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The relationship between syncope, depression and anti-depressant use in older adults

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Abstract

Background: syncope is a common problem which increases in older age groups. In syncope clinics, patients who are depressed have higher rates of unexplained syncope and higher rates of recurrent syncope.
Objectives: we aim to examine the rates of depression in older patients reporting syncope and the effect of anti-depressants (ADs) on the rates of syncope.
Design: epidemiological, point-prevalence study.
Setting and participants: data came from the Irish Longitudinal Study on Ageing, which includes 8,175 adults aged 50 and older, living in the community in Ireland.
Measurements: the Centre for Epidemiological Studies Depression scale was used to assess levels of depression. Multinomial regression was used to analyse the data with a *P*-value of <0.05 determining significance.
Results: 7,993 participants aged 50 and older were included, and of these 349 reported at least one syncopal episode in the last year. Prevalence of syncope was 4.4%. After controlling for participant characteristics and general health, those with severe

depression had a greater risk of single and multiple syncopal events (relative risk ratios [RRR]: 2.78 and 2.84, respectively, $P < 0.050$) and participants treated with tricyclic anti-depressants (TCAs) were also at greater risk for single and multiple syncopal episode in the last year (RRR: 2.31, $P = 0.062$; RRR: 2.95, $P < 0.05$).
Conclusions: this study demonstrates an increased risk of syncope in patients with depression, with higher rates of syncope reported with increasing severity of depression. Treatment with TCAs increases both the risk and frequency of syncope in the community. Depression is a potentially modifiable risk factor for syncope but treatment options need to be tailored in the older patient population.

Keywords: *depression, syncope, anti-depressant medication, older people*

Introduction

Syncope is defined as a sudden loss of consciousness associated with the inability to maintain postural tone, followed by spontaneous recovery [1]. The true incidence of syncope in the general population is difficult to estimate due to the lack of definition, differences in population prevalence and under reporting in the general population [2]. Large population studies have shown a rise in the incidence of syncope as people age. The Framingham cohort estimates that the cumulative incidence of syncope is ∼50% in men and women aged >80 years [3]. In tandem with the observed rise in incidence, there is an increase in both hospital admissions and morbidity and mortality in older patients who present with syncope [4, 5]. Syncope recurrence rates are also higher in older age groups [6]. In older patients, multiple causes of syncope are often present and the medical history may be less reliable than in the young [7]. For example, polypharmacy and cognitive impairment are known risk factors which can increase susceptibility to syncope in older populations [8].

Depressive symptoms have been described in patients with recurrent vasovagal syncope, as well as unexplained syncope [9, 10]. Despite the higher rates of depression seen in patients who experience syncope, the exact relationship between the two has not been fully established. In older cohorts, there have been links observed between depressive symptoms and rates of syncope. In older patients who have been hospitalized for syncope, there were higher rates of depression diagnosed after 2 years of follow-up [11]. However, in community-dwelling cohorts, the prevalence of depression and its role in susceptibility to syncope remain unknown. With an estimated prevalence of between 2 and 5%, depression is a significant co-morbid condition in community-dwelling older cohorts [12, 13]. Anti-depressant (AD) medications are also increasingly being prescribed for older patients with studies showing a prevalence of AD prescriptions to be between 10 and 13.7% of prescriptions for community-dwelling older people [14, 15].

To date, no population-based study has investigated the prevalence of syncope in community-dwelling elderly populations and its relationship to depression. We aim to estimate the prevalence of depression in older patients reporting syncope and the effect that treatment of depression with commonly prescribed ADs has on rates of syncopal attacks.

Methods

Data

The data come from Wave 1 of The Irish Longitudinal Study on Ageing (TILDA), which includes 8,175 adults aged 50 and older living in the community in Ireland. TILDA is a nationally representative survey of people aged 50 and over. The household response rate was 62% and those who participated provided informed consent. Participants were interviewed in their homes and were invited to attend a comprehensive physical health assessment. Further study details are presented as follows described in detail previously [16]. In this study, we use data from the in-home assessment.

Study procedures

Computer-assisted personal interview

Structured interviews were undertaken in the respondents' homes by trained professional social interviewers using computer-assisted personal interviewing. During the interview, information on the health and well-being of participants, including demographics, socioeconomic status, medical history, personal health behaviours and physical functioning and medication use, was collected.

Ethics

Ethical approval for the study was obtained from the Trinity College Research Ethics committee. All participants provided written informed consent prior to participating in the study.

Measures

Syncope

All participants were asked whether they had fainted at any point during their lifetime. Those who responded positively were asked for further details that included whether they were a frequent fainter in youth (yes/no), had fainted in the past 12 months (yes/no) and how many faints they had experienced in the past 12 months.

Center for epidemiological studies depression scale

Center for Epidemiological Studies Depression scale (CES-D) was used to assess depression [17]. This is a 20-item scale that asks respondents to evaluate how often ('rarely or none of the time' to 'most or all of the time') in the last week they have experienced a symptom. Higher scores indicate increased depression. Cut-off values were applied, where 0–15 indicates no or mild depression, 16–26 indicates moderate depression and 27 and higher indicates severe depression [18].

Anti-depressant use

All AD medications were coded using the World Health Organizations Anatomical Therapeutic Chemical index [19]. All ADs have the same first 4 digit code (N06A); once ADs were identified, these were broken into classes. In this paper, we only make the distinction between selective serotonin reuptake inhibitors (SSRIs), tricyclic anti-depressants (TCAs) (serotonin–norepinephrine reuptake inhibitors, serotonin antagonist and reuptake inhibitors, tetracyclic and monoamine oxidase inhibitors) due to small number of other ADs prescribed.

Co-morbidity

A number of self-reported conditions were controlled for in the analysis, these include high blood pressure, angina, heart attack, heart failure, diabetes, stroke, transient ischaemic attack, lung disease and dementia. These were all dichotomously coded (absent/present).

Anti-hypertensive medications

Participants were asked 'Are you currently taking any tablets or pills for high blood pressure?' (yes/no).

Substance abuse

Participants were asked 'Has a doctor ever told you that you have any of the following conditions?' where alcohol or substance abuse was listed as one of the conditions (yes/no).

Demographic information

Age, sex, level of education achieved (primary/none, secondary and tertiary) and marital status (married, never married, widowed or separated/divorced) were controlled for in the analysis.

Statistical analysis

Descriptive statistics were used to explore the relationships between syncope, depression and AD usage. To calculate the prevalence of syncope, survey weights, cluster and stratum were set and tabulation and cross tabulation was used. The standard errors were calculated using the Taylor series linearization method, and differences assessed using the design-based F statistic.

The outcome, number of syncopal episodes in the past 12 months, is a count variable and was over dispersed (standard deviation larger than the mean [mean = 0.09, SD = 0.78]). We therefore chose to categorize our outcome into three categories: no episodes, one syncopal episode and multiple syncopal episodes. As a result of this categorization, we use bivariate multinomial regression to investigate the relationships between recent syncopal episodes with depression and AD use. Subsequently, we fitted a multivariate multinomial regression model using survey weights where we adjusted for age, sex, education, marital status, health conditions, anti-hypertensive medications and substance abuse. Relative risk ratios (RRR) were produced and represented the chance that an observation fell into the comparison category rather than the baseline category (no syncopal events). Finally, we investigated interaction terms between medication type and depression. All analyses are conducted in Stata (v12.1).

Results

A total of 8,175 participants, aged 50 and older, were enrolled in this study; of which, 152 were excluded due to incomplete data. An additional 30 participants were excluded with a self-reported physician diagnosis of dementia or a Mini-Mental State Exam result of <18, due to potential recall bias. This resulted in a final sample of 7,993 participants. Descriptive statistics can be seen in Table 1. The age of the patients ranged from 50 to 99 years with an interquartile range of 56–71 (SD 0.2). Of all the participants, 225 reported one syncopal episode in the last year, and 124 reported two or more syncopal episodes. The sample had an evenly split gender distribution. Females reported higher rates of recurrent syncope when compared with their male counterparts (59.1 versus 40.9%) but this failed to reach statistical significance. Compared with participants with no episodes, participants with syncopal episodes reported higher rates of all health conditions. There were statistically significantly higher rates of hypertension, heart attack, stroke and anti-hypertensive use in the group who reported syncope. In relation to AD medication usage, the most frequently prescribed AD was the SSRI class, with 3.9% of the total sample taking an SSRI.

Prevalence

The overall prevalence of syncope in the TILDA population was 4.4% (overall), 2.8% (SE = 0.2) for one syncopal event and 1.6% (SE = 0.1) for multiple syncopal events. The prevalence rates of syncope differed for AD medication type and depression. Patients who were taking SSRIs, TCAs had a higher prevalence of syncope (for both a single and multiple syncopal event) while there was a non-significant trend of an increase for those on other ADs (Table 2). This difference in prevalence was significant only in regards to SSRIs and TCAs. Participants with symptoms of depression (CES-D

Table 1. Demographic and clinical characteristics of participants (n = 7,993)

	No episode—past 12 months		One syncopal episode—past 12 months		Multiple syncopal episodes—past 12 months		Test statistic	Total	
	n = 7,664	Weighted prevalence, % (SE)	n = 225	Weighted prevalence, % (SE)	n = 124	Weighted prevalence, % (SE)		n	Weighted prevalence, % (SE)
Sex									
Male	3,507	48.1 (0.5)	114	51.7 (3.5)	48	40.9 (4.8)	$F_{(2,1245.6)} = 1.64$	3,669	48.1 (0.5)
Female	4,137	51.9 (0.5)	111	48.3 (3.5)	76	59.1 (4.8)		4,324	51.9 (0.5)
Age (non-weighted)	7,644	63.7 (SD-9.69)	225	64.6 (SD-10.49)	124	63.5 (SD-10.06)	$F_{(2,624)} = 0.29$	7,993	63.7 (SD-10.06)
Age (mean and SD)		63.8 (0.2)		64.4 (0.8)		63.9 (1.0)			63.8 (0.2)
Education									
Primary/none	2,310	37.7 (0.8)	69	37.8 (3.5)	44	45.3 (4.8)	$F_{(4,2381.2)} = 1.31$	2,423	37.8 (0.8)
Secondary	3,077	43.7 (0.7)	95	45.0 (3.3)	39	34.0 (4.3)		3,211	43.6 (0.7)
Third/higher	2,257	18.6 (0.5)	61	17.2 (2.1)	41	20.7 (3.3)		2,359	18.6 (0.5)
Marital status									
Married	5,327	68.7 (0.7)	144	61.6 (3.5)	69	54.0 (4.6)	$F_{(6,3681.8)} = 3.74$**	5,540	68.2 (0.7)
Never married	730	9.5 (0.4)	26	12.1 (2.2)	18	13.8 (3.1)		774	9.7 (0.4)
Separated/divorced	499	6.3 (0.3)	21	9.8 (2.1)	16	14.0 (3.3)		536	6.5 (0.3)
Widowed	1,088	15.5 (0.5)	34	16.5 (0.7)	21	18.2 (3.6)		1,143	15.6 (0.5)
Co-morbidity									
High blood pressure	2,803	37.2 (0.6)	106	49.1 (3.4)	57	46.8 (4.8)	$F_{(2,1242.6)} = 7.81$***	2,966	37.7 (0.6)
Angina	392	5.3 (0.3)	17	8.5 (2.0)	19	17.9 (3.7)	$F_{(2,1248.5)} = 18.46$***	428	5.6 (0.3)
Heart attack	344	4.6 (0.3)	19	9.1 (2.1)	7	5.9 (2.3)	$F_{(2,1246.2)} = 4.38$*	370	4.7 (0.3)
Heart failure	79	1.1 (0.1)	3	1.5 (0.9)	3	3.2 (1.8)	$F_{(2,1246.7)} = 2.21$	85	1.1 (0.1)
Diabetes	582	7.9 (0.3)	21	9.1 (2.0)	16	13.0 (3.1)	$F_{(2,1245.7)} = 2.15$	619	8.0 (0.3)
Stroke	104	1.4 (0.1)	8	4.1 (1.4)	9	6.8 (2.3)	$F_{(2,1245.3)} = 15.41$***	121	1.5 (0.1)
TIA	153	2.0 (0.2)	11	4.8 (1.5)	6	4.6 (1.9)	$F_{(2,1241.7)} = 5.26$**	170	2.1 (0.2)
Lung disease	297	4.0 (0.3)	15	7.4 (1.9)	10	7.9 (2.5)	$F_{(2,1234.5)} = 4.68$**	322	7.9 (0.3)
Substance abuse	121	1.6 (0.2)	5	2.3 (1.0)	3	3.0 (1.8)	$F_{(2,1239.1)} = 0.89$	129	1.7 (0.2)
Anti-hypertensive									
Medication	2,398	32.1 (0.6)	86	39.1 (3.3)	51	41.7 (4.7)	$F_{(2,1243.8)} = 4.59$**	2,535	32.4 (0.6)
SSRI	271	3.7 (0.2)	12	6.3 (1.8)	13	10.7 (2.9)	$F_{(2,1237.2)} = 8.57$***	296	3.9 (0.2)
Tricyclic	94	1.3 (0.1)	7	3.1 (1.2)	8	6.32 (2.3)	$F_{(2,1249.8)} = 12.68$***	109	1.4 (0.1)
Other	139	1.8 (0.2)	7	2.6 (1.0)	3	2.4 (1.5)	$F_{(2,1244.6)} = 0.44$	149	1.9 (0.2)
Dr ever told you that you have depression	384	4.8 (0.3)	16	7.3 (1.8)	23	19.2 (3.9)	$F_{(2,1248.1)} = 22.65$***	423	5.1 (0.3)
CES-D									
None/mild	6,950	90.6 (0.4)	183	79.9 (2.7)	94	74.4 (4.2)	$F_{(4,2473.5)} = 17.37$***	7,227	90.1 (0.4)
Moderate	528	7.1 (0.4)	29	13.8 (2.4)	19	15.1 (3.2)		579	7.4 (0.4)
Severe	166	2.3 (0.2)	13	6.3 (1.7)	11	10.5 (3.0)		190	2.5 (0.2)

*P < 0.050; **P < 0.010; ***P < .001.

Table 2. Weighted prevalence and standard errors of syncope by medication and depression

	One syncopal episode in past 12 months		Multiple syncopal episodes in past 12 months		*F* Statistic
	n	Weighted prevalence, % (SE)	*n*	Weighted prevalence, % (SE)	
SSRI (*n* = 296)					
Yes	12	4.6 (1.3)	13	4.20 (1.16)	$F_{(2,1237.2)} = 8.57$***
No	213	2.8 (0.2)	111	1.41 (0.15)	
Tricyclic (*n* = 109)					
Yes	7	6.3 (2.4)	8	6.89 (2.49)	$F_{(2,1249.8)} = 12.68$***
No	218	2.8 (0.2)	116	1.44 (0.14)	
Other (*n* = 149)					
Yes	7	3.92 (1.5)	3	1.97 (1.17)	$F_{(2,1244.8)} = 0.44$
No	218	2.82 (0.20)	121	1.51 (0.15)	
Dr ever told you that you have depression					
Yes	16	4.06 (1.04)	23	5.69 (1.26)	$F_{(2,1248.1)} = 22.65$***
No	209	2.78 (0.20)	101	1.29 (0.14)	
CES-D					
None/mild	183	2.52 (0.20)	94	1.25 (0.13)	$F_{(4,2473.8)} = 17.37$***
Moderate	29	5.30 (0.95)	19	3.10 (0.72)	
Severe	13	7.07 (1.83)	11	6.25 (1.87)	

*$P < 0.050$; **$P < 0.010$; ***$P < 0.001$.

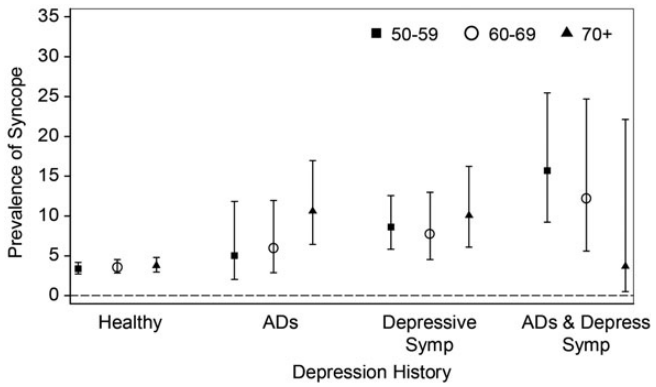

Figure 1. Prevalence of syncope by age and history of depression.

categories) or a diagnosis of depression by a physician had a significantly higher prevalence of syncope than those without symptoms or a diagnosis of depression. There was an age gradient apparent in the prevalence of syncope and being on any AD, having depressive symptoms or having both (Figure 1). Older adults (75+ years) taking an AD or having depressive symptoms had a higher prevalence of syncope than younger adults (50–64 years) taking an AD or with depressive symptoms. The reverse was seen for the prevalence for those both on an AD and with depressive symptoms; this however may have been due to very small numbers in this group.

Covariates of syncopal events

Effect of depression

Participants who reported moderate or severe symptoms of depression as evidenced by CES-D testing were more likely to have experienced at least one syncopal episode on the past year. This is evidenced by the prevalence rates (Table 2) and the results from both the bivariate (Table 3) and multivariate (Table 4) multinomial regression analyses. Participants who reported being told by their doctor that they had depression were also more likely to have experienced multiple syncopal episodes within the last year.

After controlling for demographic characteristics, health conditions and AD use these relationships were less pronounced (Table 4). Participants with severe depression (CES-D) were at an increased risk of either a single syncopal episode (RRR = 2.8) (CI −1.48 to 5.25) or multiple syncopal episodes (RRR = 2.9) (CI −1.27 to 6.45), when compared with those with none or mild symptoms of depression. Participants with moderate depression were at an increased risk only of a single syncopal episode (RRR = 2.0) (CI −1.29 to 3.01). Finally, participants who reported being told by a doctor that they had depression had a higher risk of experiencing multiple syncopal episodes (RRR = 2.7) (CI −1.36 to 5.19).

Effect of ADs

Before adjusting for participant characteristics, health conditions and depression, participants taking either SSRIs or TCAs were at greater risk of having experienced a single or multiple syncopal episodes (Table 3). All relationships were significant aside from the relationship between SSRIs and a single syncopal episode, which approached significance. After controlling for participant characteristics, health conditions and depression (CES-D or doctor diagnosis), SSRIs were no longer significantly associated with syncopal events in the past 12 months. In regards to participants on TCAs, there remained significantly increased risk of multiple syncopal events (RRR = 3.0) (CI 1.15–7.94). The relationship to a single syncopal event was not statistically significant; however, there was a trend suggesting increased risk of a single syncopal episode (RRR = 2.3) (CI 0.97–5.63).

Table 3. Bivariate multinomial regression results comparing a single and multiple syncopal episode with no syncopal episode in the past 12 months ($n = 7,993$)

	No episode versus one syncopal episode		No episode versus multiple syncopal episodes	
	RRR (95% CI)	*P*-value	RRR (95% CI)	*P*-value
SSRI	1.75 (0.96–3.22)	0.069	3.13 (1.71–5.76)	<0.001
Tricyclic	2.50 (1.11–5.61)	0.027	5.28 (2.40–11.60)	<0.001
Other	1.41 (0.63–3.17)	0.405	1.33 (0.40–4.41)	0.639
Dr ever told you that you have depression	1.55 (0.89–2.70)	0.118	4.68 (2.82–7.76)	<0.001
CES-D				
None/mild	Ref		Ref	
Moderate	2.21 (1.48–3.30)	<0.001	2.60 (1.57–4.32)	<0.001
Severe	3.11 (1.76–5.49)	<0.001	5.54 (2.86–10.74)	<0.001

RRR, relative risk ratio.

Table 4. Multivariate multinomial regression results comparing a single and multiple syncopal episode with no syncopal episode in the past 12 months ($n = 7,993$)

	No episode versus one syncopal episode		No episode versus multiple syncopal episodes	
Variable	RRR (95% CI)	*P*-value	RRR (95% CI)	*P*-value
Sex: female	0.79 (0.60–1.05)	0.600	1.18 (0.76–1.83)	0.460
Age	1.00 (0.99–1.02)	0.110	0.99 (0.96–1.02)	0.432
Education				
Primary/none	Ref		Ref	
Secondary	1.23 (0.89–1.70)	0.203	0.76 (0.48–1.22)	0.259
Third/higher	1.12 (0.77–1.63)	0.556	1.17 (0.72–1.90)	0.534
Marital status				
Married	Ref		Ref	
Never married	1.31 (0.85–2.01)	0.216	1.81 (1.03–3.18)	0.038
Separated/divorced	1.59 (0.98–2.57)	0.060	2.10 (1.14–3.85)	0.017
Widowed	1.05 (0.68–1.63)	0.807	1.30 (0.66–2.56)	0.442
SSRI	1.25 (0.68–2.31)	0.467	1.29 (0.57–2.92)	0.546
Tricyclic	2.33 (0.97–5.63)	0.060	3.02 (1.15–7.94)	0.025
Other	0.98 (0.41–2.36)	0.973	0.46 (0.10–2.02)	0.300
Hypertensive medication	0.62 (0.37–1.04)	0.073	1.13 (0.47– 2.72)	0.787
Dr ever told you that you have depression	0.99 (0.52–1.88)	0.980	2.66 (1.36–5.19)	0.004
CES-D				
None/mild	Ref		Ref	
Moderate	1.97 (1.29–3.01)	0.002	1.65 (0.96–2.84)	0.069
Severe	2.79 (1.48–5.25)	0.002	2.86 (1.27–6.45)	0.011
Co-morbidity				
High blood pressure	2.19 (1.34–3.59)	0.002	1.03 (0.43–2.49)	0.943
Angina	1.10 (0.59–2.04)	0.770	3.68 (2.00–6.76)	<0.001
Heart attack	1.60 (0.89–2.87)	0.117	0.51 (0.21–1.23)	0.135
Heart failure	0.85 (0.23–3.09)	0.808	1.91 (0.56–6.48)	0.298
Diabetes	0.96 (0.59–1.57)	0.870	1.28 (0.70–2.35)	0.422
Stroke	2.22 (1.03–4.75)	0.041	4.20 (1.90–9.26)	<0.001
TIA	1.75 (0.82–3.73)	0.147	1.52 (0.54–4.26)	0.421
Lung disease	1.57 (0.89–2.76)	0.120	1.42 (0.68–3.00)	0.350

Continued

Discussion

In this representative population sample of community-dwelling adults aged 50 and older, we investigated the prevalence of syncopal events. This is the largest, to our knowledge, investigation of the prevalence of syncopal events in a population-based community-dwelling sample of older people. Participants in this study with depression or using TCAs were at increased risk of syncopal events.

Syncope and depression

In this study, participants with depression were more likely to have reported syncope in the last year. Furthermore, participants who were classified with moderate or severe depression according to the CES-D scale were more likely to have reported a syncopal event in the last year and were also more likely to have reported multiple syncopal events in the last year. This effect appears to be independent of common co-

morbidities including cardiovascular disease. This study has added to the observations made previously of the link between depressive symptoms and syncope. Previous studies have focused on groups presenting to specialized syncope clinics as well as patients who were hospitalized for syncope [9, 10, 11, 20]; therefore, it is difficult to extrapolate the observations previously made in these studies to a general population. This study was performed on a representative sample and is more likely to reflect the true incidence and prevalence of syncope rates in patients reporting symptoms of depression. The data show that depression is a significant comorbid condition in older people with syncope. Previous work by our group has highlighted the link between depression and falls in older people.

Effects of AD medications

The prevalence of a syncopal event was higher for participants who were taking either an SSRI or a TCA. However, once we adjusted for demographic characteristics, health conditions and depression, we found that the increased risk of a syncopal event was only for participants prescribed TCAs. Taking a TCA increased the odds of experiencing multiple syncopal events. There was a trend towards higher rates of syncope in those taking SSRIs but this failed to reach statistical significance. This again was the first paper to fully explore the effects of commonly prescribed ADs on syncope. Previous studies investigating AD medication use in older people have highlighted increasing concerns regarding the safety of these medications [21]. Cohort studies have shown a higher risk of adverse events in older people on AD medication with increasing rates of gastrointestinal bleeding, myocardial infarction, stroke, falls and overall mortality reported [22].

SSRIs have previously been shown to be beneficial for recurrent syncope in younger cohorts [23, 24]. Patients in these studies demonstrated a longer time between syncopal episodes and a reduction in pre-syncopal symptoms when treated with SSRIs. These studies, however, were unable to separate out the effect that mood had on the rates of recurrent syncope. The authors did comment on the positive effects on mood in the SSRI group, which they felt may have been therapeutically beneficial [25]. This study differs in that we were able to correct for the effect of depression on syncope. When depression score was corrected for, usage of SSRIs was associated with an increased risk of syncope but this failed to reach statistical significance. There was also a trend towards recurrent syncope in this group.

This study was designed as an epidemiological, point-prevalence study and was therefore unable to draw any firm causation for the observed effects of TCAs. Previous studies have focused on the cardiovascular side effects of TCAs on older people. The most commonly reported cardiovascular side effect due to TCAs was hypotension, but also included bradycardia and tachycardia [26, 27]. Other studies have shown significant blood pressure alterations causing orthostatic hypotension [28]. A previous study with community-dwelling older people found an increase in falls and hip fractures but did not specifically mention rates of syncope [29]. However, further work in this area is needed to help individualize patient risk and guide clinicians when prescribing TCA.

The strength of this study is that the population was representative of community-dwelling older Irish adults. However, we had to rely solely on self-reported syncope and depression. The CES-D has been shown to be correlated with clinical ratings of depression; however, the CES-D is not considered a tool for the formal diagnosis of depression. Also, depression symptoms (CES-D) were assessed as occurring in the past week only, whereas syncope was assessed in the past 12 months. It is possible that we are underestimating the relationship between depression and syncope. A series of single items were used to assess syncope. Reporting syncopal episodes within the last year has previously been shown to have a good predictive value for future syncope risk [30]. However, this method is liable to recall bias and may be influenced by a patients understanding of what fainting is. It may, for example, underestimate other conditions which are similar to syncope such as seizure disorders. An MMSE cut-off score of 18 was used to exclude patients from the final analysis. A further analysis of subgroups based on MMSE score showed no statistically significant difference (χ^2: 5.45, $P = 0.244$) between faints in the past 12 months and MMSE score. There are also very few respondents in the older age groups who are taking ADs and have depressive symptoms, limiting our conclusions about this older group. Finally, the data used in this study are cross-sectional. These limitations in the study reduce our ability to fully understand the associations between depression, AD use and syncope. To achieve this, a prospective longitudinal study is required. As a longitudinal study, however, there are further opportunities to examine this effect in future waves of the TILDA study and observe the association over time.

In summary, there is a clear association between depressive symptoms and the prevalence of syncope. Clinicians should be aware of this, as depression is a potentially modifiable comorbidity in older patients who present with syncope. The choice of treatment should also be given careful consideration as increased rates of syncope have been observed with commonly used ADs. Further studies are needed to focus on the causes for the observed association found in this study.

Key points

- Community-dwelling patients with depression have higher rates of syncope.
- Patients with moderate or severe depression are more likely to report multiple episodes of syncope.
- Patients treated with TCA medications have a higher prevalence of syncopal events.

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