Social networks and health-related quality of life: a population based study among older adults

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Abstract

Objective. To examine the relationship between components of social networks and health-related quality of life (HRQL) in older adults with and without depressive symptoms. **Material and Methods.** Comparative cross-sectional study with data from the cohort study "Integral Study of Depression", carried out in Mexico City during 2004. The sample was selected through a multi-stage probability design. HRQL was measured with the SF-36. Geriatric Depression Scale (GDS) and the Short Anxiety Screening Test (SAST) determined depressive symptoms and anxiety. T-test and multiple linear regressions were conducted. **Results**. Older adults with depressive symptoms had the lowest scores in all HRQL scales. A larger network of close relatives and friends was associated with better HRQL on several scales. Living alone did not significantly affect HRQL level, in either the study or comparison group. **Conclusions**. A positive association between some components of social networks and good HRQL exists even in older adults with depressive symptoms.

Key words: social support, quality of life, depression, health of the elderly

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Resumen

Objetivo. Examinar la relación entre componentes de redes sociales y calidad de vida relacionada con la salud (CVRS) de adultos mayores con o sin síntomas depresivos. **Material y métodos.** Estudio transversal comparativo con datos de la cohorte "Estudio Integral de Depresión", realizado en la Ciudad de México en 2004. La muestra fue seleccionada por diseño probabilístico multietápico. La CVRS se midió con SF-36, mientras que *Geriatric Depression Scale* y *Short Anxiety Screening Test* determinaron síntomas de depresión y ansiedad. El análisis consistió de prueba T y regresiones lineales múltiples. **Resultados.** Ancianos con síntomas de depresión reportaron puntuaciones más bajas en todas las escalas de CVRS; una red más grande de familiares y amigos se asoció con mejor CVRS en varias escalas. Vivir solo no afectó la CVRS en grupos de estudio y comparación. **Conclusiones.** Existe una asociación positiva de algunos componentes de las redes sociales con la CVRS, incluso en ancianos con síntomas depresivos.

Palabras clave: apoyo social; calidad de vida; depresión; salud del anciano

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Research has thoroughly corroborated the links between social relationships and health.[1,2] The complex causal relation between these phenomena[3] involves material, behavioral, psychological, and physiological pathways; for instance, several studies have demonstrated that the connection between social relationships and health varies over the life course.[4,5]

Thus, as the population of many nations becomes demographically older, and social networks change, new relationships may form between individuals' social worlds and physical health.

Like that of many other nations, the Mexican population is aging. However, this demographic shift is happening twice as fast in Mexico compared to many other countries, quickly increasing both the absolute and relative numbers of older adults in the population.[6] The population of older Mexicans grew by only 1.4% in the last 50 years (1950-2000), but will grow by 17.7% in the next 50 years (2000-2050). In absolute terms this means that in 2050, there will be 166.5 older adults for every 100 children.[7]

This shift is not only a demographic problem, but also a social one, since existing governmental support structures may be unable to meet this older population's health and social support needs. Taking the place of some government services, older adults' social networks may come to play an even greater role in their well-being.

Social networks' forms and impacts on health are culturally specific. In Mexico, family relationships are the most important type of social networks.[8,9] This may become increasingly true as the population gets older and more individuals have been out of the workforce –a significant source of peer relationships– for longer periods of time.[10,11] Despite the obvious and increasing importance of social networks in older Mexicans' health, few studies have addressed this topic. What few exist were conducted in specific sub-populations with specific characteristics, including rural seniors affected by migration to the United States,[12] and the impoverished, ill elderly.[13]

The authors sought to assess the relationship between social networks and health using the concepts of the convoy model and the measured health-related quality of life (HRQL). The convoy model is a way to understand social relationships; the model maps the existence and nature of each strand in the web of social relationships that surround an individual.[14,15]

The authors hypothesize that more extended networks characterized by stronger support lead to greater well-being, while deficient social networks and lack of social support may contribute to poor health.[3,16] This hypothesis is based on findings that impoverished social environments negatively impact health;[17] for instance, Spanish older adults with infrequent social contacts experienced diminished HRQL.[18] The impact of these social networks on health was measured using HRQL, a measurement frequently used to assess health, illness and the impact of medical management from the subject's perspective. HRQL is a subjective concept through which the physical psychological and social dimensions of health are categorized as different areas that are influenced by the individual's experiences, beliefs, expectations and perceptions.[19]

Since depression is a significant public health problem in Mexico and common cause of reduced quality of life in the elderly Mexican population, this study examined the relationship between social networks and HRQL in community dwelling older adults with and without depressive symptoms.[20-22] For this purpose, a group of older adults suffering from depressive symptoms was selected and used for comparison. The objective of this was to understand the relationship between some components of these groups' social networks and their health-related quality of life perception, as well as to identify whether those components and the size of the social network contribute to a greater or lesser extent to this relationship.

Material and Methods

This is a comparative cross-sectional study using data collected during the first phase of a cohort study entitled "Integral study of depression among older adults in Mexico City's Mexican Institute of Social Security (IMSS) Policyholders". IMSS offers healthcare and social security services to roughly half of the Mexican population in Mexico City, (4 166 086 people; 15% of whom are 60 years of age or older). This segment of the population forms the basis of this study's subject group.

The study sample (n= 7 525) is representative of the population of IMSS affiliates 60 years of age and older. Participants were selected through a multi-stage cluster probability design. Included were adults 60 years of age or older who were insured by the IMSS under any of its healthcare schemes, regardless of healthcare utilization. Older adults excluded from the study were: institutionalized individuals; those deceased before the first evaluation; those not found at their home after two visits and multiple notifications; those with false or incorrect addresses, those who declined inclusion, and those who provided incomplete information on key constructs.

The sample of older adults was selected with multistage cluster probability sampling. In the first stage, IMSS Family Medicine Units were the primary sampling units: eight of the 45 Family Units were selected

(two in each of the four regions). A second cluster was comprised of Family Medicine physician consulting offices. Twelve offices were randomly selected from each selected Family Medicine Unit. In a third stage, the population censuses of each selected physician's office were integrated; the sample framework included all subjects with birthdates prior to 1944.

The study was conducted from July to December 2004. Participants were visited and interviewed at their home. After informed consent was obtained, information was gathered by means of a standardized questionnaire, which was specifically designed for the purposes of the study and validated through a pilot test. All information was collected through face-to-face interviews conducted by trained personnel.

The Mexican Institute of Social Security's Institutional Review Board reviewed and approved the research procedures. The confidentiality and anonymity of participants was preserved and no pressure was exerted on the study participants. Respondents having baseline measurements at the threshold of depression and anxiety were included in the study. Finally a nearly equal number of participants without depressive symptoms or anxiety were randomly selected and included in the study.

Measures

Social Networks. To evaluate social networks, their structures were conceptualized by estimating the availability of contacts offering resources within networks and the size of the network. The following variables were used to assess the specific elements of social networks: marital status, living alone, size of network of close relatives, and size of the network of available friends. The scope for measuring these variables covered: 1) marital status [0= married; 1= unmarried]; 2) living alone [0= not living alone; 1= living alone]; 3) size of the network of close relatives was grouped in the following categories: 0= none [reference]; 1= one or two relatives; 2= three or more relatives, and 4) size of the network of available friends, including these categories: 0= none [reference]; 1= one friend; 2= two or more friends.

Health-related Quality of Life (HRQL). Assessment of this variable was based on the concept of health-related quality of life (HRQL) in older adults.[19] The present study used the Medical Outcomes Study' 36-item-Short-Form Health Survey SF-36[23] in its Spanish version, which has been validated for the Mexican population.[24] SF-36 consists of 36 items that measure the HRQL during the four-week period prior to the application of the questionnaire, by means of eight scales or dimensions: physical functioning (PF), role limitations due to physical health problems (RP), bodily pain (BP), social functioning (SF), general mental health that includes psychological stress (MH), role limitations due to emotional problems (RE), vitality, energy or fatigue (VT), and general health perception (GH). PF, RP, and BP scales reflect the physical elements of health; SF, RE, and MH represent psychological aspects, while VT and GH reveal both subjective perceptions of health. Each scale measured by this instrument has a transformed score ranging from 0 to 100, where higher figures denote a better health-related quality of life.[23] To avoid colinearity between health related quality of life scales and depression, only the physical components of SF-36 were taken into account; thus the scales measuring general mental health that includes psychological stress (MH) and role limitations due to emotional problems (RE) were not considered.

Depressive symptoms. The 30-item Geriatric Depression Scale (GDS) was used to assess depressive symptoms.[25] This instrument was specifically developed for use with older people, does not include somatic symptoms and has been shown to have adequate levels of sensibility and specificity in several studies, including other community studies[9,26-28] Participants with a score of 11 points or more were considered to have probable depression.[26]

Anxiety. The Short Anxiety Screening Test (SAST) was used to assess participant's anxiety. This scale was developed by G. Sinoff and coworkers in 1999[29] with the aim of standardizing anxiety screening in older adults, and it considers the likely co-existence of depression with other diseases. The SAST includes somatic symptoms that are often found in elderly people afflicted by anxiety. Anxiety was thus presumed when respondents reported scores $\geq$ 23 points in the SAST.

Study group participants were included if they met the following criteria for depression and anxiety: 1) Score $\geq$ 11 points on the GDS,[26] and 2) score $\geq$ 23 points in the SAST.[30] A similar number of participants were randomly selected from the group of respondents that scored lower on the depression and anxiety questionnaires, and had agreed to take part in this study.

The socio-demographic variables considered in this study included age, sex, and education level. In addition, to examine the association between social networks and health related quality of life, variables regarding morbidity and health behavior were included, as the following adjusted variables: chronic morbidity, acute morbidity, physical activity, alcohol and tobacco consumption and adverse life events.

Data analysis

Three kinds of analyses were carried out. First, a descriptive analysis was performed, classifying the study participants into the study (with depressive symptoms and anxiety) and comparison (without depressive symptoms and anxiety) groups, and identifying differences between these groups. Differences in study variables were assessed with Pearson's Chi^2 for categorical or dummy variables and the T-test for continuous variables (age). Values of $p < 0.05$ or higher were considered statistically significant.

Secondly, older adults' HRQL was assessed with the eight scales of the SF-36 and differences among the scores on these scales were evaluated against social network variables in both the study and comparison groups through a T-test analysis (significance level, $p < 0.05$).

Finally, in order to estimate the association between social networks and HRQL in the groups with and without depressive symptoms, multiple linear regression analyses were developed in which the dependent variable was the score on each of the SF-36 scales, adjusting for co-variables (socio-demographic) and morbidity and health behaviors variables.

Results

From the study sample's framework, a total of 7 526 older adults were interviewed. Of these, 1 418 (18.8%) reported significant depressive symptoms, anxiety, or both (study group). For the purpose of this analysis the study excluded 212 individuals since they did not provide full data for all variables. Thus, the total number of older adults in the study was 2 788, with 1 418 in the study group and 1 370 in the comparison group.

The mean age was similar between study (70.6 years old) and comparison (70.9 years old) groups. However, the study group had a higher proportion of women (72% vs. 59%) and a lower education level, as shown in table I.

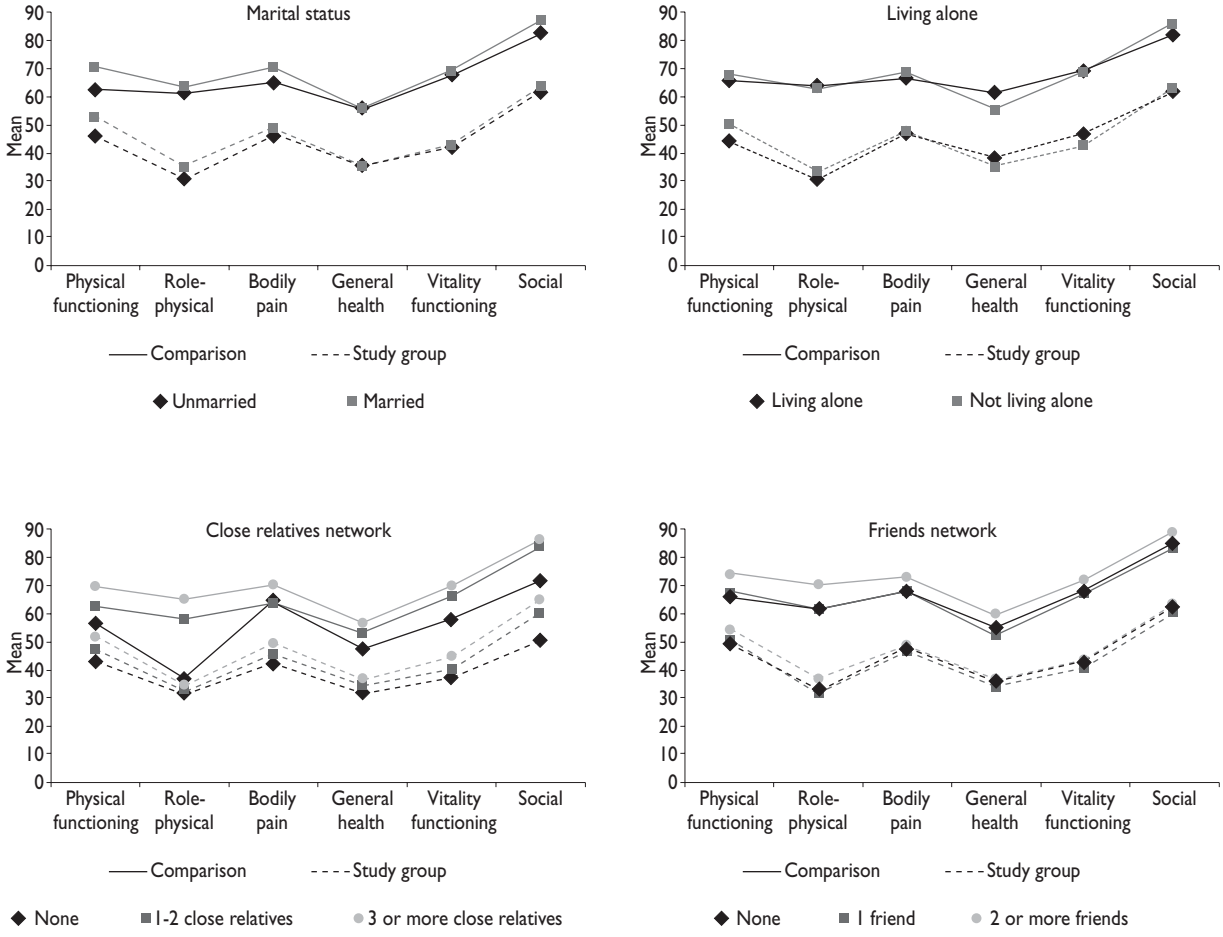
Concerning the social network variables, in the study group 47.2 percent were not married, 6.6 percent lived alone, 3.25 percent did not have a network of close relatives, and 12.9 percent relied on a network of at least two available friends. In the comparison group 39 percent were not married, 5.9 percent lived alone, 1 percent did not have a network of close relatives, and 17 percent had a network with at least two available friends. However, in both groups the proportion of older adults having social networks with no friends reached almost 80 percent (table I).

The social network variables marital status, living alone, and size of the network of close relatives and available friends impacted HRQL in both groups. The HRQL on each scale and in the presence of the four social network variables was considerably lower in the study group than the comparison group ($p< 0.001$) (figure 1). Marital status was a key variable in both groups; although the study group reported the lowest

Table I
GENERAL CHARACTERISTICS, MORBIDITY, HEALTH BEHAVIORS AND HEALTH RELATED QUALITY OF LIFE SCALES OF THE STUDY POPULATION. MEXICO CITY, 2004

	*Study group** *n= 1 418*	*Comparison group‡* *n= 1 370*	*p value*
Age –years– (mean, SD)	70.68 (7.23)	70.95 (7.25)	0.328§
Gender (%)			
Male	28.1	41.5	0.000#
Female	71.9	58.5	
Education level (%)			
No formal education	25.3	16.4	0.000#
Elementary	58.3	57.6	
Middle/technical	12.0	15.9	
High	1.6	3.2	
Professional or postgraduate	2.9	6.9	
Unmarried (%)	47.2	38.8	0.000#
Living alone (%)	6.6	5.9	0.481#
Close relatives (%)			
None	3.3	1.1	0.000#
1-2 relatives	33.9	25.2	
3 or more relatives	62.9	73.7	
Available friends (%)			
None	78.4	77.5	0.002#
1 friend	8.6	6.0	
2 or more friends	13.0	16.5	
Health related quality of life scales (mean, SD)			
Physical functioning (PF)	49.8 (30.8)	67.7 (30.4)	0.000§
Role-physical (RP)	33.3 (40.4)	63.1 (42.4)	0.000§
Bodily pain (BP)	47.7 (27.3)	68.5 (27.1)	0.000§
General health (GH)	35.4 (18.6)	55.7 (18.6)	0.000§
Vitality (VT)	42.8 (20.8)	68.7 (19.4)	0.000§
Social functioning (SF)	62.9 (28.4)	85.5 (21.4)	0.000§

* Study group with depressive symptoms (GDS and SAST)
‡ Comparison group without depressive symptoms
§ T test (study versus comparison group)
# Pearson's Chi^2 (study versus comparison group)



Source: Mexico, DF, 2004

Note: All differences between study and comparison group statistically significant $p<0.001$. *P* values obtained by T test

Figure I. Mean health-related quality of life (SF-36) by social network variables: marital status, living alone, and size of network of close relatives and friends in older adults with and without depressive symptoms. Mexico City, 2004

HRQL scores ($p< 0.001$), married people in this group report better scores than those not married on the scales of physical functioning (PF), role-physical (RP), and bodily pain (BP). In the comparison group, being married generated better scores on the scales SF (social functioning), PF, and BP (figure 1).

On the other hand, study group participants living alone reported a lower HRQL on almost every scale, except for the GH (general health) and VT (vitality) scales. Living alone did not significantly affect HRQL in the comparison group, except for GH, on which those living alone scored higher. It is worth noting that when the association of these two variables is analyzed together (marital status and living alone) similar differences in the HRQL scales remain between the study group and the comparison group (data not shown).

The lowest HRQLs, even on the RP scale, were reported in both groups among older adults without a network of close relatives. Members of the comparison group without such a network reported HRQL scores similar to those of the study group (figure 1).

As seen in the study group, having a network with only one friend does not impact HRQL perception differently from having no friends. However, networks with

Table II
MULTIPLE LINEAR REGRESSION ANALYSES OF SOCIAL NETWORKS ON HEALTH-RELATED QUALITY OF LIFE OF OLDER ADULTS. MEXICO, 2004

	Health-related quality of life scales					
	Physical functioning	*Role-physical*	*Bodily pain*	*General health*	*Vitality*	*Social functioning*
Variables	*Beta a*	*Beta a*	*Beta a*	*Beta a*	*Beta a*	*Beta a*
Unmarried	-0.01	0.01	-0.03*	0.02	0.02	-0.03*
Living alone	-0.0	-0.0	0.00	0.04*	0.03*	-0.00
Close relatives (Number)						
1-2 relatives	0.08	0.06	0.04	0.08	0.09*	0.16*
3 or more relatives	0.13*	0.09*	0.10*	0.12*	0.16‡	0.21‡
Available friends (Number)						
1 friend	-0.0	-0.01	-0.0	-0.03*	-0.02	-0.02
2 or more friends	0.03*	0.02*	0.01	0.01	0.01	0.01

* $p < 0.05$
‡ $p < 0.001$

Reference categories: married status, not living alone, no close relatives, no available friends
Multiple linear regression models adjusted for the following variables: depressive symptoms, gender, age, education level, chronic and acute morbidity, physical activity, alcohol and tobacco consumption and adverse life events

two or more friends generate a positive impact on PF and RP scales in the group with depressive symptoms. Within the comparison group, those with networks of two or more scored better on all HRQL scales (figure 1). As the number of relatives and friends in the social networks rises, especially for those in the study group, HRQL scores tend to be better.

Standardized regression coefficients reveal interesting links between social networks and HRQL in the context of the variable of depression (depressive symptoms and anxiety characterized by low HRQL in all scales measured by SF-36). After adjusting for socio-demographic variables, morbidity and adverse life events and health behaviors variables, being unmarried had a negative impact on the HRQL in BP and SF scales. In contrast, living alone had a significant ($p < 0.05$) positive association with better HRQL scores on the GH and VT scales (table II).

As the network of close relatives grows, HRQL perception improves. Outcomes of HRQL revealed that having a network of 1-2 relatives is positively associated with VT and SF scores ($p < 0.05$). A network with three or more close relatives had a positive and significant impact ($p < 0.05$) on all HRQL scales; particularly on VT and SF (p value < 0.001) (table II).

Additionally, multivariate analysis confirms that networks of two or more friends are associated with better HRQL scores, but only on the PF and RP scales. Networks of a single friend are negatively associated with GH scale scores / ($p < 0.05$), (table II).

Discussion

These results confirm the widely known association between depression and decreased health-related quality of life (HRQL) in older adults, including the community-dwelling elderly[20,30,31] and older adults whose HRQL has been measured with SF-36.[32]

The main contribution of this study is the finding that particular types of social networks seem to improve older adults' HRQL, particularly for those whose HRQL is affected by depressive symptoms. Social networks including a spouse and larger networks of close relatives and friends appear to mitigate the influence of depressive symptoms on some HRQL scales.

It was also found that in spite of the changes in population structure, Mexican older adults' social networks continue to consist largely of family. While many elderly Mexicans are not married, most live and generally associate with family. In contrast with other

cultures where friend networks are key to older people's social lives,[18] it was found that a high proportion of older Mexicans do not have a network of friends. However, results reveal that elderly Mexicans with and without depressive symptoms who have networks with larger numbers of friends have better HRQLs.

In light of the finding that larger networks of friends and family increased HRQL, living alone had a counter-intuitive effect on reported quality of life. Many studies have reported conflicting conclusions on the complex relationship between depression and loneliness.[33,34]

This pattern was also found in this study, particularly regarding the physical health related dimensions of general health and vitality. Older adults living alone scored better on these scales, a trend that remains in the group without depressive symptoms also in the general health scale. However, living alone did not improve scores on the other HRQL scales. Such a finding may suggest that those live alone are able to do so because their health status allows it. It is important to note that the percentage of participants living alone in this study is lower than that reported in other studies, where up to 50 percent of older patients were living alone or experiencing loneliness.[35,36] Nevertheless, the finding that being unmarried or living alone may not reduce HRQLs is congruent with previous studies of elderly population without depression.[37]

One must also consider the limitations caused by the definition and assessment of social networks created in the present study. First, since specific measures to evaluate social networks were not employed, description of social networks is limited to some key features of the network structure and does not include all the network's elements and characteristics. While the level of detail collected was suitable for the analysis, using a specific scale to measure these networks might have revealed associations that were not visible in this study. Secondly, social networks were assessed only in terms of structure. Contact frequency within the network structure and the quality of the social networks were not considered. While this information would have enriched the study, it was not feasible to collect because of the study's cross-sectional design. This design impedes estimation of causation. For instance, it was not possible to establish the direction of the association among social networks, HRQL and depression.

In conclusion, the findings of the present study have specific policy implications: government policies encouraging the formation of social groups could combat depression in older adults. The finding in this study that social networks of certain size and composition (larger networks of family and friends) improve HRQL in older adults, regardless of their depressive symptoms, suggests that social networks provide not only moral and emotional, but physical support as well. Larger social networks may thus support and enhance the work of national health systems. This suggestion is based on previous studies' assertions that depression can be mitigated by enhancing social networks.[38] For instance, Demura & Sato[31] showed that depressive symptoms can be reduced by increasing an individual's number of friends. Thus, fostering social networks around elderly people, particularly expanding friend networks and contact with relatives, would likely mitigate depressive symptoms and their negative impact on HRQL.

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