Gambling activity in the old age general population

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Abstract

Old age constitutes a vulnerable stage for developing gambling-related problems. The aims of the study were to identify patterns of gambling habits in elderly participants from the general population, and to assess sociodemographic and clinical variables related to the severity of the gambling behaviors. The sample included *n*=361 participants aged in the 50 to 90 year range. A broad assessment included sociodemographic variables, gambling profile and psychopathological state. the percentage of participants who reported an absence of gambling activities was 35.5%, while 46.0% reported only non-strategic gambling, 2.2% only strategic gambling and 16.3% both non-strategic plus strategic gambling. Gambling form with highest prevalence was lotteries (60.4%), followed by pools (13.9%) and bingo (11.9%). The prevalence of gambling disorder was 1.4%, and 8.0% of participants were at a problematic gambling level. Onset of gambling activities was younger for men, and male participants also reached a higher mean for the bets per gambling-episode and the number of total gambling activities. Risk factors for gambling severity in the sample were not being born in Spain and a higher number of cumulative lifetime life events, and gambling severity was associated with a higher prevalence of tobacco and alcohol abuse and with worse psychopathological state. Results are particularly useful for the development of reliable screening tools and for the design of effective prevention programs.

Keywords: Gambling disorder, Old age, Profile, Prevalence.

1. Introduction

The increasing elderly population in developed countries is unprecedented, poised to become a central social transformation with implications for all sectors of 21st-century society. According to the statistical office of the European Union, the number of older people aged 65+ in the 27 European Union countries is predicted to follow an upward trend, with a relative share of the total population of approximately 28.5% in 2050 (European Commission - Eurostat, 2019). The World Population Prospects 2019-Revised created by the Department of Economic and Social Affairs from the United Nations Secretariat also predicts that by 2050 one in four persons living in Europe and North America could be aged 65 or over (United Nations, 2019). This growing sector of the population will demand products and services that are appropriate for their needs. Since older people are increasingly active, wanting to maintain their autonomy and stay integrated in the environment around them, a challenge for global society will be to afford them the means and opportunities to age actively and healthily.

Over the past decades, recreational gambling has become an increasingly leisure popular activity among older adults, and potential health and well-being correlates has been described (such as opportunities for socialization, sensory and cognitive stimulations) (Desai, Maciejewski, Dausey, Caldarone and Potenza, 2004). But the proliferation of multiple favored gambling activities in elderly during the last years (such as slot machines, bingo, lotteries or casinos) (Ariyabuddhiphongs, 2012; Granero, Jiménez-Murcia, et al., 2020; Gustavo Costa Medeiros et al., 2015), and the growth rate of gambling participation among older adults (largely as a consequence of the ageing population and the ease access to multiple platforms offering numerous forms of offsite/online gambling) makes necessary a wide investigation of health correlates, particularly for problem and disordered gambling. The diverse personal and contextual circumstances of gambling, as well as the different impacts on the physical and psychological states, must be recognized for preventing the progression from recreational gambling to problematic and/or disordered gambling. This study is aimed to identify profiles of

older age gamblers and potential risk factors of impairing gambling, which results can contribute for preventing unnecessary dependence and guaranteeing functional autonomy (which is the core condition of successful ageing).

1.1. Positive active ageing

As in other health research areas, there is no consensus regarding the definition of old age in the context of GD (substantially variations in literature exist, usually from age 50+ to 75+ years). Indeed, since the age which qualifies for elderly in health studies is related to a large set of personal and contextual features (such as medical conditions, geographical areas or culture) it is difficult to achieve a standardized universal definition. Global organisms such as the World Health Organization does not provide a clear definition either, and although fixing around 60-65 as the beginning of elderly, the organization also recognizes that old age should be defined by new roles and not by years (WHO, 2018). As a result, some studies based on a population-aging metric focused on a chronological conception of age set the bound of 60-65 as the beginning of elderly, coinciding with administrative purposes (this threshold is required for becoming eligible for senior social programs and retirement) and with the idea that above these ages the resources required to support individuals increase. Other works consider the onset of old age as 50+ years, considering that at this age a variety of bio-psychological changes can cause health to decline, with higher likelihood for physical and mental conditions (Di Rosa et al., 2017; Skoog, 2011). Research among elderly in the GD area is scarce compared with the large number of works within other groups of age, which makes it even more difficult to reach consensus on the onset of old age. Our study selected 50+ as the lower bound since this cut-off coincides with current studies analyzing the profiles and determinants of GD in elderly people (Guillou Landreat, Cholet, Grall Bronnec, Lalande and Le Reste, 2019).

Traditionally, it has been widely considered that many changes that occur in old age are negative, and with advanced age many skills acquired during the preceding stages of life are lost. Certainly, during the elderly stage, losses in both cognitive and physical abilities occur (Fabricio,

Chagas and Diniz, 2020; Ungvari, Tarantini, Sorond, Merkely and Csiszar, 2020), with an ongoing impairment in skills related to fluid intelligence (such as working/episodic memory, reasoning or even spatial orientation) and mobility being typical. High rates in the global consumption of health care systems in parallel with aging reinforce the assumption of aging deterioration (Ahmad, Mat Ludin, Shahar, Mohd Noahand Mohd Tohit, 2020), which has largely conditioned the products and services made available to this sector of the population (most of them addressed towards relieving the impacts of such changes and deficiencies). These views are not consistent with the empirical data provided by current research on aging, which reveal that many older people who reach retirement age remain healthy, active, and with a capacity to undertake new challenges (Platzer et al., 2020). Despite the typical aging-specific deterioration in functional abilities, empirical research also highlights that healthy older people have behavioral plasticity (Navarro and Calero, 2018), and if stimulating environments are provided, behavioral benefit habits can also be adopted and/or modified (Bendayan et al., 2017; Martin, Palmer, Rock, Gelston and Jeste, 2015). Accurate knowledge of the factors related to the social and structural determinants of wellbeing are required to further improve the challenges of effectively managing the care needs of the community's older adults, with the aim of maintaining adequate levels of function and restoring any lost abilities.

Participation in leisure activities positively affects multiple aspects of human behavior, and it has been identified as a crucial predictor of life satisfaction in the life cycle (Blackman, Browne, Rockloff, Hing and Russell, 2019; Browne et al., 2017; Browne and Rockloff, 2018; Farrell, 2018). Gambling is also a widespread leisure activity in elderly individuals, who tend to perceive certain betting games as a nice break from routine life and a way of socializing (Subramaniam, Satghare, et al., 2017). Numerous positive effects of recreational gambling have been reported among older age, such as increasing levels of happiness, improving mood states, addressing loneliness (a typical situation among older age individuals, who loss the partner and/or other loved ones), contributing to greater social support (some forms of gambling lead

individuals to socialize and interact with their fellow elders), helping alleviate feelings of uselessness (also common after retirement), and even enabling to pick up skills (individuals learn to be more observant, and some game of skill can exercise the brain and help keep the mind active and working) (Dixon, Nastally and Waterman, 2010; Hilbrecht and Mock, 2019). Several harmful effects affecting quality of life have also been associated with gambling across the spectrum of risk levels among older people, who are likely to present multiple and severe negative consequences when they lose control of the gambling activity. It is therefore necessary to review the key components of the GD as a mental psychiatric condition, and identify the specific profile/s of this disorder when it occurs in old age subjects.

1.2. Gambling activity and older age

Gambling disorder (GD) is defined as a psychiatric condition in which individuals display a recurrent maladaptive gambling activity (people report persistent difficulties in limiting money or time spent on gambling), with severe consequences or impairment in several areas (psychological functioning, work performance, monetary status, and family/social relationships). In fact, the gambling activity can be considered as a continuous vector, ranging from none to a great deal. Depending on the points along this continuum, individuals can experience impairment and problems associated with their gambling behavior, and therefore, the position in the range can be considered as a measure of the gambling severity. For example, the last edition of the Diagnostic and Statistical Manual of Mental Disorders DSM-5 (American Psychiatric Association, 2013) offers a classification of the GD symptom severity boundaries defined by the number of criteria met out of a maximum of nine: mild GD (4-5 criteria), moderate GD (6-7 criteria) and severe GD (8-9 criteria).

Current epidemiological studies have attempted to estimate and compare the prevalence of gambling involvement, problematic gambling and GD across age groups. Although the estimates among older adults show substantial differences depending on the classification

schemes, sampling procedures, age thresholds and measurement tools, it seems that between 62% and 75% of individuals recruited from general populations reported having gambled in the last year (Takamatsu, Martens and Arterberry, 2016; Tse, Hong, Wang and Cunningham-Williams, 2012; Welte, Barnes, Tidwell and Hoffman, 2011), and between 0.5% and 6% met the criteria for current pathological gambling or disordered gambling (Calado and Griffiths, 2016; Subramaniam et al., 2015; Tse, Hong and Ng, 2013). Some epidemiological research also suggests than the telescoping effect is typical in older age (gambling problems develop more quickly than in younger age groups) (Bjelde, Chromy and Pankow, 2008), and that aging-related cognitive distortions are main contributors to this phenomenon and to maintaining and exacerbating gambling problems (Subramaniam, Chong, Browning and Thomas, 2017).

Motivations for gambling among the elderly can be similar to those identified in younger adults, including social interaction, fun/excitement and relief from emotional distress (Ariyabuddhiphongs, 2012). Some studies have identified specific age-related environmental and individual level factors that could act as motivators for elderly individuals to initiate and/or maintain their gambling habits: relieving boredom (people may have more free time than expected upon retirement), escaping loneliness and social isolation, relieving tension or coping with depression due to the loss of a loved one, or winning money (Gustavo Costa Medeiros et al., 2015; Subramaniam et al., 2015; Tira, Jackson and Tomnay, 2014). Cognitive decline and physical-mental illness also play a role in the onset, maintenance and escalation of gambling behaviors among older adults (Parke, Griffiths, Pattinson and Keatley, 2018; Pilver, Libby, Hoff amd Potenza, 2013; Subramaniam, Chong, et al., 2017). It is well known that the brain become more vulnerable with age, with typical neuroanatomical and neurochemical changes that can lead to multiple deficits in cognitive functioning and executive control. The affectation in frontal structures during elderly correlates with reasoning slowness, lower ability to shift attention from positive to negative information, limited ability to gain explicit insight into the rules of ambiguous decision tasks and the difficulty of choosing the less risky events after the rules have

been fully understood (Schiebener and Brand, 2017). These potential interactions has been proposed as powerful risk factors for the onset of gambling-related problems during old age stage in lifetime gamblers who had no such difficulties during early adulthood (McCarrey et al., 2012). A relationship has also been suggested between the increases in the gambling severity with higher levels of impulsivity among older age individuals who exhibit cognitive deficits (von Hippel et al., 2009). The cognitive distortions related to the illusion of control observed within older adult gamblers (who persistently belief that they have special skills, knowledge or other advantages for controlling the gambling outcome) seems play a key role in both maintaining and increasing the severity of gambling behaviors (especially the self-perceived concept of luck, chasing wins/losses, miscalculating the win/loss ratio, superstitious beliefs and the perception that gambling is a skill) (Subramaniam, Chong, et al., 2017). Finally, it has been observed that at older age when gambling becomes a problematic behavior, the motivations may change: while some individuals may begin to gamble for excitement or to combat boredom, the reasons can shift towards managing stress, guilt or emotional distress when they lose control of their gambling habits (Pattinson and Parke, 2017). It has also been observed that the increased availability of multiple forms of gambling in recent years (a high number of systems are now operating online) will also affect gambling motivations and habits in older adults, who can easily find numerous and stimulating media to gamble (Ioannidis et al., 2018; Luce, Kairouz, Nadeau and Monson, 2016; A. Sauvaget et al., 2015).

Regarding gambling preferences, older adults tend to engage in particular forms of gambling, including lottery tickets, bingo and slot-machines (Ariyabuddhiphongs, 2012; Bangma, Fuermaier, Tucha, Tucha and Koerts, 2017; Susana Jiménez-Murcia, Granero, Fernández-Aranda and Menchón, 2020; Moragas et al., 2015). These games are included within the group labeled non-strategic games (also called chance-based games), characterized by the individual’s lack of capacity or skill to influence the game outcome (Odlaug, Marsh, Kim and Grant, 2011). On the contrary, strategic games (also called skill-based games), allow gamblers to

use game-related knowledge to influence/predict the game outcome (such as poker and other cards, betting on sports events or dice). It has been argued that elderly individuals are more likely to gravitate towards non-strategic games based on their simplicity, since this gambling behavior involves quick, unplanned, reward-driven decision, and little deliberation (Grant, Odlaug, Chamberlain and Schreiber, 2012; Schiebener and Brand, 2017; Subramaniam et al., 2016). It must be underlined that the characterization of "non-strategic" is based on the mechanism of the game (the outcomes are 100% chance depending), while non-strategic players also hold cognitive biases related to their gambling behaviors (such as irrational fallacies/perceptions regarding their capacity predicting gambling-outcomes). Some studies in the neuropsychological area suggest that the specific age-related vulnerabilities of the brain should contribute towards explaining the preference for chance-based games: potential impairment in frontal structures could affect risky decision-making tasks, causing reasoning slowness and poor ability to gain explicit insight into the rules of ambiguous decisions, or even difficulty in choosing less risky events even when the rules have been processed (Boggio et al., 2010; Di Rosa et al., 2017; Halfmann, Hedgcock, Kable and Denburg, 2016; Lorains et al., 2014; Lorenz et al., 2014; Schiebener and Brand, 2017). It must be outlined, however, that multiple factors contribute on gambling preferences among older subjects, and the choice of gambling varies according to the individual and social/contextual characteristics. For example, casino trips, scrabble clubs or card games are perceived by some elderly as a playful socialization activity. Availability and legislation can also impact on gambling practices, particularly among vulnerable people (such as old age people) (Gustavo Costa Medeiros et al., 2015).

Finally, problematic and disordered gambling in older adults has been found to be associated with multiple negative outcomes. Many of the harmful effects of addictive gambling are similar across age, including low self-esteem, impaired relationships with family and friends, social isolation, financial problems and poor physical and/or mental health (such as more obesity-related conditions, higher levels of anxiety and depression, substance abuse/dependence)

(Assanangkornchai, McNeil, Tantirangsee, Kittirattanapaiboon and Thai National Mental Health Survey Team, 2016; Nicholson, Mackenzie, Afifi, Keough and Sareen, 2019; Pilver et al., 2013; Anne Sauvaget et al., 2015; Tse et al., 2012). The role of these harmful effects in the GD process (onset and progression) is not clear in the elderly. On the one hand, it has been hypothesized that problematic gambling may represent a coping strategy to manage age-related distress (such as anxiety and depression caused by retirement) (Parke et al., 2018). It has also been suggested that psychopathological disorders could indicate progression of the problematic gambling (van der Maas et al., 2017). Whatever the case, the causes of harm related to the gambling activity are multifactorial, reflecting an interaction of individual, social and environmental processes (Wardle, Reith, Langham and Rogers, 2019). This harm increases as the risk of problem gambling increases, and it can be experienced by elderly people on a spectrum that extends from minor negative effects to crisis point. Unfortunately, it has been observed that aging adults with severe affectation could only perceive and recognize these difficulties when the more adverse consequences have already occurred (Bischof et al., 2014). Since the first step towards developing effective harm prevention plans lies in identifying the nature and scale of the construct, research studies are needed to gain a broader understanding of gambling habits in the elderly and the determinants of the adverse impacts.

1.3. Objectives

The increasing incidence of problematic and disordered gambling among the elderly highlights the need to prioritize studies to identify the specific gambling profiles in this population, a prior requirement for designing evidence-based prevention and education programs. The objectives of this work are: a) to assess the patterns of gambling in elderly people recruited from the general population; b) to estimate the prevalence of the gambling severity (no risk, problematic gambling and GD) in this developmental stage; and c) to identify what variables were related to the gambling severity, considering as potential predictors the

sociodemographic profile (sex, age, immigration status, civil status, education, employment status and incomes), total number of lifetime life events, substances use (tobacco, alcohol and other illegal drugs, and psychopathological state. Based on the empirical evidence available we hypothesized that non-strategic games will be the most preferred in the sample, that prevalence of problematic or disordered gambling will be around 1% to 10%, and that higher gambling severity will be related to worse psychopathological state.

2. Methods

2.1. Participants

The data analyzed in this study pertained to a global wider research project carried out at the Pathological Gambling Outpatient Unit of University Hospital of Bellvitge, focusing on the analysis of gambling habits at older ages. This work analyzed the control group of this global project, and it was recruited at the Podiatry and Dentistry Clinics on the Bellvitge University Hospital campus, between November 2016 and February 2018. This setting was selected for recruiting the controls to guarantee equivalent origin between the cases and the control groups. Since the Podiatry and Dentistry Clinics attends individuals from the community (without a specific disorder), the sample analyzed in this work is labeled as “community sample” or “population-based sample”. Inclusion criteria were age of 50 or over and adequate cognitive capacity to complete the study’s self-report measures.

The sample included *n*=361 participants into the range 50 to 90 years-old, 226 women (62.6%) and 135 men (37.4%), recruited at the general population. Many participants were born in Spain (95.3%), achieved primary or less education levels (85.6%), were retired (98.1%) and did not required social aids (93.9%). Civil status was distributed as follows: 16 participants were single (4.4%), 223 were married or lived with a stable partner (61.8%), 12 were divorced or separated (3.3%), and 110 were widowed (30.5%). Table S1 (supplementary material) includes

the complete descriptive for the sample of the study, including all the variables analyzed in this research.

2.2. Instruments

Diagnostic Questionnaire for Pathological Gambling (according to DSM criteria) (Stinchfield, 2003). This diagnostic questionnaire allows to assess the presence of GD through 19-items based on the DSM taxonomy [for the DSM-IV-TR (American Psychiatric Association, 2010) and the DSM-5 versions (American Psychiatric Association, 2013)]. The Spanish adaptation of the scale achieved good psychometric properties (α= 0.81 calculated for the general population and α=0.77 for clinical sample) (S. Jiménez-Murcia et al., 2009). In this study, the total number of DSM-5 criteria for GD was analyzed, as well as the classification of the GD based on the gambling activity [GD absent (0 criteria), problematic gambling (1-3 criteria), low GD (4-5 criteria), moderate GD (6-7 criteria) and severe GD (8-9 criteria)]. Internal consistency for this scale in the sample of the study was adequate (α=0.71).

South Oaks Gambling Severity Screen (SOGS) (H R Lesieur and Blume, 1987; Henry R. Lesieur and Blume, 1993). This self-report questionnaire was designed to screen GD related problems with 20 items. The SOGS total score generated as the sum of the items is usually used as a measure of the GD severity (this dimensional measure is into the range 0 to 20, with higher scores indicating higher impairing gambling). The questionnaire can also be used in a categorical manner for screening for the presence of possible problem gambling (0: non-problematic gambling; 1-4: potential problematic gambling, 5 or more: probable pathological gambling). The Spanish validation of this questionnaire showed adequate psychometric properties (test-retest reliability R=0.98, internal consistency α=0.94 and convergent validity R=0.92) (Echeburúa, Báez, Fernández and Páez, 1994). Internal consistency for this scale has obtained good internal consistency in the sample of the study (α=0.84).

Symptom Checklist-Revised (SCL-90-R) (Derogatis, 1994). This self-report tool was designed as a measure of the global psychological state, including 90 items (coded in an ordered scale: 0=not at all, 1=a little bit, 2=moderately, 3=quite a bit and 4=extremely) structured in nine primary dimensions (somatization, obsessive-compulsive, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation and psychoticism) and three global indices (global index of severity -GSI-, positive index of discomfort -PSDI-, and a total of positive symptoms -PST-). The raw scores for the primary dimensions are obtained as the mean of the items retained in each factor (the range for the scores is 0 to 4, and higher values indicate worse psychological state). The GSI and the PSDI global scores area also into the range 0 to 4 (higher values indicate greater severity and distress) and the PST is into the range 0 to 90 (as higher the score as greater the number of psychopathological symptoms). The Spanish version of this scale obtained good psychometric indices (mean α=0.75) (Gonzalez De Rivera et al., 1989). Internal consistency in the sample of this study was also into the good (α=0.72 for the hostility scale) to excellent range (α=0.95 for the global indexes).

Life events. A self-report questionnaire was developed for this study, focused on identifying potential lifetime exposure to traumatic events (including life-threatening accidents, physical-sexual abuse, death of close relatives, physical assault, separation-divorces, major financial problems, serious illness, etc.). Respondents are asked to report whether each event occurred (yes-no), the number of times it occurred, age at time of the event and affectation. The total number of cumulated life events was used in this work. Internal consistency in the sample of this study was good (α=0.74).

Other clinical and sociodemographic variables. A semi-structured clinical interview with the participant measured all additional data, which included sociodemographic measures (such as sex, education level, civil status and employment status), gambling related variables (age of onset of the gambling problem, duration of the gambling problem, bets per gambling/episode and accumulated debts due to gambling behavior), and the social position index according to the

Hollingshead's algorithm (which provides a global measurement based on the participants' education level and profession (Hollingshead, 2011).

2.3. Procedure

The study was approved by the Ethics Committee of the Research Team (Hospital of Bellvitge, in Barcelona, center of origin of the data; Ref: PR286/14). The clinics at the Podiatry and Dentistry unit informed to their patients about the research and invited them to participate. Then, psychologists and psychiatrists with extensive experience in GD collected the information of the semi-structured clinical interview, and they also helped the participants to complete the self-report tools with the aim to guarantee that all the items were answered and no missing-data due to lack of understanding. The assessment took place in a single session lasting about 45 minutes, in the waiting rooms of the Podiatry and Dentistry clinics (located inside the hospital grounds) and without the presence of other people different from the participant and the clinician. There was no financial or other compensation for being part of the sample of the study.

Regarding the order for answering questionnaires measuring GD profiles, the *Diagnostic Questionnaire for Pathological Gambling* was firstly completed with the help of the clinicians. This is diagnostic tool totally matched to the DSM criteria. The SOGS was next completed by the participants. This is a screening tool assessing signs of gambling and consequences of the gambling behaviors, and it was used as a measure of the GD severity. The SOGS is not matched to the DSM criteria for GD, and it covers cognitive, emotional and other behaviors related to problem gambling, such as lying about gambling activity, losses and debts, taking time off work, arguments with family or close friends, feeling guilty, borrowing money to gamble, and performing illegal acts to finance gambling. The items examining the consequences of gambling in the SOGS are considerably more numerous than the item specifically measuring gambling behavior.

2.4. Statistical analysis

Statistical analysis was carried out with Stata16 for windows (Stata-Corp, 2019). The comparison between the categorical variables between the groups was done with chi-square procedures (χ^2) and between the quantitative variables with T-TEST. The estimation of the effect size for the mean differences in this study was based on the standardized Cohen's-*d* coefficient, considering poor-low effect size for $|d|>0.20$, moderate-medium for $|d|>0.5$ and large-high for $|d|>0.80$ (Kelley and Preacher, 2012). For categorical measures, Cohen's-*h* was obtained as a measure of the effect size, based on the difference of the arcsine transformation [(2*arcsin*square_root(p)] of the proportions estimated in each group (Cohen, 1988). In addition, Type-I error due to the multiple statistical tests was controlled with the Finner's method (a familywise error rate stepwise procedure which offers more powerful test than the classical Bonferroni correction) (Finner, 1993).

3. Results

3.1. Gambling profile in the sample

For the total sample (Table S1, supplementary), the gambling activity which achieved highest prevalence in the sample was lotteries (60.4%), followed by pools (13.9%) and bingo (11.9%). The lowest prevalence was for videogames (0%), gambling rooms (0.3%), sports bets (0.3%), horse-racing bets (0.8%), competition games (0.8%), casino (1.1%), bets on internet (1.1%), stock market (1.4%), slot machines (3.0%) and cards with money (3.3%). Regarding gambling type, 35.5% of the participants indicated no gambling activities, 46.0% only non-strategic forms of gambling, 2.2% only strategic games and 16.3% both non-strategic and strategic gambling. The mean age of onset of the gambling activities was 37.6 years of age (SD=16.0) and the duration of the gambling behaviors 37.0 years (SD=16.5). The most common was reporting no gambling activities, or only one preferred gambling activity (the mean number

of games was 1.1, SD=1.1). Only one participant indicated cumulative debts due to gambling activities in the past.

Within the group of participants with gambling related problems (*n*=34, with at least 1 DSM-5 criteria for GD), lotteries was also the most preferred gambling activity (*n*=28, 82.4%), followed by bingo (*n*=14, 41.2%) and betting-pools (*n*=13, 38.2%). Mean age of onset of the gambling activities in this group was 36.0 years-old (SD=14.5) and the mean duration of the gambling behaviors was 38.7 years (SD=14.2). The number of gambling activities ranged between 1 to 5, and 2 games was the most common (*n*=16, 47.1%).

3.2. GD prevalence

Regarding prevalence estimates in the complete sample (*n*=361), most participants were in the absent problem of gambling group [participants with 0 DSM-5 criteria: *n*=327, 90.6%, 95% confidence interval (95%CI): 87.6% to 93.6%], while the problematic gambling group included *n*=29 participants with 1 to 3 DSM-5 criteria (prevalence= 8.0%; 95%CI: 5.2% to 10.8%), and *n*=5 participants achieved DSM-5 criteria for GD (prevalence=1.4%; 0.2% to 2.6%).

Table 1 contains the prevalence estimates and comparison by sex and age group (two age groups were defined, based on the median -50th percentile- in the sample). Differences between men and women were found (χ^2=8.31, *p*=.040): men obtained a higher prevalence of participants in the problematic group compared to women (11.1% vs 6.2%), but a lower prevalence of individuals who met criteria for GD (GD-moderate was met for 1.8% of female gender while 0.7% of males were in the GD-low group). No differences in the severe gambling group were found comparing the two age groups (χ^2=1.07, *p*=.784).

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3.3. Comparison of gambling profile by sex and age

The first block in Table 2 includes the comparison of the gambling profile between men and women. As a whole, a higher percentage of men reported gambling activities in their

different forms (the proportion comparisons for lotteries, pools, slot machines, cards and stock market forms achieved statistical differences). A higher percentage of women reported no gambling activity (39.8% versus 28.1%), while a higher percentage of men reported both non-strategic and strategic gambling forms (27.4% vs 9.7%). The mean age of onset of the gambling activities was younger for men (33.9 years-old vs 40.3 years-old), while the bets per gambling-episode and the number of total games was higher in the male gender group. Regarding the comparison based on the age group (second block in Table 2), differences were found only in the age of onset of gambling (older age in elderly participants) and the duration of the gambling activities (longer duration in the elderly group).

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3.4. Variables related to gambling severity

Table 3 includes the comparison of the sociodemographic and clinical profile between participants in the absent problem of gambling group (those who reported 0 DSM-5 criteria for GD) and in the problematic or disorder gambling group (participants with 1 to 9 DSM-5 criteria for GD). This study has grouped participants with at least 1 DSM-5 criterion for GD because the number of individuals who met criteria for GD was too few to allow statistical comparisons (n=5). The results of the proportion and mean comparisons of this table suggest that the risk factors for gambling-related problems in the study are not having been born in Spain and a higher number of lifetime life events. In addition, the group with any DSM-5 criteria for GD registered a higher prevalence of tobacco and alcohol use-abuse and worse psychopathological state (higher means in the SCL-90R scales). Chronological age was into the range 50 to 85 among individuals with and without gambling related problems, and no differences by age was obtained comparing both groups (p=.758).

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4. Discussion

This population-based study examined gambling activity among the elderly, in a population-based sample composed of individuals of a large range of ages (between 50 and 90 years), and explored the sociodemographic and clinical variables related to the most severe gambling profile. The prevalence of individuals who reported gambling activity was 65.5%, with non-strategic games (mainly lottery tickets) being the most preferred form. The prevalence of GD was 1.4%, and problematic gambling was reported by 8.0% of the participants. The most severe gambling was related to immigration, stressful life events, worse psychopathological state and substance use.

The high prevalence of participants who reported gambling behavior (around 72% of men and 60% of women) is consistent with previous research studies, which show that gambling is a common leisure activity among the elderly in developed countries (Alberghetti and Collins, 2015; Pattinson and Parke, 2016; Subramaniam, Satghare, et al., 2017). The higher preference of non-strategic gambling was also an expected result, confirming that the elderly usually select simple games (Black, Coryell, McCormick, Shaw and Allen, 2017; Granero, Jimenez-Murcia, et al., 2020; Susana Jiménez-Murcia et al., 2020). Specifically, lottery tickets were the most usual game in the study for both men and women (with participation rates of 68.1% and 55.8%, respectively). Many older people like to dream of winning the lottery, and going to buy the tickets can be perceived as a great opportunity for socializing and a nice break from routine life (Granero, León-Vargas, et al., 2020). While the vast majority of participants in the study gambled without problems, the high proportion of people participating in lotteries (as well as in other gambling subtypes) s(Godinho, Kushnir, Hodgins, Hendershot and Cunningham, 2018; Luce et al., 2016)hould be taken very seriously. Firstly, the signs of a gambling problem may be subtle among the elderly, and in some cases other family members or close friends do not realize the scope of the problem until they help them pay bills or balance a checkbook. Some studies have even observed that what the elderly consider to be gambling varied compared to younger adults. For example, among some older adults, lotteries or bingo are not considered as forms of

gambling, but rather as social or light-hearted activities, and sports betting or pools are perceived as hobbies because of their love of sports or football (Tira and Jackson, 2015). In Spain, there are many different forms of lotteries, and this is a highly prevalent activity among the general population (Dirección-General-Ordenación-Juego, 2017). Its simplicity, wide publicity and general social acceptability can contribute towards reinforcing the image of lotteries as a safe activity among elderly people, who may even believe that this game is an easy way to achieve a better economic position (Lutter, Tisch and Beckert, 2018). These particular conceptions, associated with the lifestyle of many elderly people [availability of time and financial resources (Social Security income or pensions)] can contribute towards intensifying the gambling frequency and therefore their vulnerability. In addition, primary care physicians and geriatricians are the professionals closest to older people who usually need to monitor their health and the medication they are taking for age-related illnesses. It would be advisable for these health specialists to explore the existence of gambling problems during their routine visits, in order to identify potential problems with gambling activity and be able to refer them to the treatment facilities, as quickly as possible, before the consequences and damage caused by this behavior increase. Often, older people are alone, have less contact with their sons and daughters (who are working and have their own families at the time), have more limited income and may feel embarrassed about their debts and financial problems, so they may be reluctant to seek help. Therefore, it is important that the doctors who usually monitor their medication and health status explore this issue. This scenario requires appropriate evidence-based programs, such as preventive services which include education and increased public awareness of problematic behaviors related to any form of gambling. The objective should not be to eliminate gambling among older adults, but to improve knowledge of responsible gambling to reduce harm.

Regarding the prevalence of the GD in the study, 1.4% of the participants met DSM-5 criteria for disordered gambling, while problematic gambling was reported by 8%. The prevalence of GD was also higher for women compared to men (1.8% versus 0.7%), but the

prevalence of problematic gambling was higher for males compared to females (11.1% versus 6.2%). These results confirm the prevalence estimated in the epidemiological area, which reports that GD can occur at any age and in both sexes during senescence (Black et al., 2015). Beyond the estimate of the prevalence of the GD profile among the elderly, our results are particularly useful to identify early indicators of problematic and disordered gambling. Specifically, being an immigrant and having a higher number of stressful life events was significantly associated with the most severe gambling activity. These are two common risk factors systematically reported in the bibliography across ages (Smith, Hategan and Bourgeois, 2017; Subramaniam et al., 2015). In fact, immigration constitutes a multiple-stressor situation that involves cognitive appraisals and coping efforts, and it has been associated with greater psychological distress and depressive symptoms (Lanzara, Scipioni and Conti, 2018). The occurrence of lifespan stressful life events has been identified as a powerful contributor to the onset of the gambling activity, but also to the severity levels and even to the changes of gambling habits over time (Godinho et al., 2018; Luce et al., 2016). Experiencing these events has achieved predictive capacity in both the short and long term: stressful episodes in childhood, adolescence or early adulthood have been connected with increases in the frequency and severity of gambling behavior in later life (Storr, Lee, Derevensky, Ialongo and Martins, 2012). Since older individuals can suffer the effects of cumulative lifespan stressful life events, the presence of new aging-related stressors (isolation, insecurity, financial difficulties and unhealthy conditions) makes them more vulnerable to increasing and/or modifying their gambling activity (Godinho et al., 2018; Luce et al., 2016). Betting on games is usually viewed by elderly people as an attractive coping strategy for persistent stress (Guillou Landreat et al., 2019), with the eventual consequence of increases in impairment and harm.

Differences in the gambling profile comparing sexes showed among men higher prevalences for different gambling activities, higher preference for mixed games (non-strategic and strategic), younger age of onset and higher bets per episode/gambling. These results are

consistent with epidemiological and risk factors studies in elderly, which have obtained higher odds of gambling, younger onset and more severity between males (Pilver et al., 2013; Anne Sauvaget et al., 2015; Subramaniam et al., 2015). Comparison of the gambling profile by groups of age showed differences in the age of onset and the duration of the gambling activities (later onset and longer evolution in the group 75-90 years-old). Age of onset and duration of the illness are two relevant but relatively understudied factors in GD. It is well known that this disorder may have onset in a wide range of ages (from adolescence to old age), and individuals with gambling related problems may seek treatment at different moments in the GD course (Blaszczynski and Nower, 2002). Some factors could explain the longer duration in the older age group, such as the reduced progression speed with age (Gustavo C Medeiros, Redden, Chamberlain and Grant, 2017), or the usual decrease in the impulsivity levels with aging (Hamilton et al., 2015; MacKillop et al., 2016). Current meta-analyses have linked GD to dysfunctions of cognitive domains regulating impulsive behavior, as well as deficits in GD across all evaluable domains of impulsivity (Ioannidis, Hook, Wickham, Grant and Chamberlain, 2019; van Timmeren, Daams, van Holst and Goudriaan, 2018). Decreases in impulsivity levels at older ages could contribute to lower GD severity and lower impact in non-gambling-related areas, and therefore reduce the responsiveness to treatment.

The correlation between the more problematic gambling activity and worse psychopathological state and the higher prevalence of substance use is particularly alarming. As has been systematically reported across age groups, at-risk gambling is usually accompanied by the presence of co-occurring disorders, including mood-anxiety problems and substance use (Assanangkornchai et al., 2016; Nicholson et al., 2019; Pilver et al., 2013). This situation is especially problematic among the elderly, since it has been observed that older adults with a gambling disorder often experience higher levels of psychological distress and/or comorbidity compared with younger adults (Parke et al., 2018; van der Maas et al., 2017). Unlike younger gamblers, who usually report looking for action and excitement as a primary motivation for

gambling (Armstrong, Rockloff and Browne, 2020), many older people use gambling as an escape, and seniors with the greatest need for that escape are those with previous physical and/or psychological disease (who are precisely the most vulnerable to developing gambling problems) (Gustavo Costa Medeiros et al., 2015; Pattinson and Parke, 2016; Subramaniam et al., 2015; Tira et al., 2014). People who have recently lost their partner, or even those who have retired from work, are at risk of suffering from anxiety or depression, and they can find an opportunity to cope with distress in gambling and in the use of comorbid substances (Botterill, Gill, McLaren and Gomez, 2016). It should be kept in mind that as a rule, older adults want to prevent the aggravation of their functionality and health (McGilton et al., 2018), and therefore if they are helped to recognize the potential risk associated with the gambling activity, they can attempt to cut back. A new diagnosis often motivates elderly individuals to modify their daily routines and health care behaviors, which usually take time and effort and become quite difficult for some subjects (Morales-Asencio et al., 2016). It is frequent that some caregivers take on the role of directing this change process, but they may have reservations about how to handle these situations, resulting in a new source of stress between the elderly adult and the caregiver. Ultimately, caregivers and older adults usually disagree on how to remain healthy, and on the limits of individual independence (Naganathan et al., 2016). Identifying the comorbid correlates of the most severe forms of gambling in the elderly is a first step towards developing prevention and treatment recommendations, useful for all the members involved in the elderly adult's wellbeing (the participant themselves, caregivers and clinicians). Future research should explore the underlying mechanisms of the harm caused by gambling practices to prevent and minimize the negative consequences for individuals, caregivers and their contexts.

4.1. Limitations and strengths

This work should be interpreted considering several limitations. First, only data recruited in a population-based sample was analyzed, so it is not clear how our results are generalizable to

other treatment-seeking and clinical samples. Second, analyses were performed on cross-sectional data, which provide measures of association but do not allow causal relationships to be confirmed. Third, the non-random sampling procedure limits the capacity to generalize, since there is no guarantee of potential biases regarding coverage of the different levels of gambling risk in the original population of elderly people. Fourth, the lack of physical measures related to the aging process (such as the use of medical services or medication, poorer overall health status and/or higher chronic conditions) hinders their distribution into the empirical clusters and the estimate of their potential relation with gambling problems/severity. Finally, this study was carried out with a quantitative methodology (future qualitative research should provide additional evidence about attitudes and opinions regarding gambling contents).

But despite this set of limitations, this work also has several strengths. First, a relatively large set of measures has been analyzed to provide a comprehensive picture of the gambling activity in older age. Besides providing the profile of the gambling activity, several indicators have been used to measure the clinical severity related to the gambling behavior, such as the number of DSM-5 criteria, the bets per gambling-episode, the cumulative debts due to the gambling behavior and even other psychopathological comorbid correlates. Second, the large sample size analyzed in the study, including both sexes, provides high external validity to our research.

4.2. Conclusion

Gambling is a commonplace social activity across cultures, which can be a harmless recreational activity contributing to subjective wellbeing among the elderly. For older adults who have increased leisure time and/or for those individuals whose health status may limit participation in activities that they previously enjoyed, responsible gambling may provide an alternative for entertainment. However, some elderly individuals are especially vulnerable to gambling-related problems due to multiple factors, including declining health, loneliness,

personal and role losses, social isolation and lower incomes. This high-risk group can develop GD, with the consequences of increased impaired functioning and reduced quality of life.

There is a rising interest in the study of gambling behavior in the elderly, but the cumulated evidence available so far should be interpreted with caution. Data evaluating frequency, motivations, preferences, risk factors and evolution of non-problematic and problematic gambling among older adults are relatively scarce (compared to other age groups), largely because of the low sample sizes for this age group in the research area. This study provides new empirical knowledge of gambling habits in a large population-based sample of elderly individuals. Our results can contribute to the development of more person-centered approaches for intervening in the field of gambling among seniors. Studies focused on the issues related to the access to treatments and therapy efficacy for GD outline that meeting the specific needs of individuals contributes to an increase in the number of people who initiate the treatments, continue the therapy and achieve good outcomes (Dabrowska, Moskalewicz and Wieczorek, 2017). Efforts to better respond to the treatment needs of individuals with impairing gambling behavior and improve the quality of therapies should take into account the heterogeneity component of the gambling problem, and the specificity of each subject.

Results of this study also contribute to the intervention areas. It is essential that the diverse clinical settings explore and screen the presence of early symptoms and negative consequences of the gambling activity among older age individuals (including primary care settings), with the aim to incorporate strategies to reduce these potentials adverse impacts and prevent the progression to problematic and/or disordered gambling. The adequate identification of the multiple processes and correlates of GD is crucial for planning effective treatment tools, since interventions should be addressed to alleviating gambling related impairing behaviors as well as other concurrent psychiatric conditions. GD is a highly disabling mental circumstance which carries a great deal of stigma, and its developmental course is greatly worsened within high vulnerable populations (since old age individuals, who can be particularly exposed to age-

related brain dysfunctions). Therefore, evidence-based integrative intervention plans should be specifically developed for elderly, addressed to the full range of physical and emotional problems, as well as the environmental influences that affect the subjects' health. Healing-oriented holistic programs should include strategies to increase self-control and reduce impulsively (such as training in working memory and response inhibition), to improve emotional regulation, to prevent or reduce chronic stress and to increase social skills. Medication should also be required in those cases with brain chemical imbalances.

Acknowledges and Funding
This manuscript and research were supported by grants from the Ministerio de Economía y Competitividad (PSI2015-68701-R) and from the Ministerio de Ciencia, Innovación y Universidades (grant RTI2018-101837-B-100). The research was funded by the Delegación del Gobierno para el Plan Nacional sobre Drogas (2017I067 and 2019I47), Instituto de Salud Carlos III (ISCIII) (FIS PI14/00290 and PI17/01167) and co-funded by FEDER funds /European Regional Development Fund (ERDF), a way to build Europe. CIBERobn and CIBERSAM are both initiatives of ISCIII. The funders had no role in the study design, data collection and analysis, decision to publish, or preparation of the manuscript. Support was received from the Secretariat for Universities and Research of the Ministry of Business and Knowledge of the Government of Catalonia. TMM, CVA and MLM are supported by a predoctoral grant awarded by the Ministerio de Educación, Cultura y Deporte (FPU16/02087; FPU16/01453; FPU15/02911). We thank the CERCA Programme / Generalitat de Catalunya for institutional support.

Funding
The funders had no role in the design of the study; in the collection, analyses, or interpretation of data; in the writing of the manuscript; or in the decision to publish the results.

Statement of Ethical Approval
All procedures were carried in accordance with the Declaration of Helsinki. Ethical approval was obtained from the Ethics Committee of Bellvitge University Hospital (Ref: PR286/14). All the participants were informed about the study and all provided informed consent.

Declaration of Contribution of Authors
Conceptualization and design: AdP-G, RG, SJ-M. Data Analysis and Interpretation of Data: RG, SJ-M. Funding Acquisition: SJ-M, FF-A. Investigation: TM-M, GM-B, MG-P, EC, CV-A, ML-M, ZA, JS-G, GC, IB, IS, HL-G. Methodology: RG, SJ-M. Project Administration: SJ-M, FF-A, JMM. Resources: AdP-G. Supervision: SJ-M. Visualization: AdP-G, SJ-M, IG, MG-B, A-S, JMM. Writing - Original Draft Preparation: RG, SJ-M. Writing-Review & Edition: SJ-M, RG.

Statement of Conflict of Interest
No potential conflict of interest was reported by the authors.

Availability of data and material.
Data cannot be shared publicly because of being part of a public hospital clinical database. Data are available from the Hospital Universitari de Bellvitge – Institutional Data Access / Ethics Committee (IDIBELL; otri@idibell.cat) for researchers who meet the criteria for access to confidential data.

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Table 1 Prevalence of the gambling disorder severity group in the study

	Women (*n*=226)				Men (*n*=135)			
	n	*%*	*95% CI*		*n*	*%*	*95% CI*	
Absent problem of gambling (0 criteria)	208	92.0%	88.5%	95.6%	119	88.1%	82.7%	93.6%
Problematic gambling (1-3 criteria)	14	6.2%	3.1%	9.3%	15	11.1%	5.8%	16.4%
GD: Low (4-5 criteria)	0	0%	---	---	1	0.7%	0.0%	2.2%
GD: Moderate (6-7 criteria)	4	1.8%	0.1%	3.5%	0	0%	---	---
GD: Severe (8-9 criteria)	0	0%	---	---	0	0%	---	---
	[1]Age 50-74 years-old (*n*=186)				[1]Age 75-90 years-old (*n*=175)			
	n	*%*	*95% CI*		*n*	*%*	*95% CI*	
Absent problem of gambling (0 criteria)	169	90.9%	86.7%	95.0%	158	90.3%	85.9%	94.7%
Problematic gambling (1-3 criteria)	14	7.5%	3.7%	11.3%	15	8.6%	4.4%	12.7%
GD: Low (4-5 criteria)	1	0.5%	0.0%	1.6%	0	0%	---	---
GD: Moderate (6-7 criteria)	2	1.1%	0.0%	2.6%	2	1.1%	0.0%	2.7%
GD: Severe (8-9 criteria)	0	0%	---	---	0	0%	---	---

Note. GD: gambling disorder. [1]Groups of age are generated based on the median (percentile 50th) in the sample.

Table 2 Comparison of the profile of gambling in the old general population based on sex and age

	Women (*n*=226)		Men (*n*=135)					Age 50-74 (*n*=186)		Age 75-90 (*n*=175)				
Prevalence gambling activities	*n*	*%*	*n*	*%*	$\chi^2(df)$	*p*	|*h*|	*n*	*%*	*n*	*%*	$\chi^2(df)$	*p*	|*h*|
Lotteries	126	55.8%	92	68.1%	5.43 (1)	**.020***	0.26	115	61.8%	103	58.9%	0.33 (1)	.564	0.06
Pools	21	9.3%	29	21.5%	10.52 (1)	**.001***	0.34	28	15.1%	22	12.6%	0.47 (1)	.495	0.07
Slots-machines	3	1.3%	8	5.9%	6.05 (1)	**.014***	0.25	7	3.8%	4	2.3%	0.67 (1)	.414	0.09
Cards	4	1.8%	8	5.9%	4.54 (1)	**.033***	0.22	5	2.7%	7	4.0%	0.48 (1)	.487	0.07
Casino or gambling rooms	3	1.3%	2	1.5%	0.02 (1)	.904	0.01	2	1.1%	3	1.7%	0.27 (1)	.604	0.05
Bingo	28	12.4%	15	11.1%	0.13 (1)	.717	0.04	19	10.2%	24	13.7%	1.05 (1)	.305	0.11
Bets on horses/sports	1	0.4%	2	1.5%	1.11 (1)	.293	0.11	1	0.5%	2	1.1%	0.40 (1)	.527	0.07
Stock market	0	0.0%	5	3.7%	8.49 (1)	**.004***	0.28	3	1.6%	2	1.1%	0.15 (1)	.703	0.04
Competition games	2	0.9%	1	0.7%	0.02(1)	.884	0.02	2	1.1%	1	0.6%	0.28 (1)	.598	0.06
Internet (bets, any)	2	0.9%	2	1.5%	0.27 (1)	.600	0.06	1	0.5%	3	1.7%	1.14 (1)	.286	0.11
Gambling preference None	90	39.8%	38	28.1%	20.1 (3)	**<.001***	0.25	62	33.3%	66	37.7%	1.05 (3)	.790	0.09
Non-strategic only	109	48.2%	57	42.2%			0.12	88	47.3%	78	44.6%			0.06
Strategic only	5	2.2%	3	2.2%			0.00	5	2.7%	3	1.7%			0.07
Non-strategic + strategic	22	9.7%	37	27.4%			0.52	31	16.7%	28	16.0%			0.02
Gambling related variables	*Mean*	*SD*	*Mean*	*SD*	*T (df=359)*	*p*	|*d*|	*Mean*	*SD*	*Mean*	*SD*	*T (df=359)*	*p*	|*d*|
Age of onset of gambling	40.31	16.25	33.89	15.02	2.79	**.006***	0.51	34.39	13.20	40.81	17.91	8.01	**.005***	0.41
Duration of gambling activities	35.52	16.79	39.10	16.00	1.49	.139	0.22	34.07	14.17	39.99	18.15	6.34	**.013***	0.36
DSM-5 total criteria for GD	0.22	0.95	0.21	0.63	0.11	.912	0.01	0.22	0.84	0.21	0.84	0.02	.967	0.00
SOGS-total score	1.12	0.97	1.26	1.05	1.26	.209	0.14	1.26	1.15	1.09	0.83	2.18	.141	0.17
Bets/episode (mean, €)	16.36	33.77	18.10	53.79	0.28	.780	0.04	17.41	48.67	16.78	36.87	0.01	.920	0.01
Bets/episode (max., €)	42.76	193.35	145.59	489.32	1.98	**.049***	0.28	60.87	286.12	112.56	410.73	1.00	.318	0.15
Number of games	0.96	1.09	1.30	1.18	2.79	**.006***	0.30	1.11	1.06	1.07	1.21	0.18	.673	0.04

Note. SD: standard deviation. df: degrees of freedom. *Bold: significant comparison.

Effect size: |*d*| or |*h*|<0.20 lower; |*d*| or |*h*|>0.20 mild-moderate; |*d*| or |*h*|>0.50 moderate-mild; |*d*| or |*h*|>0.80 large-high.

Groups of age are generated based on the median (percentile 50th) in the sample.

Table 3 Comparison of the profiles in the old general population based on the GD severity group

		0 criteria (*n*=327)		1-9 criteria (*n*=34)				
Sociodemographic profile		*n*	*%*	*n*	*%*	$\chi^2(df)$	*p*	|*h*|
Sex	Men	208	63.6%	18	52.9%	1.50 (1)	.221	0.22
Origin	Spain	315	96.3%	29	85.3%	8.36 (1)	**.004***	0.39
Civil status	Single	12	3.7%	4	11.8%	5.16 (3)	.160	0.31
	Married / couple	202	61.8%	21	61.8%			0.00
	Divorced / separated	11	3.4%	1	2.9%			0.02
	Widow	102	31.2%	8	23.5%			0.17
Education	Less than primary	160	48.9%	20	58.8%	3.06 (3)	.383	0.20
	Primary	120	36.7%	9	26.5%			0.22
	Secondary	24	7.3%	4	11.8%			0.15
	University	23	7.0%	1	2.9%			0.19
Employment	Unemployed	7	2.1%	0	0.0%	0.74 (1)	.389	0.21
Social aids	Yes	19	5.8%	3	8.8%	0.49 (1)	.485	0.12
		Mean	*SD*	*Mean*	*SD*	*T (df=359)*	*p*	|*d*|
Age (years-old)		73.77	8.42	74.24	7.70	0.31	.758	0.06
Incomes (personal, euros)		724.8	663.6	626.2	431.2	0.85	.398	0.18
Incomes (family, euros)		1132.6	1023.6	1069.0	657.4	0.41	.686	0.08
Life events (lifetime)		*Mean*	*SD*	*Mean*	*SD*	*T (df=359)*	*p*	|*d*|
Total life-events		7.78	3.62	9.62	4.04	2.78	**.006***	0.53
Prevalence of substances		*n*	*%*	*n*	*%*	$\chi^2(df)$	*p*	|*h*|
Tobacco use-abuse		23	7.0%	8	23.5%	10.68 (1)	**.001***	0.52
Alcohol use-abuse		68	20.8%	15	44.1%	9.46 (1)	**.002***	0.51
Other illegal drugs / Medication		32	9.8%	6	17.6%	2.02 (1)	.155	0.23
Psychopathological (SCL-90R)		*Mean*	*SD*	*Mean*	*SD*	*T (df=359)*	*p*	|*d*|
Somatization		0.77	0.58	1.06	0.60	2.78	**.006***	0.51
Obsessive-compulsive		0.54	0.52	0.83	0.54	3.17	**.002***	0.56
Interpersonal sensitivity		0.27	0.35	0.52	0.56	3.71	**.001***	0.53
Depressive		0.52	0.47	0.83	0.64	3.50	**.001***	0.55
Anxiety		0.36	0.39	0.66	0.57	4.07	**.001***	0.61
Hostility		0.21	0.31	0.35	0.48	2.31	**.022***	0.34
Phobic anxiety		0.21	0.39	0.38	0.44	2.40	**.017***	0.41
Paranoid ideation		0.36	0.45	0.60	0.62	2.89	**.004***	0.45
Psychotic ideation		0.15	0.24	0.33	0.36	3.92	**.001***	0.58
GSI		0.43	0.34	0.69	0.46	4.10	**.001***	0.65
PST		23.14	15.95	35.74	17.29	4.35	**.001***	0.76
PST		1.60	0.45	1.64	0.48	0.49	.628	0.08

Note. SD: standard deviation. df: degrees of freedom. *Bold: significant comparison.

Effect size: |*d*| or |*h*|<0.20 lower; |*d*| or |*h*|>0.20 mild-moderate; |*d*| or |*h*|>0.50 moderate-mild; |*d*| or |*h*|>0.80 large-high.