Simple practical screening for impaired swallowing

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ABSTRACT

This dissertation focuses on the nurse's role in the identification of swallowing disorders (dysphagia). The dissertation consists of three parts (Phases 1–3). The research study was conducted in the period from 01/2009 to 12/2013.

In Phase 1, a total of 157 patients were recruited. The patients had a neurological or otorhinolaryngological (ENT) diagnosis and, based on their primary diagnosis, were at risk of dysphagia. The centrepiece of this phase entailed the development of a nursing screening tool for dysphagia. It was based on a so called "nursing assessment", which comprised the patients' physical assessment related to their swallowing function (a total of 32 items), including a swallow test using a thickened and thin liquid. The patients' individual item results were compared with a „gold standard", i.e. an objective examination of the swallowing function focusing on detecting penetration / aspiration – flexible endoscopic examination of swallowing (FEES), conducted by the physician.

It was found that between the two mentioned groups of patients, there were differences in the frequency of factors (abnormal findings) associated with swallowing function. Therefore, the condition of "sufficient unanimity" for the development of a generic dysphagia screening tool was not met. Consequently, a neurological screening tool was developed, by analysing the results for a subset of 106 patients with a neurological diagnosis. Out of 11 nursing assessment items with a statistically significant relationship to FEES, eight did not have missing data in more than 5% of the cases and were hence included in the screening tool. When determining the ideal cut-off score that would enable dichotomization of overall results into "normal" and "abnormal" ones, the priority was to achieve the highest possible sensitivity and negative predictive value. They were the highest for cut-off score = 1; sensitivity reached 95.5% (95% CI: 84.9–98.7%) and negative predictive value reached 88.9% (95% CI: 67.2–96.9%). Hence, this is a tool whose diagnostic parameters are just as high as the diagnostic parameters of several other, frequently cited foreign tools. No screening tool was developed for the subset of patients with an ENT diagnosis (N = 38) because the two items with a statistically significant relationship to FEES (both were related to the thin liquid swallow test) contained a high percentage of missing data and for the third item with a

statistically significant relationship to FEES, this relationship was negative. However, further research in patients with ENT diseases could focus on studying the relationship between the thin liquid swallow test conducted by nurses and an examination using a gold standard (e.g. FEES).

Phase 2 focused on studying the effectiveness of education on the neurological swallowing screening tool developed in Phase 1. A total of 70 learners (general nurses from selected health care institutions and university students enrolled in non-medical health care study programs) were recruited. They attended an educational session consisting of a video on patient assessment using the screening tool developed in Phase 1, practising the skills, and a discussion. Immediately after that, the learners completed a knowledge post-test that measured their knowledge (the total possible score was 8 points). The median of the post-test was 6 points, the mode was 7 points (24.3% of the learners obtained this score), the average total score was 5.9 points, and the average success rate was 73.8%. For half of the questions, the success rate of the research sample was higher than 80%. The lowest success rate was 51.4% (for one question).

The results suggest that the effectiveness of the education was not convincing. An interesting finding was that during the educational session, the students focused more on "technical" skills whereas the nurses focused on "cognitive" skills, i.e. on clinical reasoning and decision-making. Their goal was not to "master" the assessment techniques but rather to understand whether the presented activity made sense to them. The knowledge post-test may have been difficult in comparison with other tests described in the literature, which may have had a negative impact on the result as well.

The centrepiece of Phase 3 entailed determining inter-rater reliability (through independent assessments by two assessors) and administration time of the developed screening tool, in a research sample consisting of 42 patients with cerebrovascular accident. Inter-rater reliability of the dichotomized result was rather low (coefficient $\kappa = 0.264$; $p = 0.047$). However, for three items, substantial agreement was obtained: "*thickened liquid: cough*", "*ability to cough*" and "*aphasia*". Average agreement was obtained for items "*dysarthria*" and "*shoulder symmetry / strength*". The remaining items had low or slightly negative agreement: ("*symmetry / strength of facial muscles*", "*symmetry / strength of the tongue*" and "*ability to clench the teeth*"). For a meaningful interpretation of κ, calculations of other parameters were presented: the observed proportion of agreement, prevalence index, and bias index. At the same time, strategies to enhance the effectiveness of the educational session

and, subsequently, also the tool’s inter-rater reliability, were mentioned. As for the tool’s administration time, in most cases, the patients were assessed in about 5 minutes. Therefore, implementation of the tool in practice is realistic.