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Inter-rater reliability of direct observations of the physical and psychosocial working conditions in eldercare: An evaluation in the DOSES project

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ABSTRACT

The aim of the study was to develop and evaluate the reliability of the "Danish observational study of eldercare work and musculoskeletal disorders" (DOSES) observation instrument to assess physical and psychosocial risk factors for musculoskeletal disorders (MSD) in eldercare work. During 1.5 years, sixteen raters conducted 117 inter-rater observations from 11 nursing homes. Reliability was evaluated using percent agreement and Gwet's AC1 coefficient. Of the 18 examined items, inter-rater reliability was excellent for 7 items (AC1 > 0.75) fair to good for 7 items (AC1 0.40–0.75) and poor for 2 items (AC1 0–0.40). For 2 items there was no agreement between the raters (AC1 < 0). The reliability did not differ between the first and second half of the data collection period and the inter-rater observations were representative regarding occurrence of events in eldercare work. The instrument is appropriate for assessing physical and psychosocial risk factors for MSD among eldercare workers.

1. Introduction

Musculoskeletal disorders (MSD) are highly prevalent among eldercare workers (Davis and Kotowski, 2015; Luime et al., 2004). Correspondingly rates of sickness absence (Andersen et al., 2012) and premature retirement from the labor market (Jensen et al., 2012) are also high in this job group.

Eldercare workers' primary task is to take care of the residents, which often includes manual handling activities like lifting, repositioning, turning, pulling on/off compression stockings and pushing and pulling residents in different portable chairs. These manual handling tasks can be physically demanding for the eldercare worker, and potentially increase the risk for MSD (Lagerström et al., 1998; Trinkoff et al., 2003), which may result in sickness absence (Andersen et al., 2012) and premature retirement (Jensen et al., 2012).

Caring for residents not only includes satisfying physical needs but also emotional caring activities. Caring may include both verbal and physical interactions between the eldercare worker and the resident that can be of both positive and negative character. A systematic review and meta-analysis of 54 cohort studies showed that adverse psychosocial working conditions were prospectively associated with risk of MSD (Hauke et al., 2011). With regard to care workers, two recent studies reported that violence and aggression of the resident towards the care workers predicted risk of MSD and sickness absence among eldercare workers (Aagestad et al., 2014; Miranda et al., 2014, 2011).

Effective workplace surveillance, risk evaluation and preventive interventions for eldercare work rely on reliable measurements of physical and psychosocial factors in the care of elderly. Self-reported assessment of these factors may be imprecise and biased (Gupta et al., 2016; Jakobsen et al., 2016; Koch et al., 2016; Kwak et al., 2011; Prince et al., 2008). Therefore, observation methods have been developed and applied for assessing these exposures in elderly care (Jakobsen et al., 2016, 2015; Johnsson et al., 2004; Park et al., 2009). However, even though the manual handling activities and psychosocial interaction in the caring situation of the elderly often occur in parallel and may impact upon each other, no previous observation instruments have been developed to assess both factors simultaneously.

The "Danish observational study of eldercare work and

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musculoskeletal disorders" (DOSES) is a large prospective study in 126 wards in 20 nursing homes with the main aim to investigate the independent and combined contribution of physical and psychosocial working conditions to the occurrence of MSD and its consequences among Danish eldercare workers. We developed an observation instrument for the simultaneous assessment of physical and psychosocial risk factors for MSD by direct observations of eldercare work.

The main purpose of this article is to examine the inter-rater reliability of the DOSES observation instrument. In direct observations of daily work over longer time periods, the agreement between raters is particularly vulnerable to vary with the exposures being observed, the training and experience of the raters and the characteristics of the job (Park et al., 2009; Voskuijl and van Sliedregt, 2002). Furthermore, we investigate whether the inter-rater reliability depends on the exposure type and improves by time throughout the data collection period of 1.5 years.

2. Material and methods

We conducted the reliability evaluation in a sample of the study population in DOSES from September 2013 to December 2014. The DOSES observation instrument is based on direct observations of caring activities involving both residents and eldercare workers.

2.1. Development of the instrument

In 2012, we established a working group consisting of two researchers from the psychosocial work environment field, two researchers from the field of physical activity and demands at work and one occupational therapist. The working group collaborated with three experienced researchers, from June 2012 to April 2013, in the development of the DOSES observation instrument. The DOSES observation instrument was based on two earlier observational instruments; one instrument for observing psychosocial work environment in eldercare (Jakobsen et al., 2016, 2015) and one instrument for observing ergonomic factors (Koppelaar et al., 2012). The two instruments were developed by two experts who were also involved in the development of the DOSES observation instruments.

In a recent study that used one of the earlier observational instruments the authors found that frequent social interactions between care workers and residents were associated with higher depressive symptoms among care workers (Jakobsen et al., 2016). The design of that previous study allowed the authors only to analyze the frequency of the social interactions but not the content of the interaction. These concepts were based on the concept of 'emotional labour' as formulated by Zapf (2002) from an action regulation theoretical perspective. Emotional labour describes the process of managing feelings to fulfill the emotional requirements of a job and of clients or patients. Emotion regulation puts additional demands on workers with positive or negative effects. Because depressive symptoms and MSD are correlated with each other (Clausen et al., 2013; del Campo et al., 2017), we considered it possible that social interactions between care workers and residents, and in particular social interactions with a negative content (e.g. hostile behavior of the resident), may be related to risk of MSD among care workers. Therefore, we took our point of departure in the earlier instrument (Jakobsen et al., 2016, 2015) and further refined the instrument in a way that allowed us not only to measure frequency but also positive and negative content of social interactions between care workers and residents.

In April and May 2013, we conducted a pilot study comprising 5 wards from 3 nursing homes on 34 eldercare workers and 112 residents to test the procedures and feasibility of the methods, and the reliability of the observation instrument. After the pilot study, a discussion was held between the research group and the observers to discuss the feasibility of the methods and any obstacles that appeared. The observation instrument was considered to be feasible to use. It also showed fair to good inter-rater agreement, why only few adjustments were made after the pilot study.

2.1.1. The DOSES observation instrument

The coding and data entry scheme for the DOSES observation instrument was created on a computer using the software Noldus Observer XT 11 (Noldus, Wageningen, The Netherlands). The DOSES data entry scheme was transferred to tablets containing the commercially available software Noldus Observer XT pocket observer. This Noldus Observer software was used for data entry of the real-time inter-rater observations. The overall sampling was continuous in time, giving the opportunity to record both durations (start and stop time) and instantaneous occurrence (point-events) of the registered items.

The definition of "an observation" in this study is the observed continuous sequence of caring activities involving both resident and eldercare worker. The observation started when an eldercare worker entered the room of a resident, and the observation stopped when the eldercare worker finalized the caring activities of the resident and left the room. Within a single observation, the observer reported every event that occurred.

The overview of the DOSES observation instrument is presented in Table 1. Overall, the observation instrument was composed of 26 items for observation. For item 3, 10–17 and 25–26, additional information (referred to as descriptive factors), was added to provide more descriptive information to the specific item.

The 26 items were defined as either a "point event" or "state event" referring to how the events of the items were registered and thus the information they provide. A "point event" was registered at a single time point, providing information of the occurrence of an event. A "state event" was registered over time, containing information of both the occurrence and the duration of the event. The duration of the event was based on either manual registration of a start- and stop-time (referred to as "Start-Stop") or with manual start-time and automatic stop-time when a new item was registered (referred to as "Mutually exclusive and exhaustive").

Part 1 of the observation instrument (item 1 to 9 in Table 1) recorded the setting of the observation including caring activity in day shift, caring activity in evening shift, feeding situation, other situation and denied access to the room. The reason for denied access of the rater to the room of the resident (coded as descriptive factor 1 in the instrument) was given by the eldercare worker. These were registered as "Mutually exclusive and exhaustive". The rater registered manually with "start-stop" when a colleague or another person was present during the observation. Other occupational hazards (i.e. second-hand smoking or if the eldercare worker had to move furniture) were registered as single point events.

Part 2 of the observation instrument (item 10 to 18 in Table 1) recorded manual handling activities. Lifting a resident was defined as lifting and lowering a resident from one surface to the same or another surface. Repositioning a resident was defined as moving a resident up/down/sideways in bed, assisting the resident in rising to sit on the edge of the bed, or moving the resident forward/backwards on a chair without lifting the resident out of the chair. Turning a resident was defined as rolling a resident from the back position to a side position or vice-versa. It was also registered whether the resident helped substantially during the manual handling activities (defined as at least 25% reduction in physical load for the eldercare worker), whether an assistive device was used or whether a colleague (coded as descriptive factor 1 in the instrument) or others helped with the handling activity (coded as descriptive factor 2 in the instrument). Lifting, repositioning and turning the resident as well as pulling a support stocking up or down, or pushing/pulling a resident in a portable chair were registered as single point events the moment it occurred. Squatting was defined as working position with the knees bent to less than a 90° angle or kneeling on the floor (two merged items from Buchholz et al., 1996), and was registered as a "start-stop" event.