

## The influence of social support on cognitive impairment in the elderly

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### RESEARCH

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### ABSTRACT

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#### Background

In Malaysia, as a result of urbanization and due to the migration of the youth from rural to urban areas, more elderly are now living on their own leading to poor social support and reduced social interactions which may result in negative consequences to the cognitive function of the elderly.

#### Aims

To determine the influence of social support on cognitive impairment among elderly Malaysians.

#### Methods

This cross sectional study was conducted using a representative sample for Penang, Malaysia. The Elderly Cognitive Assessment Questionnaire (ECAQ) was used to screen for cognitive impairment and Oslo-3 Social Support Scale (OSS-3) was used to measure social support.

#### Results

A total of 2005 elderly participated in the study, 10.8 per cent had borderline cognitive impairment whereas 4.8 per cent were cognitively impaired with borderline dementia. Most of the participants had moderate social support (63.6

per cent) and 16.3 per cent had poor social support. There is about a threefold higher odds of being cognitively impaired among those who have poor social support (OR 3.1 [2.0-4.8]. a OR 2.6 [1.2-5.4]). Attributable risk analysis showed that 65 per cent risk of cognitive impairment in the sample was due to poor social support whereas in the population it was 24.0 per cent.

#### Conclusion

The rapid urbanization and the changes brought along with it are likely to affect social support and eventually the cognitive health of the elderly.

#### Key Words

Cognitive impairment, social support, elderly

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#### What this study adds:

##### 1. What is known about this subject?

Studies from the west have shown the risk of cognitive impairment due to poor social support but none have shown the attributable fraction in the population.

##### 2. What new information is offered in this study?

Low social support was found to be a predictor and an attributable risk for cognitive decline among elderly Malaysians.

##### 3. What are the implications for research, policy, or practice?

There is an urgent need to develop policies to address the issues of social networking, activities and employment opportunities for the elderly.

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#### Background

Population growth in Malaysia is declining and the ageing population increasing. Because of improved health, longer life expectancy and low mortality, the proportion of the population aged 65 years and above is increasing. But, due to declining fertility the proportion of the population below

the age of 15 is decreasing resulting in an ageing population trend.<sup>1</sup>

In the elderly, cognitive functioning is important for independence and for better quality of life.<sup>2</sup> Ageing, however, is associated with the deterioration of cognitive function, especially in relation to learning and memory.<sup>3</sup> It is estimated that the prevalence of cognitive decline doubles every five years.<sup>4</sup> Maintaining social engagement and networks has been shown to prevent or postpone cognitive decline<sup>5</sup> and larger social networks<sup>6</sup> and increased social support<sup>7</sup> have been shown to be associated with higher cognitive function.

Social support is important for the physical and mental well-being of the elderly.<sup>2,8</sup> Social support may be emotional or practical support which may be objective i.e., what is actually received or subjective i.e., what is perceived to have been received from partners, spouses, family members, friends, co-workers and neighbours etc.<sup>9</sup> Lack of social support can be a direct or an indirect risk factor in long-term negative effect on health.<sup>10</sup>

In Malaysia, the elderly are revered as sources of wisdom and care. However, as a result of urbanization caused by the migration of the youth from rural to urban areas, more elderly are now living on their own.<sup>11</sup> This could potentially lead to poor social support and reduced social interactions which may result in negative consequences to the physical and mental well-being of the elderly. At present there are no policies formulated to ensure social support for the elderly. There is a need to show evidence from local studies related to the association of social support and cognition to convince the government to develop policies relating to social support for the elderly. Most studies have shown the risk of cognitive impairment due to poor social support, but none have shown the attributable fraction in the population. Knowledge of the attributable fraction in the population will provide the information on the importance of social support as a public health importance. Although there are numerous published articles showing the association of social support to cognitive function in the west, an extensive literature search failed to show any published study conducted in Malaysia or in a similarly developing country which has a young but an increasing elderly population. Because of this, the objective of this study was to determine the association and the attributable fraction of social support to cognition in the elderly. We hypothesise that social support is significantly associated with cognitive impairment in the elderly.

## Method

### Study design and Setting

The Penang State Government, the state where this study took place, commissioned the study to determine the socio-demographic and health problems and needs of the elderly residents in the state. Penang, one of 14 states in Malaysia has a multi-ethnic population. It is one of the most densely populated states in the country with a population of 1,561,853 and with the highest proportion of older adults in the country. The proportion of the population of Malaysia aged 60 years and above according to the 2010 census was 6.1 per cent whereas in Penang it was 10.2 per cent.<sup>1</sup>

### Sampling

The sample population was taken from the Penang 'special aid for the elderly' list. Penang Government offers a once yearly payment of RM100 (USD 1 = RM 4.00) to all elderly aged 60 years and above who reside in the state irrespective of their socio-economic status. There were 136,292 older adults listed in the 'special aid for the elderly' programme for the year 2012. Participants for this study were taken from this list. To determine the prevalence of a myriad of medical problems in the population of the elderly in Penang, a simple random sample from a population of 136,292 senior citizens aged 60 years and above was taken. Stata was used to calculate the sample size. It was determined that a sample size of 384 would allow the study to determine the prevalence of these problems with a confidence interval of  $\pm 5$  per cent. Taking into consideration the possibility that some recipients of the aid might not be contactable or refuse to participate, a random sample of 450 older adults was chosen from each of the five districts from the State's 'special aid for the elderly' list to get the required 1,920 elderly participants for the study. Of the 2,250 potential participants contacted, 2005 responded, and they were all included in the study.

### Tools

The data for this study was acquired using a questionnaire. Data was collected in the form of a face to face interview by ten comprehensively trained nurses in the participant's homes using a uniform protocol which was set up to minimize error and bias. Two nurses from each of the five districts were responsible for collecting the data from their respective districts. Besides the baseline demographic information which consisted of sex, age, race, marital status, education level and employment status, the Elderly Cognitive Assessment Questionnaire (ECAQ) which is derived from Mini Mental State Examination and Geriatric Mental State Schedule was used to determine whether the respondents were cognitively impaired. ECAQ is a ten item

screening test assessing long term memory, orientation and recall validated in Singapore and is a useful tool for routine screening. It is used in the developing world for patients who may be illiterate or have relatively low levels of education. ECAQ assesses two aspects of cognitive function; memory and orientation, and information. ECAQ has a sensitivity of 85.3 per cent and specificity of 91.5 percent. A score of 7 or more is indicative of normal memory, 5 to 6 indicates a probable case and a score of 4 and below indicates probable dementia.<sup>12</sup> The ECAQ scale had a Cronbach's alpha coefficient of 0.73.

The Oslo-3 Social Support Scale (OSS-3) was used to measure social support. The OSS-3 scale was chosen because of its reliability (internal consistency:  $\alpha = 0.73$ ), brevity and the appropriateness and relevance of the questions to the different cultural groups living in Malaysia. OSS-3 consists of three questions stated below with possible answers:

1. How many people are you so close to that you can count on them if you have a serious personal problem – none (1), 1 to 2 (2), 3 to 5 (3) and  $\geq 5$  (4).
2. How much interest and concern do people show in what you do? - a lot (5), some (4), uncertain (3), little (2) and none (1).
3. How easy is it to get practical help from neighbours if you should need it? - very easy (5), easy (4), possible (3), difficult (2) and very difficult (1).

To reflect social support, the sum score which ranged from 3-14, was divided into three categories; 3 to 8 'poor support', 9 to 11 'moderate support' and 12 to 14 'strong support'.<sup>13,14</sup> The OSLO social support scale had a Cronbach's alpha coefficient of 0.67.

### Analysis

Data was tabulated, cross tabulated and analysed using SPSS version 18. Odds ratio was used to quantify the risk of cognitive impairment due to social support. Regression analysis was carried out to determine if social support was a significant predictor for cognitive impairment. Stata statistical software was used to calculate the attributable risk in the sample and the population where the sample was taken from. A probability value of  $P < 0.05$  was considered to be statistically significant.

### Ethics

The research received the approval of the Joint Penang Independent Ethics Committee (JPEC 11-0102). All respondents were asked to give a written informed consent before starting the interview. The confidentiality of the respondents was assured.

## Results

The age of the participants ranged from 60 to 99 years old. As shown in Table 1, the majority of the participants, at the time the data was collected, were women (68.0 per cent), Malay (74.0 per cent), aged between 60 and 69 (62.3 per cent), married (62.4 per cent), with the highest level of education up to primary school (63.9 per cent) and unemployed (52.4 per cent).

As shown in Table 2, most of the participants had moderate social support (63.6 per cent) followed by strong support (20.1 per cent) and poor social support (16.3 per cent). The ECAQ score ranged from 0 to 10 with a mean score of 8, the majority (84.4 per cent) had normal scores, 10.8 per cent had borderline cognitive impairment whereas 4.8 per cent were cognitively impaired with borderline dementia.

Table 3 summarises the risk of cognitive impairment due to poor social support. There is about a threefold higher odds of being cognitively impaired among those who have poor social support (OR 3.1 [2.0-4.8], aOR 2.6 [1.2-5.4]  $p < 0.001$ ) Attributable risk analysis showed that 65 per cent risk of cognitive impairment in the sample was due to poor social support whereas in the population it was 24.0 per cent.

## Discussion

In this study social support was shown to be an important risk factor for cognitive impairment. Social support was measured using the OSLO social support scale which assesses social support by gauging the responses of the respondent to social network, interest and the help the elderly perceive to have received. Low social support was found to be a predictor and an attributable risk for cognitive decline in this study.

Social support has an influence on both physical and mental health.<sup>8,15</sup> Lack of social support can be a risk for morbidity and mortality<sup>10</sup> and a predictor for disease outcomes.<sup>16</sup> Elderly with good social support especially family support are less likely to experience cognitive decline<sup>17</sup> because people with more emotional support have good base line support which is a significant predictor for better cognitive function.<sup>18</sup> Studies have shown that elderly who live alone and elderly bereft of close social ties are at higher risk of cognitive decline.<sup>19</sup> Social engagement encourages communication and participation in complex interpersonal exchanges and emotional support from family and friends,<sup>20</sup> and it also increases social network size. Social networks help reduce physical health problems, psychological vulnerabilities and loneliness hence protecting against

cognitive decline<sup>2,6,11,19-21</sup> through behavioural, psychological and physiological pathways.<sup>5</sup> Elderly with no social networks have an increased risk for cognitive impairment<sup>20</sup> because social isolation accelerates cognitive and physical decline.<sup>21</sup> Elderly with larger social networks promote social, physical and cognitive engagements which have complex environments leading to diverse stimuli and requiring complex decision making resulting in complex effort and hence contributing to better cognitive functioning.<sup>2,6,22,23</sup> Studies have showed that although basic cognitive memory suffers with age<sup>24</sup> it can be delayed with mental stimulation and physical activity.<sup>8,25,26</sup> Longitudinal studies have shown that on-going participation in social engagement protects from cognitive decline.<sup>27-30</sup> Elderly who have significant social engagement even when they live alone have better health outcomes.<sup>2,30</sup> Lack of social activity not only has a negative effect on cognition but once cognitive impairment sets in, it may also decrease social participation because of losses of ability to communicate<sup>28,31</sup> thus setting a detrimental cycle.

The beneficial effects of social support on cognition and the protective effect against dementia could be due to cognitive reserve, vascular and/or stress factors.<sup>5,32,33</sup> Continued lifetime exposure to positive social environments translates into cognitive reserve that mediates the brain changes associated with cognitive decline.<sup>34</sup> Some regions of the brain respond to environmental stimulation by increasing brain volume i.e., adding new neurons. Neural systems involved in developing and maintaining large social networks also help recruit alternate neural systems to help support cognitive functioning. Thus favourable environment conditions with plenty of intellectual stimulation including physical activity, learning and social interaction help protect against cognitive decline by neural plasticity, resistance to cell death and compensating for age related degenerative changes in the neural systems.<sup>2,5,23,34-36</sup> Compensation theory suggests that the parts of the brain structure or networks which are not normally used by an individual will compensate when brain lesions or damage occurs. Thus it is postulated that large brain capacity which have large quantity of available neural networks and additional synapses and higher cognitive reserve can sustain more brain pathology before reaching a critical threshold that makes functional deficits apparent.<sup>34,37,38</sup> This is true even for an 'old brain' which is able to grow new neurons and synaptic connections and also new vasculature.<sup>35</sup> Another reason could be due to the influence of social support on stress. It is postulated that stress leads to corticosterone hyper secretion which lead to permanent loss of hippocampal neurons. Social support, by increasing self-

esteem, social competence and better mood leads to lower stress hence preventing cognitive decline.<sup>2,5</sup>

Unlike in the west where older persons are stereotyped as physically, mentally and emotionally unfit and lack the ability to be active or involved in the community,<sup>39</sup> the elderly in Asia are revered and are considered as a source of wisdom. Elderly Malaysians, like most of their counterparts in Asia, live with their kin which results in favourable psychological outcomes. The elderly living with their family members not only receive social support from family members but they also contribute to housekeeping and care of the grandchildren.<sup>11,40</sup> However the extended household system of living is beginning to erode due to the transformation of the Malaysian society into an urban society. More elderly are either left alone in the villages or, as a result of urban poverty, are left to fend for themselves.

### Limitations

There are several limitations in this study. Firstly, this study was conducted in a densely populated state with a mostly urban population which may not represent the elderly population of Malaysia. Because of the nature of the study design we are unable to correctly determine the temporality of the association between social supports on cognitive impairment. The tool used in this study was a screening tool and no diagnostic tool was used to confirm the cases of dementia. There is a probability of over-estimation of the actual cases. We propose future study using a diagnostic tool to determine the actual association of social support with cognitive impairment.

However this is the first study of its kind in Malaysia. Studies to determine the relationship of social support and cognitive impairment are important to accumulate evidence needed to convince government agencies of the need for policies for the promotion of strong social support mechanism for the elderly. Larger and longitudinal studies are needed in countries like Malaysia where no such study has ever been conducted. The findings of such studies can promote awareness not only among the public but also the lawmakers.

### Conclusion

This study shows a significant association of social support on cognition; low social support is clearly an important factor as it is associated with a quarter of all cognitive impairment in the population. Malaysia, like many other countries around Asia, always had an extended family

household system but rapid urbanization has resulted in increasing nuclear family households. This has resulted in the change in the social support system which has been in place for generations. There is an urgency to address the issue of social support especially now that the county is rapidly changing from a rural based population to an urban population. The needs of the elderly which include social networks, suitable activities and employment opportunities should be addressed. It is pertinent that caregivers of the elderly be educated on the importance of social support and the health consequences especially cognitive health consequences.

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### PEER REVIEW

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### CONFLICTS OF INTEREST

The authors declare that they have no competing interests

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### ETHICS COMMITTEE APPROVAL

The research received the approval of the Joint Penang Independent Ethics Committee (JPEC 11-0102).

**Table 1: Baseline profile of the participants**

Variables	Frequency	Percentages
<b>Age</b>		
60-69	1250	62.3
70-79	611	30.5
≥80	144	7.2
<b>Sex</b>		
Men	642	32.0
Women	1363	68.0
<b>Race</b>		
Malay	1484	74.0
Indian	310	15.5
Chinese & Others	211	10.5
<b>Religion</b>		
Islam	1487	74.2
Buddha	297	14.8
Hindu	203	10.1
Others	18	0.9
<b>Marital status</b>		
Married	1252	62.4
Widow & Divorce	573	28.6
Single	180	9.0
<b>Education level</b>		
Illiterate	144	7.2
Non formal	387	19.3
Primary	1281	63.9
Secondary & Tertiary	193	9.6
<b>Employment Status</b>		
Employed	955	47.6
Unemployed	1050	52.4
<b>Social Support</b>		
Poor	326	16.3
Moderate	1275	63.6
Strong	404	20.1

**Table 2: ECAQ scores**

Variable	Frequency	Percentage
<b>ECAQ</b>		
Minimum	0	
Maximum	10	
Mean	8	
Median	9	
<b>ECAQ Category</b>		
0-4 (cognitive impairment with probable dementia)	97	4.8
5-6 (borderline case)	217	10.8
≥7	1691	84.4

**Table 3 Poor social support as a risk factor to cognitive decline**

<b>Variable</b>	<b>Prevalence</b>	<b>Unadjusted Odds ratio</b>	<b>Adjusted odds ratio</b>	<b>Attributable risk exposed</b>	<b>Attributable risk population</b>
<b>Poor social support</b>	16.3 %	3.1 (2.0;4.8)	2.6 (1.2;5.4)	65.0 %	24.0 %