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BRIEF REPORT

Daily surveillance of falls is feasible and reveals a high incidence of falls among older adults

Susan R. Antcliff[1] | **Jeremy B. Witchalls**[1] | **Sarah B. Wallwork**[2] | **Marijke Welvaert**[3] | **Gordon S. Waddington**[1]

[1]Research Institute for Sport and Exercise, University of Canberra, Canberra, Australian Capital Territory, Australia

[2]IIMPACT in Health, Allied Health and Human Performance, University of South Australia, Adelaide, South Australia, Australia

[3]Statistical Consulting Unit, Australian National University, Canberra, Australian Capital Territory, Australia

Correspondence
Susan R. Antcliff, University of Canberra, Kirinari Street, Bruce, ACT, 2617, Australia.
Email: susan.antcliff@canberra.edu.au

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Abstract

Objective: To ensure accurate data capture for a fall study through a system of daily contact with participants.

Methods: Fifty-eight adults older than 60 years of age and living independently in the community in Canberra, Australia, were recruited for a prospective fall study. We adopted a system of daily contact with study participants for at least 12 months, either by email or by text, asking whether they had suffered a fall in the previous 24 h. At the final testing session, we asked participants whether they had experienced a fall during the previous twelve months.

Results: We found no evidence that the daily reporting regime led to excess participant attrition. Only three participants withdrew over the course of the study, and the burden of responding was not cited as a factor in any of these cases. Of the 55 participants who completed the full twelve-month study period, 38 (69%) experienced at least one fall. We also identified inconsistencies between recall of falls occurring during the last twelve months of the study and the contemporaneously recorded data.

Conclusions: Previous studies have found that increasing the reporting demands on fall study participants will lead to higher attrition. This study demonstrates that it is possible to maintain participant engagement and minimise attrition with appropriate design of reporting procedures. We confirm existing evidence regarding the unreliability of retrospective recall of falls. The study highlights the importance of comprehensive and accurate data capture and points to the possibility of under-reporting of fall incidence.

KEYWORDS

accidental falls, aged, data accuracy, data collection

1 | INTRODUCTION

Falls are well known as a major cause of injury and disability among older adults.[1] As a consequence, considerable research efforts, including the global initiative on fall prevention and management,[2] are being made to identify risk factors and effective mitigation and treatment options. A critical element of such research is an accurate measure of fall occurrence.

In their systematic review of the literature reporting on randomised controlled trials investigating falls, Hauer et al. found substantial variations in both the definition of falls and the method of recording them.[3] In relation to the definition of falls, they noted that half of the studies did not include a definition and that in many of the remaining studies, subjective decisions were made by researchers to exclude certain events. Methods of collecting fall data were found to be similarly diverse, with virtually no attention paid to compliance. In response to these issues, the Prevention of Falls Network Europe (ProFaNE) had developed recommendations on the standardised reporting of falls,[4] including the definition of a fall, which has been adopted by the World Health Organization (WHO), and best practice on data collection and reporting. ProFaNE recommended that fall data be collected using a prospective daily diary with a minimum of monthly reporting and follow-up to rectify missing data and ascertain details of the fall. Subsequent research has documented marked discrepancies in fall rates using different collection methods.[5-7] One reported downside of the data collection methodology recommended by ProFaNE is a higher level of participant attrition, particularly among those with poorer physical and mental health.[5] We sought to ensure that we had comprehensive and accurate fall data, while remaining alert to the potential costs in terms of study fatigue and attrition among participants.

Impact Statement

Participant attrition has been seen as an unavoidable trade-off of increased data accuracy in fall research. We demonstrated that a system of direct daily contact with participants in a fall study did not lead to study fatigue or attrition over a period of more than twelve months. Furthermore, consistent with previous studies, we found that retrospective recall of falls is faulty and likely to lead to misreporting, particularly under-reporting.

2 | METHODS

Our research was designed as a twelve-month prospective longitudinal study focussed on factors contributing to fall risk. An intervention study requiring 60 participants was planned to follow the collection of fall data, but did not proceed due to COVID-19. COVID-19 also resulted in the monitoring period extending for more than 12 months for most participants. We used print, radio and organisations with links to our target population (such as U3A and COTA) to reach potential participants.

Initially, we sought people who had fallen in the previous five years, but given the difficulty in reaching our required sample, this was relaxed after 26 participants had been recruited. A minimum age of 60 was set with regard to a previous study that found that the 60–75 age group had worse proprioception than younger and middle-aged adults.[8] Those with peripheral neuropathy were excluded as two of the tests were conducted unshod. This was the only exclusion factor.

The University of Canberra Committee for Ethics in Human Research approved the study (Approval 2019/1929). Participants were adults older than 60 who were living independently in the community and gave signed consent before entering the study. The participant information sheet is provided as Appendix S1.

We implemented a system of daily contact with study participants asking them to reply to a text message or email asking whether they had fallen in the past 24 h with either 'yes' or 'no'. Where a participant had not responded within three days, we followed up via text message to ensure we had a complete record for every day of whether a fall had occurred or not. Following the World Health Organization definition,[9] we advised participants that an event that led to them coming to rest inadvertently on the ground or floor or other lower level constituted a fall. In line with the ProFaNE protocols, where a person reported that they had suffered a fall, further details on the circumstances of the fall were sought immediately via email or text message.

At the initial testing session, participants completed a fall risk questionnaire, which included a question asking whether they had fallen during the previous twelve months. This allowed us to disaggregate falls during the study by reported previous fall experience. When the questionnaire was repeated at the final testing session, some participants asked for their fall history record, which was provided by the researcher. For those who did not, we were able to check recall accuracy.

3 | RESULTS

Seventy-seven people made contact in response to the call for volunteers made via print media and radio. An initial

phone interview led to three exclusions due to peripheral neuropathy, with a further twelve deciding not to proceed for a variety of reasons, including ill health of relatives and expected absence overseas. The remaining sixty-two people came in for testing, three of whom were found to have impaired peripheral sensation and were excluded. One other person was unable to complete the initial testing and withdrew at that point.

This left fifty-eight people (mean age of 73.2 years, standard deviation 6.0) who entered the study between June and November 2019. We were able to achieve 100% response rates to our daily requests for information on falls, though in a small number of cases (on fewer than 10 occasions over the course of the study), follow-up was required. This follow-up related to <0.2% of all responses, with no additional fall being reported as a result. Of the initial 58 study participants, 55 completed at least a year of reporting on falls. Three of the participants did not complete the full twelve months of observation, due to illness or disability ($n = 2$) or personal reasons ($n = 1$). While it is impossible to know whether the burden of daily reporting was a factor contributing to the decision to withdraw, it was not given as a reason, and in all three cases, they had been responding up to the point of their withdrawal.

The daily responses indicated that 65% of participants (36/55) fell during their final 12 months in the study. When asked at the final interview whether they had fallen in the past twelve months, 87% (48/55) correctly recalled whether or not they had fallen, noting that some participants asked the researcher to check what they had advised in their daily reporting before answering this question. However, as shown in Table 1 there were some inaccuracies; 4% (2/55) reported a fall when they had not fallen during the period, and 9% (5/55) failed to recall a fall that they had reported at the time.

Table 2 summarises the fall experience in the 12 months following entry into the study according to whether participants reported that they had had a fall in the 12 months preceding their entry. A z-test shows that the difference in fall rates between the two groups is not statistically significant ($X^2 = 1.58$, P-value = 0.21). Overall, 38 (69%) of the 55 participants who completed at least 12 months in the study experienced a fall in the first 12 months. There was no significant difference ($X^2 = 0.07$, P-value = 0.79) in the fall rate between those who entered the study before and after the requirement to have fallen in the last five years was lifted—65% and 72%, respectively (17/26 and 21/29). Among those recruited before the requirement was lifted, however, 65% (17/26) reported falling in the previous 12 months, compared with 38% (11/29) of the later recruits.

Note that Tables 1 and 2 refer to different periods as shown in Figure 1. Table 1 relates to the year preceding final testing. Table 2 relates to the year following the initial testing on entry to the study. Due to COVID-19, the final testing session for many participants occurred more than 12 months after entry to the study. The two periods always overlap by at least eight months but are not necessarily identical. This explains the slight difference in the total number of falls in the two tables.

4 | DISCUSSION

Previous research has reported that the prospective fall diary approach recommended by ProFaNE leads to higher rates of participant attrition.[5] Our approach removed the onus on participants to maintain a diary, and we found no evidence that the daily contact led to attrition with the small number of participant withdrawals (3 of 58 or 5%) attributable to ill health and personal reasons. Indeed, some participants commented that they liked the contact and missed their nightly messages when the study concluded. The heavier burden is likely to be on researchers who need to manage the process of collecting and recording the data. We would argue that this is a well-justified investment where data accuracy is paramount, but accept that it may not be feasible in large studies. Technological solutions, such as Web-based diaries, might offer scope for less resource-intensive methods to extend a similar approach to larger studies.

TABLE 1 Accuracy of recall—number (%) of participants correctly recalling whether they had experienced a fall in the 12 months prior to the final testing session

	Response to retrospective fall question at exit[a]		
Actual fall experience	**Had fallen**	**Had not fallen**	**Total**
Had fallen	31 (56%)	5 (9%)	36 (65%)
Had not fallen	2 (4%)	17 (31%)	19 (35%)
Total	33 (60%)	22 (40%)	55 (100%)

[a]Participants were asked at their final testing session whether they had fallen in the preceding twelve months. In some cases, participants asked the researcher to check their record of daily responses before answering. This information was provided where requested.

As shown in Table 1, seven people (13%) did not accurately recall their fall history. The two participants who erroneously reported falling had a fall during the period of the study, but it occurred more than 12 months prior to the final interview. This error is perhaps not surprising since the act of reporting the fall might be expected to give it more salience.

The failure to recall falls confirms earlier findings on the accuracy of retrospective reporting.[10] We had five participants (9%) reporting that they had not fallen when they had. In four of the five cases, the fall occurred more than 9 months previously, but one occurred only 20 days prior to the final interview. It should also be noted that the misreporting shown in Table 1 represents a minimum, since some participants said they could not remember and asked the interviewer to check whether they had fallen. Furthermore, if the reporting of falls was an aid to recall, the discrepancy between actual and recalled falls would be expected to be greater among a population that had not been reporting falls on a daily basis.

Our study was not designed to be an incidence study, and our experience may well have been affected by the recruitment strategy and the Canberra population from which our sample was drawn. In particular, our initial recruitment strategy, subsequently relaxed, sought participants who had experienced a fall of any kind in the preceding five years. This might have been expected to lead to a higher fall incidence than would be observed in a random sample. There was a higher rate of falls during the study among those who had reported falling in the previous year relative to those who had not, though the difference was not statistically significant and the possibility of inaccurate recall needs to be borne in mind. On the other hand, the Canberra population from which our sample was drawn is unrepresentative of Australia as a whole, being better educated and of relatively high socio-economic status.[11] For example, 36 of the 55 participants (65%) had completed a bachelor's degree or higher, compared with 14% of the Australian population aged 60 or more.[12] As such, our sample might be expected to be healthier and have fewer falls than the general population.

Participants recruited after the requirement to have had a fall in the last five years was dropped reported a fall rate in the preceding year of 38%. This is not dissimilar to the rates of around 35% that are typically quoted for adults older than 65.[2] By contrast, the group recruited earlier reported a fall rate in the previous year of 65%, which aligns with the observed rates for both groups during the first 12 months of the study period—65% for those recruited under the original conditions and 72% for those recruited later. Given the similarity in fall rates between the two groups, it is possible that the group recruited earlier was biased towards those who were more likely to recall a past fall rather than those who were more likely to fall.

Irrespective of any selection bias, the size of the difference between the observed fall incidence rate of 69% for the entire sample and a rate of 35% suggests that there may be significant under-reporting of falls, either due to definitions that exclude certain falls or due to incomplete data capture.

TABLE 2 Fall incidence by reported fall history—number (%) of people who experienced a fall in their first 12 months of participation in the study according to whether they reported having fallen in the 12 months prior to entry

	Response to retrospective fall question on entry[a]		
Fall experience	**Had fallen**	**Had not fallen**	**Total**
Fell	22 (40%)	16 (29%)	38 (69%)
Did not fall	6 (11%)	11 (20%)	17 (31%)
Total	28 (51%)	27 (49%)	55 (100%)
Percentage who fell	79%	59%	

[a]Participants were asked at their first testing session whether they had fallen in the preceding twelve months.

5 | CONCLUSIONS

This study demonstrates that the trade-off between data accuracy and participant attrition found in earlier fall studies may be a function of the method of data capture and is not inevitable. Daily contact with participants over a period of more than a year was found to be feasible and did not appear to result in participant attrition. While the study is too small to be definitive about fall incidence, it does suggest that, with accurate and comprehensive recording, rates may be significantly higher than have been generally reported.

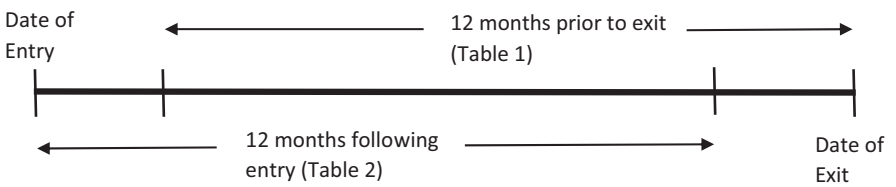

FIGURE 1 Exposure periods for fall data reported in Tables 1 and 2

Fall risk assessment tools often include a question regarding falls in the last twelve months. We add to the evidence regarding the inaccuracy of recall and the consequent need to treat responses with some caution.

The higher observed rates and small but important inconsistencies between recalled falls and the contemporaneously collected data add weight to the ProFaNE recommendations for prospective daily reporting of falls.

CONFLICTS OF INTEREST

No conflicts of interest declared.

ORCID

Susan R. Antcliff https://orcid.org/0000-0003-4308-5502

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