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Vannessa Valadez

Western Michigan University, vannessa.m.valadez@wmich.edu

Cally McShane

Western Michigan University, cally.f.mcshane@wmich.edu

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Assessing and Predicting Safe Power Mobility Use in Adults

Vannessa Valadez & Cally McShane

Background:

The current body of knowledge is lacking criteria for vision, cognition, and psychological functioning and how they affect power wheelchair use. Assessment and training is a common issue for all clinicians working in the field during powered mobility rehabilitation. Research has shown that the skills required for safe powered wheelchair driving are consistent with the skills needed for safe automobile driving (Massengale et al., 2005).

For the first time instead of using task skills, process skills were introduced as part of a powered mobility assessment with the development of the Assessment of Learning Powered mobility (ALP) tool.

1 Ask: Research Question

What factors can assess and predict safe power mobility use before a power wheelchair is acquired?

2a Acquire: Search Terms

Databases: PubMed, ClinicalKey, CINAHL

Search Terms: power mobility device, readiness, occupational performance, occupational therapy, assessment, evaluation, assistive technology, safety, factors associated, predict, power wheelchair, adult

2b Acquire: Selected Articles

Massengale et al. (2005): Correlational study. Standardized instruments were used to evaluate visual perceptual skills, visual function, cognitive skills, and personality traits. The results of these evaluations were then correlated with participants' scores on a power wheelchair performance test.

Nilsson & Durkin (2014): Grounded theory. Comparative reanalysis of assessments of powered mobility use that included merging, modifying, and expanding previous research findings. A new instrument was developed from existing data related to real environment powered mobility practice over an extensive time period.

3a Appraise: Study Quality

Massengale et al. (2005): Level IV. n=61. Participants completed testing in 4 areas of evaluation: Power Mobility Road Test (PMRT), visual function and visual perception, cognition, and personality. The evaluation instruments selected are psychometrically sound and have well-established norms.

Nilsson & Durkin (2014): Level VI. Both researchers tested their existing assessment tools from multiple perspectives by viewing and assessing approximately 40 hours of each other's video data sets using their own and each other's instruments. Video data was used to illustrate behaviors, acts, and interactions as well as clarify distinctions between phases in the learning process. The ALP tool is grounded in comprehensive data collected over an extensive period of time with a wide group of participants in order to validate the instrument.

3b Appraise: Study Results

Massengale et al. (2005): Data demonstrated strong correlations between power wheelchair driving performance and cognition ($p \leq .001$), visual perception ($p \leq .001$), and some areas of visual function ($p \leq .001$).

A multitude of factors should be evaluated by an occupational therapist before a power wheelchair is acquired.



Sunrise Medical, 2018

Nilsson & Durkin (2014): The ALP instrument takes into account the different learner groups and factors that influence powered wheelchair mobility. Psychometric testing of the ALP instrument's categories and descriptors with respect to validity is not relevant because they are grounded in observational data from powered wheelchair use in real life and not created through task analysis. The instrument also offers an indication for intervention since it is coupled with ALP facilitating strategies for each of the phases in the learning process. The descriptors, categories, phases, and stages have credibility because they are grounded in data.

4 Apply: Conclusions for Practice

There is a gap in literature regarding a comprehensive objective assessment tool to evaluate adults for driving proficiency and safety in power wheelchair use. However, research demonstrates that the prerequisites predictive of safe wheelchair driving performance include visual perception, visual function (ocular motor function, stereodepth, field of vision, binocular vision, far visual acuity), and cognition.

The ALP tool is independent of degree of cognitive limitation; it covers more than the individual's cognitive domains and skills as part of the powered mobility learning process. The ALP assesses the learners' occupational performance in relation to their expanding ability to attend to and process sensory input as well as their ability to multitask. It can be used to assess the early learning process rather than the prerequisites for safe powered mobility use.

References:

- Massengale, S., Folden, D., McConnell, P., Stratton, L., & Whitehead, V. (2005). Effect of visual perception, visual function, cognition, and personality on power wheelchair use in adults. *Assistive Technology*, 17(2), 108-121. doi: 10.1080/10400435.2005.10132101
- Nilsson, L., & Durkin, J. (2014). Assessment of learning powered mobility use—Applying grounded theory to occupational performance. *Journal of Rehabilitation Research and Development*, 51(6), 963-974. doi:10.1682/jrrd.2013.11.0237

