaliação em fisioterapia; Estruturação dos dados de avaliação, dos diagnósticos e intervenção fisioterapêutica; Informatização e integração de forma sistematizada dos dados da avaliação clínica, dos diagnósticos e intervenções.

Resultados: a estruturação dos dados foi dividida por sistemas do corpo humano. Sendo assim, para o sistema respiratório construiu-se 15 tópicos de avaliação, 145 diagnósticos e 74 intervenções; para o sistema neuromusculoesquelético construiu-se 37 tópicos de avaliação, 132 diagnósticos e 65 intervenções; para o sistema cardiovascular construiu-se cinco tópicos de avaliação, 23 diagnósticos e cinco intervenções e para o sistema gastrointestinal e renal construiu-se sete tópicos de avaliação, 21 diagnósticos e uma intervenção. Desta forma, foram construídos 64 itens de avaliação, 318 diagnósticos baseados na Classificação de Funcionalidade e 145 intervenções fisioterapêuticas.

Conclusão: o mapeamento das informações sobre avaliação fisioterapêutica, diagnósticos e intervenções para integrar um registro eletrônico em fisioterapia tornará o uso da Classificação Internacional de Funcionalidade, Incapacidade e Saúde mais segura e rápida possibilitando sua aplicabilidade diária na clínica hospitalar.

DESCRIPTORIOS: Classificação internacional de funcionalidade, incapacidade e saúde. Informática. Fisioterapia. Cuidados críticos. Registros eletrônicos de saúde.

LEVANTAMIENTO Y CRUZAMIENTO DE LAS INFORMACIONES SOBRE EVALUACIÓN CLÍNICA, DIAGNÓSTICO E INTERVENCIONES DE FISIOTERAPIA

RESUMEN

Objetivo: describir la experiencia para desarrollar un registro electrónico en fisioterapia basado en la Clasificación Internacional de Funcionalidad, Incapacidad y Salud a través del levantamiento y cruzamiento de informaciones de la evaluación clínica, diagnóstico e intervenciones fisioterapéuticas.

Método: relato de experiencia realizado en cuatro etapas: Profundización teórica de la Clasificación Internacional de Funcionalidad; Profundización teórica de la evaluación en fisioterapia; Estructuración de los datos de evaluación, diagnósticos e intervención fisioterapéutica; Informatización e integración de forma sistematizada de los datos de la evaluación clínica, diagnósticos e intervenciones.

Resultados: la estructuración de los datos fue dividida por sistemas del cuerpo humano. Así, para el sistema respiratorio se construyeron 15 tópicos de evaluación, 145 diagnósticos y 74 intervenciones. Para el sistema neuromusculoesquelético se construyeron 37 tópicos de evaluación, 132 diagnósticos y 65 intervenciones. Para el sistema cardiovascular se construyeron cinco tópicos de evaluación, 23 diagnósticos y cinco intervenciones; y para el sistema gastrointestinal y renal se construyeron siete tópicos de evaluación, 21 diagnósticos y una intervención. De esta forma, se construyeron 64 ítems de evaluación, 318 diagnósticos basados en la Clasificación de Funcionalidad y 145 intervenciones fisioterapéuticas.

Conclusión: el levantamiento de las informaciones sobre la evaluación fisioterapéutica, diagnósticos e intervenciones para integrar un registro electrónico en fisioterapia hará que el uso de la Clasificación Internacional de Funcionalidad, Incapacidad y Salud sea más seguro y rápido, posibilitando su aplicabilidad diaria en la clínica hospitalaria.

DESCRIPTORES: Clasificación internacional de funcionalidad. incapacidad y salud. Informática. Fisioterapia. Cuidados críticos. Registros electrónicos de salud.

INTRODUCTION

The role of the physiotherapist in the Intensive Care Unit (ICU) is to maintain the patient's functionality by means of prevention and treatment of osteomyelitis and respiratory complications, monitoring respiratory mechanics and gas exchange, managing invasive and non-invasive ventilation, airway care, weaning and extubation, as well as participating in the multidisciplinary team to improve patient care.¹

In this context, the physiotherapeutic care of patients involves evaluation, identification of dysfunctions and functional limitations associated with the problem, definition of patient-centered goals, the selection of effective therapeutic intervention and the evaluation of the intervention based on the evolution of the patient.²

Authors emphasize the importance of the systematization of the physiotherapist's practice and that this can be made possible using standardized tests that document the progress of the patient before, during and after the intervention. However, a systematized practice also includes the development of interventions based on the evaluation to achieve a specific therapeutic goal.¹⁻²

In the perspective of systematization, each specialty should use its own terminology, appropriate to its needs and based on the exact meaning of the words, however, to enable the exchange of knowledge, each term must be accepted by the scientific

community and common to all cultures, with the appropriate semantic.¹

To achieve this, the Brazilian Federal Council of Physical Therapy and Occupational Therapy recommends that all physiotherapists use the International Classification of Functioning, Disability and Health (ICF) for the standardization, normalization and use of a common language. The ICF belongs to the group of international classifications developed by the World Health Organization and was developed with the purpose of recording and organizing the immense volume of information on health conditions and the functional status of individuals, as well as their capacity to interact with daily life, professional, family and social life.³⁻⁴

The objective of the process of mapping and cross-checking the patient evaluation data with the diagnosis based on the ICF is to draw up adequate, effective and safe interventions for the hospitalized patient in the ICU. However, the large amount of information often limits its use in practice because of the time the practitioner would have to gather, organize and describe this information.

Electronic health records consist of a system which is used to record, retrieve and use information regarding the health of individuals, in an electronically processable way that allows peer communication to promote effective, qualified and safe care. Therefore, the creation of a recording system aims to contribute to the systematization of care given by

the professions, including physiotherapy, aiming at critical thinking, safe decision-making, investigative reasoning and the constant search for scientific information and evidence, with the goal of improving the health of the population.⁷⁻⁸

Currently, considering the large volume of data and information coming from physiotherapeutic assistance, there is an urgent need to create a computerized system that will manage and make this assistance available in a standardized way, optimizing the professional's time and facilitating the access to information. In addition, allowing the data to be presented dynamically and presenting a user-friendly interface makes epidemiological studies possible which are of great interest to society.⁹ To this end, electronic physiotherapy records for ICUs must have a standard terminology used by physiotherapists specialists in this area, both regarding evaluation and the diagnosis based on the ICF and the respective interventions. Thus, to improve their clinical practice, physiotherapists need interpretable, easy-to-use and secure electronic information systems.¹⁰

Finally, the development of a proposal for an electronic physiotherapy records that serves ICU patients is aimed at greater control, rigor, quality measures and continuity of physiotherapeutic assistance. In addition, it provides professionals with a support tool for safe decision making, ensures intervention continuity and the autonomy to establish their diagnoses.

This manuscript describes the joint experience to develop the electronic physiotherapy records based on the International Classification of Functioning, Disability and Health through the mapping and cross-checking of clinical evaluation, diagnosis and physiotherapeutic interventions.

METHOD

This experience report describes the structure of the electronic physiotherapy records (REF) based on the ICF/2003, performed in the dependencies of the Clinical Research, Technology, Health Informatics and Nursing of the *Programa de pós-Graduação em Enfermagem (PEN)* in *Universidade Federal de Santa Catarina (UFSC)*.

Two physiotherapists, one doctor, both specialists in intensive care and with experience of more than 6 years in this area, and a professor of the Department of Nursing of UFSC participated in the mapping and clinical information. The mapping

and cross-checking of clinical evaluations, diagnoses based on ICF and physiotherapeutic interventions was performed between March 2013 and June 2014 and followed the following steps (Figure 1).

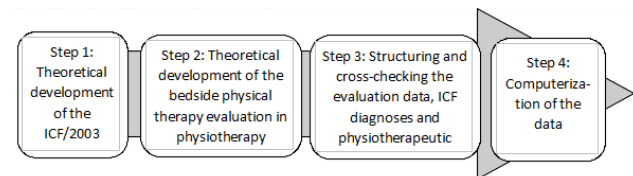


Figure 1 - Fluxogram of the study steps

1st Step: Theoretical development of the ICF/2003. This stage was created based on the reading and understanding of the ICF, as well as on studies from databases on the use of ICF in the hospital environment, especially in intensive care, from its historical evolution to its clinical applicability.

2nd Step: Theoretical development of the bedside physical therapy evaluation in books and scientific articles. Theoretical development of the physiotherapeutic intervention according to the Recommendations of Physical Therapy for the Critical Adult Patient and the I Consensus of Physiotherapy Terms.¹¹⁻¹² After this process, the data were divided in systems: Respiratory System, Neuromusculoskeletal System, Cardiovascular System and Gastrointestinal and Renal System. In addition to a free structure for data annotations of Invasive Mechanical Ventilation and another for Non-Invasive Mechanical Ventilation. This step was developed using the Word® program.

3rd Step: Structuring the evaluation data, classification of the diagnoses according to the ICF and physiotherapeutic intervention on an Excel® spreadsheet. At this stage, two physiotherapists with experience in hospital physiotherapy and intensive therapy performed the articulation of the evaluation and intervention data based on the ICF-based diagnosis.³ Thus, for each ICF diagnosis, there was at least one evaluation data and one physiotherapy intervention data. It is worth noting that not all ICF evaluation and diagnosis data had a direct physiotherapy intervention, because in many clinical situations the physiotherapist needs to evaluate and does not always perform an intervention or may decide to contraindicate physical therapy.

4th Step: Computerization of the data and construction of the computerized system for intensive care physiotherapy. This step occurred after the previous ones were finished. In October 2014, the

associated data were computerized and integrated into a system that allowed the systematization of the clinical evaluation of the patients, the ICF diagnoses and the interventions. In this system, the physiotherapist will be able to record the clinical evaluation of each proposed human system and control non-invasive and invasive mechanical ventilation. From this information, the system provides the respective ICF diagnoses and physiotherapeutic intervention suggestions. This stage was carried out in conjunc-

tion with a system programmer with experience in programming in the healthcare area.

RESULT OF THE EXPERIENCE

Table 1 shows the possibilities of clinical reasoning that can be used in professional practice and part of the result from the methodological pathway that resulted in the articulation of evaluation, diagnosis and physiotherapeutic intervention data.

Table 1 - Exemplification of the association of clinical assessment data, ICF diagnoses and Physiotherapy interventions for the Respiratory System

Evaluation	ICF/2003* Diagnoses	Intervention
Ventilatory Pattern	b4408 Respiratory Functions, others specified	
Ventilatory Pattern Diaphragmatic / Abdominal	b4408.0 No Respiratory Function deficiencies, other specified	45 ° Fowler position Supine Deep inspiration Flow-inducing spirometry Volume incentive spirometry
Mixed Ventilatory Pattern	b4408.1 Mild deficiency in Respiratory Functions, others specified	45 ° Fowler position 45 ° Supine Deep inspiration Flow-inducing spirometry Volume incentive spirometry
Apical Ventilatory Pattern	b4408.2 Moderate deficiency in Respiratory Functions, others specified	45 ° Fowler positioning Supine Deep inspiration
Paradoxical / In- verted Ventilatory Pattern	b4408.3 Severe deficiency in Respiratory Functions, others specified	45 ° Fowler position Supine Non-invasive ventilation Invasive mechanical ventilation
Hoover's Sign	b4408.4 Total deficiency in Respiratory Functions, others specified.	45 ° Fowler position Supine Non-invasive ventilation Invasive mechanical ventilation
Mechanical Ventilation	b4408.9 Not applicable	45° Fowler Position

*International classification of Functioning, disability and Health (2003)

A total of 64 bedside evaluation items were constructed for patients admitted to the ICU (Table 2). The construction was divided by human systems with the purpose of following the ICF molds to establish standardization and facilitate the daily use of the evolution of physiotherapeutic care: Respiratory System (15 topics); Neuromusculoskeletal System (37 topics); Cardiovascular System (seven topics); Gastrointestinal and Renal System (seven topics). 318 diagnoses appeared from the associations with the ICF / 2003 and were divided as follows: Respiratory System (142 diagnoses); Neuromusculoskeletal System (132 diagnoses); Cardiovascular System (23

diagnoses); Gastrointestinal and Renal System (21 diagnoses). Finally, after conducting an analysis of the clinical evaluation criteria, a ICF diagnosis was constructed for each item and subitem, and a list of possible interventions was then structured which the physiotherapist could select from, as seen appropriate for each patient, in a given clinical situation. Thus, 145 intervention possibilities were formed and divided as follows: Respiratory System (74 intervention possibilities); Neuromusculoskeletal System (65 intervention possibilities); Cardiovascular System (five intervention possibilities); Gastrointestinal and Renal System (one intervention possibility).

Table 2 - Results of the evaluation association, diagnoses based on the ICF / 2003 and physiotherapy interventions for intensive therapy. Florianópolis, SC, Brazil, 2014

	Evaluations	ICF/2003* Diagnoses	Interventions
Respiratory System	15	142	74
Neuromusculoskeletal System	37	132	65
Cardiovascular System	5	23	05
Gastrointestinal and Renal System	7	21	01
Total	64	318	145

*International classification of Functioning, disability and Health (2003)

Firstly, the construction of the physical therapy evaluation was dynamic and occurred through an extensive review of the literature, the necessary information was sought to support the diagnosis and conduct the decision-making process for physiotherapeutic conduct.¹³

Table 1 aims to demonstrate a small part of the construction of the evaluation associations, ICF diagnosis and interventions. In this way, column 1 is composed of evaluation data, and is divided into systems: respiratory system evaluation (peripheral oxygen saturation, thoracic expandability, respiratory pattern, signs and symptoms of respiratory distress, palpation, pulmonary auscultation); neuromusculoskeletal system evaluation (level of consciousness using the Glasgow coma scale, Ramsay sedation scale and the Richmond Agitation-Sedation Scale (RASS), muscle tone, motor deficit, joint restraint, pain, muscle strength); evaluation of the cardiovascular system (vital signs, use of vasoactive drugs) and the gastrointestinal and renal system evaluation (nausea, vomiting, melena, diuresis), as well as complementary examinations such as imaging tests, respiratory variables measurements (muscle strength) and arterial blood gas analysis

Subsequently, for the functional diagnosis, it was decided to use the ICF in accordance with the recommendations of the Brazilian Council of Physiotherapy and Occupational Therapy.¹⁴

The ICF was divided into two parts: The first part deals with the concepts of Functionality and Disability, composed of four components: Functions and Structures of the body; and Activities and Participation. The components of the Body contain eight chapters for the functions of organic systems and eight chapters for body structures. The Functionality components contain nine chapters for activities and participation. The chapters of activities and participation range from the subject's contact with themselves to the subject's social-political insertion in the community, from the environment closest to

the subject, more immediate to the individual, to their social environment. It should be emphasized that each chapter is composed of more detailed sub-categories. The second part addresses the contextual factors composed of two components: Environmental factors and Personal factors. The Environmental Factors contain five chapters that have a positive or negative impact on the subject's relationship with the human, physical, social, political and environmental environment. As for Personal Factors, they are not classified by the ICF due to the great social and cultural variation that are involved with the different people in the world.^{3,15-16}

However, column 2 in Table 1 shows the diagnoses based on the ICF and the parts that were used in this study. In relation to the functions and structures of the body, the following were selected: respiratory system functions (b440-b449), mental functions (b110-b114), cardiovascular system functions (b410-439), neuromusculoskeletal system functions (b710-b789), gastrointestinal and renal system functions (b510-b539, b610-b639). Respiratory system structure (s430), neuromusculoskeletal system structure (s710-s799). Regarding the Environmental factors, only products and technologies (e1101, e198) were included.

The interpretation of these diagnoses arose from a careful analysis of the evaluation process that aims to identify the functional impairment factor in order to perform the most appropriate physiotherapeutic intervention.^{13,17} In this study, it was chosen to only use these parts, as the objective of the study was to construct an evaluation, diagnosis and intervention tool specifically for patients hospitalized in the ICU. According to these findings, a study aimed at identifying the most commonly used ICF categories in the physiotherapist practice showed that sensory functions were used in 1752 cases, cardiovascular and respiratory functions in 1064 cases, and neuromusculoskeletal functions in 3485 cases, as well as structures of the nervous system

in 359 cases, cardiovascular and respiratory system structures in 5,158 cases, and neuromusculoskeletal and movement system structures in 5,158 cases.¹⁸

Finally, the purpose of the physiotherapeutic interventions was to guide and not impose a conduct. The construction of these interventions was based on studies with several levels of recommendation published in recent years.^{11,19-29}

Furthermore, column 3 in Table 1 demonstrates physiotherapy techniques and resources that aim to improve functionality and reduce respiratory and motor disabilities related to ICU admission. These resources aim to remove secretions,²³⁻²⁴ pulmonary expansion,²⁵ respiratory muscle training,²⁶ early mobilization²⁷ and the positioning of critically ill patients.^{11,21,28-29}

Regarding the evaluations that did not receive an intervention, the physiotherapist's evaluation of the presence of melena is cited as an example, the ICF diagnosis is b5258.3 (Severe deficiency in defecation functions, others specified), however in this situation there is no specific physiotherapeutic intervention for melena, the professional evaluates but does not act.

Thus, physiotherapy care in ICU patient care should promptly identify kinetic-functional problems and a rehabilitation program is considered crucial for the recovery of these patients.³⁰⁻³¹ The limitation of the study consisted in the difficulty in associating all the evaluation items of the critically-ill patient used by the physiotherapist in the ICU with the ICF diagnoses.

CONCLUSION

It is concluded that the mapping of the information regarding bedside physiotherapy evaluation, diagnoses and interventions aims to develop a data structure to establish an electronic physiotherapy record that will aim to make the use of ICF safer and faster, allowing its daily applicability in hospitals, as it is known that, even with the core sets, its use is limited in practice. This study aimed to contribute to the evolution and application of the ICF, which outlines as future plans, the development of evaluation tools that allow the identification and measurement of the patient's clinical condition, the development of investigations into treatments and combined interventions, as well as their applicability through the development and use of information technology and the creation of clinical case record forms.

In addition, the systematization of the infor-

mation obtained by cross-checking this information brings innumerable advantages, such as standardization of terms, clinical reasoning and safe decision making at the bedside, this process may reflect in the improvement of the quality of physiotherapy assistance to critically-ill patients admitted to ICUs.

In the near future, the storage of this information in a systematized and standardized way will be able to provide a base for scientific productions, as well as setting goals that improve the quality of the service and to measure the evolution of the patients, as they will provide reliable and possible comparative data.

For further research, the association of the ICF diagnoses with other assessment items in the different areas of physical therapy knowledge is suggested (such as orthopedics and neurology) and with this the possibility of developing electronic records in these areas.

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