RESEARCH ARTICLE

Sex differences in social support perceived by polymedicated older adults with multimorbidity. MULTIPAP study

Cristina M. Lozano-Hernández[1,2,3,4]*, **Juan Antonio López-Rodríguez**[1,3,4,5,6], **Milagros Rico-Blázquez**[1,3,7], **Amaia Calderón-Larrañaga**[3,8,9,10], **Francisca Leiva-Fernández**[3,11,12], **Alexandra Prados-Torres**[3,10], **Isabel del Cura-González**[1,3,5], **MULTIPAP GROUP**¶

1 Research Unit, Primary Health Care Management, Madrid, Spain, 2 Interuniversity Doctoral Program in Epidemiology and Public Health, Rey Juan Carlos University, Alcorcon (Madrid), Spain, 3 Research Network on Chronicity, Primary Care and Health Promotion -RICAPPS-(RICORS), Madrid, Spain, 4 Biosanitary Research and Innovation Foundation of Primary Care (FIIBAP), Madrid, Spain, 5 Department of Medical Specialties and Public Health, Faculty of Health Sciences Rey Juan Carlos University, Madrid, Spain, 6 General Ricardos Primary Health Care Centre, Madrid, Spain, 7 Department of Nursing, Faculty of Nursing, Physiotherapy and Podiatry of the Complutense University of Madrid, Madrid, Spain, 8 Joint Action on Chronic Diseases (JA-CHRODIS) European Commission, Brussels, Belgium, 9 Department of Neurobiology, Aging Research Centre, Care Sciences and Society, Karolinska Institute & Stockholm University, Stockholm, Sweden, 10 EpiChron Research Group on Chronic Diseases, Aragon Health Sciences Institute, Miguel Servet University Hospital, Zaragoza, Spain, 11 Multiprofessional Teaching Unit for Family and Community Care Primary Care District Málaga-Guadalhorce, Málaga, Spain, 12 Biomedical Research Institute of Malaga-IBIMA, Andalusian Health Service, Málaga, Spain

¶ Membership of the MULTIPAP GROUP is provided in the Acknowledgments.
* cristinamaria.lozano@salud.madrid.org

Abstract

The beneficial effects of social support on morbidity, mortality, and quality of life are well known. Using the baseline data of the MULTIPAP study (n = 593), an observational, descriptive, cross-sectional study was carried out that analyzed the sex differences in the social support perceived by polymedicated adults aged 65 to 74 years with multimorbidity. The main outcome variable was social support measured through the Duke–UNC-11 Functional Social Support (DUFSS) questionnaire in its two dimensions (confident support and affective support). For both sexes, the perception of functional social support was correlated with being married or partnered and having a higher health-related quality of life utility index. In women, it was correlated with a higher level of education, living alone, and treatment adherence, and in men with higher monthly income, prescribed drugs and fewer diagnosed diseases.

Introduction

Sociodemographic, environmental, and psychosocial factors can increase the probability of developing health problems [1]. Psychosocial factors such as lack of social support and loneliness have been associated with a higher mortality rate of older adults. In this population group, larger social networks are associated with up to 50% higher probability of survival [2].

Although it is not known exactly how social support affects health status, it has both direct and indirect influences. On the one hand, it seems to influence stress and affective changes through the hormonal system and, on the other hand, in behavior, conditioning people's lifestyles [3, 4]. Certain mental health conditions are related to a low perceived social support by the individual, such as anxiety disorders and depression [5, 6]. Likewise, having lower adherence to prescribed treatment and poor health habits has been directly related to having low social support [7–9].

The conceptualization and measurement of social support is a subject of controversy among experts. Not all authors agree on the identification of its dimensions. Norbeck et al. [10] state that the dimensions of social support are so highly correlated that they are difficult to distinguish. Broadly speaking, social support can encompass two dimensions. First, the structural dimension, also called the social network, evaluates the number of links an individual has to others and their interconnections, taking into account the size, frequency of contacts, composition, density, kinship, homogeneity, and strength [11]. Authors such as Hughes et al. and Umberson et al. [12, 13] have suggested that marriage positively influences the healthy behaviors of the individual and therefore their health status. Second, the functional dimension corresponds to the perception of available support flowing through the links of the social network. Dimatteo et al. and Li et al. [7, 14] showed that the network of family and close friends offers more useful social support for the individual than the support of circumstantial friends and acquaintances. One of the most widely used instruments to study perceived functional social support is the Duke-Unk-11, Functional Social Support questionnaire (DUFSS) developed by Broadhead et al. [15]. It originally consisted of 14 items that Broadhead reduced to 11 items in its first validation, and after factor analysis the two-dimensionality of the questionnaire was confirmed. It was identified that on the one hand it measures "confidential support" (the possibility of having people to communicate with) and on the other hand it measures "affective support" (demonstrations of love, affection and empathy).

There are important sex differences in social support and in how women and men perceive it due to sex roles. Traditionally, in men, stereotypes of independence, reflection, aggressiveness, stability, strength, and competitiveness have been emphasized, them being the figure in charge of the defense, production, and economic support of the family, while in women, the stereotypes have been dependency, emotionality, sweetness, instability, weakness, and prudence, them being the family figure linked to care, reproduction, and raising children [16, 17]. According to Cable et al. [18], men report receiving more support from their partners, who are their main source of social support, affirming that marriage has a beneficial effect on psychological well-being and reduces their risk of mortality. Kaplan et al. and Walen et al. [19, 20] have seen that women, on the contrary, more strongly value the support received from their social network of friends, family, and coworkers, resorting to sources outside their partner more frequently than men do [21, 22].

Studies by Berkman and Chen suggest that the relationship between social support and health status is stronger in women [23, 24]. Over their lifetime, women have more comorbidities, multimorbidity, and polymedication and tend to report a lower health-related quality of life (HRQoL) than men of the same age, despite having a lower mortality rate and higher life expectancy [25–28]. Precisely due to their longevity, it has been seen that when women reach a certain age, they have less structural social support than men in the same situation, more often finding themselves living alone [29–32].

The study of the impact of social support, and potential sex differences, in patients with chronic conditions has focused mainly on isolated diseases. Chronicity and longevity tend to generate a need for complex care due to two converging situations in older individuals: multimorbidity, defined as two or more concurrent chronic medical conditions (the threshold of three being more specific for identifying patients with complex health needs) [33], and polypharmacy, defined as the simultaneous consumption of five or more drugs by the same person

[34, 35]. The mean number of chronic problems in the in young senior patients (65–74 years) is estimated to be 2.8 [33, 36, 37], being an understudied age group with an important potential for early intervention.

The main aim of this study is to analyze sex differences in perceived (i.e. functional) social support by polymedicated old adults 65 to 74 years with multimorbidity.

Materials and methods

An observational, descriptive, cross-sectional study was conducted with an analytical approach using the baseline data of the MULTIPAP study [38]. This intervention study was conducted in 38 health centers in the regions of Andalusia, Aragon, and Madrid (Spain). Patients aged 65–74 years with multimorbidity ($\geq$3 diseases) and polymedication ($\geq$5 different drugs during at least the last 3 months) who had visited their family doctor at least once in the past year and provided written informed consent to participate in the MULTIPAP study [38] were included. Patients residing in nursing homes, with severe mental illness, or with a life expectancy of less than 12 months were excluded. Those patients who met the inclusion criteria were selected by cluster randomised sampling during visits with the 117 participating professionals; five patients per family doctor were enrolled.

The data were collected by previously trained professionals through an interview at the practice. Sociodemographic variables were collected: sex, age, level of education (below primary education, completed primary education, high school, or higher), and professional occupation according to the skill level required by each job through the ISCO-08 [39] (low, medium, or high level). The social class of the household was measured through the CNO-11 [40] (grouped from lowest to highest as VI, V, and I-IV) and monthly household income ($\leq$1050 €/month, 1051–2250 €/month, or $\geq$2251 €/month). The following clinical variables were collected: number of chronic conditions, number of drugs prescribed, diagnosis of depressive disorder and/or anxiety state or disorder, self-reported treatment adherence through the four-item Morisky–Green–Levine Medication Evaluation Questionnaire (MGL MAQ) (0.61 Cronbach's alpha) [41], and HRQoL measured by the EQ-5D-5L [42]. The validated version of the EQ-5D-5L questionnaire for the Spanish population was used [43], which consists of two parts. The first part consists of five questions related to mobility, self-care, daily activities, pain/discomfort, and anxiety/depression. Each one is scored from 1 to 5 points, and from these five questions, a single weighted score is obtained, the Utility Index (EQ-5D-5L Utilities). The scoring for this scale ranges from full health, with a value of 1, to death, with a value of 0, although negative values are allowed. To calculate this index, the algorithm proposed for Spain was used [44]. The second part is a visual analog scale (EQ-5D-5L VAS) that ranges from 0 (worst state) to 100 (best possible health state).

Structural social support was measured through marital status and number of cohabitants in the home. To explore the functional social support, a patient-reported measure was used, namely, the Duke UNC-11 Functional Social Support (DUFSS) questionnaire, which offers a total functional support score and two additional scores referring to the dimensions of confident and affective support [45]. We used the 11-item version with Likert responses of 1 ("much less than I would like") through 5 ("as much as I would like") [46]. The DUFSS questionnaire has been validated in different populations, showing differences in the distribution of the items that make up each of its dimensions. For our study, we chose the validation performed in a noninstitutionalized Spanish population over 65 years of age by Ayala et al. with 0.95 Cronbach's alpha [47]. Its factorial analysis groups items 4, 5, 6, 7, 8, 10, and 11 into the dimension of "confident" support, with a total score of 35, and items 1, 2, 3, and 9, into the dimension of "affective" support, with a total score of 20.

Analytic plan

The characteristics of study participants and of the social support components were described as frequencies and percentages for qualitative variables and as means ± standard deviations (SD) (normally distributed) or medians and interquartile ranges (IQR) (nonnormally distributed) for quantitative variables. To analyze the associations between the different dimensions of social support and sex, Pearson's chi-squared test was used for qualitative variables and Student's t-test for quantitative variables. Confidence intervals were estimated at 95%.

To study the factors associated with greater functional social support, an explanatory linear regression model was constructed for women and men separately. The dependent variable was functional social support measured through the total score of the DUFSS questionnaire. The independent variables were those that showed statistical significance in the bivariate analysis or were considered relevant in the conceptual framework of the study. Since patients were recruited grouped by clusters (i.e. their family physician), all the estimations were carried out with robust estimators. The analyses were performed with STATA v.14.

The project was approved by the Clinical Research Ethics Committee of Aragon (CEICA) on September 30, 2015. It was favorably evaluated by the Research Ethics Committee of the Province of Malaga on September 25, 2015 and the Central Research Commission of Primary Care of the Community of Madrid on March 16, 2016.

Results

Of the 593 patients included in the study, 55.8% were women. The mean age of the study population was 69.7 (2.7). Among patients who had not completed their primary studies, the majority were women (64.5% vs. 35.5%, $p < 0.001$). Women were also highly represented among those with lower-skill occupations (83.6% vs. 16.4%, $p < 0.001$) and with the lowest monthly household income (68% vs. 31.8%, $p < 0.001$).

In relation to health status, women had a higher frequency of depressive disorder (82% vs. 18%, $p < 0.001$) and anxiety disorder (77% vs. 23%, $p < 0.001$) than men. No statistically significant difference was found in the number of diagnosed diseases or the number of prescribed drugs. Regarding HRQoL measured by the VAS, women reported a health status 7 points lower than men (69.5 ± 20 vs. 62.5 ± 20.4, $p < 0.001$). Moreover, women more often presented some type of problem in any of the dimensions of HRQoL: mobility (61% vs. 39%, $p = 0.01$); daily activities (73% vs. 27%, $p < 0.001$); pain/discomfort (40.4% vs. 59.6%, $p = 0.001$); and anxiety/depression (29.5% vs. 70.5%, $p < 0.001$). Women had a lower score in utilities than men (0.73 ± 0.2 vs. 0.82 ± 0.2). Table 1 describes the characteristics of the sample according to sex.

Table 1. Characteristics of the sample according to sex.

	Total n (%)	Men n (%)	Women n (%)
	593(100)	**262(44.2)**	**331 (55.8)**
Sociodemographic			
Age m (SD)	69.7(2.7)	69.8(2.6)	69.7(2.7)
Educational level			
Did not complete primary studies	279(47.1)	99(37.8)	180(54.4)
Completed primary studies	196(33.1)	82(31.3)	114(34.4)
Bachelor or higher	118(19.9)	81(30.9)	37(11.2) ***
Occupation skill level			
Level 1	232(39.1)	38(14.5)	194 (58.6) ***
Level 2	249(42)	158 (60.3)	91 (27.5)

(Continued)

Table 1. (Continued)

	Total n (%)	Men n (%)	Women n (%)
	593(100)	**262(44.2)**	**331 (55.8)**
Level 3	80(13.5)	41(15.7)	39(11.8)
Level 4	32(5.4)	25(9.5)	7(2.1)
Social class of the household			
VI	142(24)	58(22.1)	84(25.4)
V	217(36.6)	84(32.1)	133(40.2)
IV-I	234(39.5)	120(45.8)	114(34.4) *
Monthly household income			
< = 1.050 €/month	170(28.7)	54(20.6)	116(35.1)
1.051–2.250 €/month	342(57.7)	160(61.1)	182(54.9)
≥2.251 €/month	59(10)	39(14.9)	20(6.0) ***
NS/NC	22(4)	9(3.4)	13(3.9)
Clinical			
Median number of diseases (IQR)	5(4–7)	5(4–7)	5(4–7)
Depressive disorder	110(18.6)	20(18.2)	90(81.8) ***
Anxiety state or disorder	88(914.8	20(22.7)	68(77.3) ***
Median number of drugs (IQR)	7(6–9)	7(5–9)	7(6–9)
MGL MAQ m (SD)	351(59.2)	155(44.2)	196(55.8)
HRQoL			
EQ5D5 L VAS m (SD)	65.5(20.5)	69.5(20)	62.4(20.5) ***
EQ5D5 L Utilities m (SD)	0.77(0.2)	0.82(0.2)	0.73(0.2) ***
Mobility			
No problems	293 (49.4)	145 (55.3)	148 (44.7) **
Some type of problem	300 (50.6)	117 (44.7)	183 (55.3)
Personal care			
No problems	505 (85.2)	227 (86.6)	278 (84.0)
Some type of problem	88 (14.8)	35 (13.4)	53 (16.0)
Daily activities			
No problems	411 (69.3)	213 (81.3)	198 (59.8)
Some type of problem	182 (30.7)	49 (18.7)	133 (40.2) ***
Pain/discomfort			
No problems	145 (24.5)	81 (30.9)	64 (19.3)
Some type of problem	448 (75.6)	181 (69.1)	267 (80.7) **
Anxiety/depression			
No problems	308 (51.9)	178 (67.9)	130 (39.3) ***
Some type of problem	285 (48.1)	84 (32.1)	201(60.7)

Note: m = median; SD = standard deviation; IQR = interquartile range.

* $p < .05$

** $p < .01$

*** $p < .001$

Of the 593 patients, 106 (17.9%) lived alone, of whom 79.3% were women. Men lived in households with three or more cohabitants more frequently than women (59.7% vs. 40.3%, p = 0.009). Sixteen percent of the patients were widowers, and 89.4% of them were women. The mean score of functional social support was 43.7 ± 8.8, with women scoring 2 points lower than men (p = 0.004). Table 2 describes the components of social support by sex. The

Table 2. Components of social support by sex.

	Total n (%)	Male n (%)	Female n (%)
	593(100)	262(44.2)	331 (55.8)
Structural Social Support			
Living alone	106(17.9)	22(8.4)	84(25.4) ***
Living with			
2 people	368(75.6)	169(70.4)	199(80.6) **
≥ 3 people	119(24.4)	71(29.6)	48(19.4)
Marital status			
Single	23(3.9)	11(4.2)	12(3.6)
Married	447(75.4)	228(87.0)	219(66.2)
Separated	29(4.9)	13(5.0)	16(4.8)
Widower	94(15.9)	10(3.8)	84(25.4) ***
Functional Social Support (DUFSS)			
Total score, m (SD)	43.7(8.8)	44.9(8.3)	42.8(9) **
1st tertile (low)	190(32)	70(26.7)	120(36.3)
2nd tertile (medium)	191(32.2)	88(33.6)	103(31.1) *
3rd tertile (high)	212(35.8)	104(39.7)	108(32.6)
"Confident" score, m (SD)	29.5(5.9)	30.2(5.7)	28.9(6.1) **
"Affective" score, m (SD)	14.2(3.7)	14.7(3.5)	13.9(3.7) *

Note: m = mean; SD = standard deviation; IQR = interquartile range.

* p < .05

** p < .01

*** p < .001

difference in score between the dimensions of functional support for men and women was 1.3 points in the "confident" support dimension and 0.8 points in the "affective" dimension, both scores being lower in women. Table 3 describes the distribution of the DUFSS questionnaire scores by sex. Significant differences by sex appeared regarding the category "Much less/less than I would like" in the items: *I get chances to talk to someone about problems at work or with my housework* (7.3% vs. 14.2%, p = 0.008); *I get chances to talk about money matters* (7.6% vs. 13.9%, p = 0.03); *I get help when I´m sick in bed* (5.7% vs. 13.6%, p = 0.002); *I get help around the house* (29.8% vs. 37.8%, p = 0.04); *I get praise for a good job* (16.0% vs. 25.1%, p = 0.007).

For both sexes, the variable most strongly associated with functional social support was the one referring to utilities in the HRQoL. Table 4 shows the factors associated with functional social support in women and men. For every 1-point increase in the utility score, functional social support increased 11.5 points (95% CI 7.09; 15.85) in women and 9.4 points (95% CI 3.18; 15.59) in men. Being married or partnered was also associated to perceived social support in both women and men, but more strongly in the latter (4.2 points, 95% CI 1.26; 7.07 vs. 3.3 points, 95% CI 0.29; 6.24). The rest of the variables associated to functional social support were different for each sex. In women, the functional social support score increased by 5 points (95% CI 1.91;7.94) in those who had completed high school or higher education; 2 points (95% CI 0.08;3.78) in those adhering to the prescribed treatment; and 5.6 points (95% CI 2.42;8.83) in those who lived alone. In men, the functional social support score increased by 3 points (95% CI 0.74; 5.70) in those with a household income between 1.051–2.250 €/month and 0.5 points (95% CI 0.03; 0.90) for each prescribed drug. Fig 1 shows the magnitude of the association for each of the variables that the final model yielded for both sexes.

Table 3. DUFSS questionnaire score by sex.

	Total n (%) 593(100)	Male n (%) 262(44.2)	Woman n (%) 331 (55.8)	p
Confident Dimension				
Item 4. *I get people who care what happens to me*				
Much less/less than I'd like	49(8.3)	21(8.0)	28(8.5)	
Neither a lot nor little/almost as much as I would like	544(91.7)	241(92)	303(91.5)	
Item 5. *I get love and affection*				
Much less/less than I would like	59(10)	21(8.0)	38(11.5)	
Neither a lot nor little/almost as much as I would like	534(90.1)	241(92)	293(88.5)	
Item 6. *I get chances to talk to someone about problems at work or with my housework*				
Much less/less than I would like	66(11.13)	19(7.3)	47(14.2)	**
Neither a lot nor little/almost as much as I would like	527(88.9)	243(92.8)	284(85.8)	
Item 7. *I get chances to talk to someone I trust about my personal and family problems*				
Much less/less than I would like	70(11.8)	25(9.5)	45(13.9)	
Neither a lot nor little/almost as much as I would like	523(88.2)	237(90.5)	286(86.4)	
Item 8. *I get chances to talk about money matters*				
Much less/less than I would like	66(11.1)	20(7.6)	46(13.9)	*
Neither a lot nor little/almost as much as I would like	527(88.9)	242(92.4)	285(86.1)	
Item 10. *I get useful advice about important things in life*				
Much less/less than I would like	61(10.3)	25(9.5)	36(10.9)	
Neither a lot nor little/almost as much as I would like	532(89.7)	237(90.5)	295(89.1)	
Item 11. *I get help when I´m sick in bed*				
Much less/less than I would like	60(10.1)	15(5.7)	45(13.6)	**
Neither a lot nor little/almost as much as I would like	533(89.9)	247(94.3)	286(86.4)	
Affective Dimension				
Item 1. *I get visits with friends and relatives*				
Much less/less than I would like	140(23.6)	55(21)	85(25.7)	
Neither a lot nor little/almost as much as I would like	453(79)	207(45.7)	246(74.3)	
Item 2. *I get help around the house*				
Much less/less than I would like	203(34.2)	78(29.8)	125(37.8)	**
Neither a lot nor little/almost as much as I would like	390(65.8)	184(70.2)	206(62.2)	
Item 3. *I get praise for a good job*				
Much less/less than I would like	125(21.1)	42(16.0)	83(25.1)	**
Neither a lot nor little/almost/as much as I would like	468(78.9)	220(48)	248(74.9)	
Item 9. *I get invitations to go out and do things with other people*				
Much less/less than I would like	116(19.6)	48(18.3)	68(20.5)	
Neither a lot nor little/almost as much as I would like	477(80.4)	214(81.7)	263(79.5)	

Note

* p < .05

** p < .01

*** p < .001

Discussion and conclusions

There are important sex differences in the social support perceived by polymedicated young-old patients with multimorbidity. These differences must be interpreted bearing in mind the age range studied, i.e. those born in Spain in the 1940s and 1950s, when social differences between men and women were still quite marked [48].

Table 4. Factors associated with functional social support in women and men.

Women		
	Coef. (95% CI)	**p value**
Educational level		
Completed primary studies	2.33(0.34;4.32)	*0.022*
Bachelor or higher	4.92(1.91;7.94)	*0.001*
Adherence, compliance (Morisky-Green)	1.93(0.08;3.78)	*0.041*
Utility index	11.47(7.09;15.85)	*0.000*
Live alone	5.63(2.42;8.83)	*0.001*
Married or partnered	3.27(0.29;6.24)	*0.031*
R^2		*0.1604*
Men		
	Coef. (95% CI)	**p value**
Monthly household income		
1.051–2.250€/month	3.22(0.74;5.70)	*0.011*
≥2.251€/month	2.30(-1.04;5.65)	*0.176*
Number of diseases	-0.42(-0.87;0.30)	0.067
Number of drugs	0.47(0.03;0.90)	*0.036*
Utility index	9.38(3.18;15.59)	*0.003*
Married or partnered	4.16(1.26;7.07)	*0.005*
R^2		*0.1108*

https://doi.org/10.1371/journal.pone.0268218.t004

The functional social support score reported by women was lower than that reported by men, coinciding with previous studies conducted in similarly aged populations from Spain and Brazil [21, 43]. Being the main source of care and support for others can hinder women's role as a recipient of support from others, which could explain why women, unlike men, have stated that they would like to be better listened to about their problems, hear more praise when they do something well, and get more help when they are sick [29].

The lower social support score perceived by women could also be explained by the fact that social networks are importantly influenced by sex inequalities within social structures. Women with worse educational and occupational level tend to perceive lower social support [25, 45]. In contrast, in men, the perception of social support seems to be related to their income level. Accordingly, a German study found that living in the most socially disadvantaged municipalities was associated with low social support in men, but not in women, which suggests that for men the perception of social support is related to their success in their role as household economic providers, represented in our study by income [49].

For both sexes, being married or partnered increased the perception of social support, observing a stronger association in the case of men, as described by other authors who have found that men's main sources of support are their partners [50]. The increasing feminization of old age has meant that widowhood is a mostly female experience [51]. More and more widowed men and women are living alone, but women do so more often than men, who usually live with someone [52]. Women, when widowed, may feel very supported by social networks that, until then, had not been their main source of support, such as children, other family members, and friends, and may thus perceive greater social support in this new situation [18].

Perceived social support was directly correlated with the utility index of HRQoL in both sexes. In women this relationship was most intense, and they reported worse scores in all dimensions of HRQoL, along the lines of previous research [53]. Different authors have linked
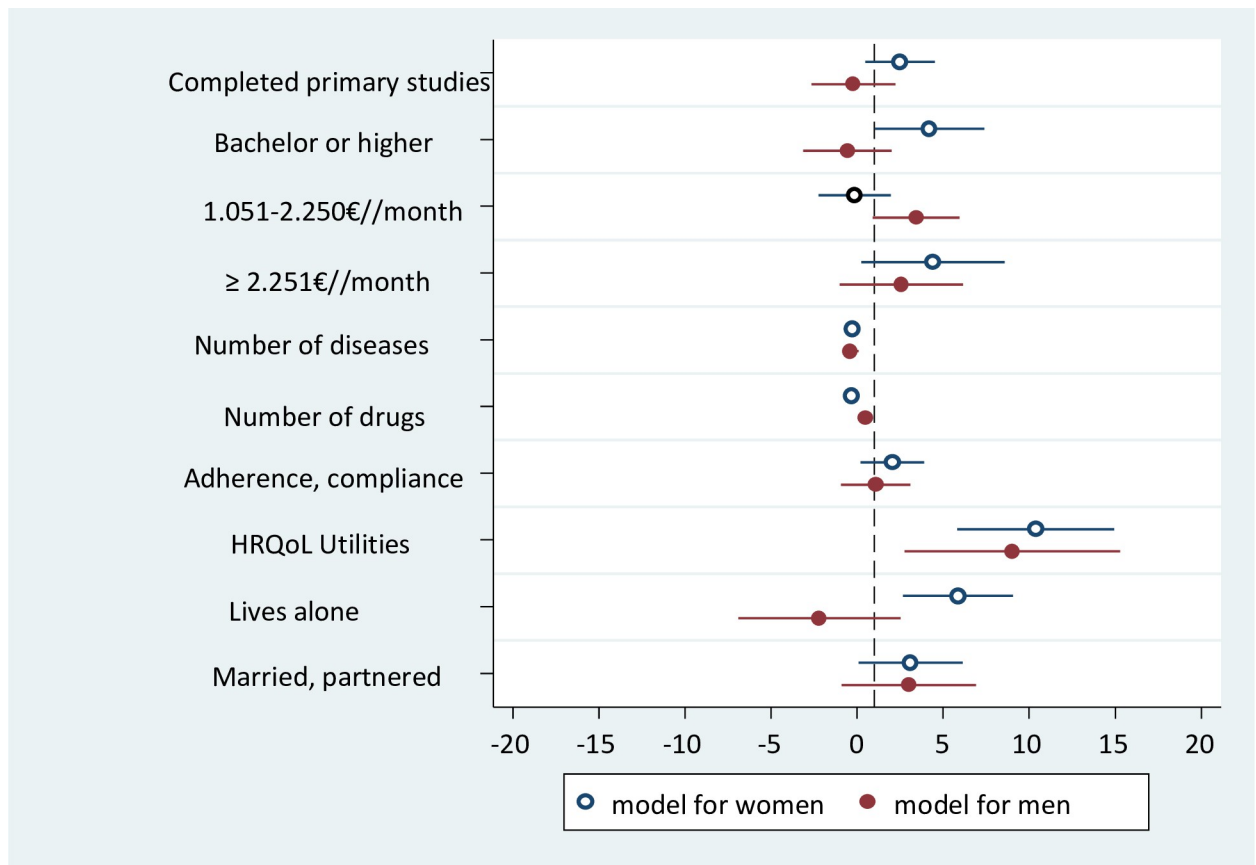
Fig 1. Differences by sex found in the final model.

https://doi.org/10.1371/journal.pone.0268218.g001

family demands with a worse quality-of-life score, especially in women with lower socioeconomic status [54].

Regarding polypharmacy, in men, better perceived social support was associated with a higher number of prescribed drugs and, in women with better adherence to treatment. This association could be explained by the effectiveness of the treatment, which may improve their health status and symptoms, allowing them to carry out social activities. In the case of women, such an association might be explained by the acceptance and social recognition that they can experience when performing self-care in a socially accepted way [29].

Perceived support is a multidimensional construct subject to different interpretations by experts in the field, for which a consensus is not reached with respect to the dimensions that compose it or how to measure it. Different validations have been carried out on the questionnaire used in this study (DUFSS) in very specific populations, such as caregivers [55], mental health patients [56], or socioeconomically disadvantaged people, and they were mostly women [11, 41]. In our study, we chose to use the most recent validation performed by Ayala et al. [47], who obtained a Cronbach's alpha of 0.94 in noninstitutionalized people aged 60 or over; their population was similar to ours and allows better comparisons with our results.

Limitations and strengths

The study of social support presents difficulties in relation to conceptualisation and measurement. In this study, structural social support has been studied through a proxy of the social

network such as marital status and the number of cohabitants in the household. This is undoubtedly a limitation, since the structural perspective studies social networks, including all the individual's contacts and providing information on their dimensions, and not only the variables available in this research. However, despite this limitation, this proxy allows us to cover part of the structural social support, following the recommendations of the authors who state that it is more appropriate to study both types of support, functional and structural.

The data used in this study are the baseline data from a randomised clinical trial, MULTI-PAP STUDY [38]. It is a pragmatic cluster randomised controlled clinical trial with 12 months follow-up. The unit of randomisation was the family doctor and the unit of analysis was the patient. Although this was a cross-sectional study, its external validity was increased through systematic random sampling drawn from a representative sampling frame. The sample was drawn from a heterogeneous sample that is representative of the general multimorbid and polymedicated population... This was achieved by selecting patients from the health centers, by their family physicians, under clinical practice conditions, giving a pragmatic outlook to the study. The restriction of the sample to the age group of young older adults aged 65 to 74 years makes the sample size difficult, but, at the same time, offers greater knowledge about this group, which is rarely studied on its own but increasingly prominent in our society.

Important sex differences exist in the social support perceived by older multimorbid adults, which should be considered in future public health and health promotion interventions.

Acknowledgments

Clinical Investigators in Primary Healthcare Centres (PHC) MULTIPAP GROUP:

Author Contributions

Conceptualization: Cristina M. Lozano-Hernández, Milagros Rico-Blázquez, Amaia Calderón-Larrañaga, Francisca Leiva-Fernández.

Data curation: Cristina M. Lozano-Hernández, Juan Antonio López-Rodríguez.

Formal analysis: Cristina M. Lozano-Hernández, Isabel del Cura-González.

Funding acquisition: Cristina M. Lozano-Hernández, Alexandra Prados-Torres, Isabel del Cura-González.

Investigation: Cristina M. Lozano-Hernández, Francisca Leiva-Fernández, Alexandra Prados-Torres, Isabel del Cura-González.

Methodology: Cristina M. Lozano-Hernández, Juan Antonio López-Rodríguez, Milagros Rico-Blázquez, Isabel del Cura-González.

Resources: Cristina M. Lozano-Hernández, Isabel del Cura-González.

Software: Cristina M. Lozano-Hernández, Juan Antonio López-Rodríguez.

Supervision: Isabel del Cura-González.

Validation: Milagros Rico-Blázquez, Amaia Calderón-Larrañaga, Alexandra Prados-Torres, Isabel del Cura-González.

Visualization: Amaia Calderón-Larrañaga, Francisca Leiva-Fernández, Alexandra Prados-Torres.

Writing – original draft: Cristina M. Lozano-Hernández.

Writing – review & editing: Juan Antonio López-Rodríguez, Milagros Rico-Blázquez, Amaia Calderón-Larrañaga, Francisca Leiva-Fernández, Alexandra Prados-Torres, Isabel del Cura-González.

References

1. Marengoni A, Angleman S, Melis R, Mangialasche F, Karp A, Garmen A, et al. Aging with multimorbidity: A systematic review of the literature. Ageing Research Reviews. 2011; 10: 430–439. https://doi.org/10.1016/j.arr.2011.03.003 PMID: 21402176

2. Holt-Lunstad J, Smith TB, Baker M, Harris T, Stephenson D. Loneliness and Social Isolation as Risk Factors for Mortality: A Meta-Analytic Review. Perspectives on Psychological Science. 2015; 10: 227–237. https://doi.org/10.1177/1745691614568352 PMID: 25910392

3. Gallant MP. The influence of social support on chronic illness self-management: A review and directions for research. Health Education and Behavior. 2003; 30: 170–195. https://doi.org/10.1177/1090198102251030 PMID: 12693522

4. Cohen S. Psychosocial models of the role of social support in the etiology of physical disease. Health Psychol. 1988; 7: 269–97. Available: http://www.ncbi.nlm.nih.gov/pubmed/3289916 https://doi.org/10.1037//0278-6133.7.3.269 PMID: 3289916

5. Instituto Nacional de Estadistica. Nota Técnica Encuesta Nacional de Salud. España 2017 Principales resultados. 2017. Available: https://www.mscbs.gob.es/estadEstudios/estadisticas/encuestaNacional/encuestaNac2017/ENSE2017_notatecnica.pdf

6. Ahn S, Kim S, Zhang H. Changes in Depressive Symptoms among Older Adults with Multiple Chronic Conditions: Role of Positive and Negative Social Support. International Journal of Environmental Research and Public Health. 2016; 14: 16. https://doi.org/10.3390/ijerph14010016 PMID: 28035968

7. DiMatteo MR. Social Support and Patient Adherence to Medical Treatment: A Meta-Analysis. Health Psychology. 2004; 23: 207–218. https://doi.org/10.1037/0278-6133.23.2.207 PMID: 15008666

8. Johnson VR, Jacobson KL, Gazmararian JA, Blake SC. Does social support help limited-literacy patients with medication adherence?. A mixed methods study of patients in the Pharmacy Intervention for Limited Literacy (PILL) Study. Patient Education and Counseling. 2010; 79: 14–24. https://doi.org/10.1016/j.pec.2009.07.002 PMID: 19647967

9. Lozano-Hernández CM, López-Rodríguez JA, Leiva-Fernández F, Calderón-Larrañaga A, Barrio-Cortes J, Gimeno-Feliu LA, et al. Social support, social context and nonadherence to treatment in young senior patients with multimorbidity and polypharmacy followed-up in primary care. MULTIPAP study. PLoS ONE. 2020; 15: 1–15. https://doi.org/10.1371/journal.pone.0235148 PMID: 32579616

10. Norbeck J S, A M Lindsey VLC. The development of an instrument to measure social support—PubMed. Nurs Res. 1981;Sep-Oct: 264–9. PMID: 7027185

11. de la Revilla Ahumada L, Bailón E, de Dios Luna J, Delgado A, Prados MA, Fleitas L. [Validation of a functional social support scale for use in the family doctor's office]. Aten Primaria. 1991; 8: 688–92. PMID: 16989055

12. Hughes ME, Waite LJ. Marital biography and health at mid-life. Journal of Health and Social Behavior. 2009; 50: 344–358. https://doi.org/10.1177/002214650905000307 PMID: 19711810

13. Umberson D, Karas Montez J. Social Relationships and Health: A Flashpoint for Health Policy. Journal of Health and Social Behavior. 2010; 51: S54–S66. https://doi.org/10.1177/0022146510383501 PMID: 20943583

14. Li H, Ji Y, Chen T. The roles of different sources of social support on emotional well-being among Chinese elderly. PLoS ONE. 2014; 9: 1–8. https://doi.org/10.1371/journal.pone.0090051 PMID: 24594546

15. Broadhead WE, Gehlbach SH, de Gruy F v, Kaplan BH. The Duke-UNC Functional Social Support Questionnaire. Measurement of social support in family medicine patients. Med Care. 1988; 26: 709–23. Available: http://www.ncbi.nlm.nih.gov/pubmed/3393031 https://doi.org/10.1097/00005650-198807000-00006 PMID: 3393031

16. Vaux A. Variations in Social Support Associated with Gender, Ethnicity, and Age. Journal of Social Issues. 1985; 41: 89–110. https://doi.org/10.1111/j.1540-4560.1985.tb01118.x

17. Christov-Moore L, Simpson EA, Coudé G, Grigaityte K, Iacoboni M, Ferrari PF. Empathy: Gender effects in brain and behavior. Neuroscience & Biobehavioral Reviews. 2014; 46: 604–627. https://doi.org/10.1016/j.neubiorev.2014.09.001 PMID: 25236781

18. Cable N, Bartley M, Chandola T, Sacker A. Friends are equally important to men and women, but family matters more for men's well-being. Journal of Epidemiology and Community Health. 2013; 67: 166–171. https://doi.org/10.1136/jech-2012-201113 PMID: 22918897

19. Kaplan RM, Hartwell SL. Differential effects of social support and social network on physiological and social outcomes in men and women with type II diabetes mellitus. Health Psychol. 1987; 6: 387–98. Available: http://www.ncbi.nlm.nih.gov/pubmed/3678167 https://doi.org/10.1037//0278-6133.6.5.387 PMID: 3678167

20. Walen HR, Lachman ME. Social Support and Strain from Partner, Family, and Friends: Costs and Benefits for Men and Women in Adulthood. Journal of Social and Personal Relationships. 2000; 17: 5–30. https://doi.org/10.1177/0265407500171001

21. Fuhrer R, Stansfeld SA. How gender affects patterns of social relations and their impact on health: a comparison of one or multiple sources of support from "close persons". Soc Sci Med. 2002; 54: 811–25. Available: http://www.ncbi.nlm.nih.gov/pubmed/11999495 https://doi.org/10.1016/s0277-9536(01)00111-3 PMID: 11999495

22. Caetano S, Silva C, Vettore M. Gender differences in the association of perceived social support and social network with self-rated health status among older adults: a population-based study in Brazil. BMC Geriatrics. 2013; 13: 122. https://doi.org/10.1186/1471-2318-13-122 PMID: 24229389

23. Berkman LF, Soh Y. Social Determinants of Health at Older Ages: The Long Arm of Early and Middle Adulthood. Perspectives in Biology and Medicine. 2017; 60: 595–606. https://doi.org/10.1353/pbm.2017.0045 PMID: 29576566

24. Chen WCW, Baily JE, Corselli M, Diaz M, Sun B, Xiang G, et al. HHS Public Access. 2016; 33: 557–573. https://doi.org/10.1002/stem.1868.Human

25. Abad-Díez JM, Calderón-Larrañaga A, Poncel-Falcó A, Poblador-Plou B, Calderón-Meza JM, Sicras-Mainar A, et al. Age and gender differences in the prevalence and patterns of multimorbidity in the older population. BMC Geriatrics. 2014; 14. https://doi.org/10.1186/1471-2318-14-75 PMID: 24934411

26. Guallar-Castillón P, Redondo Sendino Á, Banegas JR, López-García E, Rodríguez-Artalejo F. Differences in quality of life between women and men in the older population of Spain. Social Science & Medicine. 2005; 60: 1229–1240. https://doi.org/10.1016/j.socscimed.2004.07.003 PMID: 15626520

27. Benyamini Y, Blumstein T, Lusky A, Modan B. Gender differences in the self-rated health-mortality association: Is it poor self-rated health that predicts mortality or excellent self-rated health that predicts survival? Gerontologist. 2003; 43: 396–405. https://doi.org/10.1093/geront/43.3.396 PMID: 12810904

28. Kobayasi R, Tempski PZ, Arantes-Costa FM, Martins MA. Gender differences in the perception of quality of life during internal medicine training: A qualitative and quantitative analysis. BMC Medical Education. 2018; 18: 1–14. https://doi.org/10.1186/s12909-018-1378-9

29. Mondesir FL, Carson AP, Durant RW, Lewis MW, Safford MM, Levitan EB. Association of functional and structural social support with medication adherence among individuals treated for coronary heart disease risk factors: Findings from the REasons for Geographic and Racial Differences in Stroke (REGARDS) study. Plos One. 2018; 13: e0198578. https://doi.org/10.1371/journal.pone.0198578 PMID: 29949589

30. Rueda S. Health Inequalities among Older Adults in Spain: The Importance of Gender, the Socioeconomic Development of the Region of Residence, and Social Support. Women's Health Issues. 2012; 22: e483–e490. https://doi.org/10.1016/j.whi.2012.07.001 PMID: 22944902

31. Fernández Vargas AM BZMLFMF. Salud autopercibida, apoyo social y familiar de los pacientes con enfermedad pulmonar obstructiva crónica. Medifarm. 2001; 11: 530–539.

32. Bird C., & Rieker P. Gender and Health: The Effects of Constrained Choices and Social Policies. Cambridge: Cambridge University Press; 2012. https://doi.org/10.1017/CBO9780511807305

33. Prados-Torres A, Poblador-Plou B, Calderón-Larrañaga A, Gimeno-Feliu LA, González-Rubio F, Poncel-Falcó A, et al. Multimorbidity patterns in primary care: Interactions among chronic diseases using factor analysis. PLoS ONE. 2012; 7. https://doi.org/10.1371/journal.pone.0032190 PMID: 22393389

34. Blasco Patiño F, Martinez López de Letona J, Villares P, Jiménez A, Blasco-Patiño F, Martínez-López de Letona J, et al. El paciente anciano polimedicado: efectos sobre su salud y sobre el sistema sanitario. Información Terapéutica del Sistema Nacional de Salud. 2005; 29: 152–162.

35. Wallace E, Salisbury C, Guthrie B, Lewis C, Fahey T, Smith SM. Managing patients with multimorbidity in primary care. BMJ (Online). BMJ Publishing Group; 2015. https://doi.org/10.1136/bmj.h176 PMID: 25646760

36. Violan C, Foguet-Boreu Q, Flores-Mateo G, Salisbury C, Blom J, Freitag M, et al. Prevalence, determinants and patterns of multimorbidity in primary care: a systematic review of observational studies. PLoS One. 2014; 9: e102149. https://doi.org/10.1371/journal.pone.0102149 PMID: 25048354

37. The Academy of Medical Sciences. Multimorbidity: a priority for global health research. 2018; 1–127. https://doi.org/10.1002/14651858.CD008165.pub4

38. Prados-Torres A, del Cura-González I, Prados-Torres D, López-Rodríguez JA, Leiva-Fernández F, Calderón-Larrañaga A, et al. Effectiveness of an intervention for improving drug prescription in primary care patients with multimorbidity and polypharmacy: study protocol of a cluster randomized clinical trial (Multi-PAP project). Implementation Science. 2017; 12: 54. https://doi.org/10.1186/s13012-017-0584-x PMID: 28449721

39. Govering Body of International Labour (ILO). International Standard Classification of Occupations (ISCO-08). International Labour Office. 2012; 1: 615.

40. Domingo-Salvany A, Bacigalupe A, Carrasco JM, Espelt A, Ferrando J, Borrell C. Propuestas de clase social neoweberiana y neomarxista a partir de la Clasificación Nacional de Ocupaciones 2011. Gaceta Sanitaria. 2013; 27: 263–272. https://doi.org/10.1016/j.gaceta.2012.12.009 PMID: 23394892

41. Morisky DE, Green LW, Levine DM. Concurrent and predictive validity of a self-reported measure of medication adherence. Med Care. 1986; 24: 67–74. https://doi.org/10.1097/00005650-198601000-00007 PMID: 3945130

42. Oppe M, Devlin NJ, van Hout B, Krabbe PFM, de Charro F. A program of methodological research to arrive at the new international eq-5d-5l valuation protocol. Value in Health. 2014; 17: 445–453. https://doi.org/10.1016/j.jval.2014.04.002 PMID: 24969006

43. Herdman M, Gudex C, Lloyd a., Janssen M, Kind P, Parkin D, et al. Development and preliminary testing of the new five-level version of EQ-5D (EQ-5D-5L). Quality of Life Research. 2011; 20: 1727–1736. https://doi.org/10.1007/s11136-011-9903-x PMID: 21479777

44. van Hout B, Janssen MF, Feng YS, Kohlmann T, Busschbach J, Golicki D, et al. Interim scoring for the EQ-5D-5L: Mapping the EQ-5D-5L to EQ-5D-3L value sets. Value in Health. 2012; 15: 708–715. https://doi.org/10.1016/j.jval.2012.02.008 PMID: 22867780

45. Bellón JA, Delgado A, Luna J LP. Validez y fiabilidad del cuestionario de apoyo social funcional Duke-UNC-11. Atención Primaria. 1996; 18: 153–63. PMID: 8962994

46. Broadhead WE, Gehlbach SH, de Gruy F V, Kaplan BH, B W.E., G S.H., et al. The Duke-UNC Functional Social Support Questionnaire. Measurement of social support in family medicine patients. Med Care. 1988; 26: 709–723. https://doi.org/10.1097/00005650-198807000-00006 PMID: 3393031

47. Ayala A, Rodríguez-Blázquez C, Frades-Payo B, Forjaz MJ, Martínez-Martín P, Fernández-Mayoralas G, et al. Propiedades psicométricas del Cuestionario de Apoyo Social Funcional y de la Escala de Soledad en adultos mayores no institucionalizados en España. Gaceta Sanitaria. 2012; 26: 317–324. https://doi.org/10.1016/j.gaceta.2011.08.009 PMID: 22265651

48. Pinilla García A. La mujer en la posguerra franquista a través de la Revista Medina (1940–1945). Arenal—Revista de Historia de las Mujeres. 2006; 13: 153–179. https://doi.org/10.30827/arenal.vol13.num1.153–179

49. Mena E, Kroll LE, Maier W, Bolte G. Gender inequalities in the association between area deprivation and perceived social support: a cross-sectional multilevel analysis at the municipality level in Germany. BMJ Open. 2018; 8: e019973. https://doi.org/10.1136/bmjopen-2017-019973 PMID: 29654020

50. Matud P, Carballeira M, López M, Marrero R, Ibáñez I. Apoyo Social Y Salud: Un Analisis De Genero. Salud Mental. 2002; 25: 32–37.

51. Spijker J. Diez años de mejoras en la salud y los hábitos de las generaciones nacidas entre 1945 y 1969 en España. Perspectives Demogràfiques. 2019; 1–4. https://doi.org/10.46710/ced.pd.esp.17

52. López Doblas J. Las Mujeres Viudas en España. Research on Ageing and Social Policy. 2016; 4: 22. https://doi.org/10.17583/rasp.2016.1731

53. Martín-Fernández J, Ariza-Cardiel G, Polentinos-Castro E, Sanz-Cuesta T, Sarria-Santamera A, del Cura-González I. Explaining differences in perceived health-related quality of life: a study within the Spanish population. Gaceta Sanitaria. 2018; 32: 447–453. https://doi.org/10.1016/j.gaceta.2017.05.016 PMID: 28958573

54. Borrell C, Rohlfs I, Artazcoz L, Muntaner C. Desigualdades en salud según la clase social en las mujeres. ¿Cómo influye el tipo de medida de la clase social? Gaceta Sanitaria. 2004; 18: 75–82. https://doi.org/10.1157/13061997 PMID: 15171847

55. Cuéllar-Flores I, Dresch V. Validación del cuestionario de Apoyo Social Funcional Duke-UNK-11 en personas cuidadoras. Ridep · N°. 2012; 34: 89–101.

56. Mas-Expósito L, Amador-Campos JA, Gómez-Benito J, Lalucat-Jo L. Validation of the modified DUKE-UNC Functional Social Support Questionnaire in patients with schizophrenia. Social Psychiatry and Psychiatric Epidemiology. 2012; 48: 1675–1685. https://doi.org/10.1007/s00127-012-0633-3 PMID: 23229203