Gender-modulated relationships among depression, light household tasks and physical activity: population-based moderation analysis

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Abstract

Purpose – *This paper aims to study the influence of leisure-time physical activity on depression crises and the difficulty in performing light household tasks.*

Design/methodology/approach – *A population-based cross-sectional study was conducted using data from the 2020 European Health Survey in Spain. A total of 1,076 individuals diagnosed with depression were selected. ANOVA, chi-square, Fisher's exact test and Mann–Whitney U test were applied, and a simple moderation analysis was conducted using the SPSS PROCESS 4.0 macro.*

Findings – *Women had higher percentages of some or much difficulty in performing domestic activities (p = 0.007). Differences were found between experiencing a crisis in the past 12 months versus not having one (p < 0.001): less physical activity was performed, perceived health was worse and difficulty in performing domestic activities increased. The moderation analysis confirmed the moderating effect of physical activity on the relationship between experiencing a crisis and having difficulty with domestic activities (p = 0.017).*

Research limitations/implications – *The usual limitation of descriptive cross-sectional studies, which cannot establish causal relationships, must be added to low sample sizes in some categories.*

Practical implications – *The analysis with gender differentiation, promoting gender-specific adapted practices, considering age and personal circumstances of the patient, appropriate exercise prescription, as well as its evaluation and follow-up, are areas where specialist nurses need to delve deeper to enhance the quality of care.*

Originality/value – *Leisure-time physical activity moderates the relationship between experiencing a crisis and having difficulty with light household tasks: those who engage in occasional physical activity have less difficulty compared to those who do not engage in it.*

Keywords Depression, Activities of daily living, Activity physical, Mental health

Paper type Research paper

Introduction

Estimates on the prevalence of mental disorders worldwide, summarizing the results from 28 countries across the globe through the World Health Organization's (WHO) World Mental Health Survey, indicated that 18.1% to 36.1% of individuals will develop some disorder over the course of their lifetime (Kessler *et al.*, 2009).

Subsequent studies, such as Steel *et al.*'s research on the global prevalence of common mental disorders or Vigo *et al.*'s estimation of the true global burden of mental illnesses, have confirmed that approximately one in three individuals will experience some form of mental health issue throughout their lifetime (Steel *et al.*, 2014; Vigo *et al.*, 2016).

In Europe, the European Study of the Epidemiology of Mental Disorders (Alonso et al., 2002), which examines the associated factors and prevalence of mental disorders, estimates that 25.9% of the population, at some point in their lives, has been diagnosed with a mental health issue (de Pedro Cuesta et al., 2016).

The WHO has equated mental health with subjective well-being, the perception of self-efficacy, autonomy, competence, intergenerational dependence and the realization of intellectual and emotional capacities (J. Alonso et al., 2002). Several of these factors can be influenced by gender differences, as indicated in the 1970s by the epidemiologist Myrna M. Weissman, who highlighted that the prevalence of depressive disorders was higher in women (Meil Landwerlin, 2005; Salk et al., 2017). Additionally, other authors have noted that the prevalence of poor mental health was higher among women in all age groups (23.4% compared to 15.6% in men), exceeding 30% among those aged 75 and older, as well as the frequency of diagnoses of depression or anxiety (19.4% compared to 8.5%) and surpassing 25% among those aged 60 and older (Bacigalupe et al., 2020).

There are other factors that affect mental health, such as educational level, social support and economic status. In various countries, including Spain, an increase in the prevalence of depression and anxiety diagnoses is observed as socioeconomic status declines (Meil Landwerlin, 2005; Salk et al., 2017). Regarding educational level, the inequalities are greater among lower education groups, with an 86% higher likelihood of being diagnosed with depression or anxiety (Bacigalupe et al., 2020).

Regarding marital status and having or not having children, depressive symptoms increase in widowed women (in men, it is higher in those who are separated) who have two or more children, while in men, symptoms increase when they do not have children (Matud et al., 2006).

Although there have been advancements in gender equality, inequality and differentiation still exist in many aspects of everyday life, ranging from the clear example of gender-based violence to more subtle aspects such as the division of household chores, which often leads to an excessive burden (Salk et al., 2017). Men tend to engage in sporadic tasks that involve less daily load, avoiding repetitive, rigorous and routine activities. Therefore, women tend to take on a higher frequency of light domestic tasks (Larrañaga et al., 2004). Defined as unpaid tasks performed for the comfort and maintenance of household members and the home, these tasks include light chores such as washing, ironing, dishwashing, cooking, dusting and other activities such as maintenance, repair and management, among others.

From the 1980s to the year 2000, men's commitment to household chores in Spain increased by 35%, while women's commitment decreased by 5%. Nevertheless, women's workload was still twice as much as men's (7.22 h and 3.1 h, respectively). As families grow, demands increase and the gender difference becomes more pronounced, although it is smaller when women have full or part-time employment, income or higher education (Larrañaga et al., 2004).

The most common mental disorder is depression, affecting 4.4% of the global population and carrying a significant economic burden (Coto-Lesmes et al., 2020; Organización Mundial de la Salud, 2017). Depression, characterized by a low mood and disrupted behavior, thought processes and activity levels, can adversely impact daily and work activities, health perception and lifestyle habits such as nutrition, exercise and rest (Mendes Rodrigues et al., 2020). The multifactorial nature of depression requires further exploration and understanding.

One of the factors that has contributed to the global increase in depression is the COVID-19 pandemic (Becerra-García et al., 2023; Jalloh et al., 2018). During the lockdown, there was a rise in internet searches related to mental health issues such as anxiety, sadness and insomnia, among others (Becerra-García et al., 2023). Moreover, the organizations responsible for providing mental health care were temporarily suspended as they were not considered essential services, exacerbating the situation. The most common diagnosis was anxiety, often accompanied by sleep disturbances, and it primarily affected individuals who already had depression (Nicolini, 2020).

Furthermore, not only the pandemic but also the improper management of health problems, in general, make depression the most common mental health issue among older adults. The way depression presents in this population is variable, whether it be due to a preexisting mental disorder, iatrogenic causes, physical health issues and so on (Molés Julio et al., 2019). Therefore, identifying symptoms in older adults is even more challenging as they often overlap with physical decline due to aging, cognitive impairment, as well as other psychosocial factors (such as the aging culture and social isolation). Within this group, individuals who are most susceptible to developing a depressive disorder are widowed women, individuals with mobility difficulties and social isolation due to illness, and those who have experienced stressful events (Toro et al., 2014).

The experience of significant illness, chronic diseases, institutionalization or requiring mobility aids is directly related to the emergence of crises and depressive disorders. In this stage of life, depression often goes unnoticed due to the stigmatization of older adults, not only by family members or caregivers but also by health-care professionals, resulting in up to 40% of cases going unreported. There is a belief that feeling depressed in old age is normal (Toro et al., 2014).

To provide effective and comprehensive nursing care, it is essential to be familiar with the key nursing diagnoses related to depression: hopelessness (00124), situational low self-esteem (00120), impaired mood regulation (00241) and risk for self-directed violence (0140). Common interventions include emotional support (5270), cognitive restructuring (4700), group therapy (5450), teaching disease process (5602) and enhancing self-confidence (5395) (NNNconsult, 2015). Additionally, therapeutic activities (4310) and exercise promotion (0200) are repeated in each diagnosis.

Interventions related to physical activity are easy to implement, monitor and evaluate, with short-term results, making their assessment simpler. Currently, from a therapeutic perspective, physical activity is primarily directed toward combating physical rather than mental illnesses (Almagro Valverde et al., 2014). However, its utility in mental health conditions is increasingly supported (Dauwan et al., 2021; Heissel et al., 2023). Therefore, the role of psychiatric nurses is crucial in promoting exercise that is tailored to the patient's preferences, environment and lifestyle (Cornejo-Callejo and Bejarano-Ramírez, 2017). They play a vital role in encouraging individuals with mental health conditions to engage in suitable physical activity, which can have positive effects on their overall well-being and contribute to their recovery process.

In summary, a significant difference in the prevalence of depressive disorders has been observed between men and women, with women being significantly more affected. It has also been highlighted that depressive crises can impact various aspects of daily life, including the performance of domestic activities, which are also influenced by gender disparities. Among the tools to combat depression, physical activity has been identified as a quick and effective intervention. However, it is necessary to delve deeper into how physical activity affects these patients and their ability to engage in activities that may be limited by their condition, taking into consideration a gender perspective as well. Therefore, the objective of this study was to analyze the influence of physical activity as a moderating variable between experiencing a depressive crisis in the past 12 months and having difficulty performing light household tasks.

Methods

Study design. Population and simple

This is a population-based cross-sectional study conducted using data from the European Health Survey in Spain in 2020 (Instituto Nacional de Estadistica, 2021), carried out by the National Institute of Statistics (INE) in collaboration with the Ministry of Health.

A three-stage stratified sampling was conducted, with the first stage being the stratification by municipality size (first-stage units) within each autonomous community. The second-stage units consisted of main single-family dwellings, and the third-stage units corresponded to eligible individuals who were surveyed.

In the first stage, a proportional probability sampling was used within each stratum, based on the size measured by the number of main dwellings. In the second stage, the dwellings were selected using systematic sampling with random start (which provides self-weighted samples by stratum). In the third stage, the Kish method was used, ensuring an equal probability of selection for individuals.

The data collection method, initially established as computer-assisted personal interviews supplemented by telephone interviews, when necessary, was modified to exclusively conduct interviews by phone due to the COVID-19 pandemic. The method included periodic and occasional inspections to ensure accurate data collection. The interviewers received training from the INE.

Eligibility, inclusion and exclusion criteria

The records that responded "yes" to having a diagnosed depression were selected. Those that responded, "don't know," "no answer," "did not attempt" or "I need to do it" were eliminated, as well as those with missing values in the selected variables. Out of the 37,500 selected households with a total of 22,072 individuals, the final sample reached 1,076 individuals after applying the inclusion and exclusion criteria.

The explored variables and categories included gender, age, marital status, education level, occupation, perceived health, being diagnosed with depression in the past 12 months, severity of depressive symptoms, difficulty in performing light household tasks, body mass index (BMI), leisure-time physical activity (LTPA) and being user of substances or alcohol.

Ethical and legal considerations

The use of data from the European Health Survey in Spain 2020 (EESE2020) does not require approval from an ethics committee. According to Regulation (EU) 2016/679, public-use files are not considered confidential. The survey provides anonymized microdata files to the public, which makes it impossible to directly or indirectly identify the respondents.

Statistical analysis

IBM SPSS Statistics 26.0 software (IBM, Chicago, IL, USA) and Jamovi version 2.3 were used for the statistical analysis. Quantitative variables were expressed as mean and standard deviation, while qualitative variables were summarized using absolute frequencies and percentages. The Kolmogorov–Smirnov test with Lilliefors correction was applied to check for normality.

Comparing age between groups was performed using one-way ANOVA. The analysis of contingency tables with dichotomous and nominal polytomous variables was conducted using the chi-square test and Fisher's exact test. The Mann–Whitney U test was used for comparing groups with ordinal variables. The analysis of simple moderation was conducted using the PROCESS 4.0 macro for SPSS (Model 1), with 10,000 bootstrap samples (95% confidence interval). The Johnson–Neyman method was selected to identify and represent regions of significance.

Results

Description of the sample

Table 1 presents the variables and categories of the total analyzed sample. With a mean age of 70 years (SD 9.88), the highest percentages are observed in the married category (46.2%), with completed primary education (30.7%), engaged in unskilled or semi-skilled occupations (35.6%), overweight (40.2%), nonsmokers (59.9%), nondrinkers (31.3%), not engaging in physical activities (51.9%), having experienced a depressive crisis in the past 12 months (75.3%), perceiving their health as regular (45.2%) and reporting no difficulty in performing light household activities (67.4%).

Unifactorial inferential analysis

Table 2 presents the variables analyzed according to gender. Differences are notable in terms of marital status, with women comprising 36.7% of widows compared to 10.5% of men being widowers ($p < 0.001$). Women show lower percentages in higher education (ranging from secondary education to university) ($p < 0.001$). They also constitute the majority in unskilled occupations ($p = 0.004$).

Notable is the 70.8% and 39.6% of women who have never smoked or consumed alcohol compared to 30.8% and 9.5% of men, respectively ($p < 0.001$). Higher percentages are found among women in the categories of having some or much difficulty in performing light household activities compared to men ($p = 0.007$). No significant differences were found between genders in the variables BMI, LTPA, depression in the past 12 months, degree of depressive severity or perceived health.

Variables were also compared between those who reported having a depressive crisis in the past 12 months and those who did not. Notables are higher percentages of depression among those with lower education levels ($p = 0.003$) and among those with less skilled occupations ($p = 0.023$). Regarding BMI, the percentage of obese individuals was higher among those who reported a depressive crisis, while the percentage of normal weight individuals was higher among the group that did not report a crisis in the past 12 months ($p = 0.012$).

Notably, with high significance ($p < 0.001$), the variable of physical activity stands out (higher percentages from occasional exercise to exercising multiple times a week in the group without a depressive crisis compared to a higher percentage of no exercise and having a crisis). Poorer perceived health (among those with depressive crises) and experiencing some too much difficulty in performing light household activities also stand out among those who had a depressive crisis (Table 3).

Moderation analysis

Figure 1 shows the conceptual diagram followed in the analysis.

Table 4 displays the coefficients, upper and lower confidence intervals and *p*-values.

The statistical diagram (Figure 2) visually represents these coefficients and *p*-values.

The conditional effect of the predictor on the moderator values can be seen in Table 5. It is observed that the effect is significant up to the value of 2.315 ($p = 0.05$), and beyond this point, the significance is lost.

Figure 3 displays the conditional effect of depression on the difficulty of performing daily household activities based on the significant values of the moderating variable (not engaging in physical activities and engaging in them occasionally).

Table 6 presents the moderation analysis for women only. It is noteworthy that the interaction between depression and physical activity is marginally significant ($p = 0.07$).

Table 1 Description of the sample (*N* = 1,076)

Variable	Categories	Mean (SD) or n (%)
Age		70 (9.88)
Marital status	Single	112 (10.4%)
	Married	497 (46.2%)
	Widowed	318 (29.6%)
	Separated	47 (4.4%)
	Divorced	102 (9.5%)
Education level	Illiterate	27 (2.5%)
	Incomplete primary education	202 (18.8%)
	Complete primary education	330 (30.7%)
	Secondary education	250 (23.2%)
	High school	86 (8%)
	Medium vocational training	43 (4%)
	Higher vocational training	43 (4%)
	University degree	95 (8.8%)
Occupation	Directors and managers +10 employees	69 (6.4%)
	Directors and managers −10 employees	68 (6.3%)
	Intermediate occupations or self-employed	181 (16.8%)
	Supervisors and skilled technicians	183 (17%)
	Semiskilled primary sector occupations	383 (35.6%)
	Unskilled occupations	192 (17.8%)
BMI	Underweight	22 (2%)
	Normal weight	331 (30.8%)
	Overweight	433 (40.2%)
	Obesity	290 (27%)
Smoking	Daily	154 (14.3%)
	Yes, but not daily	10 (0.9%)
	Former smoker	268 (24.9%)
	Never smoked	644 (59.9%)
Alcohol consumption	Daily or almost daily	166 (15.4%)
	5–6 days per week	11 (1%)
	3–4 days per week	36 (3.3%)
	1–2 days per week	76 (7.1%)
	2–3 days per month	52 (4.8%)
	Once a month	47 (4.4%)
	Less than once a month	113 (10.5%)
	I have quit (past 12 months)	238 (22.1%)
	Never consumed alcohol	337 (31.3%)
Leisure-time physical activity (LTPA)	I do not do any	558 (51.9%)
	Occasional	391 (36.3%)
	Several times per month	51 (4.7%)
	Several times per week	76 (7.1%)
Depression (past 12 months)	Yes	810 (75.3%)
	No	266 (24.7%)
Depressive severity	None	413 (38.4%)
	Mild	355 (33%)
	Moderate	185 (17.2%)
	Moderately severe	78 (7.2%)
	Severe	45 (4.2%)
Perceived health	Very good	23 (2.1%)
	Good	236 (21.9%)
	Fair	486 (45.2%)
	Poor	270 (25.1%)
	Very poor	61 (5.7%)
Difficulty performing light household tasks	None	725 (67.4%)
	Some	133 (12.4%)
	A lot	103 (9.6%)
	I cannot do it at all	115 (10.7%)

Source: Authors' own work

| Table 2	Gender differences ($N = 1,076$)			
Variable	*Categories*	*Men (n = 295)*	*Women (n = 781)*	*p-value*
Age		68.1 (9.49)	71.1 (9.9)	<0.001
Marital status	Single	50 (16.9%)	62 (7.9%)	<0.001
	Married	159 (53.9%)	338 (43.3%)	
	Widowed	31 (10.5%)	287 (36.7%)	
	Separated	16 (5.4%)	31 (4%)	
	Divorced	39 (13.2%)	63 (8.1%)	
Education level	Illiterate	1 (0.3%)	26 (3.3%)	<0.001
	Incomplete primary education	43 (14.6%)	159 (20.4%)	
	Complete primary education	79 (26.8%)	251 (32.1%)	
	Secondary education	75 (25.4%)	175 (22.4%)	
	High school	25 (8.5%)	61 (7.8%)	
	Medium vocational training	14 (4.7%)	29 (3.7%)	
	Higher vocational training	18 (6.1%)	25 (3.2%)	
	University degree	40 (13.6%)	55 (7%)	
Occupation	Directors and managers +10 employees	32 (10.8%)	37 (4.7%)	0.004
	Directors and managers −10 employees	18 (6.1%)	50 (6.4%)	
	Intermediate occupations or self-employed	44 (14.9%)	137 (17.5%)	
	Supervisors and skilled technicians	54 (18.3%)	129 (16.5%)	
	Semiskilled primary sector occupations	106 (35.9%)	277 (35.5%)	
	Unskilled occupations	41 (13.9%)	15 (19.3%)	
BMI	Underweight	4 (1.4%)	18 (2.3%)	0.228
	Normal weight	75 (25.4%)	256 (32.8%)	
	Overweight	142 (48.1%)	291 (37.3%)	
	Obesity	74 (25.1%)	216 (27.7%)	
Smoking	Daily	60 (20.3%)	94 (12%)	<0.001
	Yes, but not daily	5 (1.7%)	5 (0.6%)	
	Former smoker	139 (47.1%)	129 (16.5%)	
	Never smoked	91 (30.8%)	553 (70.8%)	
Alcohol consumption	Daily or almost daily	89 (30.2%)	77 (9.9%)	<0.001
	5–6 days per week	5 (1.7%)	6 (0.8%)	
	3–4 days per week	14 (4.7%)	22 (2.8%)	
	1–2 days per week	16 (5.4%)	60 (7.7%)	
	2–3 days per month	12 (4.1%)	40 (5.1%)	
	Once a month	11 (3.7%)	36 (4.6%)	
	Less than once a month	39 (13.2%)	74 (9.5%)	
	I have quit (past 12 months)	81 (27.5%)	157 (20.1%)	
	Never consumed alcohol	28 (9.5%)	309 (39.6%)	
Leisure-time physical activity (LTPA)	I do not do any	144 (48.8%)	414 (53%)	0.632
	Occasional	116 (39.3%)	275 (35.2%)	
	Several times per month	14 (4.7%)	37 (4.7%)	
	Several times per week	21 (7.1%)	55 (7%)	
Depression (past 12 months)	Yes	214 (72.5%)	596 (76.3%)	0.201
	No	81 (27.5%)	185 (23.7%)	
Depressive severity	None	130 (44.1%)	283 (36.2%)	0.068
	Mild	86 (29.2%)	269 (34.4%)	
	Moderate	45 (15.3%)	140 (17.9%)	
	Moderately severe	22 (7.5%)	56 (7.2%)	
	Severe	12 (4.1%)	33 (4.2%)	
Perceived health	Very good	9 (3.1%)	14 (1.8%)	0.215
	Good	71 (24.1%)	165 (21.1%)	
	Fair	128 (43.4%)	358 (45.8%)	
	Poor	72 (24.4%)	198 (25.4%)	
	Very poor	15 (5.1%)	46 (5.9%)	
Difficulty performing light household tasks	None	220 (74.6%)	505 (64.7%)	0.007
	Some	27 (9.2%)	106 (13.6%)	
	A lot	14 (4.7%)	89 (11.4%)	
	I cannot do it at all	34 (11.5%)	81 (10.4%)	
Source: Authors' own work				

Table 3 Differences between those who have had or have not had a depressive episode in the past 12 months (N = 1076)

Variable	Categories	Yes (n = 810)	No (n = 266)	p-value
Age		70.6 (9.94)	69.4 (9.63)	0.08
Marital status	Single	79 (9.8%)	33 (12.4%)	0.418
	Married	376 (46.4%)	121 (45.5%)	
	Widowed	245 (30.2%)	73 (27.4%)	
	Separated	38 (4.7%)	9 (3.4%)	
	Divorced	72 (8.9%)	30 (11.3%)	
Education level	Illiterate	23 (2.8%)	4 (1.5%)	0.003
	Incomplete primary education	163 (20.1%)	39 (14.7%)	
	Complete primary education	262 (32.3%)	68 (25.6%)	
	Secondary education	180 (22.2%)	70 (26.3%)	
	High school	54 (6.7%)	32 (12%)	
	Medium vocational training	35 (4.3%)	8 (3%)	
	Higher vocational training	29 (3.6%)	14 (5.3%)	
	University degree	64 (7.9%)	31 (11.7%)	
Occupation	Directors and managers +10 employees	45 (5.6%)	24 (9%)	0.023
	Directors and managers −10 employees	46 (5.7%)	22 (8.3%)	
	Intermediate occupations or self-employed	129 (15.9%)	52 (19.5%)	
	Supervisors and skilled technicians	150 (18.5%)	33 (12.4%)	
	Semi-skilled primary sector occupations	289 (35.7%)	94 (35.3%)	
	Unskilled occupations	151 (18.6%)	41 (15.4%)	
BMI	Underweight	15 (1.9%)	7 (2.6%)	0.015
	Normal weight	238 (29.4%)	93 (35%)	
	Overweight	325 (40.1%)	108 (40.6%)	
	Obesity	232 (28.6%)	58 (21.8%)	
Smoking	Daily	114 (14.1%)	40 (15%)	0.012
	Yes, but not daily	4 (0.5%)	6 (2.3%)	
	Former smoker	191 (23.6%)	77 (28.9%)	
	Never smoked	501 (61.9%)	143 (53.8%)	
Alcohol consumption	Daily or almost daily	116 (14.3%)	50 (18.8)	<0.001
	5–6 days per week	6 (0.7%)	5 (1.9%)	
	3–4 days per week	23 (2.8)	13 (4.9%)	
	1–2 days per week	55 (6.8%)	21 (7.9%)	
	2–3 days per month	30 (3.7%)	22 (8.3%)	
	Once a month	35 (4.3%)	12 (4.5%)	
	Less than once a month	80 (9.9%)	33 (12.4%)	
	I have quit (past 12 months)	186 (23%)	52 (19.5%)	
	Never consumed alcohol	279 (34.4%)	58 (21.8%)	
Leisure-time physical activity (LTPA)	I do not do any	452 (55.8%)	106 (39.8%)	<0.001
	Occasional	279 (34.4%)	112 (42.1%)	
	Several times per month	30 (3.7%)	21 (7.9%)	
	Several times per week	49 (6%)	27 (10.2%)	
Depressive Severity	None	247 (30.5%)	166 (62.4%)	<0.001
	Mild	282 (34.8%)	73 (27.4%)	
	Moderate	162 (20%)	23 (8.6%)	
	Moderately severe	74 (9.1%)	4 (1.5%)	
	Severe	45 (5.6%)	0 (0%)	
Perceived health	Very good	14 (1.7%)	9 (3.4%)	<0.001
	Good	144 (17.8%)	92 (34.6%)	
	Fair	366 (45.2%)	120 (45.1%)	
	Poor	233 (28.8%)	37 (13.9%)	
	Very poor	53 (6.5%)	8 (3%)	
Difficulty performing light household tasks	None	514 (63.5%)	211 (79.3%)	<0.001
	Some	107 (13.2%)	26 (9.8%)	
	A lot	89 (11%)	14 (5.3%)	
	I cannot do it at all	100 (12.3%)	15 (5.6%)	

Source: Authors' own work

Figure 1 Conceptual diagram of moderation

Source: Authors' own work
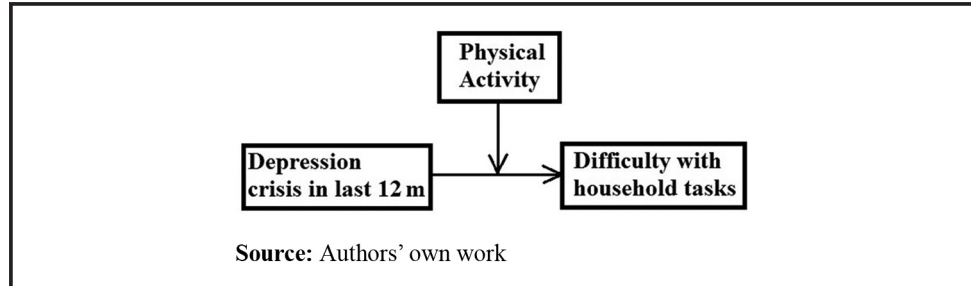
Table 4 Moderation analysis

	Coeff.	P	LLCI	ULCI
Depression*-Difficulty**	0.5812	0.002	−0.6216	−0.3963
LTPA***-Difficulty	−0.3096	<0.001	0.5279	0.7609
Depression − LTPA	−0.1831	0.0169	−0.2662	−0.1298

Notes: *Depression crisis in the past 12 months; **Difficulty performing light household tasks; ***Leisure-time physical activity
Source: Authors' own work

Figure 2 Statistical diagram

Source: Authors' own work
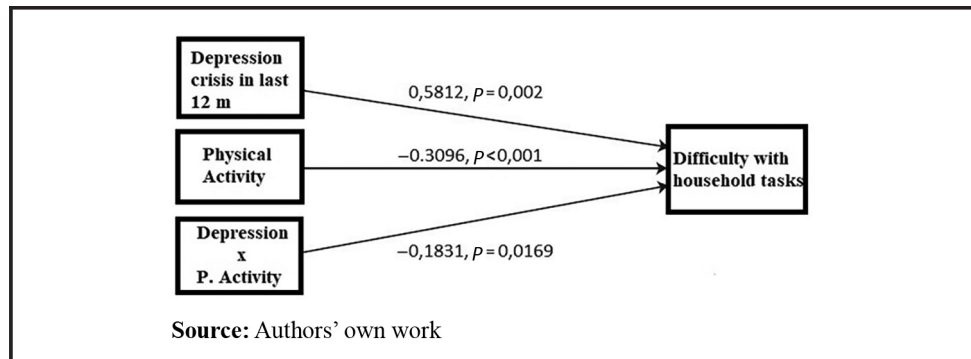
Discussion

The purpose of this study was to examine the moderating effect of physical activity on the relationship between experiencing a crisis in the past 12 months and the difficulty in performing light household activities. Gender differences and differences between individuals with and without a depressive crisis in the past year have been identified. The moderating effect of LTPA on the relationship between experiencing a crisis in the past 12 months and experiencing difficulty in performing light household activities has been confirmed.

The sample has a mean age of 70 years, with a higher percentage of married or widowed individuals, primary education level, no engagement in physical activity, experiencing a depressive crisis in the past 12 months and predominantly perceiving their health as fair or poor. These results can be explained by the advanced age of the sample, which entails physiological aging processes that increase health problems, vulnerability and functional burden, leading to a more negative perception of their health (Navarro *et al.*, 2020).

Table 5 Conditional effect of the predictor on moderator values

LTPA	Effect	se	t	p	LLCI	ULCI
1.0000	0.3981	0.0927	4.2931	0.0000	0.2161	0.5800
1.1500	0.3706	0.0856	4.3302	0.0000	0.2027	0.5385
1.3000	0.3431	0.0795	4.3177	0.0000	0.1872	0.4991
1.4500	0.3157	0.0746	4.2295	0.0000	0.1692	0.4621
1.6000	0.2882	0.0713	4.0403	0.0001	0.1482	0.4282
1.7500	0.2608	0.0698	3.7364	0.0002	0.1238	0.3977
1.9000	0.2333	0.0701	3.3275	0.0009	0.0957	0.3709
2.0500	0.2058	0.0723	2.8478	0.0045	0.0640	0.3477
2.2000	0.1784	0.0761	2.3429	0.0193	0.0290	0.3278
2.3157	0.1572	0.0801	1.9622	0.0500	0.0000	0.3144
2.3500	0.1509	0.0814	1.8532	0.0641	−0.0089	0.3107
2.5000	0.1235	0.0879	1.4041	0.1606	−0.0491	0.2960
2.6500	0.0960	0.0954	1.0066	0.3143	−0.0911	0.2831
2.8000	0.0685	0.1035	0.6619	0.5082	−0.1346	0.2717
2.9500	0.0411	0.1123	0.3657	0.7147	−0.1793	0.2614
3.1000	0.0136	0.1215	0.1120	0.9109	−0.2248	0.2520
3.2500	−0.0139	0.1311	−0.1057	0.9158	−0.2710	0.2433
3.4000	−0.0413	0.1409	−0.2932	0.7694	−0.3178	0.2352
3.5500	−0.0688	0.1510	−0.4555	0.6488	−0.3651	0.2275
3.7000	−0.0962	0.1613	−0.5968	0.5508	−0.4127	0.2202
3.8500	−0.1237	0.1717	−0.7205	0.4714	−0.4606	0.2132
4.0000	−0.1512	0.1822	−0.8295	0.4070	−0.5088	0.2064

Source: Authors' own work

Figure 3 Conditional effect of depression on the difficulty performing light household tasks according to significant values of the moderating variable
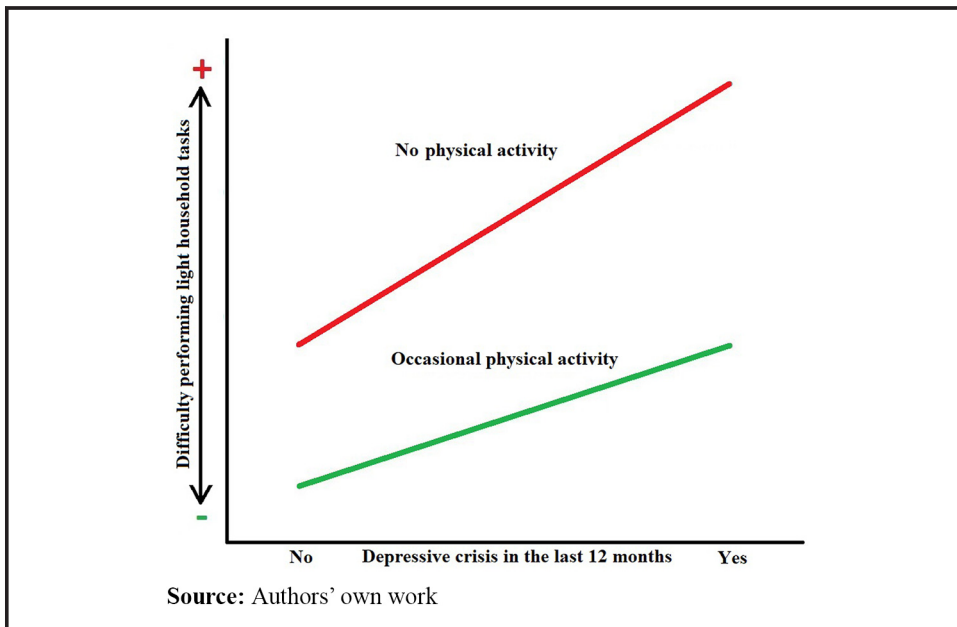
Source: Authors' own work

Additionally, it is important to consider that all individuals in the sample have been diagnosed with a depressive disorder, and a large percentage have experienced a depressive crisis in the past 12 months, which undoubtedly influences their perception of health.

Table 6 Moderation analysis (women only)

	coeff.	P	LLCI	ULCI
Depression*-Difficulty**	0.5899	$p = 0.0012$	0.2328	0.9451
LTPA***-Difficulty	−0.3223	$p < 0.001$	−0.14122	−0.2324
Depression × LTPA	−0.3223	$p = 0.0713$	−0.3454	0.0144

Notes: *Depression crisis in the past 12 months; **Difficulty performing light household tasks; ***Leisure-time physical activity
Source: Authors' own work

Women show higher values in the categories of having some or a lot of difficulty in performing light household activities compared to men, who reached 74.6% in not having any difficulty. In the study conducted by Spijker, focused primarily on the population born between 1945 and 1959, it was observed that women with low educational levels and paid work experience poorer mental health (Spijker, 2019). In our understanding, this could be due to the fact that despite having paid work, women still bear the majority of household responsibilities, while the vast majority of men do not assume caregiving and household-related tasks, or if they do, their commitment is not proportionate. Along these lines, Dominguez Amorós et al. (2018) pointed out that women maintain a commitment to domestic work and caregiving in line with the needs of household members, indicating that women's time is the adjusting variable, which significantly impacts their quality of life and well-being.

Similarly, other authors have shown that the percentage of women who dedicate at least several days a week to the care of children and/or older or disabled family members, as well as to household chores, is higher in all cases compared to the percentage of men (Dominguez-Folgueras, 2015; Muyor-Rodríguez, 2019).

According to theories that focus on social interaction, socialization processes and the formation of gender roles to explain the division of labor, the greater burden of household work is attributed to gender identity and preexisting social norms, where society attributes the performance of these tasks as almost exclusively belonging to the female role, as many of these activities are associated with being female (Dominguez-Folgueras, 2015). Gender theories show that couples with egalitarian gender values tend to share tasks more equitably (Lennon and Rosenfield, 1994).

Another result that our research revealed was the higher prevalence of depressive disorders among individuals with lower education levels and less qualified occupations, as previously mentioned (Matud et al., 2006). It has also been highlighted that the economic factor significantly impacts mental health, with unemployed individuals being the most affected (Muyor-Rodríguez, 2019).

Regarding the variable LTPA, many studies highlight gender differences. Men tend to engage in more intense activities, while women engage in moderate to light activities (de Pedro-Jiménez et al., 2022). However, we believe that this trend may equalize with age, possibly due to physiological processes associated with aging, limitations imposed by chronic illnesses and even environmental factors (such as the presence of architectural barriers) (Díez et al., 2014).

Regarding BMI, the results showed that individuals who reported a depressive crisis had a higher percentage of obesity, while those who did not report a crisis in the past year had a higher percentage of normal weight. In our understanding, depressive crises can lead to mood and nervous disturbances, as well as prolonged fatigue, which could decrease the energy level required for engaging in physical activities. We must not overlook the bidirectional relationship between BMI and depression, as increased BMI can interfere with activity engagement and perpetuate the depressive state, as previously discussed by

(R. Alonso and Olivos, 2020; Hernández Nava *et al.*, 2019; Ríos-Martínez *et al.*, 2008; Silva *et al.*, 2018). Similarly, individuals with obesity had a 55% higher risk of experiencing depression due to perceptions of being far from the ideal body and thinness (Silva *et al.*, 2018), or between BMI and the generation of pro-inflammatory molecules and resistance to the appetite-regulating hormone (leptin), which would worsen the chronic inflammatory state, similarly interfering with the participation in physical activities and, once again, perpetuating the depressive state (Huang *et al.*, 2022).

Differences were found between those who experienced a crisis and those who did not in terms of their perception of health, with those who had a crisis perceiving their health significantly worse ($p < 0.001$). This can be attributed to the influence that depression has on health perception, as highlighted by other authors in previous studies, such as Azpiazu Garrido *et al.* (2002), who associated problems in self-perceived health status with the presence of disorders such as depression.

As mentioned, having depression is associated with a decrease in leisure physical activities, and our study has demonstrated that experiencing a recent crisis significantly interferes with the engagement in these activities ($p < 0.001$). This could be attributed to the exacerbation of depressive symptoms, such as lack of motivation and inability to engage in activities, among others, as also mentioned by Nazar *et al.* (2021), who related depressive symptoms to poorer self-care habits. Additionally, Pérez Pedrogo and Martínez Taboas (2016) suggested that experiencing depression can hinder a person's exercise engagement.

Experiencing a crisis can lead to a perception of worsening health. The moderating role of LTPA between experiencing a crisis and engaging in household tasks is confirmed through our analysis. Transitioning from no exercise to engaging in some physical activity significantly reduces the level of limitation, which could be attributed to the positive impact of physical exercise on physical and cognitive functions (Sañudo *et al.*, 2013). Furthermore, it improves frailty, characterized by a decreased capacity of the body to respond to external stressors, as supported by Casas-Herrero and Izquierdo (2012), who found that older adults engaging in physical activity had a lower likelihood of experiencing frailty.

Moreover, in the study conducted by Chacón-Borrego *et al.* (2017), it was concluded that individuals who engage in physical activity, regardless of intensity and frequency, have better mood and self-perception compared to those who do not engage in physical activity. This leads to a decrease in the presence of manifestations symptoms such as sadness or restlessness.

Losing significance at higher levels of physical activity could be explained by the low percentage of individuals who engage in physical activity more frequently. It would be expected that the trend of having fewer limitations in performing household activities would increase as the level of physical activity increases, but further studies in more active populations will be needed to confirm this.

Based on the observation of a higher prevalence of limitations in women, possibly due to their predominant role in light household tasks and considering that they are more likely to experience depressive disorders, moderation analysis was conducted exclusively in women. Although the results were not as evident as in the overall analysis, a trending significance was reached ($p = 0.07$), likely influenced by the higher percentage of women with crises and difficulties in performing household activities, even though there was a smaller sample size. This population group would be the greatest beneficiary of using physical activity as a moderating factor.

Limitations and strengths

The usual limitation of descriptive cross-sectional studies, which cannot establish causal relationships, must be added to the low sample sizes in some categories. The mean age of the analyzed sample hinders the extension of our conclusions to other age groups; further studies

considering this limitation are necessary. The lack of precision and reliability associated with self-reported questionnaires, along with the potential distortion of certain variables, such as perceived health, due to the pandemic situation, are other limitations to consider.

As strengths, we must highlight that, to our knowledge, we have not found similar studies to this one in a representative sample of the Spanish population of individuals with depression. Additionally, the multivariate statistical approach using bootstrapping techniques provides results on the conditional effects of the predictor variable at different levels, which are highly useful for determining the threshold at which significance is reached.

Implications for practice

Further studies are needed to confirm our findings. Future updates of national and European health surveys could be used for comparisons.

Additionally, studies that address physical activity and mental health from the perspective of psychiatric nurses are necessary. The analysis with gender differentiation, promoting gender-specific adapted practices, considering the age and personal circumstances of the patient, appropriate exercise prescription, as well as its evaluation and follow-up, are areas where specialist nurses need to delve deeper to enhance the quality of care.

The quality of care will result in the quality of the health-care system and, consequently, will impact society as a whole.

Conclusions

Gender differences exist among individuals with depression, as well as differences between those who experienced a crisis in the past 12 months and those who did not. Physical activity moderates the relationship between experiencing a crisis and experiencing difficulty in performing light household activities. Specifically, individuals who engage in occasional physical activity have less difficulty in performing daily household activities compared to those who do not engage in physical activities. The moderation analysis conducted specifically on women yielded a trend toward significance.

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