Falls-Efficacy as a Multiple Dimension Construct: The Role of Posttraumatic Symptoms.

Abstract

Objective

The purpose of this study was to provide the basis for a new theoretical understanding of the psychological response to falls. We tested a hypothesised model of multiple dimensions of falls-efficacy (FE) in older adults. The model involved two main components of posttraumatic stress disorder (PTSD) – fear and dysphoria – that were hypothesised to be directly associated with FE. The model proposed three pathways related to FE: 'at the moment FE' related to fear, 'constant FE' related to dysphoria and 'elaborated FE' related to fear of falls (FoF).

Methods

In this cross-sectional study a convenience sample of 119 older adults hospitalised in Poland due to fall-related injuries completed a survey involving fear of falls, FE and PTSD assessment.

Results

All three hypothesised pathways related to FE were supported, which accounted for 61% of the variance in falls efficacy. Very strong relationships were found between FE and dysphoria (.447, 95% CI [.303, .632], p = .006), FE and fear (.261, 95% CI [.109, .416], p = .009), and FE and FoF (-.286, 95% CI [-.396, -.183], p = .006).

Conclusion

FE is not a unidimensional concept but acts differently depending on what influences it. Dysphoria appears to be central to the fall-related constructs of FE and FoF and responsible for their maladaptivity. FoF, which is often misinterpreted as FE, was found to be less prominent in the analyses. Thus, fear of falls may not always be negative, as it is commonly believed, but adaptive and protective.

Keywords: falls, anxiety, falls-efficacy, fear of falls, PTSD

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Introduction

Falls efficacy

Feeling safe while walking is a key aspect of mobility and independence among older adults. The belief that one has the ability to maintain balance without falling is referred to as falls efficacy (FE) (Tinetti et al., 1994). The importance of the role of FE cannot be underestimated. Indeed, FE has been found to be a better predictor of future falls than physiological fall risk factors (Landers et al., 2016), and can better discriminate between frequent fallers and non-fallers than physical performance (Kamide et al., 2019). A study conducted by Delbaere et al. (2010) found that individuals who reported high FE, despite their high physiological fall risk, had fewer falls. Thus, high FE may be protective towards future falls despite physiological risks of falling. Conversely, low FE may have detrimental effects on older adults. Those who think they are unable to accomplish certain activities are less likely to perform the activity. Low FE has been associated with decreased participation in social and leisure activities (Jung et al., 2015), compromised gait parameters (Chamberlin et al., 2005), mobility disability (Auais et al., 2018), as well as with activities of daily living and depression (Korpershoek et al., 2011). Further, Kamide et al. (2020) reported that low FE was highly predictive of frailty progression.

Fear of falls

While enhanced falls-efficacy has been found to play a positive role in fall risk, fear of falls (FoF) is believed to always have a negative influence on that risk. More recently, FoF has been proposed to be an inborn fear that is not necessarily negative but rather adaptive, depending on whether one has had a fall (Adamczewska & Nyman, 2018), or potentially even witnessed a fall, which would substantially affect their lives. FoF is a construct that is often associated with FE. FE and FoF tend to share some overlap and

correlation in research which is related to the similarities in the constructs of the measures (Landers et al., 2016). That is, FE has even been considered a measure of FoF (Tinetti et al., 1990). As a consequence of misinterpretation of FoF as low falls efficacy, many researchers misapply measurement tools and misinterpret findings. Hence, it is important to clearly differentiate FoF from FE, since the evaluation of interventions may be affected by the definitions and tools applied.

Anxiety

Strikingly, FoF has been also misinterpreted as anxiety. For instance, Murphy & Isaacs (1982) described FoF as a certain *anxiety* after falling. Furthermore, Young & Williams (2015) employed anxiety instead of fear to explain balance performance. Fear and anxiety are both emotional responses to aversive events. However, fear refers to the response to present threat (Blanchard & Blanchard, 2008), while anxiety relates to subjective feelings and worries about some poorly-specified future negative outcome (Barlow, 2002). That is, the difference between the two may be related to the degree of uncertainty (Carleton et al., 2007).

The research on FoF and anxiety has provided mixed results. FoF has been found to be independently associated with anxiety (Van Haastregt et al., 2008), significantly correlated with anxiety and depression (Gagnon et al., 2005), and even predicted by anxiety (Painter et al., 2012). However, Ribeiro and Santos (2015) reported no correlation between FoF and anxiety. It may be speculated that anxiety is related to FoF only after falling. Austin et al. (2007) found that depression did not predict new-onset of FoF but in contrast it predicted persistent FoF. It has been previously suggested that FoF may actually be protective and the presence of anxiety is responsible for maladaptivity of FoF (Adamczewska & Nyman, 2018). Thus, rather than FoF which is

adaptive, anxiety may be responsible for persistence of maladaptive responses towards fall-related threat and consequently decreased FE.

Multidimensionality of falls-efficacy

One way of addressing the issue of misinterpretation of FoF, FE and anxiety is to explore the concepts in the context of a well-researched condition, such as posttraumatic stress disorder (PTSD) where fear and anxiety play central roles (Jovanovic et al., 2013; Zoellner et al., 2014). Sumner et al. (2019) conceptualised PTSD in terms of two compromising dimensions of fear and dysphoria. Dysphoria relates to non-specific symptoms of general distress that is common to anxiety and mood disorders (Armour et al., 2016). It includes irritability, feelings of a foreshortened future, restricted affect, loss of interest in activities, estrangement from others, sleep disturbance, and concentration problems (Forbes et al., 2010). The symptoms are less phobic, but more anxious in quality and have been found to highly correlate with anxiety (Pearson's r = 0.9) and depressive symptoms (Forbes et al., 2010; Simms et al., 2002). Network analysis of PTSD indicates that fear might be the key element of PTSD, while dysphoria is rather a secondary response which emerges over time (Bryant et al., 2017). In the current study, we applied this distinction between fear and dysphoria and captured anxiety symptoms with a measure of the dysphoria factor. We challenged the current view of falls-efficacy as a unidimensional concept (Tinetti et al., 1990), according to which one is ought to experience equal FE levels when thinking about the action (potential threat) and performing the actual action (present threat), which often may not be the case since one may feel less confident about their ability to perform the activity in certain contexts (present or potential threat). We hypothesised that FE plays different roles depending on what impacts it. That is, repeated triggering of fear responses to

trauma related-cues would fuel anxiety represented by dysphoria, which would affect one's general belief in performing various activities (potential threat). Moreover, fall-related beliefs that the trauma would repeat itself would trigger contextual fear of falls (present threat). Consequently, one would feel incompetent of performing fall-related present activities represented by decreased falls-efficacy.

In the current study, we applied a path analysis approach to investigate the relationships between fall-related variables in order to support the multidimensionality of falls-efficacy. To our knowledge, this is the first study to apply a path analysis approach or similar to separate constructs of FoF, FE and anxiety. Rather, much confusion over the concepts exists in the field of falls and the role of anxiety has received rather scant attention. The aim of this paper is therefore to provide the basis for a new theoretical understanding of the psychological response to falls and in so doing clarify the relationships between these constructs.

Methods

Design

The study was a multi-centred cross-sectional survey conducted at three general hospitals in the Greater Poland Voivodeship, Poland. The area has the highest rates of fall-related deaths in Poland (12.4 versus 7.6 per 100 000 inhabitants), twice as high as the EU average (5.3 per 100 000 inhabitants; ,(Wojtyniak & Goryński, 2018). Necessary permissions to conduct the research were granted from all hospitals. Ethical approval was obtained from the Bournemouth University Research Ethics Committee.

Participants

The data presented in this study were collected from patients of orthopaedic wards at three general hospitals and one outpatient clinic which was a part of one of the hospitals. Patients who met the following inclusion criteria were invited to participate in

the study: aged >60 years, and experienced an injurious fall resulting in hospital treatment (i.e. fractures or head trauma) up to a maximum of six months prior to the study. Cognitively impaired individuals were excluded. Potential participants were approached by the researcher who advertised the study. After giving their written informed consent, participants completed the questionnaire. The researcher conducted a structured interview with participants who were physically unable to do so due to e.g. upper limb fracture. The questions and answers were read out loud and participants verbally selected the desired response.

Measures

PTSD

PTSD symptoms that might have occurred over the past month were completed with a validated self-report checklist (PCL; Weathers et al., 1993). This measure is not specific to falls and has been widely used in various contexts (Wilkins et al., 2011). The majority of participants experienced their falls within one week and so would not fulfil the time criterion for a PTSD diagnosis. Therefore, an umbrella term of 'PTSD symptomology' was adapted for the purpose of this paper since that group constituted of both individuals who met full criteria of PTSD diagnosis as well as participants with acute PTSD symptoms.

Respondents rated each item from 1 (*not at all*) to 5 (*extremely*) to indicate the degree to which they have been bothered by that particular symptom. Thus, total possible scores ranged from 17 to 85. Responses between 3-5 for each item were treated as 'symptomatic'. PTSD diagnosis was achieved according to DMS-IV criteria, i.e. at least one re-experiencing symptom, three avoidance symptoms and two arousal symptoms (American Psychiatric Association, 1994). PTSD item mappings of the fear and dysphoria dimensions model were based on the work of Sumner et al. (2019). That is,

the re-experiencing, hyperarousal and avoidance symptoms (Simms et al., 2002) compromised the fear factor, while the remaining symptoms corresponded to the dysphoria factor.

Fall-related assessment

Falls Efficacy Scale – International (FES-I: Yardley et al., 2005) was used to measure FE. It assesses the confidence participants feel when engaging in various tasks of daily living that are frequently affected by falling. Each item was rated on the scale from 1 (*not at all concerned*) to 4 (*very concerned*). FoF was assessed with a question: 'Are you afraid of falling?', with a *yes* or *no* response. Fall-related beliefs were assessed with an item asking: 'Do you believe the reason you fell will cause you another fall in the future?', with response options from 1 (*definitely repeatable*) to 7 (*definitely not repeatable*).

Data analyses

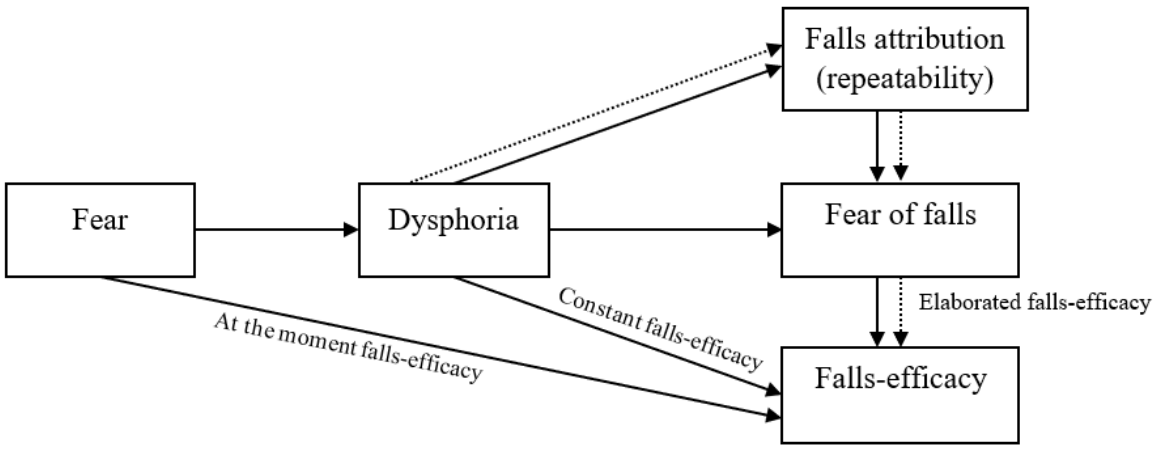
Data were analysed using the Statistical Package for the Social Sciences version 26 and Amos version 26 for Windows. No missing data were detected. The complete dataset was screened for outliers using extreme value analysis. No outliers were suitable for deletion since inspection indicated that they were representative of participant scores on other measures.

Normality was assessed visually via the analysis of histograms and with the Kolmogorov-Smirnov statistical test that revealed that the data were non-normally distributed. Since the data was positively skewed, logarithmic (log) transformations were performed (Limpert & Stahel, 2011). Logarithms of the values were calculated by logarithmic transformation (base 10) of the original values which improved the distribution of the data. There was no evidence of the presence of multicollinearity in the log-transformed data. Analyses of variance inflation factors (VIF) revealed that

none of the scores exceeded 4.00 and VIF values ranging from 3 to 5 are considered acceptable (Hair et al., 2010). Furthermore, tolerance statistics were well above 0.2 indicating that multicollinearity was not problematic (Field, 2005).

Prior to performing path analysis, Pearson correlations between PTSD factors, FoF, FE and repeatability were examined to determine the strength of the relationships. Path analysis was performed using a hypothesised model. The model was built around two PTSD factors – fear and dysphoria – that would affect the fall-related constructs of falls beliefs (repeatability), FoF and FE. As previously suggested (Sumner et al., 2019), fear was hypothesised to be the key factor that would fuel dysphoria and directly and indirectly influence fall-related constructs.

Figure 1. Hypothesised model of falls-efficacy.



The model (Figure 1) assumed three paths that influenced FE:

1. ‘At the moment falls-efficacy’ relates to the direct relationship between fear and FE. After falling there may be some reactivity towards multiple triggers such as environmental or situational factors (e.g. particular places, behaviour, weather, noises) that are associated with feeling of threat which gives rise to fear. Symptoms of hyperarousal and re-experiencing can make someone fearful when faced with a present threat that may result in maladaptive responses since one feels incapable of performing activities at the very moment.
2. ‘Constant falls-efficacy’ refers to the direct relationship between dysphoria and FE. Dysphoria results as a secondary response that emerges over time (Bryant et al., 2017). It is fuelled by fear. In particular, hyperarousal is considered the ‘engine’ that drives other PTSD symptoms (Solomon et al., 2009). In the path, dysphoria develops over time as a result of falling and makes someone constantly worry about their incapability of ever performing particular activities, which are related to their past fall.
3. ‘Elaborated falls-efficacy’ relates to the indirect relationship between PTSD factors and FE via repeatability and FoF. Repeated fear experiences fuel dysphoria over time. The emotional distress affects the way one perceives the stability of the cause of their falling, which shapes one’s view on their FoF. Depending on the perception, one feels more or less fearful and consequently capable or uncapable of performing the activity. Unlike the previous paths that are more likely to result in negative outcomes, this path may result in more positive outcomes, i.e. successfully performing the activity.

All estimation of model parameters were examined using full information maximum likelihood. The indices related to fit were examined to test the overall fit of the model.

Meeting the criteria as follows would be indicative of a good fit to the data: 1) the chi square goodness-of-fit test (nonsignificant), 2) degrees of freedom (df) (ratio of <3 for chi-square / df), the root mean square error of approximation (RMSEA) (value of ≤0.06), 4) the Tucker-Lewis Index (TLI, value of 0.95 or greater) and 5) the Comparative Fit Index (CFI, a value close to 1) (Browne & Cudeck, 1992).

Results

A total of 119 patients were recruited. Table 1 shows the demographics and falls characteristics of the study participants. Overall, 38 of 119 participants (32%) met the criteria for PTSD diagnosis. Individuals with PTSD symptoms were more likely, than those without PTSD symptoms, to show lower levels of falls efficacy and believe that the reason why they fell would cause them falls in the future. They were also more likely to experience FoF.

Table 1. Demographic data of participants and their falls characteristics.

Variable	All	PTSD	
		Yes	No
	119 (100%)	38 (32%)	81 (68%)
Age, M (SD)	74.52 (9.15)	78.26 (9.89)	72.77 (8.27)
Male (%)	42 (35%)	8 (21%)	34 (42%)
Female (%)	77 (65%)	30 (79%)	47 (58%)
Weeks since falling			
<1	83 (70%)	23 (60%)	60 (74%)
1-2	18 (15%)	8 (21%)	10 (12%)
2-4	5 (4%)	2 (5%)	3 (4%)
4-8	3 (2%)	2 (5%)	1 (1%)
<8	10 (8%)	3 (8%)	7 (9%)
Falls outcome			
Upper limb fracture	26 (22%)	4 (10%)	22 (27%)
Lower limb fracture	55 (46%)	8 (21%)	47 (58%)
Hip fracture	24 (20%)	13 (34%)	11 (14%)

Back fracture	6 (5%)	6 (16%)	0 (0%)
Head trauma	8 (7%)	7 (18%)	1 (1%)
Repeatability			
Definitely	13 (11%)	7 (18%)	6 (7%)
Very possible	11 (9%)	7 (18%)	4 (5%)
Possible	18 (15%)	10 (26%)	8 (10%)
Quite possible	38 (32%)	6 (16%)	32 (39%)
Maybe possible	10 (8%)	1 (3%)	9 (11%)
Not really possible	1 (1%)	1 (3%)	0 (0%)
Definitely not	28 (23%)	6 (16%)	22 (27%)
PTSD			
Fear Factor (SD)	19.16 (8.60)	29.15 (6.44)	13.91 (3.27)
Dysphoria (SD)	15.02 (7.62)	23.50 (6.90)	11.05 (3.67)
Fear of falls present	99 (83%)	37 (97%)	62 (76%)
Falls-efficacy (SD)	15.03 (6.33)	21.45 (5.49)	12.02 (4.07)

Note: Fear factor: 9 (low fear) - 45 (severe fear); dysphoria: 8 (low dysphoria) – 40 (severe dysphoria); falls-efficacy: 7 (no concern about falling) – 28 (severe concern about falling).

Bivariate correlations

The correlations among PTSD, FE, FoF and repeatability are presented in Table 2. Falls-efficacy negatively correlated with both FoF (r = -.494, p < .001) and repeatability (r = .449, p < .001), and positively with dysphoria (r = .728, p < .001) and fear (r = .668, p < .001).

Table 2. Bivariate correlations between the variables.

	Fear of falls	**Dysphoria**	**Fear**	**Repeatability**
Falls efficacy	-.494**	.728**	.668**	-.449**
Fear of falls		-.321**	-.293**	.421**
Dysphoria			-.785**	.447**
Fear				-.303**

** p < .001

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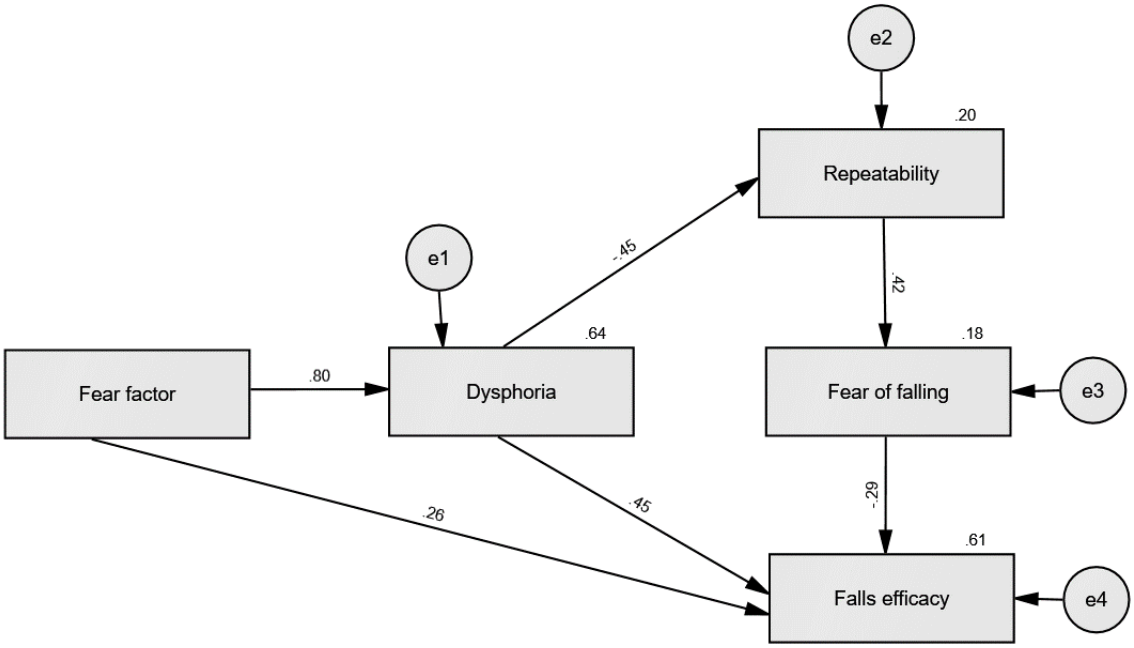
Path analysis

A path analysis to determine the presence and significance of hypothesised relationships between variables was performed (see Figure 2 and Table 3). The overall fit for the model was good for the data used $\chi^2(4, N = 119) = 5.988$, $p = .200$. Other values of model fit were also satisfactory (RMSEA = .065, TLI = .982 and CFI = .993). All the paths in the model were significant. The variables combined accounted for 61% of the variance in FE.

Figure 2. Results of the path analysis with standardised path estimates.



Note: The arrows give standardised regression effects (i.e. beta coefficients) between pairs of variables. The circular entities represent error variances for each of the measured variables. The number over the right side of the variable is the value of R^2.

Results of path analysis (Figure 2 and Table 3) supported three hypothesised paths influencing FE.

1) 'At the moment FE' - the direct effect of fear on FE was significant, yet not as strong as anticipated (.261, 95% CI [.109, .416], $p = .009$).

2) ‘Constant FE’ – a much stronger relationship was found between dysphoria and FE (.447, 95% CI [.303, .632], p = .006).
3) ‘Elaborated FE’ - repeatability, which was directly predicted by dysphoria (.447, 95% CI [-.569, -.295], p = .013) and indirectly by fear (-.358, 95% CI[-.441, -.199], p = .027), affected FoF (.421, 95% CI [.340, .516], p = .006) which in turn significantly influenced FE (-.286, 95% CI [-.396, -.183], p = .006). The indirect effect of repeatability on FE was minor yet significant (-.120, 95% CI [-.178, -.072], p = .005).

Table 3. Total, direct and indirect effects between PTSD factors and fall variables.

Effect	**Total**	95% CI*	**Direct**	95% CI	**Indirect**	95% CI
Of fear factor on						
Dysphoria	.802*	[.731, .843]	.802*	[.731, .843]	-	-
Repeatability	-.358*	[-.441, -.199]	-	-	-.358*	[-.441, -.199]
FoF	-.151*	[-.200, -.075]	-	-	-.151*	[-.200, -.075]
FE	.663*	[.580, .724]	.261*	[.109, .416]	.402*	[.279, .546]
Of dysphoria on						
Repeatability	-.447*	[-.569, -.295]	-.447*	[-.569, -.295]	-	-
FoF	-.188*	[-.254, -.099]	-	-	-.188*	[-.254, -.099]
FE	.501*	[.344, .658]	.447*	[.303, .632]	.054*	[.029, .086]
Of repeatability on						
FoF	.421*	[.340, .516]	.421*	[.340, .516]	-	-
FE	-.120*	[-.178, -.072]	-	-	-.120*	[-.178, -.072]

Of FoF on						
	FE	-.286*	[-.396, -.183]	-.286*	[-.407, -.183]	-	-

p< 0.05

CI – confidence intervals

Discussion

The aim of the present study was to examine the multidimensionality of falls-efficacy in the context of PTSD symptoms (fear and dysphoria) in a sample of injured and hospitalised fallers. The present study revealed that 32% of participants developed PTSD symptomology. This is in line with previous findings (Bloch et al., 2014; Chung et al., 2009; Jayasinghe et al., 2014) where approximately one in three older adults developed PTSD after an injurious fall.

The current study found that decreased falls-efficacy was positively related to fear of falls and dysphoria. Dysphoria symptoms, entailing a sense of loss of mastery may prevent self-efficacious behaviours (King et al., 2009). Consequently, anxiety can make older adults feel less confident about their abilities (Chu et al., 2011; Gagnon et al., 2005; Ribeiro & Santos, 2015). This is consistent with Payette et al. (2016) who reported that FE had a strong relationship with anxiety. However, the relationship between FE and FoF was only moderate and FE correlated more strongly with dysphoria. This contradicts the traditional understating of FoF and FE as being interchangeable concepts (Mckee et al., 2002), but is in line with the Multifactorial Causation Model of Falls and Fear (Hadjistavropoulos et al., 2011), which assumes that FE and FoF are separate constructs.

It is currently assumed that falls-efficacy is a unidimensional concept, which is experienced in the same way regardless of the context. That is, whether an older person is faced with the potential, present or a general idea of performing any activity. The

present study revealed that falls-efficacy is a more nuanced concept with various constructs influencing it. The study showed that dysphoria considerably impairs FE. According to Benight & Bandura (2004), individuals with low self-efficacy tend to believe they are unable to manage their threats and view many aspects of their environment as dangerous. They worry about potential threats and magnify them that consequently compromise their functioning (Benight & Bandura, 2004). In that sense, FE refers to perceived potential abilities to manage fall-related tasks. It is consistent with Jiang et al. (2016) who found that psychological distress predicted FE at 6 months follow-up among nursing home residents. Moreover, Rivasi et al. (2019) found that depressive symptoms were predictive of FoF development (assessed with a falls efficacy scale) at a two year follow-up and suggested that a drop in FE occurred as a result of a burden of depressive symptoms.

Another hypothesised path that found support in the analysis was the direct path between fear and FE. During trauma exposure, attention tends to be focused on the danger, generating fragmented and poorly contextualised memories that are hard to control (Brewin et al., 2010). Traumatised individuals are unable to control their flashbacks, yet by avoiding trauma triggers, they can purposively decrease the probability of experiencing one (Brewin, 2014). That is, individuals with high levels of fear factor that involve re-experiencing, hyperarousal and avoidance, tend to show low levels of FE because they may feel unable to face fall-related triggers. They may want to choose to avoid a release of negative sensations associated with it. In this context, FE refers to perceived specific and actual abilities to perform current activity. Fear, according to Barlow (2002), is a basic, adaptive and protective response toward a current, identifiable threat. We suggest that FoF should be interpreted with this definition of fear rather than assumed to always be maladaptive.

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The last hypothesised path predicts the contextuality of the fear based on one's previous experiences. The belief that the reason why one fell would cause another fall is related to the controllability of falling in the future. One may attribute their falls to permanent characteristics (e.g. poor health) or temporary characteristics (e.g. bad weather). Depending on the attribution, some situations may be perceived as controllable by an individual or uncontrollable or perhaps controllable by 'fate' (Byrns et al., 2002). In the model, such control beliefs determine the way FoF is experienced. That is, the less controllable the fall-related situation, the more likely FoF is experienced. FoF may protect one from undertaking the activity that may cause them falling which implies a positive role of FoF. However, excessive FoF may prevent one from doing something that may not necessarily lead them to falling; or too little FoF may result in undertaking relatively risky activities. In that context FoF is maladaptive. Given the contextuality of FoF based on one's previous experiences and attributions, in this path FE may be most closely related to one's physiological fall risk.

Implications

Most research on falls efficacy has framed it as a unidimensional experience. Our research suggests the multidimensionality of falls-efficacy which is a novel approach to the construct. There is a need for a wider consideration of falls-efficacy in relationship with fear, fear of falls and anxiety. The results of our study suggest that it is not FoF that is responsible for maladaptive responses towards fall-related situations, but the consequences of the trauma associated with previous falls – fear and anxiety. This novel approach may therefore shift attention from the well-established belief of the negative role of FoF towards other constructs such as anxiety that may have much more severe consequences for older adults. It appears that the presence of anxiety not only is responsible for maladaptive FoF, but is also crucial for falls-efficacy since it refers to

constant FE. Anxiety relates to subjective feelings and worries in which one's thoughts are focused on some, probably poorly specified, future negative outcome (Blanchard & Blanchard, 2008). Thus, anxiety needs to be taken into account in interventions aimed at improving falls-efficacy. In that sense, an older person may have general assumptions about their ability to function without falling, which we framed as 'constant falls-efficacy'.

Our research also suggests that anxiety is fuelled by repeated triggering of fear responses which are accompanied by strong physiological reactions such as fight or avoidance (Blanchard & Blanchard, 2008). Therefore, the management of the responses may enhance 'at the moment falls-efficacy', and consequently an older person may feel more confident and able to control poorly-contextualised triggers when performing current activity. It could be assumed that the fear factor and fear of falls would show some commonalities, yet the important distinction between the two is the specification of fear. The 'elaborated falls-efficacy' relates to contextualised fear based on an older person's pervious fall-related experiences. Thus, interventions could address older adults' beliefs about their falls, such as controllability of future falls. Potentially, nominating and targeting the most prominent dimension of falls-efficacy for each individual with compromised FE, may be the most efficient form of fall prevention interventions. For instance, employing a cognitive behavioural intervention has been found to be successful at reducing fall rates (Winter et al., 2013). Furthermore, Parry et al. (2016) found that a cognitive behavioural therapy significantly improved falls-efficacy and depression scores in older adults. Developing such interventions might be crucial since psychotropic medications, that may otherwise be effective in decreasing symptoms of anxiety or PTSD, are themselves independent risk factors for falls (Payne, Abel, Simpson, & Maxwell, 2013) and may increase fall risk by nearly 50% (Woolcott

et al., 2009). Indeed, psychotropic medications such as antidepressants and antipsychotics have a greater likelihood of causing falls compared to other drugs (Basaran et al., 2016; Ribeiro & Santos, 2015).

Limitations and future research

There are several limitations to this study. First, we measured FoF using one item assessment. The degree of FoF ought to be measured. To avoid burden on participants, we limited the number of questions to be asked to the minimum. We did not assess anxiety separately but relied on the dysphoria factor of the PTSD checklist. That is, although dysphoria and anxiety share some overlap and are highly correlated (Forbes et al., 2010), they are not the same constructs. Future research should include a separate measure of anxiety. The sample constituted of older adults who just experienced a fall. That is, three quarters of the sample had a fall within a week and some were still waiting for surgery. The majority of them were immobile and therefore often unable to experience the 'present' threat, or potentially, magnified the severity of the threat in order to avoid further falls and injuries. Thus, the real long-term impact of falls could not be assessed within the scope of this study. Consequently, the implications of the study may not be transferable to other populations, e.g. older adults who have experienced non-injurious falls. Further research incorporating more diverse samples is therefore required.

Furthermore, since most of participants were recent fallers, full diagnosis of PTSD was not possible. Future research should involve a follow-up which would assess whether the majority of older people's symptoms of PTSD would meet diagnostic criteria and be present for at least a month, and if so the persistence of such symptoms longitudinally. Further research may focus on other anxiety disorders that are not readily associated with falls, such as obsessive-compulsive disorder which may potentially influence falls

efficacy. That is, one may engage in compulsive behaviours to reduce discomfort associated with intrusive fall-related thoughts. One may also feel compulsion for always touching a handrail which may have devastating consequences for FE in situations when a handrail is not available and therefore, they may avoid the activity. Furthermore, scanning the environment for specific hazards may result in inattention to other potential hazards.

Conclusion

In conclusion, PTSD symptoms are not uncommon among fallers and affects fall-related constructs. Applying PTSD to the research expanded our understanding of falls efficacy which may not be a unitarian concept, but act differently depending on what influences it. FoF in that sense is not negative but adaptive and heavily affected by the perceived repeatability of previously experienced falls.

Disclosure of interest

The authors report no conflict of interest.

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