Article

Suicidal Ideation, Social Participation, Loneliness, and Mobility Limitations: Longitudinal Evidence in Older European Adults

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ABSTRACT

Background: Suicide behavior represents a major public health problem for the older population. Within the continuum of suicidal behavior, suicidal ideation may lead to a suicide attempts/death. Risk factors for developing suicidal ideation include mobility limitations, lack of social participation and loneliness. However, there is a need for longitudinal studies to examine these relationships over time. **Method:** 50423 older people from three waves of the SHARE project formed the sample (60 years in the first wave; $M \pm SD = 71.49 \pm 8.15$; 55% female). **Results:** A series of nested Cross-Lagged Panel Models (CLPM) of suicidal ideation, mobility limitations, social participation and loneliness were tested. The best fitting model was that with equal autoregressive and cross-lagged effects across waves ($\chi^2 = 1220.56$, CFI = .982, RMSEA = .028, SRMR = .024). The autoregressive effects showed high stability across waves. The cross-lagged effects between suicidal ideation and mobility limitations were strong, while the cross-lagged effects between suicidal ideation and social participation were comparatively smaller. In the case of loneliness, statistical significance was not achieved. **Conclusions:** These findings highlight the importance of promoting mobility programs and social activities to prevent suicidal ideation among older adults.

Ideación Suicida, Participación Social, Soledad y Problemas de Movilidad: Evidencia Longitudinal en Adultos Mayores Europeos

RESUMEN

Antecedentes: El suicidio representa un problema de salud pública para la población mayor. Dentro del continuo del comportamiento suicida, la ideación suicida puede conducir a un intento de suicidio/muerte. Las limitaciones de movilidad, falta de participación y soledad son factores de riesgo de la ideación suicida. Sin embargo, son necesarios estudios longitudinales. **Método:** 50423 personas mayores de tres olas del proyecto SHARE formaron la muestra (60 años en la primera ola; $M \pm SD = 71.49 \pm 8.15$; 55% mujeres). **Resultados:** Se probaron Modelos de Panel Cruzados Diferidos anidados de ideación suicida, problemas de movilidad, participación social y soledad. El modelo con un mejor ajuste fue el de efectos autorregresivos y cruzados iguales en todas las olas ($\chi2 = 1220.56$, CFI = .982, RMSEA = .028, SRMR = .024). Los efectos autorregresivos mostraron una alta estabilidad a través de olas. Los efectos cruzados entre la ideación suicida y las limitaciones de movilidad fueron fuertes, mientras que los efectos cruzados entre la ideación suicida y la participación social fueron comparativamente más pequeños. Para soledad, no fueron estadísticamente significativos. **Conclusiones:** Estos hallazgos resaltan la importancia de promover programas de movilidad y actividades sociales para prevenir la ideación suicida entre los adultos mayores.

Suicide-related behavior in old age represents a worrying and growing public health concern. Compared to other age groups, older adults show higher rates of suicidal behavior (GBD 2017 Causes of Death Collaborators, 2018). The rate of death by suicide increases with age among individuals older than 60 (Bonnewyn, et al., 2017; Naghavi, 2019), and the number of older adults with suicide ideation and attempts is likely to increase in the future (Cabello et al., 2020).

As people age, physiological frailty, social isolation, and increased odds of living alone reduce individuals' prevention against suicide attempts (De Leo, 2022; Stanley et al., 2016). Most of the theories of suicide behavior are based on the ideation-action framework to explain the development of suicidal ideation and the transition to a suicide attempt (Klonsky et al., 2018). Examples include the Interpersonal Theory of suicide (IPTS; Joiner, 2005, Van Orden et al., 2010), the Three-Step Theory of suicide (3ST; Klonsky & May, 2015) and the Integrated Motivational-Volitional Model of suicide (IMV; O'Connor, 2011).

Among these theories, the IMV is a relevant second-generation theoretical framework for understanding suicidal behavior (O'Connor & Kirtley, 2018). According to the IMV, suicidal behavior can be considered a continuum with three phases. First, the pre-motivational step, where life stressors increase the likelihood of experiencing an adverse psychological reaction to stress. Second, the motivational phase, where feelings of defeat, humiliation, and entrapment lead to the onset of suicidal ideation. Finally, the volitional phase, where factors governing the transition from suicidal ideation to suicide attempt occur. Older adults who attempt suicide are more determined and more likely than younger adults to have a plan (Draper, 2014). In this sense, suicidal ideation in older age constitutes a relevant target for intervention.

Suicidal behavior is rarely due to a single cause (Al-Halabí et al., 2016), with main risk factors varying across age groups (Cabello et al., 2020). Among older adults, risk factors associated with suicidal behavior include physical problems, depressive symptomatology, loneliness, cognitive decline, and social isolation (Heuser & Howe, 2019; Wand et al., 2021). Regarding physical problems, the systematic review by Beghi et al. (2021) highlighted physical limitations as one of the most prevalent risk factors for suicidal behavior in old age. In addition, Kim et al. (2016) found that chronic illness moderated limitations in usual activities and pain increased the risk of both suicidal ideation and suicide attempts among older adults. In another systematic review Fässberg et al. (2016) studied the associations between physical illness, functional disability, suicidal ideation and nonfatal and fatal suicidal behavior of people aged 65 or more. In view of these results, Fässberg et al. (2016) concluded that there was a consistent association between functional disability and suicidal behavior. In its part, Lutz and Fiske (2018) carried out a systematic review that further included people older than 50 years old and concluded that there was an association between functional disability and both suicidal ideation and death by suicide. However, the causal nature of this association was not clear.

There is no specific model for late-life suicide (Laflamme et al., 2022), but the notion that functional disability can lead to suicidal behavior in old age is consistent with several theories about suicide. First, according to the IMV model of suicide (O'Connor, 2011), physical limitations at the old age can be considered chronic life stressors, leading to increased feelings of loneliness, fewer social relationships, and a potential reduction in social activity participation (Gyasi et al., 2021). As Lam et al. (2018) proved, engaging in multiple social activities has been shown to alleviate the negative physiological effects of age-related changes. In this line, older adults that participate in social activities, like going to clubs and attending neighborhood events seem to be protected against suicidal thoughts (Ghose et al., 2021). Additional evidence comes from a study using a sample of old Israeli men that found that the association between physical pain and suicidal ideation was mediated by loneliness and social integration (Lutzman et al., 2021).

Another theoretical model accounting for the relationship between functional disability and suicide is the IPT (Joiner, 2005; Van Orden et al., 2010). According to this theory, suicidal ideation occurs when the person experiments thwarted belongingness together with perceived burdensomeness. The IPT emphasizes the importance of social disconnection to develop suicidal thoughts and behaviors (Joiner, 2005; Van Orden et al., 2010). Thwarted belongingness is conceptualized as having poor social support, high interpersonal conflict and feelings of loneliness, while perceived burdensomeness is described as feelings of self-hatred or lack of trust in others (Van Orden et al., 2012). Given that people with mobility limitations may need increased care and assistance, they might feel that they are a burden to others (Eades et al., 2019). Thus, we hypothesize that mobility limitations influence feelings of frustrated belonging and perceived burden, which in turn increases suicidal ideation.

The temporal associations between functional disability and suicidal ideation are also unclear. There are a few longitudinal studies addressing this relationship, but mixed results have arisen. Some studies determined that there was an association between functional limitations and suicidal ideation in older people (Handley et al., 2014; Kang et al., 2014; Raue et al., 2007), while others found that the baseline mobility problems were not significantly associated with the course of suicidal ideation (Forsell, 2000; Gustavson et al., 2016; Kiosses et al., 2015; Lutz, 2019). Most of these longitudinal studies employed only two time-points, and additional studies using at least three time-points could help clarify the nature of this association (Lutz & Fiske, 2018). Overall, it is crucial to examine the associations between mobility limitations, loneliness, and social participation with suicidal ideation to clarify the underlying causes of suicidal ideation in older adults. Specifically, longitudinal research ought to integrate existing suicidal risk factors into a comprehensive framework aimed at developing targeted support and preventive interventions.

Therefore, the aim of this study is to offer longitudinal evidence for the longitudinal relationship between social participation, loneliness, and mobility limitations and suicidal ideation in a representative sample of older adults. It is hypothesized that lower levels of loneliness, together with higher social participation, and less mobility limitations will buffer suicidal ideations.

Method

Participants

The resulting sample used in this study was composed by 50423 individuals, 55% were female and 45% were male. Their mean age at the beginning of the study period was 71.49 years old (*SD* =

8.15) and their mean years of education were 10.45 (*SD* = 4.44). In terms of marital status, 34360 (68%) participants were married or had a registered partner, 3688 (7.3%) were divorced, 2241 (4.5%) had never been married, and 9980 (19.9%) were widowed. A total of 14 European countries and Israel were represented in the data: Austria (5.4%), Germany (6.1%), Sweden (6.7%), Spain (8.9%), Italy (7.6%), France (5.7%), Denmark (4.8%), Switzerland (4.3%), Belgium (7.7%), Israel (3.4%), Czech Republic (7.7%), Luxembourg (2.0%), Slovenia (6.3%), Estonia (8.2%) and Croatia (3.2%).

Instruments

Suicidal ideation was assessed using a dichotomous item from the EURO-D scale: "In the last month, have you felt that you would rather be dead?". The mentioning of suicidal feelings or the wish to be dead were coded as 1 = yes, 0 = no. This binary item has been previously used to assess suicidal ideation in studies using data from SHARE (Ayalon, 2011; Fässberg et al., 2014; Saïas et al., 2012; Stolz et al., 2016) and it has been found to be associated to a large number of different psychosocial conditions such as the ones employed in this research.

Mobility limitations indicate the difficulties that the respondent reported to have experienced in each of ten activities and that have lasted/are expected to last a minimum of three months: Walking 100 meters, sitting two hours, getting up from chair, climbing several flights of stairs, climbing one flight of stairs, stooping, kneeling, crouching, reaching or extending arms above shoulder, pulling or pushing large objects, lifting or carrying weights over 5 kilos and picking up a small coin from a table. The current analysis employed a cumulative count of mobility limitations, and therefore ranged from 0 to 10, with each additional point reflecting an additional limitation.

Loneliness was assessed with the Three-Item Loneliness Scale (Hughes et al., 2004), a short version of the R-UCLA Loneliness Scale (Russell et al., 1980; Russell et al., 1978). The three items refer to lack of companionship, feeling left out, and feeling isolated, and responses are coded in a three-point Likert scale ("often", "some of the time", "hardly ever or never"). The minimum score is 3 ("not lonely") and the maximum is 9 ("very lonely"). The internal consistency estimates using the alpha and omega coefficients provided identical score values: .99 for time 1, 1.00 for time 2, and 1.00 for time 3.

Social participation included individuals' participation in four different activities during the previous year: doing voluntary or charity work, attending educational or training courses, going to sport/social/other clubs, and taking part in political or community-related organizations. For each activity, responses were coded as 1 (yes) or 0 (no). Social participation was calculated as the sum of the activities in which the person participates as in previous research (Cruwys et al., 2013; Kanamori et al., 2014; Takeuchi et al., 2013; Youn et al., 2020; Zhang et al., 2015). Therefore, responses ranged between 0 (did not participate in any of the activities) and 4 (participated in all considered activities). Recent research using SHARE data has proved through exploratory factor analysis that the combination of these four items forms a social activity factor (Fernández et al., 2023).

In addition to the three measures employed over time, age and gender were also considered as time invariant control variables.

Procedure

The sample comes from the Survey of Health, Ageing and Retirement in Europe (SHARE; Börsch-Supan et al., 2013), an international panel study targeted at individuals aged 50 years or older across 27 European countries and Israel. The survey collects data about individuals' health, economic situation and social life and habits. This longitudinal survey follows a probabilistic sampling strategy across participating countries. First, each country prepares a sample design that includes the sample frame to be used as well as the sampling technique. Then, the international coordinators at the SHARE headquarters review and approve the preliminary design. The sample is then collected within each country and processed to create a gross sample file. The international coordinators evaluate and confirm the gross sample before uploading it to software, where it is later integrated with the associated addresses. Further details regarding the sampling strategy can be consulted in Bethmann et al. (2019).

Currently, SHARE has eight waves of data that have been collected bi-annually since the start of the project in 2004. The present study employed data from waves 6 (Börsch-Supan, 2022a), 7 (Börsch-Supan, 2022b) and 8 (Börsch-Supan, 2022c) collected during years 2015, 2017 and 2019/20, respectively. Among individuals that participated in wave 6, we selected those who were aged 60 or older at the moment of the interview. All waves received ethical approval from the Ethics Council of the Max Planck Society. Details can be consulted at https://share-eric.eu/fileadmin/user_upload/Ethics_Documentation/SHARE_ethics_approvals.pdf.

Data Analysis

SPSS 28 (IBM Corp. Released, 2021) and Mplus 8.9 (Muthén & Muthén, 1998-2017) were employed for statistical analyses. Descriptive statistics and correlations among the variables under study were estimated in SPSS, and Cross-Lagged Panel Models (CLPMs) were estimated in Mplus 8.9 (Muthén & Muthén, 1998-2017). The CLPMs included suicidal ideation, loneliness, social activity, and mobility limitations measured at each of the three time-points, and age and gender as time-invariant control variables. These longitudinal models examine the reciprocal relationships among the variables of interest across time. The cross-lagged aspect of the model refers to lagged effects of one variable onto another across time. The cross-lagged structural models were estimated with Weighted Least Squares Mean and Variance corrected (WLSMV), which has been regarded as adequate for non-normal and ordinal data (Finney & DiStefano, 2013). This method of estimation does not require the usual parametric assumptions of maximum likelihood estimators and can simultaneously accommodate both quantitative and categorical (ordinal) measures with few categories (Muthén & Muthén, 1998-2017). In the CLPMs, 43 cases (0.09%) of the total cases were deleted from the analyses due to missingness. Model fit of the CLPMs was assessed

with the best-available statistics and indexes (Kline, 2011): a) the chi-square statistic (χ^2); the Comparative Fit Index (CFI); the Standardized Root Mean Squared Residual (SRMR); and the Root Mean Squared Error of Approximation (RMSEA). Hu and Bentler (1999) guidelines suggest that a CFI of .95 or higher, and RMSEA and SRMR equal or lower than .05 can be considered as markers of excellent fit of the model. Additionally, to test the differences in fit between different models, we considered CFI differences greater than 0.01 as indicating significant deterioration of model fit (Cheung & Rensvold, 2002). The estimated CLPM is available in Figure 1. Regarding effect sizes (standardized parameter estimates), we have used the effect size guidelines established by Orth et al. (2022) for CLPMs in particular. According to these guidelines, effects in the range between 0 and .03 are negligible, between .03 and .07 are considered small, between .07 and .12 are medium, and above .12 are regarded as large.

Figure 1

Cross-Lagged Panel Model Relating Social Participation (SP), Suicidal Ideation (SI), Loneliness (LO), and Mobility Levels (ML)
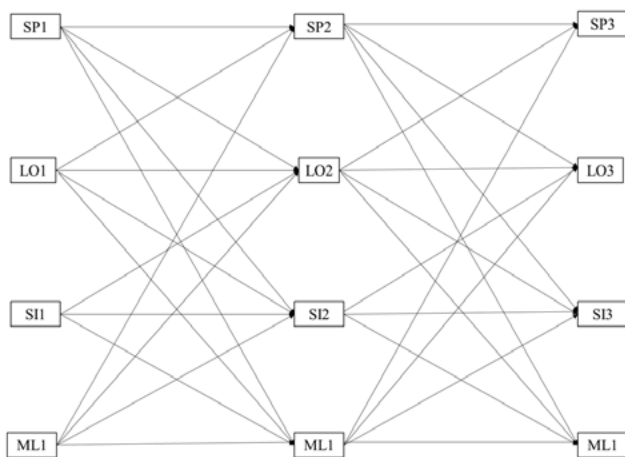
Note. Correlations within waves and effects of control variables (gender and age) not shown for clarity.

Results

Descriptive Statistics and Correlations Among Variables

Descriptive statistics of all variables involved in the study across waves are presented in Table 1. Additionally, correlations among suicidal ideation, mobility limitations, social participation and loneliness are presented in Table 2.

Regarding the correlations among all the variables and all time points, here is a clear pattern of significant correlations, with suicidal ideations being positively related to mobility limitations and loneliness, and negatively related to social participation. In the same vein, loneliness and mobility limitations are positively related to each other and negatively related to social participation.

Cross-Lagged Panel Models

We estimated three CLPMs following a sequence of nested models. The first CLPM was the one depicted in Figure 1, in which all parameters were freely estimated. The second CLPM constrained autoregressive effects (the effect of each variable of interest in time *t-1* on the same variable in time *t*) to be equal across time. The third CLPM further constrained cross-lagged effects across waves. Therefore, this final model allows to test for same effects of all variables of interest across waves, that is, stability of the effects across time points. In absence of model fit deterioration, the constrained (more parsimonious model) is preferred.

Table 1

Means, Percentages, Standard Deviations Minimum and Maximum of the Variables Study

Variable	Mean or %	SD	Min.	Max.
Age	71.49	8.15	60	105
Gender			0	1
Male	45%			
Female	55%			
SI T1			0	1
No	92.8%			
Yes	7.2%			
SI T2			0	1
No	93.4%			
Yes	6.6%			
SI T3			0	1
No	93.3%			
Yes	6.7%			
ML T1	1.89	2.52	0	10
ML T2	2.00	2.55	0	10
ML T3	2.02	2.59	0	10
SP T1	0.55	0.84	0	4
SP T2	1.16	0.85	0	4
SP T3	0.59	0.84	0	4
LO T1	4.00	1.44	3	9
LO T2	3.97	1.44	3	9
LO T3	3.98	1.43	3	9

Note. SD = Standard deviation; Min. = Minimum; Max. = Maximum; SI = Suicidal Ideation; ML = Mobility Limitations; SP = Social participation; LO = Loneliness; T = Time.

Model fit indexes for the three estimated CLPMs are presented in Table 3. Compared to the freely estimated model, the CLPM model with equal autoregressive effects does not present deteriorated model fit. Therefore, stability of the autoregressive effects is maintained across waves of data. In the same vein, when all cross-lagged effects were constrained to equality across waves, model fit improved and hence this is considered the best fitting model.

The standardized main effects (autoregressive and cross-lagged) of the final CLPM can be consulted in Figure 2. Focusing on suicidal ideation, its main link is with mobility limitations. That is, suicidal ideation is the best predictor of future mobility limitations and vice-versa. This result suggests that mobility problems and depression (and ultimately suicidal ideation) may be intertwined at the old age, producing a negative feedback effect. Social participation had a modest negative impact on suicidal ideation, while the effects of loneliness were not statistically significant.

Table 2

Correlations Among Social Participation, Loneliness, and Physical Inactivity Across all Waves of the Study

|	SI T1	SI T2	SI T3	ML T1	ML T2	ML T3	SP T1	SP T2	SP T3	LO T1	LO T2	LO T3
SI T1	1											
SI T2	.307	1										
SI T3	.215	.354	1									
ML T1	.165	.164	.126	1								
ML T2	.157	.228	.155	.570	1							
ML T3	.121	.161	.213	.438	.606	1						
SP T1	-.078	-.055	-.057	-.158	-.190	-.156	1					
SP T2	-.086	-.084	-.078	-.203	-.253	-.212	.486	1				
SP T3	-.059	-.054	-.081	-.165	-.217	-.235	.456	.512	1			
LO T1	.261	.128	.112	.192	.207	.149	-.152	-.156	-.117	1		
LO T2	.139	.204	.150	.241	.324	.237	-.163	-.236	-.193	.520	1	
LO T3	.121	.115	.249	.186	.237	.313	-.111	-.178	-.186	.349	.566	1

Note. SI = Suicidal Ideation; ML = Mobility Limitation; SP = Social Participation; LO = Loneliness; T = Time. All the correlations are statistically significant *p* < .001.

Table 3

Model Fit Indexes for the Sequence ff CLPMs

CLPM Models	2	df	p	RMSEA [CI 90%]	SRMR	CFI	ΔCFI
Free estimates	1303.30	15	< .001	.041 [.039, .043]	.032	.981	--
Equal autoregressive	1398.59	19	< .001	.038 [.036, .040]	.031	.979	.002
Equal autoregressive and cross-lagged	1220.56	39	< .001	.028 [.026, .029]	.024	.982	- .001

Note. ΔCFI= differences between CFIs always against the freely estimated model. CLPM = Cross-lagged panel model.

Figure 2

Standardized Estimates of the Autoregressive (Grey) and Cross-Lagged Effects (Black) of the Best Fitting CLPM
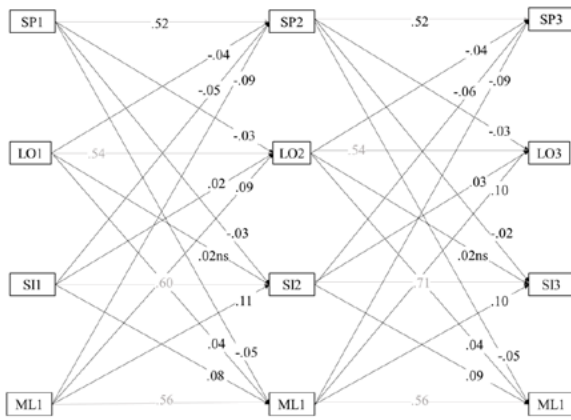
Note. Within waves associations and effects of the control variables not shown for the shake of clarity; all estimates are statistically significant (*p* < .05) unless it is denoted with ns (non-significant); SP = Social participation; LO = Loneliness; SI= Suicidal Ideation; ML = Mobility Limitation.

Finally, Table 4 offers the standardized effects of the control variables (age and gender) on the variables in the panel model, across time. In general, results show that, as people age, suicidal intentions, mobility limitations, and loneliness are more likely to take place, and, at the same time, social participation decreases. Regarding gender, although with smaller effects, men were more likely than women to have suicidal intention, mobility problems,

and feelings of loneliness, but also showed higher rates of social participation.

Table 4

Standardized Effects of the Control Variables (Age and Gender) on Suicidal Ideation, Mobility Limitations, Social Participation, and Loneliness Across Waves

Predictors	Outcomes			
Time1	SI	ML	SP	LO
Age	.165	.238	-.154	.144
Gender	.123	.104	-.030	.105
Time2	SI	ML	SP	LO
Age	.046	.127	-.025	.048
Gender	.034ns	.041	.027	.025
Time3	SI	ML	SP	LO
Age	.026ns	.078	-.024	.006ns
Gender	.001ns	.010ns	.015	-.00ns

Note. All estimates are statistically significant (*p* < .05) unless ns (not significant) is marked. SI = Suicidal Ideation; ML = Mobility Limitation; SP = Social participation; LO = Loneliness.

Discussion

The main objective of the present study was to explore the interrelationships between suicidal ideation and some of its correlates at older age. Specifically, the relationships between suicidal ideation, loneliness, social participation, and mobility limitations were tested through cross-lagged panel models (CLPMs). For this purpose, we used data from the SHARE survey collected at three-time points. Consequently, this study overcomes the limitations of previous correlational and two-time studies.

In light of the results, we provide evidence in favor of the impact of mobility problems on suicidal ideation over time. Although this effect has been explored in the literature, previous results were contradictory (Forsell, 2000; Gustavson et al., 2016; Handley et al., 2014; Kang et al., 2014; Kiosses et al., 2015; Lutz, 2019; Raue et al., 2007). Our study extends previous longitudinal research on the relationship between mobility limitations and suicidal ideation. More concretely, results indicate that both variables interact, feeding back on each other over time. The presence of high levels of suicidal ideation in people with mobility problems is especially serious if we consider that people with poor mobility have greater endurance to physical pain (Lutz & Fiske, 2018). If this is so, their ability to withstand pain may increase their likelihood of engaging in lethal self-injury leading to death by suicide.

The IPTS and the IMV of suicide emphasize the impact of psycho-social variables, along with physical ones, on suicidal ideation (Joiner, 2005; O'Connor & Kirtley, 2018). Thus, the impact of mobility limitations on suicidal ideation could be twofold: direct and indirect, through its effect on the reduction of the individual's social activity. Our study shows that mobility limitations in older adults cause them to participate in fewer social activities, and this accentuates their perceived sense of loneliness. These results are in line with those obtained in previous studies (Moeyersons et al., 2022). However, although previous studies in the literature showed that feelings of loneliness promote the development of suicidal ideation (McClelland et al., 2020), present results show that when social participation markers are included the effect of loneliness on suicidal ideation is no longer statistically significant. Furthermore, previous research has shown that more social participation, defined as membership in more social groups, was associated with lower depression (Cruwys et al., 2013) and well-being in older adults (Lam et al., 2018). Our study expands this area of the literature by showing that social participation is also related to lower suicidal ideation over time.

Findings also showed that effects were consistent across waves, indicating that the impact of loneliness, mobility limitations, and social participation tends to remain stable over time. These results have clear implications for the development of policies and programs for the reduction of suicidal ideation in older adults. First, it supports the notion that encouraging social participation at an early stage is not only beneficial at that moment but can also establish positive changes with long-term benefits for healthy aging trajectories. Community-based programs, including participation in social, volunteering, recreational, and community exercise activities, have been identified as possible interventions to prevent suicidal behavior in older adults (Laflamme et al., 2022; Okolie et al., 2017). In addition, older adults who have multiple social group memberships are more socially connected and protected from a range of medical conditions, including depression (Cruwys et al., 2013), brain injury (Jones et al., 2012) or strain and enduring pain (Jones et al., 2011). Participation in multiple social activities not only fosters feelings of social identity but also enhances social and psychological resources, lowering loneliness (Steffens et al., 2016). Improving social relationships, especially in perceived bonds, has been identified as a promising strategy to reduce late-life suicide risks (Chang et al., 2017). Thus, promoting social activity aligns with the suicide prevention strategies proposed by the WHO (2014). These are based on the socioecological model, which propose that intervention should occur at multiple levels: social, community, interpersonal, and individual.

Secondly, to emphasize that when designing programs for the maintenance of functional skills and physical mobility, they can be enriched by basing them on situations of social interaction so that the benefit is maximized, not only promoting physical health but also offering opportunities for socialization (Hikichi et al., 2015). Suicidal behavior is a complex problem that requires a combination of multiple strategies that may have additive effects on suicide prevention as well as synergistic effects (Al-Halabí & Fonseca-Pedrero, 2021). For example, participation in volunteer activities and neighborhood walking programs were effective strategies for promoting better physical health and decreasing loneliness in older adults (Hays et al., 2001; Pettigrew et al., 2020).

Lastly, special attention should be paid to the mental health of those older adults with mobility problems that are limiting their social interactions, as results show that mobility problems exert a positive effect on future suicidal ideation. This result may be useful for the development of selective prevention programs, which ought to first identify specific groups that are at higher risk (Al-Halabí & Fonseca-Pedrero, 2021). In this regard, present results support suicide-specific funding for interventions tailored at older people and for more studies addressing interventions in vulnerable older adult groups (Laflamme et al., 2022).

The main strength of the present study is that it includes a longitudinal analysis based on a representative sample of older adults from Europe and Israel. However, it is not free of limitations. First, the complexity of the statistical model proposed, and the characteristics of the SHARE database excluded other potentially interesting variables for the prediction of suicidal ideation from the study: one of them is depression. Although some authors have claimed that depression is a mediator between mobility limitations and suicidal behavior (Ahn & Kim 2015; Park et al., 2014), we could not include depression in our study because the suicidal ideation item is taken from the scale of depression employed in SHARE. Other antecedents, whose interaction ought to be explored in future research, are spirituality, desperation, or psychological pain (Li et al., 2016).

The second limitation is that our study focuses on the number of social activities in which participants are involved and not in the frequency of participation in each activity. Further studies are needed to examine this additional aspect of social activity participation. The third concern refers to the measurement of suicidal ideation. Suicidal ideation was measured with the only indicator available that measures suicidal ideations, a single item from the EURO-D depression scale, which measures whether the person has had suicidal ideation in the last year. This binary item has been previously used to assess suicidal ideation in studies using data from SHARE (Ayalon, 2011; Fässberg et al., 2014; Saïas et al., 2012; Stolz et al., 2016), and it is indeed the only measure of suicidal ideation in this survey. Although Desseilles et al. (2012) outline that single suicide items from depression scales can be used as valid measures of suicidal ideation, finer measures of suicidal ideation could improve the results of future research. Therefore, a more precise measure, such a proper scale

about suicidal ideations, would have been more desirable. In addition, it is important to note that our suicidal ideation item does not distinguish between passive ideation and active ideation (suicide attempts or actual suicide). Nevertheless, the fact that it is a single-item measure allows for brief and useful screening, and a positive result entailing "having had a desire to die" is an aspect that deserves to be studied and prevented, even if it has not been actively manifested yet.

Finally, this study focused on suicidal ideation, the most common manifestation of suicidal behavior (Chiles et al., 2019). Future studies could analyze the end-of-life interviews contained in the SHARE database. As their name suggests, these interviews collect information about the death of participants and inform whether the person ended their own life. Although the number of subjects in this circumstance is expected to be small, future research may deepen their study using case methodology.

Author Contributions

Zaira Torres: Conceptualization, Methodology, Formal Analysis, Investigation, Data Curation, Writing - Original Draft. **Sara Martínez-Gregorio:** Writing - Original Draft, Writing-Review and Editing. **Irene Fernández:** Data Curation, Writing - Original Draft, Writing - Review. **José M. Tomás:** Methodology, Formal Analysis, Investigation, Project Administration, Funding Acquisition. **Amparo Oliver:** Conceptualization, Project Administration, Funding Acquisition, Supervision.

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Declaration of Interests

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Data Availability Statement

The data that support the findings of this study are available at the SHARE Research Data Center to the entire research community free of charge (www.share-project.org). Restrictions apply to the availability of these data, which were used under license for the current study, and so are not publicly available. However, data are available from the authors upon reasonable request and with permission of the SHARE Project (http://www.share-project.org/data-access/user-registration.html?L=).

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