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Research paper

Development and validation of the Psychotropic Education and Knowledge (PEAK) test on psychotropic drugs for nurses in an acute geriatric care setting

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ABSTRACT

Introduction: In Belgium, psychotropic drug use is high among older people. With low proven long-term effectiveness and possible severe side effects, psychotropic drugs in geriatric patients should be prescribed with utmost caution. Nursing staff's knowledge on psychotropic drugs can be crucial in the appropriate prescribing and reduction of these drugs. Since knowledge assessment instruments on psychotropic drugs are scarce, a Dutch knowledge test, the Psychotropic Education and Knowledge (PEAK) test, was designed using a prospective psychometric instrument validation study.
Methods: Factors relevant for nursing practice on psychotropic drugs were identified. A Delphi expert panel ($n = 10$) evaluated face and construct validity. Internal consistency was assessed using the known groups' method. Reliability and stability were assessed using a test-retest procedure in nursing students ($n = 52$). Item analysis included difficulty index and discrimination value.
Results: Twenty-four items were retained after the Delphi panel. The discrimination value was acceptable [0.05–0.27] and difficulty index showed good results [0.10–0.89]. A good stability, $r = 0.80$ (95% CI = 0.68-0.88, $P < .001$] and a good internal consistency (Cronbach's $\alpha = 0.76$) were found. The mean knowledge of respondents ($n = 317$) was low, with nurses (46.0%) scoring better than nursing students (37.9%, $P < .001$). Having a Bachelor degree and graduating in geriatric specialisation was associated with higher results.
Conclusion: This is the first knowledge assessment instrument on psychotropic drugs for nurses in an acute geriatric care setting. Mean test scores were low, indicating a knowledge deficit among nurses and nursing students. Further refining of the test and validation in other care settings is needed.

1. Introduction

The number of older people rises gradually in Belgium [1]. The old subpopulation is characterised by more people with multiple chronic diseases [2,3], predominantly cardiovascular disease, arthropathy, and cognitive impairment or dementia [4].

Consequently, treatment of chronic diseases requires lifelong drug therapies. Older people are more susceptible to adverse drug effects and side effects due to changes in pharmacokinetics and -dynamics [5–7]. A higher drug intake and prescribing cascades[1] contribute to a higher risk of adverse drug effects, and drug related hospital admissions [8]. Drug prescribing in older people should therefore be done in thoughtful consideration [9].

Psychotropic drug use in older adults is high [10], especially in Belgium [11]. Varying from the care setting in Belgium, the consumption rate varies between 42% for community-dwelling older people [12] to 79% in long-term care settings in Belgium [11,13]. Psychotropic drugs are frequently prescribed and are longer maintained than advised [14].

In this study, a closer look is taken on the role of nurses. During hospital admissions psychotropic drugs are frequently started

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[1] A vicious circle where a drug side effect is mistakenly treated with another drug, resulting in other side effects.

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[15,16], either for the sedative properties or when the care burden is too high [17,18]. Reasons for a start-up with psychotropic medication are insomnia, or behavioural and psychological symptoms [19–21]. It is imperative, regardless of the care setting, that nurses who take care of older patients are knowledgeable about psychotropic drugs [19]. In this study, the level of knowledge of nurses on psychotropic drugs in an acute geriatric care setting was investigated. Therefore, a prospective instrument validation study was performed to develop a reliable and valid knowledge assessment test, namely the Psychotropic Educational And Knowledge (PEAK) test in the Dutch language for nurses in an acute geriatric care ward [22].

2. Methods

2.1. Sample

For the construction and validation of the knowledge test, we used a sample of nursing students and nurses working in acute geriatric care units of hospitals in the municipality of Ghent, Belgium. Our sample of nursing students consisted of students in the final year of the HVE, or final Bachelor year (either geriatric or general hospital specialisation).

In Belgium, there are two types of schools and degrees for nursing students. First, the Bachelor degree is a three-year academic degree granted by University Colleges (European Qualifications Framework level 6). Second, the Higher Vocational Education (HVE, in Dutch *Hoger Beroepsonderwijs- HBO-5*) constitutes of an additional three years of education after secondary school (European Qualifications Framework level 5). There is an advanced academic focus in the Bachelor level, while HVE focuses on skills for clinical practice. Students obtaining a Bachelor degree had the choice in their final year of education for a specialisation (paediatric, geriatric, psychiatric, social and general hospital nursing).

2.2. Search strategy

A literature search was performed to either find suitable knowledge assessment tests, or if not available, to explore different fields of knowledge on hypnosedatives and antipsychotics suitable for nurses. Limits for our query were set to recent articles (after 2000), in English or in Dutch and full text available. Search items include following MeSH terms: *psychotropic drugs, antipsychotic agents, benzodiazepines, aged, elderly, accidental fall, dementia, Alzheimer's disease* and following queries: *neuroleptic or hypnosedative drugs, behavioural and psychological symptoms of dementia (BPSD), sleep disorders, agitation and aggression*. MeSH terms on drug classes (i.e.: *benzodiazepine, hypnotic, psychotropic drugs*...) were combined with MeSH terms for a knowledge test (i.e.: *scale, survey, assessment*...).

2.3. Development of the instrument

First, an identification of the field of knowledge was done, followed by item generation and instrument formation. Second, after the designing of the test, the psychometric validation was performed (Fig. 1).

Three knowledge tests were found, yet these were not transferable or suitable for a full takeover in Dutch, due to lack of validation or reliability [23,24], or intended for use in nursing students [25].

A full takeover of one knowledge test was not possible. Instead, 13 questions were selected from the tests found. The questions were selected on their relevance for the nursing practice. Another 12 items were constructed, based on the expert knowledge of a geriatrician/clinical pharmacologist, a nurse specialist, and a nurse researcher. The test, totalling 25 questions in the preliminary phase, was divided in three main themes: general pharmacological aspects, and questions on antipsychotic or hypnosedative drug treatments in the old. This structure was used, to assess post-hoc if respondents excelled or failed in a particular field of knowledge, indicating the need for further education in this field.

The respondents of the test were given three answering options (correct, incorrect and 'I do not know'). Correct answers were awarded with one point, incorrect answers were penalised using a standard correction for guessing (2 answer possibilities means a deduction of 0.5 points). Choosing the option 'I do not know' or leaving the item blank yielded zero points. The final score on the test was calculated in %.

2.4. Validation process

2.4.1. Internal validation

The content validity was assessed by an expert panel in a Delphi method. Experts ($n = 14$) were invited based on their expertise and experience on psychotropic drugs in older adults. The participating experts ($n = 10$) consisted out of one general practitioner, one geriatrician, two pharmacologists, two old age psychiatrists and four nurses, of which three working in acute geriatric care settings.

The Delphi method was held in several rounds, in which each expert had to evaluate all separate items on correctness and intelligibility for nurses using a five-point Likert scale, or suggest other items for inclusion in the test. The content validity was assessed using the ratio between the number of experts evaluating an item as clear and unambiguous, and between the total numbers of experts evaluating the question [26]. If an item was deemed to be correct, necessary and understandable for nurses, it was selected for use in the final test. It the criteria were not met, an item was reviewed according the given feedback and represented to the experts. In the final Delphi round, the experts did not have to score the intelligibility test.

2.4.2. Construct validation

The construct validity is demonstrated using the known groups' technique. This technique discriminates predefined groups of respondents with different levels of knowledge on the subject. To assess differences in mean scores, *t*-tests were used. Our predefined groups (highest to lowest predicted knowledge): head nurses, nurses with a Bachelor degree, nurses with a HVE degree, nursing students in the last year of Bachelor training and nursing students in the last year of HVE education. A further distinction was made between the type of nursing specialisation (geriatric versus hospital care), or other educational programmes followed.

2.4.3. Reliability

The stability, as part of the reliability, was tested using the test-retest technique, in which the result of a single individual on the test throughout time is investigated. A class of students ($n = 55$) in the higher vocational education course was presented with the same test within a short interval of time, where questions and answer possibilities were randomised the second time in order to avoid recognition. A standard of a Pearson correlation index > 0.70 was set.

Finally, the internal consistency or item relatedness was determined using the Cronbach's α. This test makes it possible to measure if the items in the test measure the same attribute, namely the level of knowledge on psychotropic drugs. Acceptable coefficients fell in the range $0.70 \leq \alpha \leq 0.95$ [27].