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# "Loneliness is a sad disease": oldest old adults' empirical definition of loneliness and social isolation from a mixed-method study in Northern Italy

Sara Santini[1], Mauro Colombo[2], Antonio Guaita[2], Paolo Fabbietti[3] and Georgia Casanova[1*]

## Abstract

**Background** Loneliness and social isolation can occur at any stage of life, but some predictors may be more common among older adults. Due to growing population ageing, loneliness and social isolation are relevant social issues. Many studies apply the main definitions of loneliness and social isolation offered by the literature without considering how individual representations, socio-cultural context and the culture of care may influence their perception. This study wishes to fill in these literature gaps by analysing empirical definitions of loneliness and social isolation arising from a mixed-gender randomized sample of Italian oldest old people.

**Methods** Between January and March 2019, 132 older people, most aged 80+, living in a northern Italian town, were asked to answer a questionnaire and a semi-structured interview. According to a mixed-method analysis the definitions of loneliness and social isolation were analysed by respondents' gender, living arrangement (e.g., living alone or with partners or other people), and years of education to find possible associations to the meanings attributed to the two concepts.

**Results** The sample was gender-balanced and mid-low educated; more than one fourth of respondents lived alone. The results underline how the empirical definitions of loneliness and social isolation are closer to each other than the academic ones. The two concepts are often perceived by participants as distinct, but they are strongly interconnected so that they can be used interchangeably by older Italian people. The two main themes identified by the analysis are loneliness as "death" and social isolation as "guilt". In the respondents' opinion, the main loneliness driver is the loss of loved, close persons, while social isolation is driven by disability. Age, educational level, and living arrangements did not influence the meanings attributed to social isolation. On the contrary, living arrangement ($P=0.002$) and educational level ($p=0.023$) seem to influence the empirical definitions of loneliness.

**Conclusion** The knowledge of the meanings that oldest old give to the two concepts may inspire advanced intervention aimed at buffering the psychological and social consequences of loneliness and social isolation in the older population.

*Correspondence:
Georgia Casanova
g.casanova@inrca.it

Full list of author information is available at the end of the article

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## Introduction

Literature underlined how cultural, gender, and age differences could influence individual perception of loneliness and social isolation [1–5] and cognitive discrepancy related to the perception of the ability to change the personal condition of loneliness and social isolation [5]. Despite these influences and cultural differences, loneliness and social isolation have standard characteristics that allow to identify them by general definitions applicable in different contexts. In social sciences, loneliness is generically defined as an undesirable individual experience due to a subjective feeling of unmet social needs [6] that is only weakly correlated with one's social network size and frequency of interaction with others [7], regardless of the individual's age. This means that having few social contacts does not necessarily entail loneliness. Still, the perception of how these relationships may or may not be satisfactory makes the difference between feeling and not feeling alone [8]. Loneliness is a dynamic concept changing along the life course, because individuals' ability to cope with stressful life events, e.g. bereavement or retirement, can change over time [3, 4] and as a consequence also their capability of experiencing loneliness. Moreover, loneliness has been classified as "transient", i.e., occurring at a certain point in life and for a determined time, or "chronic", i.e., lasting more than two years [1]. Weiss (1973) [9] defines loneliness as "personal" or "emotional", when it is related to the absence of a significant person like a spouse or partner who provides emotional support, or as "social" when it is the consequence of the absence of a sympathy group.

Social isolation is defined as an absence of relationships with others and a small number of significant bonds [10, 11]. Cornwell and Waite [12] distinguish two forms of social isolation: "social disconnectedness" and "perceived isolation". Social disconnectedness is characterized by the scarcity of contacts with others, e.g., small networks, infrequent interaction and lack of participation in social activities and groups. Social isolation conditions can be due to the disappearance of social relations with a partner or friend's death or the changing context of life (e.g. retirement) [13, 14]. In this case, perceived isolation can be although there is a nonlinear correlation between loneliness, social isolation, and age, being 80 years and older is one of the drivers of feeling lonely [15]. Other socio-educational and economic factors are being male, having a high school diploma or less, experiencing poor social participation, having a physical and cognitive impairment, having lower income levels, being unmarried or widowed, living alone or being unemployed. All the above factors may represent the more common vulnerabilities in later life, exposing older people to a higher risk of loneliness and social isolation [16, 17].

Characterised by the personal experience of dissatisfaction with the quality of one's relationships, and it can embed feelings of loneliness and the absence of support. Conversely, perceived isolation is the personal experience of dissatisfaction with the quality of one's relationships, and it can embed feelings of loneliness and the absence of support. This perspective implies that since perceptions of isolation can be entirely unrelated to an individual's objective network structures and frequency of contacts, social isolation ends up being very close to the concept of loneliness. It also implies that they are often intertwined in human beings' personal experiences.

Also in the common language, the two concepts of loneliness and social isolation are often used interchangeably, often together with "solitude" [16], which is defined as a state of being alone or remote from society. Nevertheless, solitude has no negative connotation, especially when it is considered the expression of the personal volunteer to be alone. Still, conversely, it can bring potential beneficial effects in the life course, such that it has also been defined as "positive solitude" [18]. In older age, positive solitude can be used to cope with and resolve loneliness, and it can help older persons reflect and have a peaceful state of mind [18].

Risk factors for loneliness include increased difficulties in activities of daily living and motor decline [19]. Poor health conditions influence the experience of loneliness and social isolation. For example, the onset of decreased mobility and health conditions connected to the ageing syndrome, e.g., reduced hearing and vision and decreased chances to meet people, are drivers of loneliness and social isolation [20].

Cultural factors can also influence the perception of loneliness, which seems to increase in individualistic and family-oriented cultures [2, 21, 22]. Similarly, the culture of care— meant as the mix of national health and social policy, availability and accessibility of support, meanings, values, beliefs and preferences related to the assistance (both given and received [23]) can influence the representations that individuals living in a particular society attribute to loneliness and social isolation [24]. Thus, older people living in a family-oriented care culture [25–27], where the family plays a central role in providing informal care, can expect and wish to receive companionship and care in their home, exclusively from their family members, especially their daughters [28].

A quite recent study highlighted that loneliness and isolation were often experienced at the same time by older adults and that this cumulated experience can lead

to older adults' poor health, depression, worse quality of life, greater medical costs, and higher rates of Emergency department access [29].

On the contrary, social engagement is associated with decreased disability, lower mortality and shorter hospitalization times [30, 31]. Thus, social participation activities have recently begun to be included in preventive medicine interventions targeted to older people, as such activities were deemed effective in improving self-rated physical and mental health, especially among older people with low socio-economic status [32].

Moreover, regardless of age, there are no systematic differences between people living in rural and urban areas, nor statistically significant gender differences in levels of loneliness, even if women may be more prone to admit feelings of loneliness. At the same time, men prove to be more sensitive to the social and cultural stigma connected to loneliness [16]. Some studies underline that loneliness is higher in older women [33, 34], while others state that it is so in older men [35]. The perception of loneliness and social isolation may also change over the life course [36].

The literature highlights how loneliness and social isolation affect the well-being and health of older people [37–39]. Many studies have shown that loneliness in older age can be associated with higher rates of mortality [40–45] and worse quality of life [46]Social isolation can be associated with multimorbidity and mortality [47], depression [10] and cognitive decline [48]. Loneliness and social isolation can increase cortisol concentration, weaken the immune system, cause sleep disruption and increase body weight [42]. They are also associated with cardiovascular and mental health conditions [13].

Since Western and developed countries' societies are characterized by a fast and unprecendented population ageing, the proportion of older population at risk of loneliness and social isolation is also increasing. In fact, in 2021, 39.8% of women and 20.0% of men aged 65 or over lived alone in Europe, with an increase of 18.7% and 50.4% since 2009 [49]. Moreover, from 2016 to 2020 the global loneliness rate among European citizens doubled, reaching 25%, and the number of older adults who feel alone rose from 15 to 23% [16]. Considering that in Europe, in 2030, around 25% of the global population will be over 65 + and that between 2019 and 2100 the percentage of people aged 80 and over will double, from 5.8 to 14.6% [50], it is expected that the percentage of older people suffering from loneliness and social isolation will reach unprecedented levels. This is the case in Italy, characterised by a family-oriented care regime and a strong feminization of care [25–27]. Although the gender gap, ranked by the Gender Equality Index [51], decreased in the last 20 years [52], the inequality in the distribution of care activities between men and women is still evident in the informal care sector, where the percentage of women involved in care, every day, is 34% of the overall female population, compared to 24% of men [52]. In light of the above, when the presence of family members becomes sporadic and discontinuous, and especially when daughters are included in the labour market, older people living in a family-oriented care culture may suffer from loneliness more than older people living in countries where ageing in a nursing home is commonplace.

The social relevance of loneliness and social isolation pushed some national governments (e.g., the UK, Netherlands and Japan) to announce specific policy strategies to counter these phenomena, even supported by the nomination of dedicated ministerial task forces [53–55]. In Italy, where this study was carried out, in 2023, the persons aged 65 and over represented 47,5% of the overall population living alone, and the projections foresee that the percentage will reach 57,7% in 2043, due to the low fertility rate and the longevity of the Italian population [56]. Thus, this country pays great attention to loneliness and social isolation not only as risks fot the health and well-being of older people but also as possible consequences of the willingness to ageing in place. In fact, the voluntary of ageing in one's own home is very common in Italy, where the house represents the place of family and memories and reflects the identity of the person who lives in. Nevertheless, ageing at home may sometimes lead to loneliness and social isolation, especially when the older person has a physical disability, e.g. reduced vision and hearing, that reduces the person's mobility [57].

Ranci et al. [58] underline the urgency of new policies for contrasting loneliness and social isolation, which can become consequences of the ageing in place for older people living with disability or frailty in a context where long-term care services (e.g. domiciliary healthcare) are not well distributed in the territories, e.g. in inner areas [59]. As is the case for the provision of long-term care, the family in Italy seems to be the first, if not the only, resource to counteract the loneliness of older people through the intimacy of family relationships. Consistent with this, older people who receive support only from public long-term care services perceive higher levels of loneliness than those who can count on close relatives making company and providing support [60]. Despite the lack of specific laws promoting the social inclusion of older people, several initiatives are aimed at contrasting the social isolation of community-dwelling older people and reinforcing their social participation and social ties [61].

Concern about the effects of isolation on older people's physical and mental health has prompted many scholars to undertake studies on the subject. The COVID-19 pandemic boosted such interest since governmental physical distancing measures, better known as "stay at home"

measures, substantially increased loneliness and social isolation in the general population, especially in the older one, given that older people were at higher risk of death if infected. The available literature confirms a higher prevalence of loneliness and isolation in studies conducted months from the start of the COVID-19 pandemic compared to those undertaken within the first three months of the pandemic, confirming the long-term effects of social and physical restrictive measures on older people's perception of loneliness and isolation [62]. Moreover, the increased risk of developing dementia by 49–60% in older people as a consequence of the prolonged loneliness and social isolation imposed by the COVID-19 health crisis [63] increased the number of studies on the topic.

Regardless of the parenthesis of the pandemic, the latest literature focused attention on information communication technologies (ICTs), including social networking sites (SNS), as promising tools for tackling social isolation and loneliness among older individuals [64]. A recent study confirms that older people living in the Italian north and urban sites use PCs/tablets to talk with family members and less for other functionalities (e.g., the internet) [60]. Furthermore, although the usage of SNSs can reduce the feeling of being left out among older adults [65, 66], no study found significant associations between the usage of SNSs and lower levels of social isolation among older adults, and few studies suggested that it can be associated to lower levels of loneliness [67].

Despite the vast number of studies on loneliness and social isolation in older age, several limitations can be observed in the available literature. First, few experimental studies involved randomized samples, including the oldest old (i.e., individuals aged 80 years and over), who are the most exposed to the risk of social exclusion [68].

Moreover, although Floyd and Hesse [69] offered an empirical definition to underline the difference between loneliness and affection deprivation, and Wright, Burt and Strongman [70] identified empirical characteristics of loneliness in the workplace, empirical definitions of loneliness and social isolation are not widely used in the literature. Moreover, few studies consider cultural attitudes (e.g., individual network size ties and social engagement attitudes) as a factor influencing loneliness definition [71] e.g., suggesting differences between Western societies characterized by relatively few stable social relationships and social interactions and higher social embeddedness countries, e.g., Egypt and India [72]. Furthermore, except for a study by Ratcliffe, Wigfield, and Alden [73] exploring the characteristics of loneliness expressed by older people, focusing only on males, few studies explore gender-driven representations of loneliness and social isolation. Despite these detected differences, empirical research usually does not explore loneliness and social isolation as concepts formulated by the older individuals enrolled in the studies, preferring to use the main definitions in the literature [74, 75]. This study will cover these literature gaps by analyzing the empirical definitions of loneliness and social isolation from a mixed-gender randomized sample of Italian people. Knowing the meanings that older people aged 80 and over attach to the concepts of loneliness and social isolation is important for designing policies and planning interventions that respond to the real needs of older people.

## Materials and methods

### Study design

This study is part of a larger ones named "Aging in a Networked Society - Social Experiment Study" (ANS-SE), a randomized controlled trial conducted on older people aged 75 and over and residing in Abbiategrasso, a town located in the Milan area (Italy). The general study aimed to assess the impact of social network systems (SNSs) use on loneliness and social isolation [76]. This specific sub-study wanted to collect the definition of loneliness and social isolation given by the older participants for answering two research questions: (1) Which meanings are attributed to loneliness and social isolation by older people participating in the study? (2) To what extent gender, educational level, and living conditions influence the respondents' definitions of loneliness and isolation?

### Sampling strategy and inclusion criteria

Participants were recruited through the municipal registry office's lists. Older people aged 75 and over were contacted by telephone to check their interest and availability to participate in the study. After agreeing on a date for the interview, older people went to the research centre to be screened by the Geriatric Depression Scale (GDS) [77] and the Italian revised version of Mini-Mental State Examination (MMSE) by Measso and colleagues [78]. Only people with GDS who scored less than or equal to 9, without physical limitations and good cognitive functioning corresponding to an MMSE score > 24 [78], were asked to participate in the study. Only those giving their written consent were enrolled. Written consent was obtained from respondents, and all responses were collected anonymously in compliance with EU Regulation No. 679 of the European Parliament, the Council of 27 April 2016, and the Helsinki Declaration (2013). The study obtained the approval of the competent Ethic Committee (prot. 431/ 2019).

### Data collection

Psychologists and neuropsychologists collected data between January and March 2019 through a questionnaire and semi-structured interviews. The questionnaire included demographic questions, such as year and

gender, and queries to assess the respondents' general health condition, cognitive status, and mental health.

The qualitative (QUAL) data were collected through face-to-face interviews [79, 80]. After participants had signed the informed consent form, the interviews were audio recorded and transcribed per the Cohen [81] guidelines on conducting semi-structured interviews. The interview topic guide included four questions asking for the personal definition of "loneliness" and "social isolation", the difference between the two concepts, and the respondents' personal experiences. Every interview lasted approximately 25 min. The interviewers were researchers skilled in qualitative research with older people. Thus, they knew how to capture any sign of tiredness or suffering in older people and welcome and manage any emotion arising in the interviewees. Moreover, before the interview started, the interviewers clarified that older people could interrupt the dialogue without consequences.

#### Measures and data analysis

A mixed-method (MM) approach [82–85] was chosen, whereby the QUAL data highlighted the contents of the definitions of loneliness and social isolation left by older people (research question number 1), and the quantitative (QUANT) data provided information on the social and demographic background of the respondents (research question number 2). QUANT and QUAL data were collected and analyzed separately. Then, they were integrated during the process of contrasting and comparing the results of each phase. The synthesis of the two analyses was reached when the definitions of "loneliness" and "social isolation" (QUAL data) were interpreted in connection with gender, educational level and living conditions (QUANT data). The following QUANT variables were analysed: gender, age, educational level and living arrangements.

The authors decided to analyse QUAL data by living arrangements because they may influence the experience of feeling alone as showed by Schmitz et al. [86] who underlined that being in a co-residential partnership and having a large social network protects the oldest-old against loneliness. Moreover, the educational level may not influence the representation of loneliness and social isolation per se, but the respondents' capability of expressing one own thoughts on the concepts. Furthermore, concerning gender differences, Pinquart and Sorensen [23] for example, argued that older women are more vulnerable to loneliness than older men, because they tend to live longer and so they are more likely to be widowed, to struggle with functional limitations and to require more health care. However, the influence of gender in the perception of loneliness is quite controversial and the study focused on this topic are mainly quantitative [87]. Thus, the authors hoped to contribute to the debate with this mixed-method study.

Data were expressed as mean and standard deviation or as number and percentage, depending on the nature of the variables. The respondents' definitions of loneliness and social isolation, collected through the interview and consisting of textual data, were compared to their gender, living arrangements and educational level (independent variables) by the chi-square test because they were all categorical variables. Statistical significance was set at $p < 0.05$. Data are reported as absolute frequencies and percentages. We did not add the post-hoc onto Tables 5 and 6 because of the low number of respondents and because the high number of possible combinations of the variables would have weakened the analysis power. Then, we focused only on the statistically significant results for interpreting the data emerging from the mixed analysis and described them in the text.

QUAL textual data from the transcriptions were analysed using the thematic analysis method [88–90]. The text chunks were associated with codes systematised into a codebook (Table 1) and combined under the main themes identified based on the consistency of different codes grouped under the same theme. The themes are the final definitions of loneliness and social isolation, as reported in Tables 3 and 4. Since the interview was semi-structured (not in-depth) and the respondents' education level was relatively low, the answers were not exhaustive enough to allow them to identify sub-themes.

Therefore, the analysis started deductively from the topic-guide questions, and then it continued inductively by reflecting the original thoughts of the respondents. The mixed deductive-inductive approach allowed us to include topics that spontaneously emerged from the interviews, despite not being explicitly asked, in the analysis, and that enriched the study results. This is the case, for example, of identifying barriers and drivers to loneliness. The parallel and independent analysis by two researchers and the involvement of a third one in case of disagreement between the two leading researchers minimised the research bias [91–95]. Moreover, the risk of distortion of data interpretation was limited thanks to the separation of the collection of data task, assigned to psychologists and neuropsychologists, from the analysis of data, conducted mainly by the senior sociologist of the research team. Furthermore, the QUAL analysis's trustworthiness was obtained through scholars' checks and peer review [96].

To answer the second research question, the QUAL responses were analysed based on QUANT data relating to gender, educational level and respondents' living conditions to understand how these variables may have influenced the formulation of the sample responses.

**Table 1** Codebook

| Codes/Subcodes | Description |
|---|---|
| LONELINESS DEFINITION | This code captures the respondents' definition of loneliness |
| SOMETIMES POSITIVE | This code captires the positive aspect of being alone sometimes |
| NO ANSWER | This subcode captures the missing answers to the question of loneliness definition |
| LONELINESS AS A CHOICE | This subcode captures respondents' considerations of loneliness as a personal choice. |
| BEING/LIVING ALONE | This subcode captures respondents' considerations on loneliness as a consequence of living alone |
| PERSONAL FEELING NOT DEPENDING ON EXOGENOUS FACTORS | This subcode captures respondents' considerations on loneliness as a feeling depending on exogenous factors |
| DEPRIVATION OF: | This subcode capturesrespondents' considerations on loneliness as a deprivation |
| MEANINGFUL RELATIONSHIPS/INTEREST TO OTHERS | This subcode capturesrespondents' considerations on loneliness as a deprivation of meaningful relationships |
| COMMUNICATION/DIALOGUE/UNDERSTANDING | This subcode capturesrespondents' considerations on loneliness as a deprivation of dialogue |
| ISOLATION DEFINITION | This code captures respondents' definition of social isolation |
| NO ANSWER | This subcode captures the missing answers to the question on social isolation definition |
| A FEELING | This subcode captures the nuances of social isolation as a personal feeling |
| BOTH VOLUNTARY AND SUFFERED | This subcode captures the definition of social isolation as a result of a mix of one's choices and behaviours, and conditions imposed by others |
| LACK OF CONTACTS and/or AUTONOMY | This subcode captures the isolation as a lack of social contacts |
| PUNISHMENT/JAIL | This subcode captures isolation as a punishment |
| DEPRIVATION OF RELATIONSHIPS AND DIALOGUE | This subcode captures the isolation as a deprivation of dialogue |
| SUFFERED ACTION (EXCLUSION) | This subcode captures isolation as merely a condition depending on the decision of others to exclude a person |
| PERSONAL DECISION (VOLUNTARY CONDITION) | This subcode captures isolation as a personal and aware choice |
| COMPARISON BETWEEN LONELINESS AND SOCIAL ISOLATION | This code captures the different meanining respondents attribute to the two concepts |
| NO ANSWER | This subcodes reports the missing answers highlighting the dearth of conceptualization by respondents or their uncertainty on the topic |
| ARE THE SAME THING OR RELATED | This subcodes captures the thoughts of respondents giving the same meaning to the two concepts |
| ARE DIFFERENT | This subcodes captures the thoughts of respondents giving diffntret meanings to the two concepts |
| LONELINESS AND ISOLATION CONSEQUENCES | This code captures the respondents' perspective about the possible outicomes of the two concepts |
| QUALITY OF THE RELATIONSHIP IN THE LAST MONTH | This code captures the respondents' perspective on their own relationships to understand if their quality affects the respondents' answers |
| NO ANSWER | This subcodes reports the missing answers. |
| MOST NEGATIVE | This subcode mirrors the low quality of the respondents' relationships |
| MOST POSITIVE | This subcode mirrors the high quality of the respondents' relationships |
| FEELINGS OF LONELINESS AND ISOLATION | This code captures the personal reaction to loneliness and social isolation |
| NEUTRAL | This subcodes mirrors the thoughts of respondents having a neutral reaction to the possibility of experiencing loneliness and social isolation |
| NEGATIVE | This subcodes mirrors the thoughts of respondents having a negativel reaction to the possibility of experiencing loneliness and social isolation |
| PROTECTING FACTORS FROM LONELINESS AND ISOLATION | This code captures the respondents' idea on factors preventing loneliness and isolation in older age |
| DRIVERS TO LONELINESSAND ISOLATION | This code captures the respondents' idea on drivers to loneliness and isolation in older age |

## Results

In this paragraph, the focus is on the definitions of loneliness and social isolation provided by the oldest old persons enrolled in the study. Nevertheless, the authors also include the analysis of respondents' feelings related to the definitions because the meanings of the concepts are also made of sentiments and personal beliefs. The respondents' opinions on the factors that may lead to loneliness and social isolation or contrast them are also important because they completed the interviewees' perspective and allow us to get a step forward and understand where social initiatives can be implemented for fostering social participation and inclusion.

**Table 2** Participants' characteristics

| Characteristics | Total (*N* = 132) |
|---|---|
| **Gender, N(%)** | |
| Male | 68 (51.5) |
| Female | 64 (48.5) |
| Mean age, SD | 79.9 ± 7.08 |
| Italian revised version MMSE, SD by Measso et al. (78) | 28.22 ± 2.83 |
| GDS, SD | 1.89 ± 1.94 |
| **Educational level, N(%)** | |
| <5 years of education | 3(2.4%) |
| 5–7 years of education | 42(31.8%) |
| 8–12 years of education | 62(47%) |
| 13 years of education | 20(15.2%) |
| >13 years of education) | 5(3.8%) |
| **Living arrangement, N(%)*** | |
| With spouse/partner and others | 20(15.2%) |
| With spouse/partner only | 66(50%) |
| With others (e.g. siblings, other family members, no spouse/partner) | 8(6.1%) |
| Alone | 36(27.3%) |

*Two missings

### Respondents' description

The final sample is made of 132 respondents whose mean age is 79.9 years, and gender is balanced between males and females (Table 2); 34.2% of respondents had a low level of education, i.e., 7 or fewer years of schooling; 47% had an average education, and only 19% achieved a Bachelor's degree or more. 71.3% of the sample lived with a spouse/partner and/or with other persons; only 27.3% lived alone.

### Meanings of loneliness and social isolation provided by older interviewees

The thematic map (Fig. 1) shows the main themes/meanings raised by the analysis concerning the definitions of loneliness and isolation given by the interviewees. Every theme is followed by the number of times that it emerged in the 132 interviews.

46.8% of respondents defined loneliness as the "deprivation of meaningful relationships", regardless of their living alone (Fig. 2). This means that, in this view, loneliness is perceived as an objective factor, i.e., the absence of people you can speak with and/or you can rely on because of a close bond and affection. Only 33% of respondents considered loneliness as a "personal feeling" that people can experience even when they are together with other people. A minority of the sample (13.8%) defined loneliness as a lack of communication with other persons, a voluntary choice and being alone, without specifying whether for personal choice or not.

Only six people out of 132 said that loneliness can be a positive condition and that one can feel well alone. Given the very small number, we did not include these definitions in the analysis.

Table 3 reports the most informative quotations on the "loneliness" definition extrapolated from the interviews.

Isolation received a greater variety of definitions than loneliness (Fig. 3). 33.6% of the respondents defined isolation as "a voluntary condition" i.e., something that people choose to live. On the contrary, 22.4% defined it as a condition that people suffer from in this view, isolation overlaps social exclusion. 18.7% of the interviewees considered isolation as a "lack of contact" with people living outside the household and 15% as a "punishment" and associated this word with the concept of "jail". From a gender perspective, males defined isolation related to

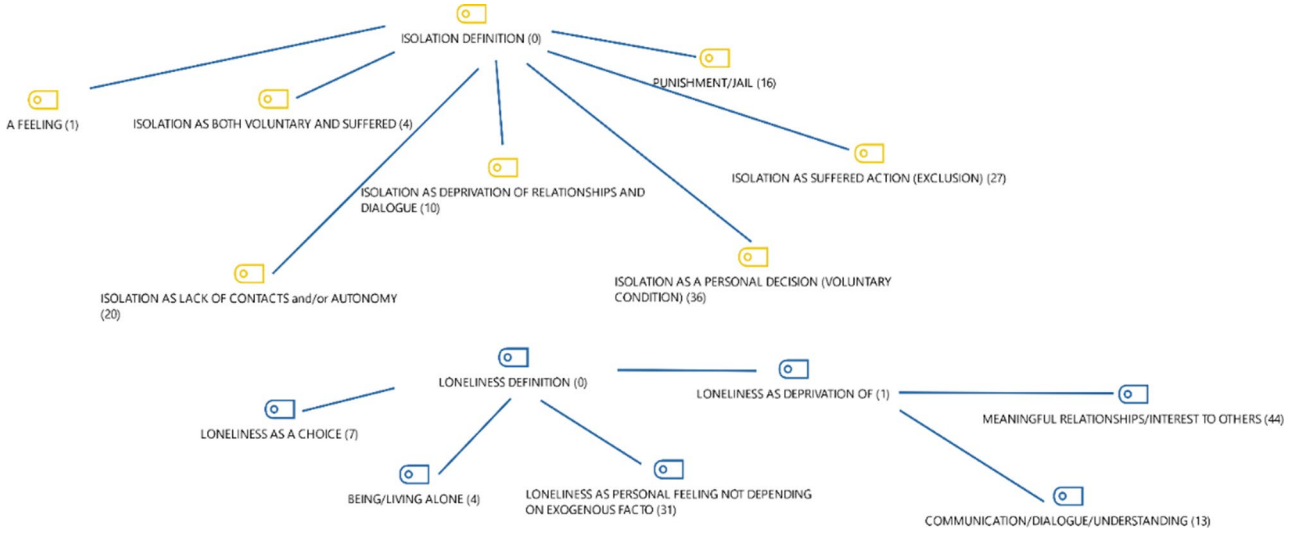


**Fig. 1** Thematic map

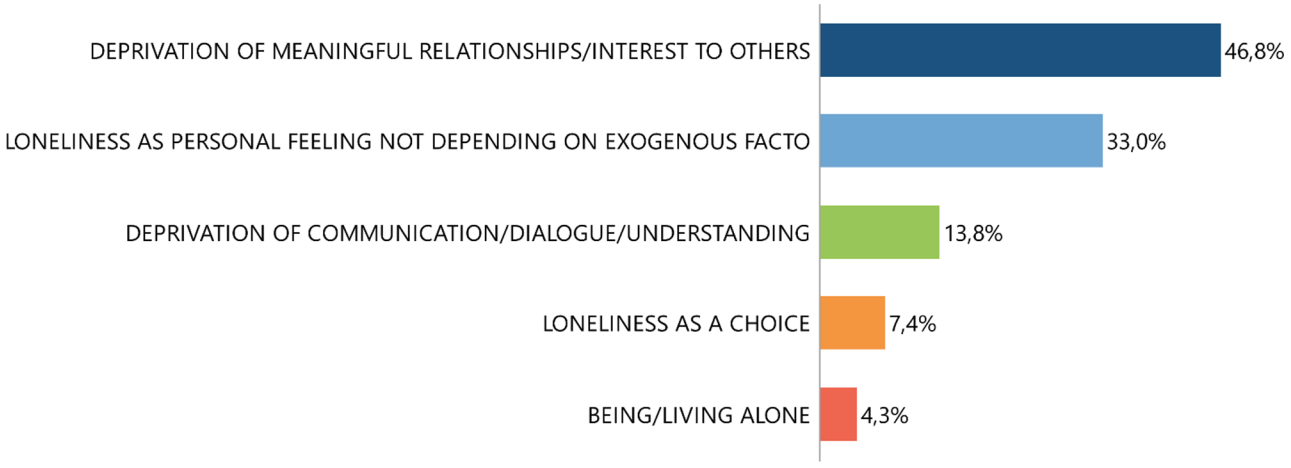


**Fig. 2** Frequency of codes of "loneliness" definitions

**Table 3** Older adults' definitions of "loneliness"

| Definitions | Quotations |
|---|---|
| Deprivation of meaningful relationships | "Loneliness is when a person has not anyone to share the experiences with" (ID17, F, 82 years) |
| Personal feeling | "Loneliness is feeling alone in the midst of people, even in the midst of loved ones" (ID972, M, 80) |
| Lack of communication/dialogue/understanding | "Loneliness is the lack of lively dialogue beyond the simple "good morning" (ID1565) |
| Voluntary choice | "Loneliness is when a person does not want to have relationships with others because of his/her personality" (ID343, F, 81 years) |
| Being/living alone | "Loneliness is when you live alone, and you are afraid that something bad may happens and there is nobody you can ask help" (ID627, M, 81 years) |
| It can be also positive | "Loneliness may be very positive or very negative. For me, it is good sometimes when I can be alone, quiet and do what I like" (ID1097, F, 80 years) |

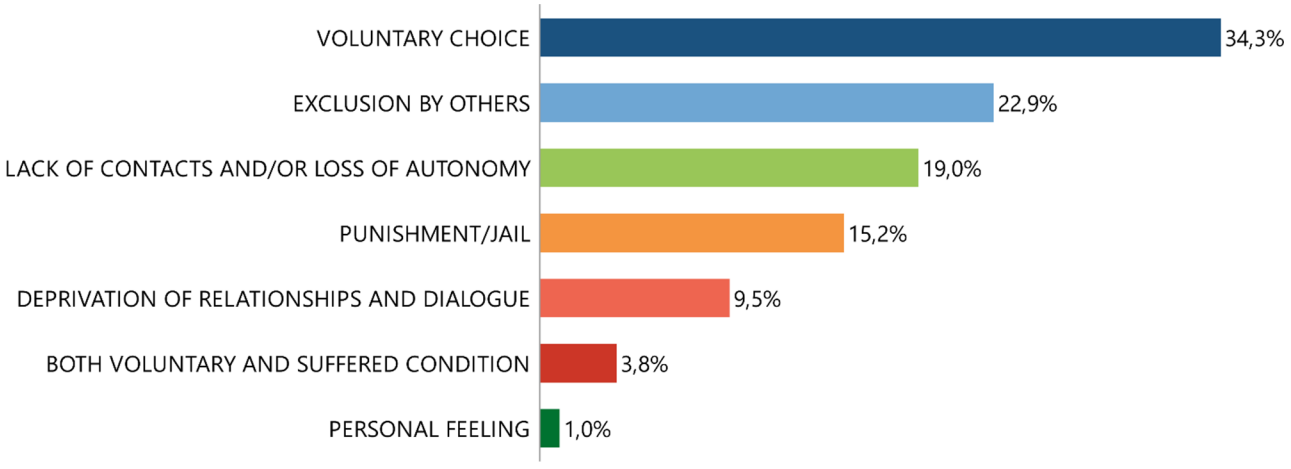


**Fig. 3** Frequency of codes of "social isolation" definitions

the semantic area of punishment more frequently than females (12 vs 4). 9.3% of the interviewees thought that social isolation can mean a "deprivation of relationships and dialogue", and only 0.9% think that it can be an "individual feeling".

Table 4 reports some definitions of isolation given by the interviewees.

#### Difference between loneliness and isolation

We asked the respondents if they found any difference between loneliness and isolation. Out of 132 interviewees, 36 answered they saw a difference, and 13 said they did not. The others did not provide an answer. Most respondents guessed the difference between loneliness and social isolation, but they were unable to explain it. In many cases, respondents felt uncomfortable answering

**Table 4** Older adults' definitions of "social isolation"

| Definition | Quotations |
|---|---|
| Voluntary condition | "Isolation is those who no longer want to leave the house, isolate themselves, that no one comes to talk to her. Who tries to isolate herself from all the people who might even ask indiscreet questions or, thus, that she just doesn't want to see anyone" (ID685, M, 81) |
| Suffered action (exclusion) | "It is to be abandoned" (ID987, F, 80 years) |
| Lack of contact with the outdoor | "A person who is in hospital or in a facility" (ID534, F, 82 years) |
| Punishment/Jail | "Isolation is one that, that is, he did not behave well in life or killed someone or did, I don't know, hurt someone and surely he takes isolation as a punishment, if he is a dangerous type" (ID1562, M, 80 years) |
| Deprivation of relationships and dialogue | "It is when a person can't dialogue…communicate with others" (ID1515, M, 79 years) |
| Both a voluntary and suffered action | "Isolation is when you isolate yourself because you are angry with everyone (by character) or when you are excluded because you have a bad temper" (ID355, M, 82 years) |
| A feeling | "A person feeling alone" (ID1013, F, 81 years) |

this question, and this may be one of the possible explanations for the lower number of answers to this question compared to the other ones.

Nevertheless, a few respondents could give a meaningful explanation of such a difference. One respondent said: *"I think there is no difference between loneliness and isolation, because those who seek loneliness isolate themselves"* (ID 670, M, 81 years).

Another respondent focused on the difference between the two conditions: *"Yes, there is a big difference because you may want to be isolated, but you may not want the loneliness that others make you feel by not coming to visit you"* (ID 685, F, 80 years).

For several respondents, the two conditions are interconnected, as described by the following quotation: *"A person who is isolated from everyone, abandoned, nobody goes to their place for a visit, remembers them and he/she falls down in such a way that little by little they go out by themselves"* (ID 1413, F, 79 years).

#### Personal feelings about loneliness and social isolation

Most of the respondents defined loneliness and isolation as a negative experience. Only a few people considered it as a neutral factor in the life of older people. Loneliness was often associated with the semantic realm of *illness and death*, as shown by the following quotations:

"Loneliness is a sad disease" (ID1065, M, 80 years).

"In my opinion, loneliness leads to death over time" (ID1565, F, 79 years).

> *"Loneliness is really a bad thing because when you are alone you only think about bad things because you don't remember the good things you experienced" (ID701, M, 81 years).*
> *"Loneliness is a state in which a person suffers because he/she has no references for his/her relationship and therefore it can also be a serious condition" (ID1081, M, 81 years).*

In the following quotation, loneliness is described as a slow process triggered by an adverse event in which people are left alone, and they want to be left alone as well. Day by day, people got used to be left alone. They do not stand the presence of other people, or even the sound of their voices. The result is suffering: "*When people experience great sorrow, relatives and friends stay away because pain is scary. My husband and I, for example, have had a big disappointment in our life: everyone stays away and now it happens that if a person comes into the house talking, chatting loudly, laughing, that annoys us because we are now used to loneliness*" (ID 635, F, 81 years).

All the sample, except for two people, regardless of the respondents' gender, thought that loneliness was a negative experience. The respondents considered loneliness such a bad thing that someone called it a "beast" (ID1624, M, 79 years) and another a "disease" (ID1304, M, 80 years). We chose two quotations that appear to be the most emblematic among all:

> *"Loneliness is bad, it is an ugly beast, it is an ugly beast. And loneliness hurts so much especially when, I speak for myself eh I speak for myself, I lived through it; I go home, open the door, find myself alone, or at night I am alone, or eat and I am alone, at dinner and lunch, it is bad, it is bad, bad. It makes me feel like dying because I have no one" (ID1624, M, 79 years).*
> *"It is a bad disease, practically because it can also be considered a disease, loneliness, indeed, personally I consider it a disease like boredom, like so many other things. Loneliness is a bad thing, for me, the way I see it. I have never had the pleasure, the displeasure, of knowing it" (ID1304, M, 80 years).*

In light of the above, it is not surprising that the main and the most common feeling about loneliness among older respondents was fear: *"I am terribly scared by loneliness"* (ID1697, M, 79 years).

### Drivers of and factors mitigating loneliness and isolation

Although interviewees were not asked to provide their opinion on drivers of loneliness and isolation or mitigating factors, some respondents spontaneously referred to their own perspectives on this topic. In the opinion of some respondents, loneliness is the consequence of the loss of loved ones, going from losing one's partner to losing relatives and friends, up to the point where the older person has the feeling of seeing his/her relational world disappearing little by little, feeling increasingly alone, as the following quotations explain quite well: *"Since my husband died, the door is closed in the evening and I am alone. There is nothing, it can happen that I do not feel good and there is no one I can lean on"* (ID701, F, 81 years).

> *"Loneliness can derive from my age because friends, because relatives, because the whole world, let's say, in which we lived together, is disappearing, and at this point this is a form of loneliness" (ID821, M, 81 years).*
> *Nevertheless, loneliness can be shaped by individuals' behavior excluding other people: "Sometimes we create loneliness, isolating ourselves, rejecting other people, also rejecting the advice, the words of others and we close ourselves in our shell" (ID1210, F, 81 years).*

For someone else, loneliness may also be the consequence of becoming dependent. Thus, the first factor contrasting loneliness is autonomy: *"I don't suffer from loneliness because I drive, I go here and there, that is, the problem is when one is no longer able to leave the house and is no longer independent"* (ID1210, F, 81 years).

Finally, some older respondents underlined that they suffer from loneliness, especially during the winter, because walking in the snow or rain is dangerous, and so they remain closed at home: *"Winter, especially if it snows and I'm indoors, wears me down. Otherwise, when the weather is good, I have no problems because I go out, even with the cane now, now that I have to use it, I go out and find life different"* (ID534, F, 82 years). This leads us to think that also seasons and bad weather can motivate older people to get out and meet people or not.

In the opinion of most respondents, the first and basic antidote to loneliness is being able to talk to someone, primarily family members: *"Exchange a word, maybe even a stupid one, talk to a person even for a quick chat or a coffee in company I think it might help a little, but if one is isolated, depression comes soon"* (ID1026, F, 80 years).

Similarly, to loneliness, in the respondents' opinion, the first driver to social isolation is the loss of independence: *"Unfortunately, the friendships that one has, either are lost or, let's say, are no longer really 100%, I say so, as long as one manages to have independence, does not suffer from social isolation, however, one day when one is no longer independent, it becomes a problem"* (ID343, F, 81 years).

The second factor leading to isolation in older age is being in trouble without the possibility of finding any help from someone else: *"Social isolation is the situation in which those who have accumulated a series of problems and cannot find a solution end up"* (ID 1319, M, 81 years).

### The influence of gender, educational level and living conditions on the definitions of loneliness and isolation

To reply to the second research question, the definitions of "loneliness" and "social isolation" have been crossed with the respondents' gender, living conditions and educational level.

The definitions of "loneliness" did not change with the respondents' gender: the difference is not statistically significant ($p = 0.235$) (Table 5).

Conversely, there is an association between respondents' living arrangements and the definition of "loneliness" ($p = 0.002$). In detail, one fourth of the respondents living with their partner and other persons thought that loneliness is a personal choice, while 73.3% of respondents living with their partner said that loneliness is a personal feeling. More than half of interviewees living alone did not answer the question on the definition of loneliness but, the few who did, define it as deprivation of meaningful relationship (15.9%) and communication (30%).

The definition of the concepts are also influenced by the educational level ($p = 0.023$). The idea that loneliness is a feeling that one person can develop for personal reasons regardless of exogenous and/or objective conditions, such as, for example, living and spending most of the time alone, is most common among respondents with up to 13 years of education. The idea that loneliness is a deprivation of meaningful relationships is common especially among older respondents with eight to 12 years of education. Participants with 13 years of education and more thought that loneliness means living without meaningful relationships or that it is a personal feeling, i.e., a subjective factor.

The definition of "social isolation" (Table 6) is also quite well distributed between males and females, except for the conceptualization of social isolation as a punishment, which is three times more frequent among men than women (12 vs. 4), despite there being no statistically significant difference.

The living arrangement does not affect the social isolation definition in a statistically significant way ($p = 0.389$).

Half of the respondents with up to seven years of education believed that social isolation coincides with exclusion as it is a suffered condition (11 answers), and the

**Table 5** "Loneliness" definition by respondents' gender, living arrangement and years of education

| Participants' characteristics | Loneliness definitions | | | | | | *p* |
|---|---|---|---|---|---|---|---|
| | Deprivation of meaningful relationships | Living alone | Personal feeling | A personal choice | Lack of communication | No answer | |
| **Gender**, **N(%)** | | | | | | | |
| Males | 24(54.5) | 4(80.0) | 18(58.1) | 3(42.9) | 8(61.5) | 11(34.4) | 0.235 |
| Female | 20(45.5) | 1(20.0) | 13(41.9) | 4(57.1) | 5(38.5) | 21(65.6) | |
| Sub-total | 44(100.0) | 5(100.0) | 31(100.0) | 7(100.0) | 13(100.0) | 32(100.0) | |
| **Living arrangement**, **N(%)*** | | | | | | | |
| With partner and others | 9(20.5) | 1(33.3) | 4(21.1) | 1(25.0) | 0(0.0) | 5(10.0) | 0.002 |
| Only with partner | 25(56.8) | 2(66.7) | 14(73.7) | 2(50.0) | 5(50.0) | 18(36.0) | |
| With others without a partner | 3(6.8) | 0(0.0) | 1(5.3) | 1(25.0) | 2(20.0) | 1(2.0) | |
| Alone | 7(15.9) | 0(0.0) | 0(0.0) | 0(0.0) | 3(30.0) | 26(52.0) | |
| Sub-total | 44(100.0) | 3(100.0) | 19(100.0) | 4(100.0) | 10(100.0) | 50(100.0) | |
| **Years of education**, **N(%)** | | | | | | | |
| < 5 | 2(5.0) | 0(0.0) | 0(0.0) | 0(0.0) | 0(0.0) | 1(2.3) | 0.023 |
| 5–7 | 7(17.5) | 0(0.0) | 12(38.7) | 4(66.7) | 0(0.0) | 19(44.2) | |
| 8–12 | 23(57.5) | 3(100.0) | 8(25.8) | 2(33.3) | 7(77.8) | 19(44.2) | |
| 13 | 8(20.0) | 0(0.0) | 9(29.0) | 0(0.0) | 1(11.1) | 2(4.7) | |
| >13 | 0(0.0) | 0(0.0) | 2(6.5) | 0(0.0) | 1(11.1) | 2(4.7) | |
| Sub-total | 40(100.0) | 3(100.0) | 31(100.0) | 6(100.0) | 9(100.0) | 43(100.0) | |

*2 missing

**Table 6** "Social isolation" definition by respondents' gender, living arrangement and years of education

| Participants' characteristics | Social isolation definitions | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Personal feeling | Both voluntary and suffered condition | Punishment | Deprivation of meaningful relationships and contacts | Suffered condition | Voluntary condition | No answer | *p* |
| **Gender**, **N(%)** | | | | | | | | |
| Males | 0 (0.0) | 3 (75.0) | 12 (75.0) | 15 (50.0) | 14 (58.3) | 18 (50.0) | 6 (28.6) | 0.108 |
| Female | 1 (100.0) | 1 (25.0) | 4 (25.0) | 15 (50.0) | 10 (41.7) | 18 (50.0) | 15 (71.4) | |
| Sub-total | 1 (100.0) | 4 (100.0) | 16 (100.0) | 30 (100.0) | 24 (100.0) | 36 (100.0) | 21 (100.0) | |
| **Living arrangement**, **N(%)*** | | | | | | | | 0.389 |
| With partner and others | 0(0.0) | 2(33.3) | 1(7.1) | 6(20.7) | 4(19.0) | 3(8.8) | 4(14.8) | |
| Only with partner | 0(0.0) | 2(33.3) | 8(57.1) | 12(41.4) | 8(38.1) | 20(58.8) | 16(59.3) | |
| With others without a partner | 0(0.0) | 1(16.7) | 1(7.1) | 1(3.4) | 0(0.0) | 3(8.8) | 4(14.8) | |
| Alone | 1(100.0) | 1(16.7) | 4(28.6) | 10(34.5) | 9(42.9) | 8(23.5) | 3(11.1) | |
| Sub-total | 1(100.0) | 6(100.0) | 14(100.0) | 29(100.0) | 21(100.0) | 34(100.0) | 27(100.0) | |
| **Years of education**, **N(%)** | | | | | | | | |
| < 5 | 0(0.0) | 0(0.0) | 0(0.0) | 1(3.1) | 0(0.0) | 1(2.8) | 1(4.5) | 0.387 |
| 5–7 | 0(0.0) | 1(33.3) | 4(30.8) | 8(25.0) | 11(45.8) | 9(25.0) | 10(45.5) | |
| 8–12 | 1(50.0) | 2(66.7) | 6(46.2) | 16(50.0) | 9(37.5) | 19(52.8) | 8(36.4) | |
| 13 | 0(0.0) | 0(0.0) | 3(23.1) | 6(18.8) | 2(8.3) | 7(19.4) | 2(9.1) | |
| >13 | 1(50.0) | 0(0.0) | 0(0.0) | 1(3.1) | 2(8.3) | 0(0.0) | 1(4.5) | |
| Sub-total | 2(100.0) | 3(100.0) | 13(100.0) | 32(100.0) | 24(100.0) | 36(100.0) | 22(100.0) | |

*2 missing

other half is convinced that it is a voluntary action, even if there is no statistically significant difference ($p = 0.387$) most of the respondents thought that it depends on lacking meaningful connections and contacts. As regards the educational level, there is no correlation with the social isolation definition. Nevertheless, the idea that social isolation is a punishment and the consequence of guilt it is more common among respondents with 5–12 years of education.

## Discussion

The empirical definitions of loneliness and social isolation identified by these results are closer than the academic ones proposed by, Perlman and Peplau, (1981) [5],

Peplau et al. (1984) [6], Hawkley et al. (2003) [7], Motta (2021) [8], Cacioppo et al. (2011) [10] and Zavaleta et al. (2011) [11] and partly complementary. The definition of loneliness as a 'beast' highlights its 'violence', its emotional and instinctual nature not so much in its manifestations (which are indeed described as subtle and slow), as in the emotional sphere of the respondents. Thus, in this respect, it is very close to the emotional loneliness described by Weiss (1973) [9].

In line also with the theory of Valtorta & Hanratty [97], loneliness follows an emotional determination based on the absence of relationships with specific desired companions, particularly spouses, children, family members and closest friends. Moreover, the association of loneliness with negative feelings and physical conditions such as "fear" and "disease" confirm its strong emotional value for the oldest old [98]. The fact that loneliness is conceived as the direct consequence of the interruption of the relationship with family members is not surprising considering the centrality of the family in the imagination of Italian older people and the family-oriented care system that characterizes Italian society [25–27].

In line with the academic definitions of social isolation, in the respondents' view, social isolation is characterized by few social contacts with the external social network (e.g., friends, neighbours etc.), recalling the idea of a low social participation attitude, seen as a voluntary choice [99] that leads to social disconnectedness [12]. Thus, social isolation in this definition recalls the concept of solitude [16] as a voluntary choice, but it maintains a negative connotation, far from the concept of positive solitude [18]. In fact, in the respondents there is not the idea of social isolation as the personal voluntary choice of being disconnected to be closer to inner dimension and to find a peace of mind. On the contrary, the respondents linked social isolation to "guilt", fact that it is not common in the international literature, but it is mirrored by another study conducted in Italy [100]. In this study, the interviewed older people said that they felt in guilt because they lost the role they had in the family and in the community e.g. the role of grandfathers looking after grandchildren. Thus, it is possible that the sense of guilt referred by the oldest old enrolled in our study partly depends on the belief that when one retires from the social life and gives up social functions in the community s/he becomes useless. However, other studies should be done on the relationship between social isolation and guilt.

The empirical definitions of loneliness and social isolation identified by these results are closer to each other than the academic ones. In the current study, the two concepts are perceived as strongly interconnected so that they can be used interchangeably by the oldest old people. Both concepts, indeed. Identify the substantial effect of a lack of social relationships, overcoming the separation between subjective feeling and objective facts, proposed by Peplau and Perlman [6] and Cacioppo [10]. However, the results underline how loneliness and social isolation are slow processes characterized by no sudden self-choice and sometimes out of older people's control. In this case, loneliness and social isolation are undesired living conditions due to adverse events or individual ageing and the reduced autonomy to leave one's home [101, 102].

The results also show that there is not a gender-driven difference in the meaning that women and men involved in this study have provided for loneliness. Conversely, this difference concerns the concept of social isolation, because men were more likely than women to link social isolation to a guilt. This negative representation of social isolation may depend on the fact that males tend to be more isolated than females through most of the life course, and this gender difference is much greater for the never married and those with disrupted relationship [36]. Thus, such a negative interpretation of the social isolation in the interviewed oldest old men, may be the result of the cumulative effect of the tendency to be isolated throughout the life course.

In the respondents' opinion, the main driver of loneliness in older age is the death of meaningful close persons over time; this confirms that the objective loss of significant connections can make loneliness closer to social isolation because it becomes not only a subjective perspective, but it depends on the loss of actual relationships. Conversely, keeping in touch and speaking with family members can mitigate the feeling of loneliness. These results underline the central role households play in Italy as a pillar of the welfare system [103, 104].

Respondents identify independent living and social participation as the leading solutions to contrast loneliness and social isolation in the oldest old more than living with someone. Both solutions are discussed interchangeably and are complementary elements of common strategies oriented towards improving the quality of life [105].

The respondents' gender did not influence the definitions of loneliness, confirming the concepts underlined by Baarck [16]. Conversely, it looks as though gender influences the definition of social isolation. The oldest old men in the sample are keener to conceptualize social isolation as a social punishment, i.e., as the consequence of acting contrary to the rules dictated by the community to which they belong. Moreover, the educational level seems to affect the meanings attributed to loneliness. The higher the respondents' level of education, the closer the definitions are to those given in the literature. The oldest old people with a low educational level are keen to think of social isolation as a punishment.

Finally, the respondents' living conditions do not influence their representations of social isolation.

## Study limitation

Some limitations characterize this study. First, the QUAL questions were added to a planned two-hour QUANT data collection. For this reason, the time devoted to the qualitative interview was limited. This did not allow us to study in depth some specific aspects (e.g., the gender connotation of the negative perception of both concepts studied). Nevertheless, the main objective of the interviews, i.e. collecting the personal definitions of loneliness and social isolation, was reached, because the main topics have been deepened. Second, the data collected during 2019 did not include the possible effects of the restrictions due to the Covid-19 pandemic on the empirical definitions of the concepts studied, because they were administered before the outbreak happened on 9th March 2020 in Italy, and the closure of the care facilities However, in the last three years, several studies showed the impact of the social restrictions put in practice during the pandemic on the older old population, despite none (to the best of our knowledge) compared the meanings and representations of loneliness and social isolation before and after the pandemic among over 80 people.

Third, data collection was carried out in a small Italian town; this study did not take into account specific characteristics of socialization or cultural habits determined by this specific territorial reality. Fourth, some people in the randomized sample did not agree to participate in the QUAL study, potentially reducing the spectrum of different detected opinions.

Moreover, the interview topic-guide had not questions on the expectations of older old respondents on the family members they preferred to be close to for buffering the sense of loneliness. So we do not know if they expected to receive company by daughters more than by sons or if they preferred the company of same age people or younger. The interviewers did not deep it because the main objective of the study was to collect interviewees' meanings of loneliness and social isolation.

Furthermore, when we analysed the definitions of loneliness and social isolation by respondents' gender, living arrangement and educational level, some groups of respondents became very small. This has limited the statistical significance and the generalisation of the outcomes.

Finally, the participants lived in a small city of 33,000 inhabitants, where territorial proximity could influence people's social connections, facilitating the citizen's and neighbours' contacts and personal perceptions of loneliness and social isolation.

## Suggestions for care to professionals and researchers

Despite these limitations, the study contributes to the literature by offering an empirical definition of loneliness and social isolation from a specific and understudied target group of Italian oldest old people.

The results may be useful for social workers and health care providers to plan interventions to prevent the occurrence of loneliness and social isolation among community-dwelling older people. Initiatives should aim at helping older people meet neighbours and acquaintances to create new strong bonds that ease the loss of those lost throughout life, mainly due to bereavement. Moreover, such interventions should prioritize the involvement of older people who lost meaningful and close relationships and provide for psychological support for treating the possible sense of guilt that can accompany the perception of social isolation when it is lived as a punishment. Further studies are recommended to investigate the differences in the empirical concepts of loneliness and social isolation in oldest old age, in different contexts (e.g., metropolitan and rural areas), countries and cultures. Based on the limitations of this study, future research should involve a large sample not to fragment the sample in too many categories and to maintain the statistically significance of the associations between qualitative contents and respondents' characteristics such as gender, living arrangements and educational level. The interpretation of the social isolation as guilt and punishment in the interviewed oldest old men, may shed light on a different way for including oldest old men in interventions aimed at social inclusion that approach them starting from the reinforcement of their social identity meant as the representation that they think the members of the community have about them and reinforce their self-esteem and the sense of self. However, the gender characterization of empirical concepts of social isolation should be studied in depth by future studies and the impact of mandatory physical restrictions in pandemic time on the oldest old living in the community needs to be explored.

Furthermore, the results confirm that warm seasons and good weather can influence oldest old individuals' willingness to get out and meet people [106, 107]. This result encourages interventions that differ across seasons i.e. that prioritise outdoor initiatives e.g. in the country and/or sea side in Spring and Summer, while incentive volunteers' visits at older people's home and activities in social centres in Autumn and Winter.

Finally, since the study was based on empirical definitions of loneliness and social isolation and the representations/meanings of loneliness and social isolation may be influenced by the culture of care of every country, maintain the focus on Italy allowed us to avoid wrong generalizations and comparisons with other countries.

However, future studies comparing loneliness and social isolation in different cultural contexts are encouraged by the results of this study.

## Conclusion

In the opinion of most of the interviewed oldest old, loneliness is defined as the deprivation of meaningful relationships and a personal feeling, that only partly coincide with the academic definitions. Social isolation is viewed partly as the consequence of the willingness and specific choice of people to have not contacts and partly as suffered condition imposed by others. To distinguish the two concepts, it was difficult for the respondents as well as it is in social sciences and in the practice of everyday life. From an epistemological perspective loneliness belongs to the realm of death and social isolation to that of guilt and punishment, especially for older men.

Loneliness and social isolation constitute not only a social, but also a health emergency. By understanding the meanings that oldest old people give to the two concepts, it is also possible to understand the representations associated with them and design more effective social interventions.

The study highlights that feeling lonely is like dying and this can trigger feelings of guilt in the oldest old population with dangerous consequences for their mental health.

Any intervention to prevent and limit loneliness and social isolation in older age should start with an epistemological investigation of these concepts.

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**Author contributions**
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**Data availability**
The data supporting this study's findings are available from the Golgi Cenci Foundation. However, restrictions apply to the availability of these data, which were used under license for the current study and are not publicly available. Data are, however, available from the authors upon reasonable request and with the permission of director of Golgi Cenci foundation, dr. Antonio Guaita.

## Declarations

**Ethics approval and consent to participate**
The study received approval from the Ethic Committee of the University of Milano Bicocca (prot. 431/ 2019) and was registered at Clinical Trials.gov (NCT04242628).

**Competing interests**
The authors declare no competing interests.

**Author details**
[1]IRCCS – INRCA National Institute of Health & Science on Aging, Centre for Socio-Economic Research on Aging, Ancona, Italy
[2]Golgi Cenci Foundation, Abbiategrasso, Milano, Italy
[3]IRCCS INRCA-National Institute of Health and Science on Ageing, Center for Biostatistic and Applied Geriatric Clinical Epidemiology, Ancona, Italy

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