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Essence of measurement in neurological nursing

Measurement is the process of ascribing symbols to the observed values of investigated traits, and consists in comparing the established indicators of the object measured, with a proper pattern equipped with a scale. In nursing, the measurement most frequently means 'specific activities' undertaken by a nurse in order to provide information for the quantitative description of a certain trait noted in an individual patient. The result of the measurement is compared with the pattern (standard) established for the whole population, group of people, defined age-interval, e.g. number of breaths (16-20/min.), hour diuresis (30-50 ml), etc (5).

Measurement serves the estimation of specific variables, facilitates their comparison and generalization, allows the formulation of quantitative regularities, enables the usage of mathematical and statistical concepts and theories in order to verify the reliability of hypotheses with respect to the modern model of nursing, therefore allowing an objective, unequivocal and several times repeated evaluation of the results of nursing obtained (2,3,4). From the methodological point of view, the application of measurement in research allows the avoidance of subjectivity of evaluation, i.e. independence of the result from the person performing the study. Measurement in studies is realized by means of various scales (6, 9).

The need to define uniform criteria for the evaluation of psychosocial and biological, as well as health situation of a patient creates the need for the development of various scales of nursing care and creation of uniform standards of nursing care.

Types of scales (10): nominal, ordinal (rank), interval, quotient. The nominal scale consists in the classification of objects with respect to the possession or lack of the trait examined. The ordinal scale represents a higher level of measurement than the nominal one because it considers the intensity, strength and value of the defined trait in individual objects under study. Numbers determine the order of appearance (rank) of elements, but do not define the distance between them. The interval scale is the ordinal scale plus a measurement unit (9, 11). The quotient scale is an ordinal scale which additionally possesses the absolute zero point.

Several types of scales have been developed or adopted for the needs of nursing (11): a) numerical scales – Activity Scale of Hospitalized Patients, b) numerical-graphic scales – State of Health Measurement Scale, c) score scales: Scale of Independence of Neurological Patient, Scale of Functional Independence of Disabled Patient, Scale of Self-Care Efficiency of Neurological Patient, Scales with Forced Choice – score scale for the evaluation of risk of bed-sores (Norton, Douglas).

Disability of patients with Parkinson disease is evaluated by means of the Activities of Daily Living Scale – ADL and UPDRS investigating patient's capability with respect to speaking, writing, swallowing, consumption of meals, using equipment, performing hygienic activities, locomotion, tremor and sensation disorders, dyskinesia and fluctuation.

Determination of the activities based on the scale allows monitoring of the course of the disease and evaluating its progress (1).

The Scale of Self-Care Efficiency of Neurological Patient was constructed of four-level indicators, and belongs to interval scales. This scale allows determination of independence in self-care and the level of health education, which contributes to self-care efficiency. In order to calculate the general scale result a method of the accumulation of scores was applied, where the maximum number of scores is equal to the quotient of the number of defined indicators in this scale and the numerical value (weight) ascribed to these indicators. The general result of this scale determines the level of self-care efficiency of a neurological patient (7,11).

Table 1. Scale of perceived level of knowledge and skills among patients with epilepsy

Type of skills	Patient's evaluation				
	4 p	3 p	2 p	1 p	0 p
Pathomechanism of epilepsy					
Causes of convulsive epileptic attack					
Types of epileptic attacks					
Procedures in epileptic attacks					
Factors counteracting attacks					
Factors inducing convulsive attacks					
What are anti-epilepsy drugs (AED)					
Importance of taking AED systematically					
Style of life with epilepsy:					
mode of nutrition					
physical activity					
consumption of alcohol, strong tea, coffee, etc.					
importance of stress in epilepsy					
attitudes of family towards patient with epilepsy					
attitudes of the environment					
attitudes of employers					
what is social invalidity?					
what occupations can a patient undertake?					
Significance of keeping a calendar of attacks					
Importance of possessing an epilepsy identification card					
Scope of the epilepsy identification card					
Other skills					

Reliability and accuracy are the two basic preconditions for the correctness of any measurement irrespective of the type of scale on which a given measurement is based (8). Reliability of the measurement is characterized by the constancy of the results obtained, in the case where it is applied once more in the same object of study. When applied twice or several times in small time intervals with respect to the same population sample it provides results relatively stable and easy to foresee (6,8). Most frequent reliability is statistically determined by the Cronbach method. Accuracy of the measurement occurs if it measures merely what is to be measured, i.e. exclusively the object of the study (6, 8). None of the measurements applied is characterized by widely understood accuracy in general, but only in relation to precisely defined aspects of the phenomenon investigated (6,8).

The table presents the scale determining the scope of knowledge and skills possessed by patients with epilepsy. A patient himself marks the level of his health education, choosing the appropriate number of scores. The highest number of scores which may be obtained by a

patient with epilepsy, i.e. 4 scores, means that the patient possesses the complete scope of required knowledge and skills (100.0%); 3 scores – an incomplete scope 99.0% – 75.0%; 2 scores – insufficient scope but above 50% (74.0%–50.0%); 1 score – considerably insufficient scope 49.0%–25.0% and 0 scores – lack or significant insufficiency of the scope of knowledge and skills (24.0%–0.0%).

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SUMMARY

Measurement consists in ascribing symbols to observed values of the investigated traits and in comparing the established indicators of the object measured with a proper standard equipped with a scale. In nursing, measurement means specific activities realized by a nurse in order to obtain information concerning the quantitative description of certain traits occurring in an individual patient. Measurement is performed by means of a scale. The following scales are distinguished: nominal, ordinal, quotient and interval, the latter being most frequently applied in nursing. Self-care efficiency of a neurological patient, functional independence of a neurological patient and the level of health education in neurology were examined, among other things, by means of this scale.

Istota pomiaru w pielęgniarstwie neurologicznym

Pomiar polega na przyporządkowaniu symboli obserwowanym wartościom badanych cech i na porównaniu ustalonych wyznaczników mierzonego obiektu z odpowiednim wzorcem wyposażonym w skalę. W pielęgniarstwie pomiar oznacza określone czynności realizowane przez pielęgniarkę w celu uzyskania informacji do ilościowego opisu pewnej cechy występującej u danego pacjenta. Pomiar jest dokonywany za pomocą skal. Wyróżnia się skale: nominalną, porządkową, ilorazową i interwałową, przy czym w pielęgniarstwie znajduje najczęściej zastosowanie ostatnia skala. Za jej pomocą badano m. in. wydolność samo-opiekuńczą pacjenta neurologicznego, niezależność funkcjonalną chorego neurologicznie i poziom edukacji zdrowotnej w neurologii.