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Editorial

The Measurement and Reporting of Falls: Recommendations for Research on Falls Data Collection and Capturing Social Determinants of Health

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The World Falls Guidelines working groups called for more robust research into the many gaps in knowledge around falls prevention implementation[1]. The purpose of this editorial is to provide guidance on the measurement and reporting of falls in research. Our previous editorial[2] provided insight into defining faller types; this editorial will focus on considerations for falls data collection across settings, and the importance of capturing social determinants of health data to inform optimal treatment and monitoring procedures.

Prospective Falls Data Collection

The ProFaNE consensus recommended prospective falls data collection, rather than retrospective[3], yet since 2005, numerous studies have solely examined falls retrospectively[4]. Research investigating fall predictors through retrospective falls analyses may be less precise due to recall bias and the potential for secondary complications resulting from falls. Specifically, relying solely on cross-sectional fall-risk assessments and inquiring about fall history is not advisable for predicting falls, particularly when previous falls have resulted in transient physical injury or psychological concerns (e.g., fear of falling) that result in a change in movement pattern. It would be most appropriate to implement a prospective cohort study design, examine the baseline fall risk factors, and follow the participant prospectively over 12 months for falls[1]. When evaluating outcomes of intervention studies, it is advisable to incorporate a prospective reporting period before implementing the intervention, rather than relying on comparisons between self-reported retrospective falls prior to the intervention with prospective falls over an intervention period, or solely examining falls over the intervention period compared to a control group. The next section explains the constraints inherent in comparing falls across different data collection methods.

Methods of prospective falls reporting among community-dwelling older adults

ProFaNE recommended that falls be collected at least monthly, with daily recording, and face-to-face interview or telephone calls to gather missing falls data over a 12 month period[3]. Because the guidance on the methods for falls data collection was broad[3], study methods have been quite variable[5,6]. Studies have employed phone calls from a computerized system, contact from a research assistant, questionnaires, diaries, falls calendars, medical charts, and postal cards from nursing home staff to researchers when a fall occurred[5,6]. Some studies included a combination of these approaches to capture missing falls data (e.g., monthly falls calendars and follow-up phone calls when the calendars were not returned)[5,6]. While there have been advancements in fall detection technologies, their readiness level is low (e.g., one false alarm per 40 usage hours, lack of real-world falls data collection)[7]; further work is needed to improve fall detection technologies. It is unclear whether one, or a combination of these methods, are more reliable than the others.

Despite recommendations that falls data be collected at least monthly, with daily recording[3], the frequency of prospective falls data collection has varied, ranging from weekly to annually[5,6]. One study compared a retrospective report of falls in postal questionnaires mailed every 4 months against prospective monthly falls diaries for one

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	Community dwelling older adults	Residential settings, residents and patients	Guidance for those with impaired cognition irrespective of setting
Duration	12-month prospective		
Frequency of reporting	Daily	Immediately following fall	Daily
Frequency of collecting	Monthly		
Method of collecting	Diaries, phone calls or emails	Incident reports	Diaries, phone calls or emails
Method of reporting	Information on fall circumstances, injury and medical attention by participant	Information on fall circumstances, injury and medical attention by staff	Information on fall circumstances, injury and medical attention by carer & participant (if possible)
Missing data	Report proportion and imputation methods		
Social determinants of health	Minimum of: Sex Age Socio-economic index or income Education Race Medical conditions Medications		

Table 1. Summary of recommendations for the measurement of falls.

simultaneous 4-month period[8] and found falls rate on diaries were 32% higher than reported on the questionnaire; however, diary allocation (higher participant burden) was associated with a higher rate of withdrawal from the trial[8]. The 2005 guidelines did not mention reporting the amount of missing falls data[3], and only 36% of studies in a previous systematic review reported the percentage of complete fall data[5]. Given that the frequency of falls data collection can impact the completeness of falls data, we recommend that researchers report the amount of missing falls data and obtain falls data at least monthly with daily recording by the participant.

There has also been variability in the falls monitoring period, despite a recommended 12 months[3], with monitoring period for studies ranging from 1 month[5,6] to over 7 years[9]. This variability in the exposure to risk can lead to under-reported and misclassified falls data across studies, which are critical issues when identifying faller types. Moreover, the accuracy of falls reporting is reduced over data collection time periods longer than 12 months, as participants tend to return diaries less frequently, which impacts missing data[10]. Empirical evidence shows that 32.8% of single fallers and 50% of recurrent fallers deny falling in the previous year when comparing retrospective to prospective falls monitoring[11]. Misclassifying faller types may increase the likelihood of type II error resulting in misleading and irreproducible study findings[12].

For community-dwelling older adults with cognitive impairment, often caregivers are contacted to provide an account of falls[6]. However, this can pose an issue if the carer was not present at the time of the fall, and the older adult with cognitive impairment was able to get up on their own and did not notify their caregiver. We recommend that researchers collect falls at least monthly, for 12 months, with daily recording by participants and carers, follow-up for missing falls data, and report the amount of missing falls data that could not be captured.

Prospective falls reporting in residential care facilities and hospitals

The consensus statement provided recommendations for research examining community dwelling older adults[3]. Within residential care facilities and hospitals, it is common for falls to be documented by nursing or care staff. Such incident reports may be reliable for documenting injurious falls but may be limited for non-injurious falls if staff do not observe the fall. The level of detail in documenting the circumstances and outcomes of the fall may vary depending on local protocols or staff completing these. Some researchers have partnered with nursing homes to obtain video footage of falls in the common areas[13], advancing the field in terms of analyzing the circumstance and biomechanics of real-world falls[13]. There still appears to be a gap in staff documenting fall-related mild traumatic brain injuries, which has even limited

analyzing video footage of real-world falls[13]. Limitations in solely examining falls prospectively via medical or facility records should be recognized by researchers.

The importance of reporting falls with social determinants of health

The frequency and circumstance of falls may depend on social determinants of health[14], but the 2005 consensus did not provide recommendations for standardization of reporting[3]. The World Health Organization has categorized social determinants of health into structural (e.g., governance, policies, culture, societal values) and intermediary (e.g., socioeconomic position, gender, ethnicity, education, income) determinants, with social cohesion and social capital acting between these determinants[15]. For instance, in the community, more older women fall than men, but in care homes, and post-hospital discharge, frail men present with more falls[14]. Caucasians seem to exhibit the most falls compared to other races, but the reasons are not understood[14]. People living with dementia also tend to experience more falls[14]. With respect to the economic context, older adults who have food insecurity report more falls than older adults who have food security[14,16]. A number of other social determinants of health may impact falls, but they are often not reported and their impact on falls is largely unknown[14]. With a better understanding of how social determinants of health impact falls, future research should take actionable steps to eliminate health inequalities and inform targeted fall-related treatment and monitoring strategies.

Conclusion

To ensure that differences in falls reporting are related to the population studied and not data collection methods, we advocate for researchers to collect prospective falls at least monthly, with daily recording by participants/staff/carers over a 12-month period (Table 1). This approach, whether investigating fall predictors or intervention outcomes, promotes consistency and facilitates data synthesis for meta-analyses. We also suggest that future research reports social determinants of health related to falls to eliminate health disparities.

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