

LONELINESS: ASSOCIATION WITH MENTAL HEALTH IN A POPULATION-BASED STUDY

Eduardo J. Pedrero-Pérez^{1,2}, Agustín Haro-León²,
Josselyn Sevilla-Martínez² and Elena Díaz-Zubiaur²

¹Complutense University of Madrid; ²Madrid Salud, Madrid City Council
(Spain)

Abstract

Loneliness is an emerging public health problem in developed countries. The objective was to establish the prevalence in a representative sample of a large city and its relationship with mental health indicators. Using stratified random sampling, a sample of 8,828 was obtained. The degree to which they had felt lonely during the last year and other questions and questionnaires related to their mental health were asked. A total of 10.2% reported feeling lonely during the last year. Those who felt lonely were four times more likely to develop more symptoms of poor mental health (63% vs. 16%), to receive a diagnosis of anxiety/depression, and to be prescribed psychotropic drugs. The structural model suggests that loneliness worsens mental health, leading to greater prescription of drugs, which increases feelings of loneliness. Loneliness tends to remain in anonymity and intimacy and is addressed mainly through the prescription of psychotropic drugs that aggravate the problem, plunging the subject into a vicious circle that is difficult to escape. The results make it necessary to offer more effective responses than a mere pharmacological approach.

KEY WORDS: *loneliness, mental health, anxiety, depression, prescription drugs.*

Resumen

La soledad es un problema emergente de salud pública en países desarrollados. El objetivo es establecer la prevalencia en una muestra representativa de una gran ciudad y su relación con indicadores de salud mental. Se realizó un muestreo aleatorio estratificado ($n= 8.828$), se preguntó por el grado en que se había sentido sólo durante el último año y se pasaron cuestionarios relativos a su salud mental. Un 10,2% declaró sentirse solo durante el último año. Quienes se sienten solos cuadruplican las probabilidades de desarrollar más síntomas de mala salud mental (63% vs. 16%), recibir un diagnóstico de ansiedad/depresión y de serles prescritos psicofármacos. El modelo estructural sugiere que la soledad empeora la salud mental, conllevando mayor prescripción de fármacos, lo que incrementa la sensación de soledad. La soledad suele quedar en el anonimato y la intimidad, y se aborda principalmente mediante la prescripción de psicofármacos

que agravan el problema, sumiendo al sujeto en un círculo vicioso con difícil escapatoria. Los resultados obligan a ofrecer respuestas más eficaces que el mero abordaje farmacológico.

PALABRAS CLAVE: *soledad, salud mental, ansiedad, depresión, psicofármacos prescritos.*

Introduction

"Imagine a condition that makes a person irritable, depressed, and self-centred, and is associated with a 26% increase in the risk of premature mortality. Imagine too that in industrialised countries around a third of people are affected by this condition, with one person in 12 affected severely, and that these proportions are increasing. Income, education, sex, and ethnicity are not protective, and the condition is contagious. The effects of the condition are not attributable to some peculiarity of the character of a subset of individuals, they are a result of the condition affecting ordinary people. Such a condition exists-loneliness" (Cacioppo & Cacioppo, 2018, p. 426).

The feeling of loneliness has become a major health problem in developed countries in recent years. A recent study conducted in the United States with more than 20,000 participants estimated that 44% of Americans over the age of 18 felt lonely (Bruce et al., 2019). Another study in 11 European countries of more than 30,000 participants over the age of 60 found that between 30 and 55 per cent of Eastern European adults felt lonely, falling to between 10 and 20 per cent in Western Europe (Hansen & Slagsvold, 2015).

One of the problems that research must face is the conceptual delimitation between living alone, feeling alone or being isolated, among other related concepts (Valtorta et al., 2016). Living alone is in no way equivalent to feeling lonely, just as living with others does not guarantee that one will not feel lonely. Isolation can be the voluntary restriction of social relations or the undesired consequence of a poorly managed solitude, defined, ultimately, as the objective situation of having minimal contact with other people. The feeling of loneliness is a personal experience that evokes the absence of social, emotional, and behavioral components in daily life, including the lack of support, the lack of intimacy with other people or the feeling that no one will provide help if it is needed. A major characteristic of loneliness is that it can only be obtained from a person's own statement to the extent that it involves individual evaluative judgment (Valtorta et al., 2016).

Among all these concepts, the feeling of loneliness is the one that has shown strong association with a great diversity of health problems (Rico-Urbe et al., 2016). Systematic reviews and meta-analyses have found strong associations between loneliness and depressive symptoms, cognitive impairment, and dementia (Erzen & Çikrikci, 2018; Wang et al., 2018). Other population studies with a lower level of evidence have found strong associations between feelings of loneliness and various mental disorders, as well as with suicidal behaviour (Stickley & Koyanagi, 2016). Links have also been found with physical problems: loneliness appears to be strongly

associated with hypertension and other cardiovascular problems (Leigh-Hunt et al., 2017; Valtorta et al., 2016), health status (Rico-Urbe et al., 2016) and all-cause mortality (Holt-Lunstad et al., 2015; O'Suilleabháin et al., 2019). It has not yet been possible to delimit the mechanisms that mediate the effects of solitude on health, although the role of high levels of cortisol has been suggested (Cacioppo et al., 2002), which would indicate that psychosocial stress is the intermediary mechanism and the activation of the hypothalamus-pituitary-adrenal axis, the neuroendocrine route (Cacioppo et al., 2015). This relationship with stress would also explain the higher frequency of psychopathological disorders linked to loneliness (Holt-Lunstad et al., 2015). Most studies have focused on older populations, but many other studies have found that loneliness is not a feeling exclusive to older people, but that it affects all ages, including children, adolescents, and youths, and all show similar links to physical and mental health (Maes et al., 2017; Mahon et al., 2006).

No studies have been found that provide scientific evidence on the differences in the perception of loneliness between urban and rural populations, although different studies tend to find that loneliness is more frequent in urban populations, while interpersonal contact and social support networks are stronger in rural areas, mitigating loneliness (Henning-Smith et al., 2018). The main objective of the present study is to find the prevalence of loneliness in a representative sample of a large city (Madrid, Spain) and then to study the relationship between the feeling of loneliness and mental health indicators.

Method

Participants

A sample of 8,828 subjects was obtained (from the total sample of 8,845, 17 subjects with incomplete data were eliminated), whose descriptions are shown in Table 1.

Instruments

- a) *Health Survey of the City of Madrid (Díaz Olalla et al., 2020)*. This survey included the question "How often have you felt alone during the last year?" was included in the General Survey, with the following response options: Always or almost always; Quite often; Rarely; and Never or almost never. For the purposes of this study, the first two were grouped in the category "Loneliness" and the last two in "Not Loneliness". The following questions have also been extracted from the survey: 1) "Have you been told by your doctor that you suffer... (a) Anxiety; and (b) Depression", with a dichotomous answer of Yes/No; 2) "Have you consumed in the last year (a) Tranquilizers or sleep medication; (b) Antidepressants; and (c) Strong pain medications", offering examples of the most common brands, also with a dichotomous Yes/No response; 3) "In the last 12-months, would you say your health has been very good, good, fair, bad, very

- bad?"; 4)- "How often do you drink any alcoholic beverages?", with the following response options: Never; One or less times a month; Two to four times a month; Two or three times a week; and (5) Four or more times a week; and 5) "Could you tell me if you currently smoke tobacco" with the following response options: (1) Yes, daily; (2) Yes, but not daily; (3) Not currently, but I have smoked before; and (4) Do not smoke, nor have you ever smoked.
- b) *General Health Questionnaire-12* (GHQ-12; Goldberg & Williams, 1988), Spanish version (Rocha et al., 2011). The GHQ-12 is a self-administered screening instrument that aims to detect indicators of psychological distress and possible cases of psychopathological disorders (non-psychotic) in contexts such as primary care or in the general population. The items are answered on a Likert-type scale of four options. Previous studies indicate that a criterion score of three or more affirmative responses is indicative of risk of poor mental health, while a total Likert score would be a measure of the intensity of the distress (Makowska et al., 2002).

Table 1

Descriptives of the sample and subsamples depending on whether or not they declare a feeling of loneliness in the last year

Variables	Total (N= 8.828)	Loneliness (n= 904)	No loneliness (n= 7924)		
Age				<i>p</i>	<i>F</i> (ω^2)
<i>M</i>	49.3	47.9	49.6	< .01	7.9 (.01)
CI 95%	48.9-49.7	46.7-49.1	49.2-50.0		
SD	17.8	18.6	17.7		
Rank	15-98	15-94	15-98		
Sex				<i>p</i>	χ^2 (<i>V</i>)
Males	4045	308	3737	< .001	56.0 (0.08)
CI 95%		6.5-8.7			
Females	4783	596	4187		
CI 95%		11.3-13.7			
Academic level (%)					
Primary or less	10.7	18.0	9.9	< .001	79.7 (0.10)
Secondary	47.4	50.8	47.0		
University	41.9	31.2	43.1		
Social class (%)					
Disadvantaged	36.2	48.4	34.8	< .001	69.8 (0.09)
Media	24.3	23.1	24.5		
Favoured	39.5	28.5	40.7		
Developmental level of the district of residence					
Low	23.4	26.5	23.0	< .05	9.9 (0.02)
Medium/low	32.2	31.1	32.3		
Medium/high	23.3	24.4	23.3		
High	21.1	17.9	21.1		

Procedure

The population universe was made up of persons resident in the city of Madrid aged 15 years or over ($N= 3,205,390$). The type of sampling used was two-stage stratified random sampling. The criterion for stratification was the twenty-one city districts and post-stratification by sex and age groups from pre-set minimum sizes. The selection of the sampling units in the first stage (households) was carried out by simple random sampling in each geographical stratum and the second stage (persons to be interviewed) also by a simple random system within each household, until the commented quotas were completed, prefixed by age and sex according to the composition of the population in each stratum. In each household, only one interview was conducted.

The information was collected through a telephone interview conducted by previously trained interviewers and assisted by computer using the Computer Assisted Telephone Interviewing (CATI; Choi, 2004) based on a structured questionnaire. The fieldwork was carried out between October and December 2017.

About 87% of the population of Madrid has both landline and mobile phones, and 10% have exclusively mobile numbers. Therefore, the sampling scheme was originally designed to recruit 50% of the sample by landline phone and 50% by mobile number. In the end, 57% of the total sample was interviewed by landline phone. The landline phones were selected from the telephone companies' directories that identify the area of the city where the owner of the line resides, which significantly simplifies the stratification by this criterion. Mobile phones were recruited from a list of randomly generated mobile phone numbers, until the pre-determined strata quotas were completed.

In total, 83,464 random calls were made to recruit 8,845 participants (ensuring a minimum of 400 interviews per district). In 49.6% of these calls, there was no contact (after a maximum of 10 attempts made in three weeks) or residences (offices, commercial companies, etc.), or they corresponded to numbers of persons resident outside the city of Madrid; furthermore, 17% of the calls resulted in contacts with persons who did not meet the age and sex quota of each district, and finally, 21.4% were simple refusals, and around 800 persons began the interview but did not complete it. The substitution was carried out with more random calls to comply with the sampling scheme of pre-determined district quotas by age and sex. With this sample volume and considering the hypothesis of simple random sampling, an error of less than 1.5% is guaranteed for the whole population in the case of comparable frequencies ($p=q=.5$).

The relative level of development of the districts was obtained by calculating the Combined Index of Health, Knowledge and Income (ICSCR), obtained with the same methodology that produced by the United Nations Development Programme (UNDP), the well-known HDI (United Nations, 2018). The ICSCR index is obtained from three indicators: (1) health: life expectancy at birth (2016 values were used for this study); (2) education: population aged 30-64 with education beyond secondary school (2017 data); and (3) income: gross disposable income per capita (2014 data available). A cluster analysis was carried out which grouped them into four

categories: high development, medium-high development, medium-low development and low development.

For the characterization of social classes, respondents were classified by occupational class (Domingo-Salvanya et al., 2013). Each interviewee was assigned the social class of the household in which she is included, which is not necessarily that of the person responding to the questionnaire, but rather that of the main breadwinner of that household.

The study was approved by the Ethics Committee of the Carlos III Health Institute of Madrid (number CEIPI51_2017-v2).

Data analysis

When the difference between categorical variables was estimated, chi-square (χ^2) and Cramer's V were used to estimating the effect size, considering the rules proposed by Cohen (1988): $V = .1$ low effect; $V = .3$ moderate effect; $V = .5$ large effect. For the comparison of continuous variables, ANOVA test and the omega square (ω^2) were used to estimate the size of the effect ($\omega^2 = .01$ low effect; $\omega^2 = .06$ moderate effect; $\omega^2 = .14$ large effect). For percentage comparison, the 95% confidence interval (CI 95%) has been estimated. The statistical package SPSS 17 was used for these analyses (ω^2 was estimated manually from the ANOVA table). A path analysis was performed using the unweighted least square method, appropriate to the type of variables used (Morata-Ramírez et al., 2015). The adjustment of the models has been estimated using the indicators provided by the AMOS 18 program: CMIN/DF, as a general index, although their sensitivity to the sample size requires the use of other indicators; RMR, AGFI and GFI as absolute adjustment indices, NFI and RFI as incremental indices and PGFI and PNFI as parsimonious indices. The most widely accepted criteria in force have been used to interpret the suitability of these indicators (Kenny, 2015). The model that has shown the best adjustment is presented in graphic form, showing the regression weights and marginal measures.

Results

The 2.7% of the sample answered that during the last year they have always or almost always felt alone, 7.5% quite often, 30.5% rarely and 59.3% never or almost never. If the answers are grouped ("always or almost always" and "quite a few times" vs. "few times" and "never or almost never"), 10.2% of the sample ($n = 904$, IC95% 9.4-11.0) declared feeling lonely in the last year. Table 1 shows the descriptions of both subsamples and the total sample. Significant differences are observed in all variables, although the effect size is small in all cases. Those who declare a feeling of loneliness are younger on average, more frequently women, have a lower level of education, belong to more disadvantaged social strata and live in districts with a lower level of development.

Women score significantly more in all age groups. The youngest age group (15-29 years) is the one that presents the highest frequency in men and, in both sexes, is clearly above the two older groups, although significantly only in men. In fact, the group of younger men declares a feeling of loneliness often significantly higher than all other groups of this sex (Figure 1). A closer look at this younger group shows (Figure 2) that the higher prevalence is at the expense of the adolescent female group, although overlapping confidence intervals in all cases.

Figure 1

Percentage of subjects declaring a feeling of loneliness in the different age groups and by sex

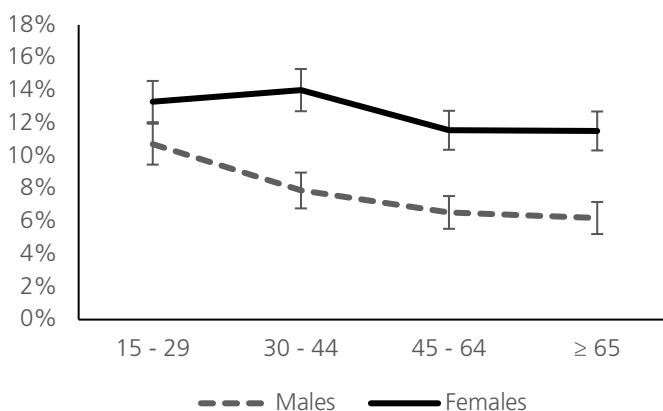
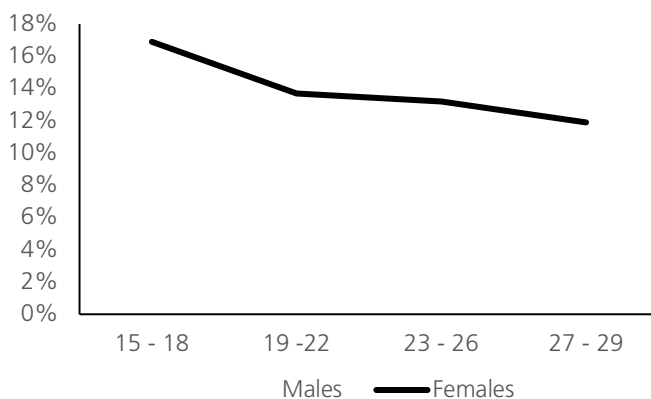


Figure 2

Percentage of subjects declaring feeling of loneliness in the younger age group by sex



Loneliness and mental health

Those who report feeling of loneliness present a risk of poor mental health in 63.3% of cases (CI 95%, 59.1-67.5) compared to only 16.2% of those who do not report it (CI 95%, 15.1-17.3), which represents significant differences and with considerable effect size ($\chi^2= 1,048.4$, $p < .001$, $V= .35$). These differences appear in both men (57.7%, CI 95%, 50.3-65.1, $V= .31$) and women (66.2%, CI 95%, 61.1-71.3, $V= .36$), although differences by sex were not significant. Among those who reported feeling lonely, the intensity of distress was greater ($M= 15.97$, $SD = 7.2$) than in those who did not feel lonely ($M= 9.10$, $SD= 3.9$), which represents significant differences ($F= 2,078.7$, $p < .001$, $\omega^2= .19$). These values hardly change when controlling for sex ($F= 1,086.3$, $p < .001$, $\omega^2= .19$).

Loneliness and alcohol consumption

The 38.1% of those who feel lonely declare that they are abstemious, compared to 25.8% of those who do not feel lonely. About 33.0% of the latter drink more than twice a week compared to 25.2% of those who feel lonely. These differences are significant, although with a poor effect size ($\chi^2= 83.3$, $p < .001$, $V= .10$). However, those who feel lonely drink, on average, more drinks in each consumption episode, differences that were significant ($\chi^2= 34.0$, $p < .001$, $V= .07$).

Loneliness and tobacco consumption

Those who feel lonely smoke more frequently (24.5%, CI 95%, 20.8-28.2) than those who do not (18.3%, CI 95%, 17.2-19.4). Although the percentage of people with a feeling of loneliness who have no intention of quitting smoking is higher (49.6%, CI 95% 45.3-53.9) than the rest (47.5%, CI 95%, 44.3-50.7) the differences are not significant.

Loneliness and consumption of prescribed psychotropic drugs

The 40.2% of those who feel lonely have been diagnosed at some time with depression and 36.5% with anxiety, compared with 7.7% and 8.5% respectively in those who do not feel lonely, which represents significant differences ($p < .001$) and with moderate effect size ($V= .29$ and $V= .22$, respectively).

Table 2 shows the differences in the consumption of psychotropic drugs during the last year. In all cases, these differences are statistically significant and with an effect size between low and moderate. In all cases, women report a higher frequency than men and the differences with those who do not feel lonely reach greater magnitude of the effect. Specifically, a quarter of women who feel lonely have received anti-anxiety drugs and a third anti-depressants.

Loneliness and perception of health

The 46.8% (CI 95% 42.5-51.1) of those who feel lonely consider that their health in the last year has been good or very good, compared to the rest of the sample that considers it in 75.3% of the cases (IC95% 74.1-76.5). On the contrary, 17.2% (CI 95% 14.0-20.4) of those who feel alone consider that their health has been bad or very bad in the last year, as compared with only 4.4% (CI 95% 3.8-5.0) of the rest of the sample. These differences were significant and with considerable effect size ($\chi^2 = 433.0$, $p < .001$, $V = .22$).

Table 2

Consumption of psychotropic drugs prescribed in the last year in those who feel lonely compared to those who do not declare this feeling

Psychotropic drugs	Feeling of loneliness	No feeling of loneliness	χ^2	V
Anxiolytics				
Males	17.2%	6.3%	74.2	0.14
Females	25.0%	8.7%	209.7	0.21
Total	22.6%	7.5%	326.3	0.19
Antidepressants				
Males	28.4%	6.6%	117.9	0.17
Females	34.7%	9.9%	254.2	0.23
Total	33.0%	8.3%	419.6	0.22
Opioid analgesics				
Males	12.6%	6.9%	20.0	0.07
Females	21.9%	10.2%	92.6	0.14
Total	18.6%	8.6%	128	0.12

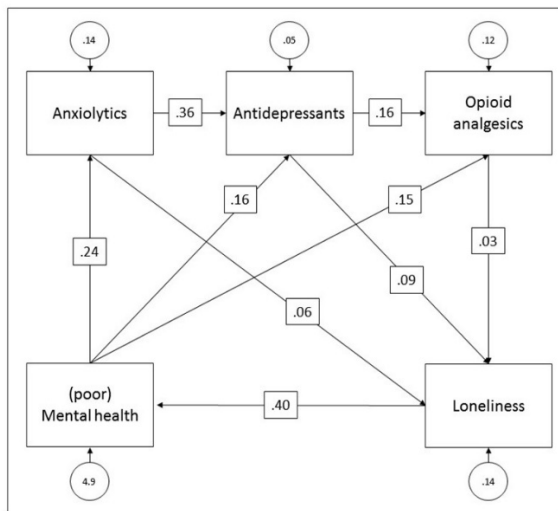
Note: All differences are statistically significant ($p < .001$).

Structural model

Figure 3 shows the structural model with the best fit indicators (CMIN= 1.54; RMR= 0.003; GFI= .99; AGFI= .99; PGFI= .07; NFI= .99; RFI= .99; PNFI= .10) between loneliness, symptoms of poor mental health (GHQ-12 Likert score) and psychoactive drug use. The model reflects a causal hypothesis according to which the feeling of loneliness increases the symptoms of psychological distress, these increase the prescription of psychotropic drugs, which in turn increases the feeling of loneliness, forming a vicious circle. It is interesting to note that this model suggests that there is a sequence of prescription, so that the first response is the prescription of anxiolytics, which secondly favors the prescription of antidepressants and finally opioid analgesics, regardless of the existence of pathological processes associated with pain.

Figure 3

Structural model of the relationship between loneliness, mental health and prescription medications



Note: The standardized regression weights on the lines and the balloon marginal measures on the exogenous variables are indicated.

Discussion

At least 9.2% of the population of a large city (Madrid) declared that they felt lonely during the last year. This prevalence is close to the estimates of previous studies for Western European countries (Hansen & Slagsvold, 2015) and far below the estimates for Eastern European and Anglo-Saxon countries. However, this is a very significant prevalence, especially when the impact on mental and physical health that has been identified in other work is considered (Erzen & Çikrikci, 2018; Rico-Urbe et al., 2016; Stickley & Koyanagi, 2016; Wang et al., 2018).

The problem of loneliness affects more women, who suffer from it in at least 11% of cases, although the size of the effect of these differences is low. Previous studies have found that these differences only appear once adolescence is over, at which stage there seems to be no effect of the sex variable (Maes et al., 2019). However, this is not what is observed in the present study, given that the highest prevalence of loneliness is obtained mainly from adolescent women, far from what is declared by men.

Most previous studies have focused on the study of loneliness in advanced ages. However, other studies have also explored younger populations, finding that loneliness is not only a problem linearly associated with age (Maes et al., 2017; Mahon et al., 2006; Surkalim et al., 2022). In the present study, the prevalence of loneliness in women tends to remain stable in all age groups, while among men it is the younger ones that most often report it, with the prevalence then stabilizing

with a tendency to decrease. Meta-analysis studies have identified predictors of loneliness in adolescents, such as depressive symptoms, shyness, low self-esteem (strong predictors), social support, social anxiety, parental expressiveness (moderate predictors) and stress (weak predictor) (Mahon et al., 2006). Another meta-analysis study found that the temporal evolution of the feeling of loneliness is represented by an inverted U from childhood, remaining stable with a tendency to decrease from adolescence to old age, at which time it experiences a new increase (Mund et al., 2019). The importance of identifying the feeling of loneliness in adolescents is evident when it has been related to problems such as suicidal ideation (Bennardi et al., 2019), bullying (Machimbarrena et al., 2019), drug addiction (Wootton et al., 2019), or the problematic use of information and communication technologies (Peper & Harvey, 2018), among other problems that especially affect the youngest.

In line with this, this study finds that people who experience feelings of loneliness are at serious risk of developing poor mental health or vice versa. The prevalence obtained is four times that of those who do not feel lonely, which is a large size of the effect, with no differences by sex. This corresponds with what has been obtained in previous studies that relate loneliness and depression (Erzen & Çikrikci, 2018), loneliness and stress and their influence on premature aging (Wilson et al., 2018) or loneliness and dementia (Penninkilampi et al., 2018), among many others.

One would expect to find a higher prevalence of alcohol consumption as a coping mechanism for distress, as identified in previous studies. However, this study has not found that those who feel lonely make this use of alcohol, except for the fact that they consume more drinks with each alcohol use episode. Instead, there is a positive relationship between loneliness and smoking behavior. This relationship is not well established, being found in about half of the studies, but not in the rest. Some studies attribute to tobacco use the functionality of facilitating connection with others, but it is not clear that this is true in all cases (Dyal & Valente, 2015).

Those who feel lonely perceive that their health, in overall terms, is considerably worse than those who do not feel lonely. The predictive power of this self-perception in all-cause mortality, independent of other objective variables, has long been known and has been confirmed by many more recent studies (DeSalvo et al., 2006). The differences found in this study reach a very considerable effect size.

The diagnoses of anxiety and depression range from 40% for depression and 37% for anxiety, compared to 7.7% and 9% respectively for those who do not feel alone. These diagnoses are followed by the prescription of drugs 3 or 4 times more frequently for those who feel lonely. It is worth considering whether these drugs help to overcome the basic problem, and, to this end, a causal hypothesis has been sought by means of a structural equation. The model found is very striking: the feeling of loneliness increases the symptoms of psychological distress, which favours the prescription of drugs that, in turn, increase the feeling of loneliness. The model also suggests a prescription sequence that favours an initial use of anxiolytic drugs, which leads, in a subsequent step, to the prescription of antidepressants and these to the prescription of opioid analgesics. This suggests that loneliness plunges the

individual into a vicious circle in which the problem, far from being solved, becomes even worse. Healthcare pressure probably favours this pharmacological approach to a problem that can hardly be explained by neuropsychologic disorders, but which is complicated to address by primary care teams: reducing the distress associated with loneliness and loneliness itself requires interventions that promote cognitive rather than merely biochemical changes (Masi et al., 2011). Few studies have looked for relationships between loneliness and mental health, capable of suggesting causal hypotheses between the two. Gerino et al. (2017) found that resilience and mental health exerted a mediating effect between feelings of loneliness and quality of life, although they used a small sample of ($n= 209$). VanderWeele et al. (2011) found that loneliness was better explained by the patient's depressive history than by occasional states of depression, although also with a very small sample ($n= 229$). Other studies explore relationships between mental health through different variables and always with small samples ($n < 350$ in all cases), which makes it difficult to compare with what was obtained in the present work (Elahe et al., 2017; Liu et al., 2014; Weeks et al., 1980).

The limitations of the present work are those typical of population-based ecological studies: the difficult transposition of results to the individual level (ecological bias) and the possible interference of uncontrolled variables in the observed relationships (confounding bias) (Richard et al., 2011). Also, the sampling method, by means of telephone calls, can include biases that exclude part of the population (Garcia-Continente et al., 2014); this problem has been tried to alleviate by using lists of fixed and mobile telephones, although the final sample obtained does not faithfully reflect the real distribution of the population, and is shifted towards higher levels in the social class.

In conclusion, the present study indicates that at least 9,2% of the population of a large city (in this case, Madrid) feels lonely, although this percentage increases to between 11 and 14% in the case of women. This is not, as might be assumed a priori, a problem exclusive to the elderly, but is even more frequent among the youngest, especially in the case of women. This feeling of loneliness is linked, in line with what has been observed in previous studies, with psychological distress, anxious and depressive symptoms and a greater risk of these symptoms progressing to the diagnosis of associated mental disorders. The pharmacological approach, aimed at reducing symptoms, not only does not seem to help solve the problem, but it seems to aggravate it, placing people in a vicious circle that deepens their perception of loneliness. These values of prevalence in all age segments and the varied range of associated problems make it necessary to consider this problem as a priority and to articulate effective responses, at least in urban contexts, where loneliness is manifested in all its harshness, but which also have a greater range of resources that can and should be deployed promptly to mitigate one of the most prevalent ailments in the world today.

References

- Bennardi, M., Caballero, F. F., Miret, M., Ayuso-Mateos, J. L., Haro, J. M., Lara, E., Arensman, E., & Cabello, M. (2019). Longitudinal relationships between positive affect, loneliness, and suicide ideation: Age-specific factors in a general population. *Suicide and Life-Threatening Behavior, 49*, 90-103. doi: 10.1111/sltb.12424
- Bruce, L. D., Wu, J. S., Lustig, S. L., Russell, D. W., & Nemecek, D. A. (2019). Loneliness in the United States: A 2018 national panel survey of demographic, structural, cognitive, and behavioral characteristics. *American Journal of Health Promotion, 0890117119856551*. doi: 10.1177/0890117119856551
- Cacioppo, J. T., & Cacioppo, S. (2018). The growing problem of loneliness. *Lancet, 391*(10119), 426. doi: 10.1016/S0140-6736(18)30142-9
- Cacioppo, J. T., Cacioppo, S., Capitanio, J. P., & Cole, S. W. (2015). The neuroendocrinology of social isolation. *Annual Review of Psychology, 66*, 733-767. doi: 10.1146/annurev-psych-010814-015240
- Cacioppo, J. T., Hawkey, L. C., Crawford, L. E., Ernst, J. M., Burlinson, M. H., Kowalewski, R. B., Malarkey, W. B., Van Cauter, E., & Berntson, G. G. (2002). Loneliness and health: Potential mechanisms. *Psychosomatic Medicine, 64*, 407-417.
- Choi, B. C. (2004). Computer assisted telephone interviewing (CATI) for health surveys in public health surveillance: Methodological issues and challenges ahead. *Chronic Diseases and Injuries in Canada, 25*, 21-27.
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd Ed.). Erlbaum.
- DeSalvo, K. B., Bloser, N., Reynolds, K., He, J., & Muntner, P. (2006). Mortality prediction with a single general self-rated health question: A meta-analysis. *Journal of General Internal Medicine, 21*, 267-275. doi: 10.1111/j.1525-1497.2005.00291.x
- Díaz Olalla J. M., Benítez Robredo, M. T., Rodríguez Pérez, M., & Sanz Cuesta, M. R. (2020). *Estudio de Salud de la Ciudad de Madrid 2018* [Health Survey of the City of Madrid]. Madrid Salud, Ayuntamiento de Madrid. <https://madridsalud.es/estudios-de-salud/>
- Domingo-Salvanya, A., Bacigalupe, A., Carrasco, J. F., Espelt, A., Ferrando, J., & Borrell, C. (2013). Propuestas de clase social neweberiana y neomarxista a partir de la Clasificación Nacional de Ocupaciones 2011 [Proposals for social class classification based on the Spanish National Classification of Occupations 2011 using neo-Weberian and neo-Marxist approaches]. *Gaceta Sanitaria, 27*, 263-272. doi: 10.1016/j.gaceta.2012.12.009
- Dyal, S. R., & Valente, T. W. (2015). A systematic review of loneliness and smoking: Small effects, big implications. *Substance use & misuse, 50*(13), 1697-1716. doi: 10.3109/10826084.2015.1027933
- Elahe, M. A. J. D., Talepasand, S., & Rezaei, A. M. (2017). A structural model of depression based on interpersonal relationships: The mediating role of coping strategies and loneliness. *Archives of Neuropsychiatry, 54*(2), 125. doi: 10.5152/npa.2017.12711
- Erzen, E., & Çikrikci, Ö. (2018). The effect of loneliness on depression: A meta-analysis. *International Journal of Social Psychiatry, 64*, 427-435. doi: 10.1177/0020764018776349

- García-Continente, X., Pérez-Giménez, A., López, M. J., & Nebot, M. (2014). Potencial sesgo de selección en las encuestas telefónicas: Teléfonos fijos y móviles [Potential selection bias in telephone surveys: Landline and mobile phone]. *Gaceta Sanitaria*, *28*, 170-172. doi: 10.1016/j.gaceta.2013.05.010
- Gerino, E., Rollè, L., Sechi, C., & Brustia, P. (2017). Loneliness, resilience, mental health, and quality of life in old age: A structural equation model. *Frontiers in Psychology*, *8*, 2003. doi: 10.3389/fpsyg.2017.02003
- Goldberg, D., & Williams, P. (1988). *A user's guide to the General Health Questionnaire*. NFER-Nelson.
- Hansen T, & Slagsvold B. (2015). Late-life loneliness in 11 european countries: Results from the generations and gender survey. *Social Indicators Research*, *124*, 1-20. doi: 10.1007/s11205-015-1111-6
- Heinrich, L. M., & Gullone, E. (2006). The clinical significance of loneliness: A literature review. *Clinical Psychology Review*, *26*, 695-718. doi: 10.1016/j.cpr.2006.04.002
- Henning-Smith, C., Ecklund, A., & Kozhimannil, K. (2018). Rural-urban differences in social isolation and its relationship to health. *Innovation in Aging*, *2*(Suppl 1), S770. doi: 10.1093/geroni/igy023.2851
- Holt-Lunstad, J., Smith, T. B., Baker, M., Harris, T., & Stephenson, D. (2015). Loneliness and social isolation as risk factors for mortality: A meta-analytic review. *Perspectives on Psychological Science*, *10*, 227-237. doi: 10.1177/1745691614568352
- Kenny, D. A. (2015). *Measuring model fit*. Available in <http://davidakenny.net/cm/fit.htm>
- Lara, E., Martín-María, N., de la Torre-Luque, A., Koyanagi, A., Vancampfort, D., Izquierdo, A., & Miret, M. (2019). Does loneliness contribute to mild cognitive impairment and dementia? A systematic review and meta-analysis of longitudinal studies. *Ageing Research Reviews*, *52*, 7-16. doi: 10.1016/j.arr.2019.03.002
- Leigh-Hunt, N., Bagguley, D., Bash, K., Turner, V., Turnbull, S., Valtorta, N., & Caan, W. (2017). An overview of systematic reviews on the public health consequences of social isolation and loneliness. *Public Health*, *152*, 157-171. doi: 10.1016/j.puhe.2017.07.035
- Liu, D., Yu, X., Wang, Y., Zhang, H., & Ren, G. (2014). The impact of perception of discrimination and sense of belonging on the loneliness of the children of Chinese migrant workers: A structural equation modeling analysis. *International Journal of Mental Health Systems*, *8*(1), 1-6. doi: 10.5152/npa.2017.12711
- Machimbarrena, J. M., Álvarez-Bardón, A., León-Mejía, A., Gutiérrez-Ortega, M., Casadiego-Cabrales, A., & González-Cabrera, J. (2019). Loneliness and personality profiles involved in bullying victimization and aggressive behavior. *School Mental Health*, *11*, 807-818. doi: 10.1007/s12310-019-09328-y
- Maes, M., Qualter, P., Vanhalst, J., Van den Noortgate, W., & Goossens, L. (2019). Gender differences in loneliness in children and adolescents: A meta-analysis. *European Journal of Personality*, *33*(6), 642-654. doi: 10.1002/per.2220
- Maes, M., Van den Noortgate, W., Fustolo-Gunnink, S. F., Rassart, J., Luyckx, K., & Goossens, L. (2017). Loneliness in children and adolescents with chronic physical conditions: A meta-analysis. *Journal of Pediatric Psychology*, *42*, 622-635. doi: 10.1093/jpepsy/jsx046

- Mahon, N. E., Yarcheski, A., Yarcheski, T. J., Cannella, B. L., & Hanks, M. M. (2006). A meta-analytic study of predictors for loneliness during adolescence. *Nursing Research, 55*, 308-315. doi: 10.1097/00006199-200609000-00003
- Makowska, Z., Merecz, D., Moscicka, A., & Kolasa, W. (2002). The validity of general health questionnaires, GHQ-12 and GHQ-28, in mental health studies of working people. *International Journal of Occupational Medicine and Environmental Health, 15*, 353-362.
- Masi, C. M., Chen, H. Y., Hawkey, L. C., & Cacioppo, J. T. (2011). A meta-analysis of interventions to reduce loneliness. *Personality and Social Psychology Review, 15*, 219-266. doi: 10.1177/1088868310377394
- Morata-Ramírez, M. A., Holgado-Tello, F. P., Barbero-García, I., & Mendez, G. (2015). Confirmatory factor analysis: Recommendations for unweighted least squares method related to Chi-Square and RMSEA Type I error. *Acción Psicológica, 12*, 79-90. doi: 10.5944/ap.12.1.14362
- Mund, M., Freuding, M. M., Möbius, K., Horn, N., & Neyer, F. J. (2019). The stability and change of loneliness across the life span: A meta-analysis of longitudinal studies. *Personality and Social Psychology Review, 1088868319850738*. doi: 10.1177/1088868319850738
- O'Súilleabháin, P. S., Gallagher, S., & Steptoe, A. (2019). Loneliness, living alone, and all-cause mortality: The role of emotional and social loneliness in the elderly during 19 years of follow-up. *Psychosomatic Medicine, 81*, 521-526. doi: 10.1097/PSY.0000000000000710
- Penninkilampi, R., Casey, A. N., Singh, M. F., & Brodaty, H. (2018). The association between social engagement, loneliness, and risk of dementia: A systematic review and meta-analysis. *Journal of Alzheimer's Disease, 66*, 1619-1633. doi: 10.3233/JAD-180439
- Peper, E., & Harvey, R. (2018). Digital addiction: Increased loneliness, anxiety, and depression. *NeuroRegulation, 5*, 3-3. doi: 10.15540/nr.5.1.3
- Richard, L., Gauvin, L., & Raine, K. (2011). Ecological models revisited: Their uses and evolution in health promotion over two decades. *Annual Review of Public Health, 32*(1), 307-326. doi: 10.1146/annurev-publhealth-031210-10114
- Rico-Urbe, L. A., Caballero, F. F., Olaya, B., Tobiasz-Adamczyk, B., Koskinen, S., Leonardi, M., Haro, J. M., Chatterji, S., Ayuso-Mateos, J. L. & Miret, M. (2016). Loneliness, social networks, and health: A cross-sectional study in three countries. *PLoS ONE, 11*, e0145264. doi: 10.1371/journal.pone.0145264
- Rocha, K. B., Pérez, K., Rodríguez-Sanz, M., Borrell, C., & Obiols, J. E. (2011). Psychometric properties and normative values of the General Health Questionnaire (GHQ-12) in general Spanish population. *International Journal of Clinical and Health Psychology, 11*, 125-139.
- Stickley, A., & Koyanagi, A. (2016). Loneliness, common mental disorders and suicidal behavior: Findings from a general population survey. *Journal of Affective Disorders, 197*, 81-87. doi: 10.1016/j.jad.2016.02.054
- Surkalim, D. L., Luo, M., Eres, R., Gebel, K., van Buskirk, J., Bauman, A., & Ding, D. (2022). The prevalence of loneliness across 113 countries: Systematic review and meta-analysis. *British Medical Journal, 376*, e067068. doi: 10.1136/bmj-2021-067068

- United Nations (2018). *Human Development Indices and Indicators 2018. Statistical Update*. United Nations Development Programme. <https://www.undp.org/ukraine/publications/human-development-indices-and-indicators-2018-statistical-update>
- Valtorta, N. K., Kanaan, M., Gilbody, S., & Hanratty, B. (2016). Loneliness, social isolation and social relationships: What are we measuring? A novel framework for classifying and comparing tools. *BMJ Open*, *6*, e010799. doi: 10.1136/bmjopen-2015-010799
- VanderWeele, T. J., Hawkey, L. C., Thisted, R. A., & Cacioppo, J. T. (2011). A marginal structural model analysis for loneliness: Implications for intervention trials and clinical practice. *Journal of Consulting and Clinical Psychology*, *79*(2), 225-235. doi: 10.1037/a0022610
- Wang, J., Mann, F., Lloyd-Evans, B., Ma, R., & Johnson, S. (2018). Associations between loneliness and perceived social support and outcomes of mental health problems: A systematic review. *BMC Psychiatry*, *18*, 156. doi: 10.1186/s12888-018-1736-5
- Weeks, D. G., Michela, J. L., Peplau, L. A., & Bragg, M. E. (1980). Relation between loneliness and depression: A structural equation analysis. *Journal of Personality and Social Psychology*, *39*(6), 1238. doi: 10.1037/h0077709
- Wilson, S. J., Woody, A., Padin, A. C., Lin, J., Malarkey, W. B., & Kiecolt-Glaser, J. K. (2018). Loneliness and telomere length: Immune and parasympathetic function in associations with accelerated aging. *Annals of Behavioral Medicine*, *53*, 541-550. doi: 10.1093/abm/kay064
- Wootton, R. E., Greenstone, H. S., Abdellaoui, A., Denys, D., Verweij, K. J., Munafo, M. R., & Treur, J. L. (2019). Bi-directional effects between loneliness and substance use: Evidence from a Mendelian randomisation study. *medRxiv*, 19006767. doi: 10.1101/19006767

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