



Underneath the Sheets: a Cross-Cultural Cluster Analysis of Older Adults' Patterns of Aging and Sexual Well-Being in Portugal and Mexico

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Abstract

This study aims to assess the patterns of life satisfaction with life (SwL), sexual satisfaction, and adjustment to aging (AtA), of older adults in Mexico and Portugal. A sample of 658 older adults, aged 65 years-old and older, from Mexico and Portugal were recruited for this cross-cultural study. The following measures were applied: (a) Adjustment to Aging Scale (ATAS); (b) Satisfaction with Life Scale (SwLS); (c) New Sexual Satisfaction Scale (NSSS); (d) Mini-Mental State Exam; and (e) Sociodemographic, health and lifestyle questionnaire. Clusters were identified and characterized by using K-means cluster analysis, encompassing SwL, AtA, and sexual satisfaction. Sexual well-being differences among clusters were analyzed with One-way ANOVAs. Findings indicated three clusters, which explained 76.4% ($R-sq=0.764$) of the total variance: Cluster #1: “Moderately adjusted older adults” ($n=355$, 53.9%), Cluster #2: “Moderately fulfilled older adults” ($n=265$, 40.3%), and Cluster 3: “Well adjusted and satisfied older adults” ($n=38$, 5.8%). Participants in Cluster #1 were mostly Mexican, with moderate levels of AtA and reduced sexual satisfaction and SwL. Conversely, Cluster #2 predominantly consisted of Portuguese participants with moderate sexual satisfaction and SwL, and lower levels of AtA. Participants from Cluster #3 were mostly Portuguese with high levels of AtA, sexual satisfaction, and SwL. This innovative study explored the intricate relationship between sexual well-being, the ability to adjust to aging, and overall SwL, in two different cultural contexts. Findings contributed to the understanding of the relationship between these three variables and for developing tailored future interventions and service planning with older adults in different cultures.

Keywords Adjustment to aging · Cluster analysis · Cultural differences · Older adults · Satisfaction with life · Sexual satisfaction

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Introduction

The aging of the population is increasing in many countries, but the quality of those extra years varies greatly. Differences in physical and mental health can have a profound influence on older people's sexual well-being, satisfaction with life (SwL), adjustment to aging (AtA), and overall well-being (von Humboldt et al., 2021; WHO, 2022). In 2021, the Mexican population aged 65 years or older corresponded to 8.13% (O'Neill, 2023), while the Portuguese population corresponded to 23.4% (INE, 2021). There is a significantly higher proportion of older people in Portugal than in Mexico and the two countries also differ in many other ways (von Humboldt et al., 2021). Differences in the demographic distribution may lead to variations in experiences among older adults, including access to healthcare, social support systems, opportunities for active aging initiatives, and the prevalence of age-related stigma within society (Institute of Medicine, 2008).

Moreover, there are cultural differences regarding sexual well-being between Portugal and Mexico. Older Portuguese adults prioritize aspects of intimacy, positive self-concept, and interpersonal connections, as significant contributors to their overall sexual well-being. Conversely, older Mexican adults prioritize health and self-care supportive relationships as significant variables for their sexual well-being. Additionally, Mexicans rank positive self-concept as less important to their sexual well-being (von Humboldt et al., 2021).

Sexuality in Later life

Older adults are sexually active until their late years, although their frequency of sexual activity decreases with age (Træen et al., 2019; von Humboldt et al., 2020). Moreover, numerous studies have focused on older individuals who express a need for physical affection and intimacy (Davis, 2015; Hillier & Barrow, 2010; von Humboldt et al., 2023), although there is a significant lack of data on the cultural aspects of sexual well-being. Globally and from a cultural perspective, sexual behavior in old age is often viewed as infrequent (von Humboldt et al., 2020), mainly due to the scarcity of research. Although cultural norms and gender roles continue to shape sexuality for both men and women in later life stages (Schwartz & Velotta, 2018; von Humboldt, Carneiro et al., 2021; von Humboldt et al., 2021; von Humboldt et al., 2019), literature on sexual well-being with Mexican and Portuguese older adults still shows little information about their sexual activities and forms of expression (von Humboldt et al., 2020).

Assembling cross-cultural data on the sexual well-being of older adults, especially across different continents, has proven to be challenging (von Humboldt, Mendoza-Ruvalcaba, Humboldt et al., 2021b, c, d). In a study involving four countries, Træen et al. (2019) found that Portuguese older adults reported the highest sexual satisfaction levels, with 83% of them engaging in sexual activity in the past year. In Hernández Gálvez's research (2021) on older Mexicans, 86% of participants expressed sexual interest, with 63% engaging in weekly sexual activity. Additionally, 87% reported high satisfaction with their sexuality.

Sex encompasses more than just intercourse in older ages, including various forms of physical and emotional intimacy, such as kissing, caressing, sensual touch, mutual masturbation, and oral sex, among others. It is essential to recognize that sexual activity among older adults is not limited to intercourse and may include variations due to health conditions or physical limitations (Steckenrider, 2023).

Sexual well-being is the perception of an individual's sexual experiences, and it is positively associated with physical and mental health, successful aging, well-being, and psychological development (von Humboldt, Carneiro et al., 2021; von Humboldt et al., 2020; von Humboldt, Low, Humboldt et al., 2022b, c, d). It encompasses factors like sexual interest satisfaction, interest, self-esteem, function, intimacy, and psychosexual variables (Štulhofer et al., 2019; von Humboldt et al., 2020), however, its conceptual definition and measurement methods have not been consistent, despite its common use in the literature (Štulhofer et al., 2019). Moreover, age-related sexual well-being is influenced by sociocultural factors (Træen et al., 2017), with inconsistencies in the research. These disparities likely stem from the diversity of cultural norms and values surrounding sexuality among older adults across different regions and societies. The absence of comprehensive cross-cultural studies exacerbates these inconsistencies, hindering a deeper understanding of shared socio-cultural characteristics that significantly impact sexual well-being (Træen et al., 2017; von Humboldt, Ribeiro-Gonçalves, Costa, Humboldt et al., 2022b, c, d).

Moreover, in a nationwide longitudinal investigation involving older adults, the general levels of sexual contentment were notably diminished among LGB individuals in contrast to their heterosexual counterparts (Grabovac et al., 2019). In another study involving older same-sex partnerships, it was discovered a significant correlation between resilience and relationship satisfaction, with the latter notably influencing sexual satisfaction (Fleishman et al., 2020).

Role of Sexuality in Promoting Health

Regular sexual activity, defined as sex more than twice a month, is linked to psychological and physical health benefits, including improved SwL, increased heart rate variability, and reduced risks of certain diseases (Costa & Brody, 2012; Diener & Chan, 2011; Flynn & Gow, 2015; Heiman et al., 2011). Moreover, a pleasurable and dynamic sex life is associated with lower mortality (Smith et al., 2019).

Research suggests that pleasure, self-esteem, and sexual satisfaction are crucial for healthy aging (Anderson, 2013). Additionally, literature emphasized the positive impact of sexual health on quality of life and general well-being (Træen et al., 2017; von Humboldt et al., 2022c). Conversely, another study indicated that SwL and well-being played a significant role in older adults' sexual function (Kleinstäuber, 2017). Furthermore, previous research found a link between different behavioral, health, and demographic variables, such as age, sex, overall physical health, mental health, and sexual health in older adults (Kleinstäuber, 2017).

Sexuality and Well-Being in Old Age

In a previous study, both men and women who were sexually active reported higher SwL (Smith et al., 2019; Štulhofer et al., 2019). Indeed, as individuals transition into late adulthood, they encounter physical, mental, and social changes that can be challenging (von Humboldt et al., 2019; von Humboldt & Leal, 2015). The process of AtA among older adults involves various elements, including a sense of purpose, vitality, physical health, aging in place, and social support (von Humboldt et al., 2013a; von Humboldt & Leal, 2017).

With the aging population and a growing emphasis on well-being in old age, the predictors of AtA have become a significant public health interest in old age (von Humboldt et al., 2019; von Humboldt, Leal, Pimenta et al., 2013). Physical limitations, daily stressors, poor sexual intimacy, adverse life events, and difficulties in reconciling with the past are linked to poorer AtA, and more vulnerability when facing the challenges of aging (von Humboldt, Leal, & Pimenta, Humboldt et al., 2013a; von Humboldt, Ribeiro-Gonçalves, & LealHumboldt et al., 2022b, c, d). Indeed, addressing such challenges requires comprehensive interventions with older adults. Recent research highlights the effectiveness of couples therapy in addressing sexual desire among distressed couples, emphasizing the enhancement of couples' intimacy and the promotion of optimal sexual experiences (Kleinplatz et al., 2020).

Sexual well-being, SWL and, AtA seem to be related, although the literature is still very scarce. In the process of adjusting to aging, older adults seem to value quality over frequency of experiencing, which, in turn, contributes to their overall well-being (Skałacka & Gerymski, 2019). Moreover, well-being is a central focus in aging research, and it is related to SwL, good health, sexual well-being, and social engagement, among others (Træen & Villar, 2020). Additionally, sexual satisfaction is a key predictor of older adults' SwL, emphasizing the importance of deriving pleasure from experiences (Skałacka & Gerymski, 2019). Furthermore, sexual well-being significantly influences well-being and SwL in old age (Sinković & Towler, 2019). Although cultural differences exist (von Humboldt et al., 2016; von Humboldt, Ribeiro-Gonçalves, Costa, Humboldt et al., 2022b, c, d), older individuals often value love and sexuality, as crucial for their health and well-being (Sandberg, 2015). Indeed, research has reiterated the importance of a fulfilling sex life for well-being, SwL and ultimately, aging well (Træen & Villar, 2020; Vasconcelos et al., 2022).

Our study addresses a significant gap in the existing body of knowledge, as there is currently no research that explores the relationship between sexual well-being, AtA, and SwL in old age across cultures. Hence, our study aims to assess the patterns of life SwL, sexual satisfaction, and adjustment to aging (AtA), among older adults in Mexico and Portugal.

Method

Participants

For this study, 750 people were initially contacted, and 658 completed the measures ($M=72.76$; $SD=6.82$), with ages ranging from 65 years of age to 91 years of age. From this convenience sample, 74.5% are women. Moreover, 53.8% are Portuguese and 46.2% are Mexican. Convenience sampling was employed for ease of recruitment to help us learn from older participants residing in Mexico and in Portugal. Moreover, distinct cultural differences between two countries on two different continents provide a valuable comparative framework. Mexico and Portugal have diverse cultural norms and societal structures which may influence people's perspectives on ageing and sexual well-being. The sample comprised individuals from various ethnic backgrounds, with 57.8% being White, 31.4% Hispanic or Latino, and 10.8% Black or African American. 98.2% of these participants were heterosexuals and cisgender. Our sample included 21.4% of the participants with completed high school, 17.8% with a university degree, and 60.8% with completed elementary school. Although this sample was not representative of the general population, the education levels observed in our study generally align with the broader demographics of the Portuguese (Fragoso et al., 2019) and Mexican populations (INEGI, 2010). Furthermore, a significant 75.8% of participants reported good health and 87.9% of participants were retired and 14.7% were still employed. Additionally, most of the participants perceived themselves as spiritual (57.3%). Table 1 shows the sociodemographic, health and lifestyle characteristics of the participants.

The inclusion criteria for the participants in this study were as following: (a) Participants must be 65 years old and older; (b) participants have a clear understanding of their voluntary participation in the study; (c) participants show no history of cognitive impairments, psychiatric or neurological disorders, substance abuse, or similar conditions; and, (d) participants have a basic proficiency in using technology, such as smartphones, tablets, computers, apps, among others. Participants were assessed to confirm their eligibility based on their decision-making capacity and cognitive abilities, as they were required to voluntarily self-administer the study questionnaire.

Material

Adjustment to Aging Scale (ATAS)

This cross-cultural valid and reliable measure includes 22 items in five different subscales, with good psychometric qualities. A higher score indicates a higher ATAS in this 7-point Likert scale. These subscales and their respective Cronbach's alpha coefficients were the following: sense of purpose and ambitions (0.874), zest and spirituality (0.927), body and health (0.904), aging in place and stability (0.862), and social support (0.932). The overall scale exhibited high internal consistency, with a Cronbach's alpha coefficient of 0.891 (von Humboldt, Leal, Pimenta, et al., 2014).

Table 1 Sociodemographic and health characteristics of the participants

Characteristics	Portuguese 354 (53.8%)	Mexican 304 (46.2%)	Total (%) 658 (100%)
Age, Average \pm SD			M = 72.76 \pm 6.82
Gender, n (%)			
Female	245 (69.2%)	246 (80.9%)	491 (74.5%)
Male	109 (30.8%)	58 (19.1%)	168 (25.4%)
Educational level, n (%)			
< Secondary	236 (66.7%)	164 (53.9%)	400 (60.8%)
Secondary	38 (10.7%)	103 (33.9%)	141 (21.4%)
> Secondary	80 (22.6%)	37 (12.2%)	117 (17.8%)
Marital status, n (%)			
Single	30 (8.5%)	19 (6.3%)	49 (7.4%)
Married/ <i>de facto</i> union	190 (53.7%)	145 (47.7%)	335 (50.9%)
Divorced/separated	40 (11.3%)	27 (8.9%)	67 (10.2%)
Widow	94 (26.6%)	113 (37.2%)	208 (31.5%)
Household, n (%)			
Living with someone	250 (70.6%)	203 (66.8%)	453 (68.8%)
Living alone	104 (29.4%)	101 (33.2%)	205 (31.2%)
Family Annual Income, n (%)			
\leq 25,000 €	228 (64.4%)	192 (63.2%)	420 (63.8%)
> 25,000 €	126 (35.6%)	113 (36.8%)	239 (36.2%)
Employment status, n (%)			
Employed	52 (14.7%)	45 (14.8%)	97 (14.7%)
Unemployed	302 (85.3%)	259 (85.2%)	561 (85.3%)
Spirituality, n (%)			
Yes	250 (70.6%)	128 (42.1%)	377 (57.3%)
No	104 (29.4%)	176 (57.9%)	281 (42.7%)
Perceived health, n (%)			
Good	248 (70.1%)	251 (82.6%)	499 (75.8%)
Poor	106 (29.9%)	53 (17.4%)	159 (24.2%)

New Sexual Satisfaction Scale - Short (NSSS-S)

The NSSS-S is the short form of the New Sexual Satisfaction Scale, which includes 12 items assessing several dimensions of sexual satisfaction, such as sexual communication, sexual compatibility, and sexual pleasure. It is a two-dimensional factor structure, evaluating self-centrality and partner and sexual activity centrality. On a 5-point Likert scale, participants rate each item, with higher ratings indicating higher levels of sexual satisfaction (Pechorro et al., 2015).

The NSSS-S has been proven to be a valid and reliable measure of sexual satisfaction both in the Portuguese version (Cronbach's alpha coefficient ≥ 0.89 ; (Pechorro et al., 2016) and for the Spanish version (Cronbach's alpha coefficient ≥ 0.87 ; (Strizzi et al., 2016). Additionally, the scale is validated in older populations and showed strong internal consistency, as evidenced by a Cronbach's alpha of 0.94 (Pechorro et al., 2015).

Satisfaction with Life Scale (SWLS)

Larsen et al. (1985) developed the Satisfaction with Life Scale (SWLS), which was designed as a simplified evaluation of a person's overall level of SwL. With just five items, it has shown strong psychometric properties (Pavot & Diener, 1993), and is considered a valid and reliable tool for older populations (Pavot & Diener, 2008). The internal consistency was found to be strong ($r=.78$). The SWLS has been used as a cross-cultural outcome indicator in several health-related studies (Pavot & Diener, 2008), and subsequently concerning physical and mental health outcomes in countries like the U.S. (Kim et al., 2021), Mexico (López-Ortega et al., 2016), Greece (Yotsidi et al., 2023), and Ethiopia (Mekonnen et al., 2022).

Sociodemographic, Health and Lifestyle Questionnaire

The questionnaire included participants' basic background information, such as age, biological sex, gender, sexual identity, education level (<secondary; secondary; >secondary), household (living alone vs. living with someone), income (<25.000€ vs. >25.000€), employment (retired vs. not retired) and marital status. It was also assessed whether participants perceived themselves as spiritual and how they evaluated their experiences with love in life. The health and lifestyle section included information about the participants' health history, current health status, lifestyle preferences, leisure activities during free time, and access to healthcare. Participants were asked to rate their perception of their love experience in life, in terms of being good or poor. Additionally, participants were asked whether they engaged in leisure activities in their free time (Yes/No). The sample was described using descriptive statistics.

Mini-Mental State Exam (MMSE)

The Mini Mental State Examination (MMSE) is a tool for conducting a complete and methodical cognitive and mental evaluation and it was used as a screening tool within the inclusion criteria. Several cognitive dimensions are examined in this 30-question measure: orientation, registration, attention and calculation, memory, and language. Thirty is the maximum score, while cognitive impairment is indicated with a score of 23 or less. The MMSE may be used frequently and on a regular basis. The MMSE is a useful technique for detecting cognitive decline in older people who are living in the community. The MMSE was shown to be extremely reliable on retest, after 24 h and 28 days ($r=.89$ and 0.99 , respectively) (Folstein et al., 1975).

Procedure

First, the aim of the study was shared with the participants. Each participant was informed that their participation was voluntary, and they were free to withdraw at any time. They were given anonymity and confidentiality. The instructions to complete the questionnaires were given to each participant. All questionnaires were administered in person by a health professional. Moreover, efforts were made to create a supportive and non-judgmental environment during data collection to encourage

genuine responses, particularly in sensitive areas, such as sexual well-being. The measures were initially available in Portuguese and Spanish. Moreover, the sociodemographic, health and lifestyle questionnaire was translated into both languages, in accordance with the recommendations outlined by Buil et al. (2012), emphasizing the importance of maintaining equivalence of meaning rather than relying on literal translation.

Participants were recruited through a snowballing approach, where initial contacts were asked to refer others within their social networks. Additionally, recruitment efforts involved posting advertisements on public message boards in community centers, late-life learning centers or senior universities, local communities, community gerontological centers, and public spaces frequented by older adults, in the Metropolitan area of Lisbon, Portugal and the Metropolitan area of Guadalajara, Mexico. Emails were sent to individuals included in the above institution lists.

Data was collected from October 1, 2022, and April 30, 2023. The respondents received no payment for filling out the questionnaires. All procedures were approved by the Research Ethics Committee of the William James Center for Research and ISPA - Instituto Universitário. The Helsinki Declaration's ethical guidelines for human participants were observed, as well as the Code of Ethics of the Portuguese and Mexican Psychologists.

Data Cleaning

When preparing for statistical analysis, detailed data cleaning procedures were implemented to ensure the integrity and validity of our results. We identified and handled outliers and we assessed skewness and kurtosis, to evaluate data distribution. We also addressed missing data through appropriate techniques and examined multicollinearity among variables. Furthermore, prior to conducting the hierarchical cluster analysis, a number of assumptions were rigorously tested to validate the robustness of our methodology. These included verifying the normality of variables, assessing homogeneity of variance, and investigating potential multicollinearity among predictor variables (Maroco, 2021).

Statistical Analysis

A cluster analysis was conducted on a sample of 658 individuals, with the objective of aggregating their scores across three key indicators: (1) AtA, including its five dimensions: sense of purpose and ambitions, zest and spirituality, body and health, aging in place and stability, social support; (2) sexual satisfaction, including ego-centered and partner/sexual activity centered; and (3) SwL.

Hierarchical cluster analysis with the Ward technique was used to form the clusters, and the squared Euclidean distance was used as an indicator of participant dissimilarity. The number of clusters to keep was determined based on the R^2 examination, as explained in the work by Maroco (2021). As a result, three distinct and homogeneous clusters were identified, capturing approximately 76% of the total variance.

The non-hierarchical *k-Means* approach was used to further refine the grouping of people into the maintained clusters. According to Maroco's (2021) methodology,

the F statistics of the clusters ANOVA were examined to identify the key factors that distinguished the three clusters. The differences in sociodemographic and behavioral traits among people within each of the three clusters were then examined using chi-square analysis. The validity of the clusters was further supported by an analysis of mean differences between cluster groups. The clusters were used as the levels of the independent variable in the analysis of variance (ANOVA) and Tukey HSD tests, while the dependent variables were the measures of sexual well-being. For all analyses, $p < .05$ was considered to represent the level of statistical significance. Version 29 of IBM SPSS Statistics for Windows was used for all data analysis.

Results

Clusters Centers and Frequencies

Data met the necessary assumptions for the hierarchical cluster analysis, considering the normality of variables, homogeneity of variance, and multicollinearity among predictor variables. Three clusters were retained after applying the R^2 criterion. These accounted for 76.4% of the total variance ($R-sq=0.764$). The three clusters are visible in the dendrogram with the hierarchical relationships (see Fig. 1).

The cluster centers and the F statistics for each variable are shown in Table 2. The dimensions comprised by AtA mostly differentiated the clusters. “Zest and spirituality” ($F=734.645$) showed the highest differentiating effect, followed by “aging in place and stability” ($F=695.049$), “body and health” ($F=647.149$), “sense of purpose and ambitions” ($F=465.605$), and “social support” ($F=363.693$). Clusters are also distinguished by “ego-centered sexual satisfaction” ($F=159.120$) and “partner/sexual activity-centered sexual satisfaction” ($F=154.165$). The dimension that least distinguishes the three clusters is SwL ($F=174.113$).

This study identified three distinct clusters, based on participants’ scores of AtA, sexual satisfaction, and SwL. Cluster #1: “Moderately adjusted older adults” (Moderate AtA/Low sexual satisfaction/Low SwL) included 355 participants, with moderate AtA and low scores in sexual satisfaction and SwL. Cluster #2: “Moderately fulfilled older adults” (Low AtA/Moderate sexual satisfaction /Moderate SwL) comprised

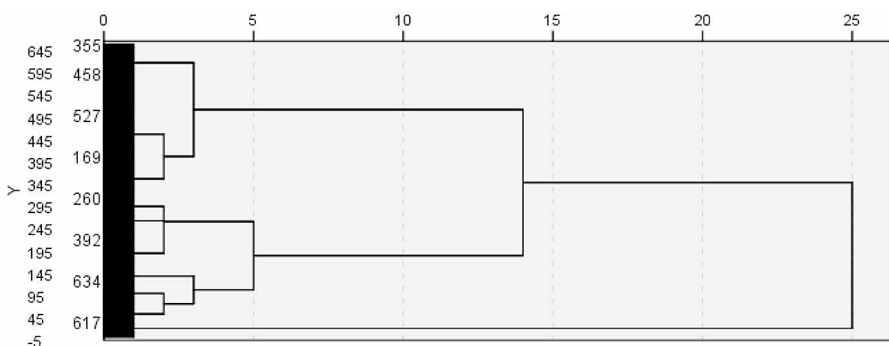


Fig. 1 Dendrogram: Hierarchical clustering with single linkage ($N=658$)

Table 2 Clusters centers, frequencies, and F statistics for each variable

	Cluster #1 (<i>n</i> =355)	Cluster #2 (<i>n</i> =265)	Cluster #3 (<i>n</i> =38)	F
1. Sense of purpose and ambitions	0.796	0.545	2.287	465.605***
2. Zest and spirituality	0.777	0.553	2.554	734.645***
3. Body and health	0.645	0.313	2.826	647.149***
4. Aging in place and stability	0.653	0.325	2.850	695.049***
5. Social support	0.585	0.247	2.546	363.693***
6. Ego-centered sexual satisfaction	0.419	0.764	1.360	159.120***
7. Partner/sexual activity centered sexual satisfaction	0.417	0.767	1.319	154.165***
8. Satisfaction with life	0.428	0.656	1.463	174.113***

*** $p < .001$

265 older adults with low AtA, and moderate sexual satisfaction and SwL. Cluster #3: “Well adjusted and satisfied older adults” (High AtA/High sexual satisfaction / High SwL) only encompassed 38 participants, with high scores in all three variables.

Cluster Solution According to Sociodemographic and Lifestyle Characteristics

Chi-square analysis revealed statistically significant differences in sociodemographic, health, and lifestyle characteristics across the three clusters (see Table 3, categories derived from the Sociodemographic, Health, and Lifestyle questionnaire).

These findings indicated significant differences for the three clusters, concerning nationality [$\chi^2(2) = 103.90, p < .001$]. Specifically, Cluster #2: “Moderately fulfilled older adults” (Low AtA/Moderate sexual satisfaction/Moderate SwL) and Cluster 3: “Well adjusted and satisfied older adults” (High AtA/High sexual satisfaction/High SwL) showed a higher representation of Portuguese participants, while Cluster #1: “Moderately adjusted older adults” (Moderate AtA/Low sexual satisfaction/Low SwL) showed a higher frequency of Mexican participants.

In terms of sex, [$\chi^2(2) = 2.95, p < .001$], Cluster #2: “Moderately fulfilled older adults” (Low AtA/Moderate sexual satisfaction /Moderate SwL) showed the highest percentage of women (77.4%), whereas Cluster #3: “Well adjusted and satisfied older adults” (High AtA/High sexual satisfaction/High SwL) presented the highest proportion of men (34.2%).

Significant variations in the level of education [$\chi^2(4) = 28.13, p < .001$] and marital status [$\chi^2(6) = 65.26, p < .001$] across the clusters were also observed. Participants with lower educational levels and who were married were more likely to fall into Cluster #3: “Well adjusted and satisfied older adults” (High AtA/High sexual satisfaction /High SwL). Conversely, individuals with higher levels of education and who widowed or divorced were prominently represented in Cluster #1: “Moderately adjusted older adults” (Moderate AtA/Low sexual satisfaction/Low SwL), and Cluster #2: “Moderately fulfilled older adults” (Low AtA/Moderate sexual satisfaction / Moderate SwL).

Moreover, persons who identify as being spiritual [$\chi^2(2) = 1.21, p < .001$] were more concentrated in Cluster #3: “Well adjusted and satisfied older adults” (High AtA/High sexual satisfaction /High SwL). While all three clusters have a high percentage of individuals with perceived good general health, Cluster #3: “Well adjusted

Table 3 Three cluster solution according to sociodemographic and lifestyle characteristics

	N	Cluster #1 Moderate AtA/Low SS/Low SWL n=355(%)	Cluster #2 Low AtA/Moderate SS/Moderate SWL n=265(%)	Cluster #3 High AtA/High SS/High SWL n=38(%)	χ^2	df	sig.
Nationality							
Portuguese	354	129 (36.3%)	188 (70.9%)	37 (97.4%)	103.90	2	<0.001
Mexican	304	226 (63.7%)	77 (29.1%)	1 (2.6%)			
Biological sex							
Female	490	260 (73.2%)	205 (77.4%)	25 (65.8%)	2.95	2	<0.001
Male	168	95 (26.8%)	60 (22.6%)	13 (34.2%)			
Educational level							
< Secondary	400	188 (53.0%)	179 (67.5%)	33 (86.8%)	28.13	4	<0.001
Secondary	141	98 (27.6%)	42 (15.8%)	1 (2.6%)			
> Secondary	117	69 (19.4%)	44 (16.6%)	4 (10.5%)			
Marital status							
Single	49	17 (4.8%)	29 (10.9%)	3 (7.9%)	65.26	6	<0.001
Married/ <i>de facto</i> union	335	188 (53.0%)	124 (46.8%)	23 (60.5%)			
Divorced/separated	67	36 (10.1%)	29 (10.9%)	2 (5.3%)			
Widow	207	114 (32.1%)	83 (31.3%)	10 (26.3%)	1.21	2	<0.001
Spiritual person							
Yes	377	207 (58.3%)	146 (55.1%)	24 (63.2%)			
No	281	148 (41.7%)	119 (44.9%)	14 (36.8%)	60.86	2	<0.001
Perceived general health							
Good	499	277 (78.0%)	191 (72.1%)	31 (81.6%)			
Poor	159	78 (22.0%)	74 (27.9%)	7 (18.4%)			
Love experience in life							
Good	528	281 (79.2%)	215 (81.1%)	32 (84.2%)	42.57	4	<0.001
Bad	130	74 (20.8%)	50 (18.9%)	6 (15.8%)			
Leisure activity							
Yes	328	196 (55.2%)	120 (45.3%)	22 (57.9%)	18.09	2	<0.001
No	330	159 (44.8%)	145 (54.7%)	16 (42.1%)			

and satisfied older adults” (High AtA/High sexual satisfaction /High SwL) has the highest percentage of these [$\chi^2(4)=42.57, p<.001$]. Last, having a positive love experience in life and engaging in leisure activities were more prominent characteristics of individuals in Cluster #3: “Well adjusted and satisfied older adults” (High AtA/High sexual satisfaction /High SwL) [$\chi^2(2)=18.09, p<.001$].

Group Differences Concerning Perceived Sexual Well-Being

Table 4 shows concise group differences concerning questions related to perceived sexual well-being, included in the Sociodemographic, Health, and Lifestyle questionnaire. The perceived overall sexual well-being [$F=57.237, p<.001$], sexual attractiveness [$F=65.635, p<.001$], sexual openness and communication [$F=55.254, p<.001$], and sexual satisfaction [$F=69.453, p<.001$] were all significantly influenced by cluster membership.

Multiple comparisons using the Tukey HSD Test showed that participants in Cluster #3: “Well adjusted and satisfied older adults” (High AtA/High SS/High SWL) demonstrated the greatest values in all sexual well-being variables, hence participants in Cluster #3 rated the highest perceived overall sexual well-being, attractiveness, openness and communication, and satisfaction.

Discussion

These findings revealed three unique clusters: Cluster #1: “Moderately adjusted older adults” was characterized by moderate levels of AtA, low levels of sexual satisfaction, and low SwL; Cluster #2: “Moderately fulfilled older adults” was defined by low levels of AtA, moderate levels of sexual satisfaction and moderate levels of SwL; and Cluster #3: “Well adjusted and satisfied older adults” was characterized by high levels of AtA, high levels of sexual satisfaction and high levels of SwL. The three clusters showed distinct sociodemographic, health, and lifestyle differences concerning perceived sexual well-being.

Clusters Analysis Regarding Adjustment to Aging, Satisfaction with Life and Sexual Satisfaction

Cluster #1: “Moderately adjusted older adults” showed moderate scores in all dimensions of AtA. Participants in this cluster showed a strong sense of purpose and ambition, as well as higher levels of zest and spirituality. However, they showed lower scores in body and health, aging in place, stability, and social support dimensions. Moreover, this cluster reports lower levels of ego-centered and partner/sexual activity-centered sexual satisfaction and the lowest levels of satisfaction with life. They seem to be less satisfied with their sexual experiences in both personal and partner-focused aspects and they appear to be less content and fulfilled with their overall life circumstances. Despite the importance of sexual activity and satisfaction for well-being, some older people report having sexual difficulties (Erens et al., 2019). Moreover, the association between SwL and satisfaction with one’s sex life emphasizes

Table 4 Three cluster groups according to sexual satisfaction items: Descriptives and univariate tests

	Cluster	M	DP	F	<i>p</i>
How do you classify your sexual wellbeing?	1	2.37 <i>a</i>	1.99	57.237	<0.001
	2	3.34 <i>b</i>	1.89		
	3	4.36 <i>c</i>	1.93		
How do you classify your sexual attractiveness?	1	2.15 <i>a</i>	1.38	65.635	<0.001
	2	2.62 <i>b</i>	1.50		
	3	4.41 <i>a</i>	1.81		
How do you classify your sexual openness and communication?	1	2.97 <i>a</i>	1.26	55.254	<0.001
	2	3.24 <i>b</i>	2.11		
	3	4.50 <i>b</i>	2.08		
How do you classify your sexual satisfaction?	1	2.81 <i>a</i>	1.52	69.453	<0.001
	2	3.15 <i>b</i>	1.91		
	3	4.62 <i>c</i>	1.94		

Note: Measures marked with different letters differ statistically, at the level of $\alpha < 0.05$, according to the Tukey HSD test

a pivotal link in successful aging (Buczak-Stec et al., 2019). Older individuals with positive AtA often recognize the interconnectedness of life domains and that fostering positive experiences, including sexual satisfaction, may contribute to aging well (von Humboldt, Carneiro et al., 2021; von Humboldt & Leal, 2014). Additionally, sexual satisfaction is related to higher SwL, which underscores the importance of holistic well-being to aging itself (Buczak-Stec et al., 2019).

Cluster #2: “Moderately fulfilled older adults” included older adults with low scores for the AtA dimensions. These showed a low sense of purpose and ambition, zest and spirituality, body and health, aging in place, and social support. This group appeared to strike a balance between different aspects of AtA. Moreover, these participants expressed moderate levels of ego-centered and partner/sexual activity-centered sexual satisfaction, and SwL. Research showed that even though some older people reported more loneliness and less sexual intimacy, they did not report lower sexual desire (Kolodziejczak et al., 2019). Moreover, while prior research indicates a decline in sexual activity with age, this does not automatically imply a corresponding decrease in sexual satisfaction (Stentagg et al., 2021). In fact, older adults seem less concerned with the frequency of their sexual intimacy, and focus more on intimacy that brings enjoyment and sharing experiences (Skalacka & Gerymski, 2019).

Cluster #3: “Well adjusted and satisfied older adults” stood out for high ratings in all AtA dimensions. These participants displayed a strong sense of purpose and ambition, zest and spirituality, as well as good physical health, stability, and social support. Moreover, they showed relatively high levels of ego-centered and partner/sexual activity-centered sexual satisfaction and exhibited the highest levels of SwL. They reported a strong sense of satisfaction in both personal and partner-oriented aspects of their sexual experiences. Indeed, research highlighted the connection between satisfaction with one’s sex life (Buczak-Stec et al., 2019) and AtA in old age (von Humboldt, Carneiro et al., 2021). Sexual satisfaction represents a life aspect closely linked to overall SwL in older individuals and enhancing sexual satisfaction can potentially influence the attainment of successful aging (Buczak-Stec et al., 2019).

Although most of the participants valued sexual well-being, 56 participants pointed it as unimportant which aligns with the existing literature. Indeed, according to previous studies, older individuals may have less sexual engagement than younger cohorts (Mitchell et al., 2013).

Characterization of the Three Clusters, Considering socio-demographic, Lifestyle and Health Variables

Cluster #1 is primarily composed of Mexican participants. Participants were mostly highly educated women. Compared to the other clusters, this cluster showed a higher proportion of divorced or widowed participants, with a slightly higher prevalence of Mexican individuals. They consider themselves spiritual, and most of them perceive their general health as good and engage in leisure activities. Even though a substantial proportion of individuals in this cluster reported having had positive love experiences, this cluster has the highest percentage of people with negative love experiences in life. Research indicates that married individuals tend to show higher SwL than single older adults, highlighting the potential for greater long-term happiness among married individuals and increased life satisfaction (Ndayambaje et al., 2020). Additionally, higher levels of education seem to not be related to high levels of satisfaction or happiness (Ruiu & Ruiu, 2019). Furthermore, the lack of interest in sexual activity in later life has been linked to health problems and religiosity (Mencia & Rodríguez-Martín, 2019; Sinković & Towler, 2019).

Cluster #2 included a higher proportion of Portuguese participants. The majority were married and female, and with a below secondary educational level. Many individuals in this cluster identified as spiritual and reported good general health. Love experiences in life were also positive for most of Cluster #2 participants (81.1%), and with leisure activities embraced by less than half of them. Research indicated that marriage or cohabitation with a partner tends to be correlated with increased SwL, improved overall well-being, better mental health, and a reduced prevalence of depressive symptoms in later life (Becker et al., 2019; Gibney et al., 2017).

Additionally, Cluster #3 showed an overwhelming majority of married Portuguese participants. While this cluster maintained a female majority, it also includes a higher proportion of males compared to the other clusters. Most individuals in this cluster hold an educational level below secondary, perceive their general health as good and perceive themselves as spiritual. Research reiterated that perceived spirituality and good health are correlated with higher levels of SWB, AtA, and increased SwL (von Humboldt et al., 2020; von Humboldt, Leal, & Pimenta, Humboldt et al., 2014a). Love experiences in life are highly positive for most individuals in this cluster, and a slightly higher percentage of participants engaged in leisure activities compared to Cluster #1: “Moderately adjusted older adults”. Older people generally have greater leisure opportunities to pursue their interests and engage in cultural and recreational activities (Pettigrew et al., 2019), which in turn, can promote their AtA and overall SwL (von Humboldt et al., 2022c; von Humboldt & Leal, 2017). Furthermore, a strong positive correlation exists between sexual spirituality and both SwL (Ndayambaje et al., 2020) and successful AtA (von Humboldt, Leal, & Pimenta, Humboldt et al., 2014a).

Furthermore, cultural diversity was evident among the three clusters. Cluster #1 encompassed mostly Mexican older adults, with moderate levels of AtA, low sexual satisfaction, and SWL. Conversely, Cluster #2 encompassed more Portuguese older people, with low AtA and moderate levels of sexual satisfaction, and SwL. Cluster #3 comprised a high majority of Portuguese individuals with high levels of AtA and sexual satisfaction and SwL. These findings highlight cultural influences on sexual expression among older adults, reflecting varying societal attitudes toward aging and sexuality. Cultural norms, social support networks, and perceptions of aging and sexuality influence individuals' experiences and behaviors, shaping their levels of adjustment and well-being. As highlighted by (von Humboldt et al., 2022). Cultural norms and values regarding sexuality differ across societies, shaping individuals' attitudes and behaviors. Moreover, the study aligns with the broader literature, emphasizing the multifaceted impact of diverse cultural experiences and personal factors on older adults' engagement, satisfaction, and connection with their sexuality (Portellos et al., 2023).

Characterization of the Three Clusters, Considering Sexual well-being Items

Cluster #1 exhibits relatively lower levels of perceived sexual well-being, attractiveness, openness, and communication, as well as satisfaction. Individuals in this cluster tend to perceive themselves as less satisfied and open in their sexual experiences, and they rated their attractiveness and overall sexual well-being as below average. While research on sexual satisfaction in old age is limited, research has pointed out that factors such as investing in overall well-being, regaining a sense of youthfulness, and feeling attractive and desirable are among the primary motivations for older individuals to participate in sexual activity (Gewirtz-Meydan & Ayalon, 2019). These motivations, in turn, may contribute to their overall SwL and a sense of aging well (von Humboldt et al., 2021).

Cluster #2 participants showed moderate levels of perceived sexual well-being, attractiveness, openness, communication, and satisfaction. Literature emphasized that attractiveness and positive communication are significant factors for older adults engaging in sexual activity, and are a means for expressing their sexuality (von Humboldt et al., 2013b, 2014b, 2021).

Lastly, participants in Cluster #3 expressed high levels of perceived sexual well-being, attractiveness, openness, communication, and satisfaction. These participants seem to have a more positive and fulfilling sexual life. Most older adults did not perceive age as a barrier to enjoying fulfilling sexual experiences (Gewirtz-Meydan & Ayalon, 2019; von Humboldt et al., 2020). Furthermore, research highlights the importance of feeling attractive among older adults (Tiggemann & McCourt, 2013), as they tend to prioritize their health and bodily functioning over aesthetic considerations (Towler et al., 2021).

Limitations and Implications of the Study

This present study has several limitations. Respondents may not have been open in their responses, due to the sensitivity of sexual themes, stigma or social desirability.

Moreover, social expectations due to societal expectations about older age being a time not appropriate for sexual activity may have biased participant responses.

Our sample also lacks diversity in terms of sexual orientation and gender identity, with an overrepresentation of women, who seem to be more open to discussing sexual topics, potentially due to some factors, such as permissive cultural norms surrounding communication about sensitive issues, perceived relevance of the topic to women's experiences, and individual differences when sharing intimacy with others.

Very nearly all (98.2%) participants were heterosexual and cisgender, so we were not able to assess group differences based on sexual orientation/gender identity. Future studies comparing older people in terms of their gender and sexual orientation would be relevant for increasing knowledge about older groups. Non-heterosexual older adults are more likely to face sexual stigma and internalized stereotypes (Torres Mencia & Rodríguez-Martin, 2019; von Humboldt, & Leal, 2014; von Humboldt, et al., 2018, 2021a, 2022a). Because we used quantitative methods for assessing sexual satisfaction, AtA, and SwL, these instruments might also not fully capture the complex experiences of older individuals. This study uses cross-sectional data that cannot tell us whether cluster memberships shift over time. By using cross-sectional data, context and unmeasured variables may have influenced relations between AtA, SwL and sexual satisfaction. Indeed, other factors, such as interpersonal relationships, religious beliefs, and access to healthcare may significantly influence perceptions of sexual satisfaction and well-being among older adults. Cluster analysis is essentially exploratory, and different clustering techniques may provide different outcomes. Future studies could aim to delve deeper into these findings, by employing statistical techniques to explore the complex interplay between various determinants of sexual satisfaction and well-being among older adults. Longitudinal studies could also be conducted to assess how these factors evolve over time and their influence on individuals' sexual well-being trajectories. Additionally, qualitative research approaches, such as interviews or focus groups, could provide rich insights into the subjective experiences and perceptions of sexual satisfaction and well-being among older adults.

Research in this area is also extremely scarce. The clusters that we speak of offer preliminary evidence of cultural differences in two medium-size samples of older persons from two different countries. To enhance the generalizability of our findings, more ethnically diverse groups will be recruited in a future study. Notwithstanding these limitations, this study provides some direction and perhaps with respect to assessment parameters for health professionals working with older populations, particularly since there are no studies linking AtA, SWB, and sexual satisfaction. Our findings offer valuable insights for older adults, healthcare professionals, and sex educators. Tailored interventions and support programs can address the diverse needs highlighted by the identified clusters. Additionally, targeted approaches in patient care, inclusive sex education, and advocacy for resources can enhance the well-being of older adults. Further research to help inform targeted interventions for older adults is crucial.

Conclusions

This study illuminates intricate relationships between sexual satisfaction, AtA, and SwL from a cross-cultural perspective. Notably, no previous studies have employed a cluster analysis approach to examine these interconnected variables in old age in different cultural older samples. Likewise, initiatives geared towards developing resources that can foster positive attitudes about aging and building resilience against age-related changes could facilitate sexual well-being in old age.

This research sheds light on the critical importance of challenging age-related biases when it comes to sexual well-being. These biases encompass stereotypes and prejudices toward older adults, including assumptions about decreased sexual desire or activity, diminished attractiveness, or the belief that older adults are not sexually active or interested (von Humboldt et al., 2020). Negative sexual stereotypes could deter older people from seeking health support for sexual issues concerns. Recognizing the strong link between sexual variables and aging well has the potential to reshape attitudes around sexual inclusivity (von Humboldt et al., 2020).

Another significant implication of this study highlights the need to acknowledge the diverse experiences of older adults. This demographic group is diverse and consists of older individuals from various ethnic and cultural backgrounds, different socioeconomic statuses, and distinct health conditions. Indeed, this study emphasizes the importance of exploring how different groups of older adults perceive and prioritize sexual satisfaction, AtA, and SwL. By doing so, these findings serve as a fundamental step in crafting culturally responsive interventions and policy programs.

Furthermore, understanding the patterns of AtA, SwL and sexual satisfaction among older adults in two different countries provides valuable insights into the factors influencing aging and sexual well-being in diverse cultural contexts. These findings can inform the development of targeted interventions and support programs aimed at older adults and address the specific needs of older adults in these regions. Additionally, by identifying distinct clusters of older adults with differing experiences of aging and sexual well-being, policymakers and healthcare professionals can tailor resources and services to better meet the needs of each group, ultimately promoting healthier and more fulfilling aging experiences.

Despite the significant impact of sociocultural variables on the sexual well-being of older individuals, research in this area remains scarce (von Humboldt et al., 2021). In brief, the findings of this study offer preliminary evidence of linkages between AtA, SwL and sexual well-being in older age. Indeed, these clusters indicate that there are variations in sexual and age-related perceptions in later life between older Mexican and Portuguese persons. Exploring in depth the connections between these three variables sheds much-needed light on factors that contribute to sexual well-being and that could inform policies and interventions tailored towards older populations.

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revision of the manuscript; IL: study concept and design, interpretation of data. All authors read and approved the final manuscript.

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Data Availability The datasets in the current study are available from the corresponding author on reasonable request.

Declarations

Compliance with Ethical Standards The study was conducted according to the guidelines of the Declaration of Helsinki, and approved by the Ethics Committee of ISPA – Instituto Universitário (Protocol code: SFRH/BPD/116114/2016; Date of approval: 11/7/2016). The study did not involve experimental protocols. Informed consent was obtained from all subjects.

Competing Interests The authors report there are no competing (financial and non-financial) interests to declare.

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