



Social network and its effect on selected dimension of health and quality of life among community dwelling urban and rural geriatric population in India

K. Bincy*, M. Logaraj, V.V. Anantharaman

Department of Community Medicine, SRM Institute of Science & Technology, Chennai, Tamilnadu, India

ARTICLE INFO

Keywords:

Social network
Elderly
Social isolation
Dimension of health
Quality of life

ABSTRACT

Background: As the age increases, elderly people experiences more changes in physical, mental and social well-being. Quick growth of the elderly in India draws into consideration of the factors that are contributing to their altering health realities. Social isolation is one of the major risk factor affecting the health particularly in elderly. **Methods:** A cross sectional study was conducted with 1000 older adults aged ≥ 60 years, using multistage systematic sampling technique, in a selected urban and rural block. Individual's interviewed with standard questionnaire. Data was entered in excel and analyzed using SPSS software version 20.

Results: Among the participants, 36.4% were men and 63.6% were women with the mean age 64 years. Majority of them were in the age group of 60–69 (65.6%). Participants those with good social network is only 29.9% remaining 70.1% were having poor social network. In rural setting illiterate were socially connected ($p = 0.001$) whereas in urban setting literate elderly were more socially connected ($p = 0.0001$). Multiple regression analysis showed that depression, stress, severe cognitive impairment, poor health status, and poor quality of life are tend to be significant in poor social network ($p = 0.0001$).

Conclusion: Most of the elderly are at risk of isolation. Elderly with poor social network are negatively associated with selected dimension of health and quality of life. Health care intervention programs by public health services need to focus on protecting social health of elderly. Alignment of health system to the needs of elderly will definitely promote health and graceful ageing.

1. Introduction

Ageing is one of the common global phenomena. As the science gets advanced, longevity of human life span increasing. This extra years lived by the elderly should be meaningful, healthy and dignified. Impaired physical functioning in old age increasing the dependency on others.¹ Nearly 500 million people are above the age of 65 years and they account 8% of the world's total population. Globally, around 2030 the estimation of older adults is likely to be one billion, which will approximately reaches 13% of the total population. Usually the proportion of older adult are higher in developed countries, at the same time rapid increase in older population are also seen in developing countries. For the first time in history of human being, people aged 65 and over will very soon outnumber the children under age five.² India's ageing report shows that the greying population in India which was just 7.5% in 2001 has increased to 8.2% by 2011. It was predicted that the

population of senior citizens in India could be around 19% of total population by the year 2050. As per (UNFPA-2017 "India ageing report"), Tamil Nadu has 11.2% of elderly population. In 2016 life expectancy for Females: 73.5 years Males: 68.9 years.³ This growing population brings enormous social, economic and public health implications, which include higher expenses on healthcare, need for social security reforms, and shortage of care-givers to support dependent older adults.⁴

Social network is defined as a subjective sense of belonging, which also includes greater participation in the community, social contact, and social support. Social network has several functions including the provision of emotional, instrumental, appraisal, and financial support. It is important to acknowledge that social network may involve both negative and positive interactions, with health. India's older populations will rely on the family and social network⁵

Social isolation is one of the serious problem with older adults. Social

* Corresponding author.

E-mail address: bincylilly@gmail.com (K. Bincy).

<https://doi.org/10.1016/j.cegh.2022.101083>

Received 1 April 2022; Received in revised form 1 May 2022; Accepted 27 May 2022

Available online 2 June 2022

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network is considered a significant predictor of physical health.^{6,7,8} Thus maintaining social network is essential for good health and their better quality of life.⁹ A study shows, due to lack of social network nearly half of the elderly were in isolation mode and high risk for isolation.¹⁰ Social isolation is one of the risk for developing negative behaviors and also associated with mortality and morbidity like coronary heart disease/stroke, re-hospitalization, falls, cognitive decline, cancer, infectious diseases, accidents, and suicides.^{11,12,13,14,15,16} A meta-analysis about social participation and risk for mortality found that 50% increased likelihood of survival for elderly who have stronger social participation.⁷ Social isolation can also affect cognitive function, and progression of the neurodegenerative or compensatory process themselves.¹⁷

Perception of loneliness increases when there is a decline in their social network.¹⁸ Studies indicate that assessing social network of an elderly is useful to identify the populations that experience social exclusion or isolation.^{19,20}

Support received by the family, plays a fundamental role in social support among elderly worldwide. This social support system is diminishing over the past few decades due to urbanization and enormous migration. Increasing trend of nuclear family set-up, migration in search of better education and job opportunities, diminishing intergenerational co-residence are likely to experience emotional, physical, and financial insecurities among older adults.¹⁷ In India, according to the WHO Survey on Global AGEING and Adult Health (SAGE) 2007–10, about one in five older adults (19.3%) had symptoms related to depression. Recent studies have revealed that the effect of support from friends on psychological distress among the elderly is stronger than the effect of support from their children and other relatives.²¹

A growing body of literature shows that for maintaining a healthy life social ties play a major role.²² Targeting of socially isolated elderly is an important public health issue. Defining the interlacing effect of social network with health in an aging population helps to guide cultural drift to a healthier future in aging²³ and also helps in designing, sound and effective social and health care policies²⁴ and allocating limited resources or establishing public health interventions to improve geriatric health and well-being.²⁰

Assessing the social network and its effect on dimension of health will help us in increasing the knowledge on preventive aspect of health. There is a scarcity in research on social network and its effect on the well-being and dimensions of health.²⁵ However, there has hardly been any study in India that has looked at the effects of social networks with dimensions of health and quality of life among elderly. Present study aims at assessing the social networks and its effect on selected dimension of health and quality of life, among elderly living in urban and rural setting.

2. Methodology

A cross sectional study was conducted with 1000 elderly individuals from the period of August 2021–January 2022. After obtaining clearance from Institutional Ethics Committee, elderly included in the study were debriefed about the nature of the research, their role in the study, and were educated about the research purpose and obtained informed consent.

2.1. Participants

Elderly ≥ 60 years, and who had no hearing loss and were able to communicate effectively and who had their residence for at least 1 year, were included for the study. People aged above 60 years but not willing to participate and who were not available even after three visits, bed bound elderly people were excluded from the study. The participants were interviewed individually.

2.2. Sampling technique

Using Multistage Systematic random sampling method, based on assumption of 50% presence of social networks in the population, 5% precision, and 20% non-respondent rate, sample size was calculated as 500. Each 500 from Rural and Urban, total 1000 elderly were selected for the study. For rural sample, under Kattankulathur block, among the 3 Primary Health Centers, 1 Primary Health Center was randomly selected using lottery method, the selected PHC covering villages and its population were enlisted, then PPS was done to select samples in each village and every 5th household was selected systematically till the sample size achieved. For urban sample, under Tambaram block among 3 urban PHC, 1 urban Primary Health Center was randomly selected using lottery method, the selected urban PHC covering town panchayat and its population were enlisted, then PPS was done to select samples in each town panchayat and every 8th household was selected systematically till the sample size achieved.

2.3. Study tool

Socio demographic characteristics: The socio-demographic questionnaire was developed to assess the demographic characteristics of participants, such as age, gender, education, marital status, occupation, income etc.

Lubben Social Network Scale (LSNS) was developed by Lubben and Gironde (2004), it consists of 18 items which help to assess the nature of the relationship with friends, relatives and neighbours. This scale was validated in India, it evaluates social isolation by quantifying frequencies of social contact with friends, neighbours and family members, and perceived social support. The scores for each LSNS item range from 0 to 5, with lower scores indicating smaller networks. Total scores are an equally weighted sum of the 18 items, ranging from 0 to 90. For LSNS-6 cut off 12, for LSNS-18 cut of score 36. High scores indicate strong social networks. The instrument was translated to local language, for the present study.

2.4. Physical dimension

Assessment of functional ability using ADL Questionnaire (Katz Index) which includes six functioning-Bathing, Toileting, Dressing, Transferring, Feeding, Continence, and Homemaking.

Self-Assessment of Overall Health, Self-Reported Morbidity verified from previous medical records, Healthy Behaviour assessment includes Smoking, Alcohol Consumption, Tobacco usage and sleep pattern and General physical examination which includes Anthropometry measurements, Blood Pressure, Random blood sugar and haemoglobin level.

2.5. Mental dimension

Mini-Mental Scale Examination (MMSE) was used to evaluate cognitive impairment. Scoring 24 and below indicates cognitive impairment. Geriatric depression scale 15 (GDS short version) was used to assess the depression. A score >5 suggests mild, and ≥ 10 is severe depression.²⁵

2.6. Vocational dimension

Semi-structured questionnaire to assess leisure time activity includes Voluntary work, Cultural activity.

Reading book, Shopping, Gardening, Hobbies, Watching television.

2.7. Quality of life

Older people quality of life (OPQOL) questionnaire to assess the quality of life. Each of the 13 items is scored strongly agree = 1, Agree = 2, neither = 3, Disagree = 4, strongly disagree = 5. The items are

summed for a total OPQOL-Brief score, then positive items are reverse coded, so that higher scores represented higher QOL. Score below 33 (very bad), score 33–50 (bad), score 51–55 (alright), score 56–59 (good), and score 60–65 (very good).

2.8. Statistical analyses

All the responses were coded and entered into excel. Descriptive statistics and inferential analysis was done to observe baseline differences in both the groups and chi-square test done for categorical variables, Odds Ratio was calculated to predict the risk factor and multiple linear regression analysis adjusted for sex, age, education, comorbidities was done to observe the independent predictors and to know the interactive effect of social network with GDS score, MMSE score, stress score, ADL score. All statistical analysis were performed with Statistical Packages for Social Sciences (SPSS) version 21.

3. Results

Total thousand elderly populations were included in the study; among them 43.1% were men and 56.9% were women with the mean age 64 years (see Table 1). Most of the elderly were married (73%). Majority of the elderly were illiterate (40.9%). Hindus (61.2%) were predominant in the study population. Most of the elderly were residing with their children (55.8%) followed by with spouse (21.5%) and living alone (20.4%). Private health care utilization is seems to be higher in urban elderly (72.8%) then rural elderly (46%). Other demographical details for the participants were presented in the table: 1. Among the total participants those with decent social network is only 29.9% remaining 70.1% were having poor social network. Social network classified as three main domain family, friends and neighbor social network, among this more family (35.2%), friends (29%) and neighbours (32.2%) network is seen in rural, whereas in urban family, friends and neighbours network was 17.4%, 19.8%, 18% respectively (Table 2). Elderly with ADL dependence (OR-5.32), moderate (OR-9.18) and high stress (OR-19.75), severe cognitive impairment (OR-12.42), very bad quality of life (OR-18.75), living alone (OR-8.97) and poor health status (OR-3.67) had higher risk of poor networking than others (Table 3).

The networking state was selected as the study's dependent variable. On request, the variables that were statistically significant in univariate analyses and were associated with social networking were included into multivariate analyses. The final multivariate logistic regression model's findings are shown in Table 4. Poor quality of life, depression, cognitive impairment, stress, and leisure activity are all factors linked to the development of poor networking in the elderly population. On the other hand, positive aspect of maintaining good social network will able to cope up with depression and stress, helps to delay the onset of dementia, make elderly involve in various physically active leisure activity and it shows significant ($p < 0.0001$).

4. Discussion

We found the extent of social networks and its relation between physical, mental, vocational dimension and quality of life. The importance of social connectedness has been honored since antiquity. Still, not all individuals are equally capable of developing and maintaining friendships and social ties. Our study found out that most of the senior who reside in a rural and urban settings were under the threat of getting isolated. Our results revealed that social isolation was strongly associated with physical, mental and cognitive health. The family network, friends network and neighbours network are high among rural when compared to urban. Former studies states that Alzheimer's diseases could be directly related to the size of the social network, seems more likely that social network size can act as a reserve capacity capable of reducing the chances of developing the disease pathology, which will be clinically expressed as cognitive impairment.²⁶ Those with larger social

Table 1
Distribution of baseline characteristic stratified by region.

Characteristics	Urban (n = 500)	Rural (n = 500)	Total (n = 1000)
Sex			
Male	207(41.4%)	224(44.8%)	431(43.1%)
Female	293(58.6%)	276(55.2%)	569(56.9%)
Age			
60–69	383 (76.6%)	243 (48.6%)	626(65.6%)
70–79	88(17.6%)	200 (40%)	288(28.8%)
80 & Above	29(5.8%)	57 (11.4%)	86(8.6%)
Marital status			
Married	375(75%)	355(71%)	730(73%)
Unmarried	30(6%)	9(1.8%)	39(3.9%)
Widow	93(18.6%)	107(21.4%)	200(20%)
Widower	2(0.4%)	29(5.8%)	31(3.1%)
Education			
Illiterate	91 (18.2%)	318 (63.6%)	409(40.9%)
Primary school	166(33.2%)	94(18.8%)	260(26%)
Middle school	124(24.8%)	58(11.6%)	182(18.2%)
Secondary & Higher secondary	81(16.2%)	10(2%)	91(9.1%)
Graduate	38(7.6%)	20(4%)	58(5.8%)
Religion			
Hindu	284(56.8%)	326(65.2%)	612(61.2%)
Christian	167(33.4%)	148(29.6%)	315(31.5%)
Muslim	54(10.8%)	19(3.8%)	73(7.3%)
Economic Dependency			
Independent	193(38.6%)	274(54.8%)	467(46.7%)
Dependent	307(61.4%)	226(45.2%)	533(53.3%)
Living Arrangement			
Alone	117(23.4%)	87(17.4%)	204(20.4%)
With spouse	102(20.4%)	113(22.6%)	215(21.5%)
With children	270(54%)	285(57%)	558(55.8%)
With Relatives	11(2.2%)	15(3%)	26(2.6%)
Utilization of health care services			
PHC	53(10.6%)	183(36.6%)	236(23.6%)
CHC	21(4.2%)	43(8.6%)	64(6.4%)
Tertiary	62(12.4%)	44(8.8%)	106(10.6%)
Private	364(72.8%)	230(46%)	594(59.4%)

Table 2
Distribution of social network pattern in regions.

Social Network	Urban (N = 500)	Rural (N = 500)	Total (n = 1000)	Chi-Square, df, p-value
Poor social Network	382(76.2%)	319(63.8%)	701(70.1%)	18.936, df-1, p > 0.0001
Decent social Network	118(23.6%)	181(36.2%)	299(29.9%)	
Family Network				
Poor social Network	413(82.6%)	324(64.8%)	737(73.7%)	22.515, df-1, p > 0.0001
Decent social network	104(20.8%)	176(35.2%)	263(26.3%)	
Friends Network				
Poor social Network	401(80.2%)	355(71%)	756(75.6%)	12.009, df-1, p > 0.001
Decent social network	99(19.8%)	145(29%)	244(24.4%)	
Neighbours Network				
Poor social Network	410(80.2%)	339(67.8%)	749(74.9%)	26.814, df-1, p > 0.0001
Decent social network	90(18%)	161(32.2%)	251(25.1%)	

networks are more likely seems to be engaged in cognitive, physical and social activities, and these eventually associated with reducing the risk of developing cognitive impairment and dementia [^{26, 27}]. Our study result was in line with the study statement, elderly with decent network tend to report decreased in the cognitive impairment. Some deficits which are commonly seen with old age such as deficits in any vision, audition, speed of processing, episodic memory and attribution of mental states, could lead to poor social functioning and confound the

Table 3
Odds Ratio for selected variable with social network.

Variables	Social Network (N = 1000)		OR	CI (95%)	P-value
	Decent Social network (n = 299)	Poor Social network (n = 701)			
ADL					
Independent	260(13.5%)	537(53.7%)	1		
Partially dependent	72(7.2%)	98(9.8%)	1.437	0.94–2.19	0.09
Dependent	06(0.6%)	66(6.6%)	5.325	2.279–12.445	<0.0001
Depression					
Present	34(3.4%)	545(54.5%)	0.0367	0.024–0.054	<0.0001
Absent	265(26.5%)	156(15.6%)	1		
Stress					
Low stress	126(12.6%)	39(3.9%)	1		
Moderate stress	121(12.1%)	344(34.4%)	9.1850	6.067–13.9042	<0.0001
High stress	52(5.2%)	318(31.8%)	19.75	12.4274–31.410	<0.0001
MMSE					
Severe	06(0.6%)	138(13.8%)	12.601	6.656–23.87	<0.0001
Mild	59(5.9%)	139(13.9%)	3.154	2.217–4.486	<0.0001
No impairment	201(20.1%)	132(13.2%)	1		
Quality of life(OPQOL)					
Good	225(22.5%)	168(16.8%)	1		
Alright	18(1.8%)	171(17.1%)	12.723	7.525–21.512	0.001
Bad	26(2.6%)	288(28.8%)	14.8352	9.474–23.228	0.0001
Very bad	28(2.8%)	2(0.2%)	18.750	4.405–79.807	0.0001
Living Arrangement					
With children	221(22.1%)	334(33.4%)	1		
Alone	14(1.4%)	190(19%)	8.979	5.084–15.859	0.0001
With spouse	59(5.9%)	156(15.6%)	1.749	1.239–2.468	0.001
With relatives	5(0.5%)	21(2.1%)	2.77	1.032–7.479	0.04
Health Status					
Good	172(17.2%)	206(20.6%)	1		
Fair	107(10.7%)	407(40.7%)	3.175	2.367–4.260	0.001
Poor	20(2%)	88(8.8%)	3.673	2.171–6.216	0.0001

Table 4
Multiple Linear regression of independent predictors of social network.

Health Attributes	Estimate (Beta)	P value
QOL Bad	-0.012	0.01*
QOL Good	0.981	0.84
QOL Very bad	-0.228	11
QOL Very good	0.554	0.45
No cognitive impairment	0.420	0.78
Severe cognitive impairment	0.13	0.03*
Depression Present	-0.536	0.001*
Low Stress	0.156	0.11
Moderate Stress	0.242	0.001*
Perceived Health status- Good	0.007	0.88
Perceived Health status- Poor	0.006	0.93
ADL Independent	0.093	0.34
ADL Partially dependent	0.004	0.96
Leisure Activity-gardening	0.002	0.98
Leisure Activity-hobbies	0.413	0.52
Leisure Activity-No	0.026	0.03*
Leisure Activity -Reading book	0.365	0.05
Leisure Activity -Shopping	-0.183	0.18
Leisure Activity-Voluntary Activity	0.501	0.12
Leisure Activity-Watching tv	-0.238	0.01*

effects of social networks in the development of dementia.²⁶ Multiple neurodevelopmental disorders are characterized, by an impaired capability to develop social ties, such as autism spectrum disorders, fragile X syndrome, and schizophrenia.²⁸

When stratified by Living arrangement, our study found a significant relationship with poor social network in elderly individuals living alone than those living with family. This in agreement with the study by Saito, Fujiwara, et al. (2010), they measured the prevalence of social isolation and assessed the frequency of interaction with people other than family members in Japan, was 24.1% for those living alone and 28.7% for those living with family. They measured only the frequency of contact with people other than family members living together. But, in our study, we

also considered contact with family members who were living together.²⁹

The results of this study showed that having a relationship with the family, friends and living in a good neighborhood, leads to better quality of life, same as preceding study.³⁰ Changing modern life, industrialization, leads to the limitation of relationship network and these people are at the threat of isolation. Our findings show that the mean of elderlies' social network is lower than average. Another study by Rutledge et al. (2003) showed that the mean of elderlies' social network in the US is advanced than average, which is not harmonious with the present study.³¹ Perhaps this inconsistency is due to the differences in study population. In the above study, the Lubben social network tool (10 questions) was used, but we used the Lubben social network tool (18 questions), which was more comprehensive, and probing further dimensions regarding elderlies' social network.

In another study by Heidary et al. the relationship between social support and size of social network with the life quality of person's affected with cancer was explored.³² According to the results of the above study, utmost of these affected person's considered their family members and spouses as their supporter and member of social network, from this aspect, it is analogous to the present study, because the results of the present study showed that elderlies' social network in family dimension has greater mean. Although the tools used in Heidary et al. are different from the present study they only estimated the size of social network and the importance of family members.³² But in the present study, the importance of social network in all aspect was elucidated, however family network is found to be more, hence the results can be considered as analogous and this can also correlated with the aspect of having great role of family in our country and culture.

A previous study using the LSNS-6 by Iliffe et al. reported that there is a relationship between social isolation and depression, and this is in agreement with our findings.³³ We also found that poor social network is strongly associated with depression among the elderly ($p > 0.001$). Furthermore, Harlow, Goldberg, and Comstock has reported that having more network was consistently associated with lower levels of

depressive symptoms, which is also in accordance with our findings.³⁴ In a study from Tamil Nadu India states that depression among the elderly seems to be high and there is a lack of social support for elderly.³⁵ Hence by strengthening older people's network there is a possibility to alleviate the depression among this vulnerable population.

Our study result also in agreement with previous studies which demonstrated associations between social isolation and decline in cognitive function and poor health status, in the multivariate analysis using the LSNS-6^{33,36}

Previous studies reported that engagement in leisure activities, was associated with decreased dementia risk, consequently, leisure activities in old age have been a common focus for studies regarding different aspect of health status, depression, cognition, and mortality.³⁷ Leisure activities mainly includes physical, mental and social component. In our study we found that most of the elderly were involved in very less leisure activities. Most of the elderly in our study are reported to have the habit of watching tv as their leisure activity and it is predicted that this habitual will decreases if social network is improved ($p < 0.001$). Behavioral change education is needed for elderly and it is essential to make involve them in a variety of social, physical and cultural activities to reduce the risk of isolation and to promote healthy ageing.

For instance, in the Indian context family provide instrumental support and emotional support to the older adults. Only a few studies have recognized the growing importance of friends on older adult's health and well-being.³⁸ Few studies argue that older adults who have friends network will help them to improve well-being through different ways like sharing health information, mutual assistance, economic and emotional support, this help them to deal with distress related to age and sickness.³⁹⁻⁴¹

For greater understanding about the factors related to social isolation is likely to provide public health professionals with multiple opportunities for developing effective and targeted interventions.⁴² Thus, to provide support for preventing social isolation in community-dwelling elderly people regardless of household composition, it is important to maintain and promote mental health, to deepen relationships with old friends, and to provide support through social or cultural activities. Moreover this finding appear to reflect changing perception of traditional Indian family structure and life. Furthermore, some of the current pressing social issues in the country like, the elevated prevalence of depression and a suicidal rate among elders may be contributed by the prevalence of relatively restricted social relations.⁴³ Multiple studies constantly noted that one of the leading factor for suicide among older adult and high level of depression is high level of isolation.⁴⁴

The present study shows that although the elderly live with children, they are vulnerable due to their having few friends. Our findings suggest that this validated lubben social network scale help us to identify at-risk older people and help us to guide the design and implementation of service programs for this vulnerable group. The understanding of association between social network and health dimension possibly will encourage programs especially designed for older adults to enhance healthy ageing, with focus on bridging social capital so that it can break the vicious cycle between poor health condition and social isolation.¹² Further research studies are needed to identify the older adults at risk of isolation and to generate a database for effective policymaking and planning for interventions. Longitudinal observation study is needed to know how social network impact on overall health of the elderly. A better understanding of age related issues and changing trends helps in making a progress on Healthy Ageing.

4.1. Limitation

Only quantity of the network is assessed, not the quality of the network. Majority of the population in our study was women in both the groups due to their availability on data collection time. Several factors and circumstances may cause social disconnectedness, in this study we did not considered the reason for social disconnectedness.

5. Conclusion

We found that poor social network as a social risk factor for adverse health outcome among older adults. Living alone, with poor social network also contribute adverse health outcome. Maintaining decent social network among elderly person is positively associated with selected dimension of health and quality of life. Government can play enormous role in maintaining social ties, it will be beneficial if public health services implement health care intervention programs by strengthening the social network of elderly. Social relationship-based interventions provides opportunity to enhance not only the quality of life but also survival. We also suggest that there should be more innovative approach to strengthen the social network of adults and more social network recreational centers for older adults, so that they can interact with friends within the community or between communities and participate in group activities.

Funding

No external funding was received for this study.

Declaration of competing interest

The authors declare that they have no competing interests.

Acknowledgements

We would like to sincerely thank all the participants in this study for actively volunteering to undergo the survey.

References

- 1 Amarya S, Singh K, Sabharwal M. In: D'Onofrio G, Greco A, Sancarolo D, eds. *Ageing Process and Physiological Changes*. Gerontology; 2018. <https://doi.org/10.5772/intechopen.76249>.
- 2 United nation department of economics and social affair PD. *World Population prospects.the 2004 Revision*. new York;united nations: United nation department of economics and social affair; 2005.
- 3 Evaluation Icomprhfoiifhma. *India: Health of the Nation's States the India State-Level Disease Burden Initiative*. ICMR,PHFI,and IHME; 2017.
- 4 Singh L, Arokiasamy P, Singh PK, Rai RK. Determinants of gender differences in self-rated health among older population: evidence from india. *Sage Open*. 2013;3(2), 2158244013487914.
- 5 Amieva H, Stoykova R, Matharan F, Helmer C, Antonucci TC, Dartigues JF. What aspects of social network are protective for dementia? Not the quantity but the quality of social interactions is protective up to 15 years later. *Psychosom Med*. 2010; 72(9):905-911.
- 6 Nicholson Jr NR. Social isolation in older adults: an evolutionary concept analysis. *J Adv Nurs*. 2009;65(6):1342-1352.
- 7 Kawachi ISS, Kim D. *Social Capital and Health*. 2008.
- 8 Berkman LF. Assessing the physical health effects of social networks and social support. *Annu Rev Publ Health*. 1984;5:413-432.
- 9 Eng PM, Rimm EB, Fitzmaurice G, Kawachi I. Social ties and change in social ties in relation to subsequent total and cause-specific mortality and coronary heart disease incidence in men. *Am J Epidemiol*. 2002;155(8):700-709.
- 10 Boden-Albala B, Litwak E, Elkind MS, Rundek T, Sacco RL. Social isolation and outcomes post stroke. *Neurology*. 2005;64(11):1888-1892.
- 11 Mistry R, Rosansky J, McGuire J, McDermott C, Jarvik L. Social isolation predicts re-hospitalization in a group of older American veterans enrolled in the UPBEAT Program. Unified Psychogeriatric Biopsychosocial Evaluation and Treatment. *Int J Geriatr Psychiatry*. 2001;16(10):950-959.
- 12 Pillai JA, Verghese J. Social networks and their role in preventing dementia. *Suppl1 Indian J Psychiatr*. 2009;51(Suppl 1):S22-S28.
- 13 Bahramnezhad F, Chalikh R, Bastani F, Taherpour M, Navab E. The social network among the elderly and its relationship with quality of life. *Electron Physician*. 2017;9: 4306-4311.
- 14 Ghazi H, Sutan R, Elnajeh M, Abdalqader M, Baobaid M. The importance of social participation and networking among elderly people: short review. *J Manage Sci*. 2017;15.
- 15 Holt-Lunstad J, Smith TB, Layton JB. Social relationships and mortality risk: a meta-analytic review. *PLoS Med*. 2010;7(7), e1000316.
- 16 Santini ZI, Koyanagi A, Tyrovolas S, et al. Social network typologies and mortality risk among older people in China, India, and Latin America: a 10/66 Dementia Research Group population-based cohort study, 2015 *Soc Sci Med*. 1982;147: 134-143.

- 17 Holmes WRaJ J. *Social Participation and Healthy Ageing: A Neglected, Significant Protective Factor for Chronic Non-communicable Conditions*. vol. 7. Globalization and Health; 2011.
- 18 Lee GR, Ishii-Kuntz M. Social interaction, loneliness, and emotional well-being among the elderly. *Res Aging*. 1987;9(4):459–482.
- 19 Steinkamp MW, Kelly JR. Social integration, leisure activity, and life satisfaction in older adults: activity theory revisited. *Int J Aging Hum Dev*. 1987;25(4):293–307.
- 20 Hagedoorn M, Van Yperen NW, Coyne JC, et al. Does marriage protect older people from distress? The role of equity and recency of bereavement. *Psychol Aging*. 2006;21(3):611–620.
- 21 Hejun Kang YLM. Social integration: how is it related to self-rated health? *Adv Aging Res*. 2013;2:1.
- 22 Bangalore. In: Jaiswal V, Subramanyam G, eds. *A Study on Knowledge and Utilization of Social Media in Elderly People in Whitefield*. 2015.
- 23 Doubova SV, Pérez-Cuevas R, Espinosa-Alarcón P, Flores-Hernández S. Social network types and functional dependency in older adults in Mexico. *BMC Publ Health*. 2010;10(1):104.
- 24 Singh L, Singh PK, Arokiasamy P. Social network and mental health among older adults in rural Uttar Pradesh, India: a cross-sectional study. *J Cross Cult Gerontol*. 2016;31(2):173–192.
- 25 Sheikh Jay JI. Geriatric Depression Scale (GDS): recent evidence and development of a shorter version. *Clin Gerontol: J Ment Health Aging*. 1986;5(1-2):165–173.
- 26 Barrett L, Henzi P. The social nature of primate cognition. *Proc Biol Sci*. 2005;272(1575):1865–1875.
- 27 Byrne RW, Bates LA. Sociality, evolution and cognition. *Curr Biol: CB*. 2007;17(16):R714–R723.
- 28 Grady CL, Keightley ML. Studies of altered social cognition in neuropsychiatric disorders using functional neuroimaging. *Can J Psychiatr Revue canadienne de psychiatrie*. 2002;47(4):327–336.
- 29 Shimada K, Yamazaki S, Nakano K, M N, Takahashi R, Yasumura S. Prevalence of social isolation in community-dwelling elderly by differences in household composition and related factors: from a social network perspective in urban Japan. *J Aging Health*. 2014;26.
- 30 Netuveli G, Wiggins RD, Hildon Z, Montgomery SM, Blane D. Quality of life at older ages: evidence from the English longitudinal study of aging (wave 1). *J Epidemiol Community Health*. 2006;60(4):357–363.
- 31 Rutledge T, Matthews K, Lui LY, Stone KL, Cauley JA. Social networks and marital status predict mortality in older women: prospective evidence from the Study of Osteoporotic Fractures (SOF). *Psychosom Med*. 2003;65(4):688–694.
- 32 Heiydari S, Salahshorian A, Rafie F, Hoseini F. Correlation of perceived social support and size of social network with quality of life dimension in cancer patients. *J Feyz J Kashan Univ Med Sci*. 2008;12(2):15–22.
- 33 Iliffe S, Kharicha K, Harari D, Swift C, Gillmann G, Stuck AE. Health risk appraisal in older people 2: the implications for clinicians and commissioners of social isolation risk in older people. *Br J Gen Pract: J Roy Coll Gen Pract*. 2007;57(537):277–282.
- 34 Harlow SD, Goldberg EL, Comstock GW. A longitudinal study of the prevalence of depressive symptomatology in elderly widowed and married women. *Arch Gen Psychiatr*. 1991;48(12):1065–1068.
- 35 Bincy K, Logaraj M, Ramraj B. Depression and its associated factors among the older adults in rural, Tamilnadu, India. *Clin Epidemiol Global Health*. 2021;10, 100677.
- 36 Kobayashi KM, Cloutier-Fisher D, Roth M. Making meaningful connections: a profile of social isolation and health among older adults in small town and small city, British Columbia. *J Aging Health*. 2009;21(2):374–397.
- 37 Karp A, Paillard-Borg S, Wang HX, Silverstein M, Winblad B, Fratiglioni L. Mental, physical and social components in leisure activities equally contribute to decrease dementia risk. *Dement Geriatr Cognit Disord*. 2006;21(2):65–73.
- 38 S T. *Household Context, Social Capital and Wellbeing of Older Adults in India*. New Delhi: United Nations Population Fund (UNFPA); 2014.
- 39 Webster NJ, Antonucci TC, Ajrouch KJ, Abdulrahim S. Social networks and health among older adults in Lebanon: the mediating role of support and trust. *J Gerontol B Psychol Sci Soc Sci*. 2015;70(1):155–166.
- 40 Berkman LF, Glass T, Brissette I, Seeman TE. From social integration to health: durkheim in the new millennium, 2000 *Soc Sci Med*. 1982;51(6):843–857.
- 41 Kawachi I, Kennedy BP, Glass R. Social capital and self-rated health: a contextual analysis. *Am J Publ Health*. 1999;89(8):1187–1193.
- 42 Nicholson NR. A review of social isolation: an important but underassessed condition in older adults. *J Prim Prev*. 2012;33(2-3):137–152.
- 43 Conwell Y, Van Orden K, Caine ED. Suicide in older adults. *Psychiatr Clin*. 2011;34(2):451–ix.
- 44 Park S, Smith J, Dunkle RE. Social network types and well-being among South Korean older adults. *Aging Ment Health*. 2014;18(1):72–80.