

A uniform database of rehabilitation as a basis for evaluating the outcome quality

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1. Summary

To make it possible to benefit from patient data recorded in rehabilitation clinics, with regard to outcome quality and scientific investigation, the Rehabilitation Research Centre at the University of Ulm has created a rehabilitation register, a database based on ORACLE[®], into which the relevant patient data is transferred, having been made anonymous via an SQL archiving program. The archived data includes the clinical parameters, the running text of the discharge report, and the doctor's and patient's assessment of the rehabilitation outcome. It can be automatically searched for structured data, according to every conceivable criterion and in every conceivable combination, also in combination with a text search in the running text of the admission and discharge reports and the rehabilitation outcome.

With the aid of the rehabilitation register and thanks to the possibilities of EDP (Electronic Data Processing), in future it will be possible to make much more differentiated comments on the rehabilitation outcome than would be the case if the search were restricted to structured data alone. This is essential in order to be able constantly to improve outcome quality and to verify the economic benefit of rehabilitation medicine.

2. Introduction

Outcome quality in rehabilitation medicine is influenced by a variety of factors. In this context, it is important for patient data to be available for scientific consideration (personal data, data on findings on admission and discharge, rehabilitation outcome, therapy, etc.). If deficits are identified, possible improvements can be designed and the outcome quality can thus be improved. Our aim is to provide a convenient, easy-to-use user interface, so that this data can be easily input and optimally evaluated.

3. Methods

Under the global approach of rehabilitation, free formulation of a rehabilitation objective geared to the individual is essential. The approach can be described as global because,

unlike acute medicine, rehabilitation medicine is multidimensional. Rehabilitation medicine is defined by the terms "impairment", "disability" and, consequently, "handicap". Thus doctor and patient agree a rehabilitation objective, as an important component of quality assurance, and on completion of the rehabilitation measures, achievement of the objective is documented in writing. At the beginning and end of rehabilitation, the patient answers questions important in assessing the outcome by ticking the appropriate answer from among those provided. The questions relate to assessing his health and capabilities and to his expectations of rehabilitation.

In our research association, around 20 000 data sets a year are available, in the form of structured medical and socio-demographic data, supplemented by the running text from the record of achievement of the rehabilitation objective and from discharge reports.

Text processing via EDP is not sufficient to enable a rational evaluation to be achieved. Instead, it was necessary to switch the entire reporting system over to a database system and to give text processing only the role of an input mask.

The Rehabilitation Research Centre at the University of Ulm has developed a completely new secretariat program. Components consisting of electronic patient register, structured discharge report for pension insurance, variable statistical evaluation and remote data transmission were incorporated into a client-server architecture based on an ORACLE® database.

To make it possible to benefit from this data, with regard to outcome quality and scientific observations, a rehabilitation register was created, a database also based on ORACLE®, into which the relevant patient data is transferred, having been made anonymous via an SQL archiving program.

The archived data includes the clinical parameters, the running text of the discharge report, achievement of the rehabilitation objective, and the patient's assessment of the rehabilitation outcome. As a result of control mechanisms supported by EDP, the information obtained from the medical routine of rehabilitation is of high quality and facilitates a completely new dimension of statistical evaluation, such as the calling up of data in a few seconds in accordance with the influencing variables of choice (discharge status, fitness for work, cause of disease, periods of unfitness for work, performance capacity, etc.) and the inclusion of linguistic variables.

Since the letter, the agreed objective and achievement of the objective are freely formulated and stored in the database, there are a vast range of options for differentiated evaluations.

4. Results

The program development has not yet been completed, so the applications currently possible will now be presented.

The patient account currently comprises approx. 10 000 entries from various clinics involved in the research association. Research can be carried out either on a clinic-by-clinic basis, or on the basis of all the clinics combined.

The first thing that appears when the rehabilitation register is opened is a greeting mask, on the basis of which one clicks on either pure evaluation of structured data, evaluation of structured data in combination with free texts (this is currently still restricted to evaluation of the free text of achievement of the rehabilitation objective), or diagnostic statistics.

The structured data can be searched according to every conceivable criterion and in every conceivable combination. Diagnostic groups (in accordance with the International Statistical Classification of Diseases and Related Health Problems (ICD-9)) and problem

groups can be created. Patient data can be sifted out and directly subjected to statistical processing.

All criteria for selection from among the structured data can be linked to a text search. Two keywords linked with "OR" can each be linked with a blocking word. There are "INSTRING" functions, i.e. the sequence of letters may also occur within a longer word. The program then forms a sentence string with 5 words on the left of the word searched for and 5 words on its right. The blocking words can be checked in the sentence string, with "no" or "not" as the blocking word meaning the opposite. The blocking words can be linked with "AND" or "AND NOT".

As already mentioned, the text search is currently still restricted to the free text describing the achievement of the objective.

If information from several clinics is investigated jointly, the findings in a comparison of the clinics are sorted by differences in the patient questionnaires, in other words assessment of the state of health at the beginning minus assessment of the state of health at the end of rehabilitation. Thus it can immediately be seen, for example, which clinic produces the best outcome from the patient's point of view with a particular diagnosis or in accordance with other selection criteria. Quality assurance can be evaluated for all criteria individually or combined, for individual clinics or for all of them combined. All the outcomes can be schematically displayed and printed out.

The cost unit itself can also evaluate the outcome quality obtained by the affiliated clinics centrally and set them in relation to all the socio-medical variables from the PATIENT ACCOUNT. The evaluation is based on data that have not been made anonymous, in order to identify patients. Using this method, problem groups or problem clinics can be selected.

5. Discussion

The data input into the computer when the doctor's letter is written is stored centrally in the patient account with no further effort required. Following the automated transfer of the data, in anonymous form, to the rehabilitation register, it becomes accessible to scientific investigation. As the data is available in electronic form and owing to the easy-to-use, multilayered enquiry masks, the time taken to survey the data is only a fraction of that required in traditional processes involving study of files and manual evaluation. The questions can be dealt with virtually automatically.

Loss of information is reduced to a minimum, since the loss of files does not involve loss of data, and the input data is largely complete because of the EDP control. The archives are space saving and economical, and save on resources, because almost no consumer materials are involved. The remote data transmission takes only a matter of seconds, thus opening up completely new prospects in the context of co-operation among colleagues and continuity of treatment.

The rehabilitation register permits, on a routine basis and without major and time-consuming effort, monitoring of one's own performance on the basis of a wide range of parameters such as diagnosis, admission of patient fit for work or unfit for work for inpatient treatment, patient motivation, etc.

Thus profiles of the performance of participating clinics can be produced for internal use, but these can also be made available for statistical comparison of the clinics. It becomes possible to compare the outcome of various clinics within the association participating in the rehabilitation register. This objectification of outcome quality may reveal deficits and facilitates continuous and specific influencing of the relevant parameters.

Quality assurance can function only by objectifying quality and by means of appropriate quality control. People who can be monitored are concerned to improve their performance, and this applies just as much to clinics as institutions as to individual employees.

In future, it will be possible to search all free texts not only for individual words, but also for sequences of words of any length. Doctors' comments, directly or stored in encoded form as synonyms, can be sifted out with the aid of thesauri. For example, in an unadorned direct comment, the term "wants pension" appears. In coded form, this would read "The patient is of the opinion that he can no longer perform his previous work". In SQL, all synonyms can be linked with an "OR" command.

It will also be possible to include the therapy and to relate it to the outcome achieved. Thus it will be possible, for example, to compare different therapies for one clinical picture retrospectively, without major effort.

It will be possible to combine any number of diagnoses (ICD). In other words, patients can be selected not only under the main diagnosis, but also under the main diagnosis in combination with various secondary diagnoses. In addition, in view of the imprecision of the ICD (something that also applies to the ICD-10), it will be possible to input all diagnoses in explicit terms.

Checking of the data input for internal consistency can be done automatically whenever anything is input. "Internal consistency" means, for example, that the sense of the rehabilitation outcome formulated should tally with that of the findings on discharge.

With the aid of the rehabilitation register and thanks to the possibilities of EDP, in future it will be possible to make much more differentiated comments on the rehabilitation outcome than would be the case if the search were restricted to structured data alone. This is essential in order to be able constantly to improve outcome quality and to verify the economic benefit of rehabilitation medicine.

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