

# Predictors of geriatric sociability, loneliness and depression in the maldives.

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## Abstract

Approximately 15% of the elderly population is estimated to suffer from a mental disorder that can be addressed through early diagnosis and interventions. This paper aimed to assess the predictors of loneliness, depression and social isolation using data from 312 older adults in Maldives. Three distinct multiple linear regression models were fitted to each mental health indicator. A statistically significant association was observed among loneliness, depression and sociability. The majority of the Maldivian elderly were social, suffered mild levels of depression and low levels of loneliness. The Maldivian concept of free-living older citizens with close proximity to their families as opposed to the concept of elderly in nursing homes apart from families may have contributed to this ideal depiction. Due to the observed multicollinearity, the design of geriatric health policies, care strategies and response interventions for the elderly need to target all three mental health indicators together.

**Keywords:** Loneliness, Depression, Sociability, Elderly, Maldives.

## Introduction

The proportion of the world's population over 60 years of age is estimated to double from 12% to 22% from 2015 to 2050. Approximately 15% of the over 60 population is estimated to suffer from a mental disorder [1]. At a national level mental disorders lower a country's productivity and increases health care expenses. It becomes a burden for the family and affects the physical health of the person at an individual level. The 2016 Global strategy and Action plan on ageing and health and the Comprehensive mental health plan 2013-2020 are key responses adopted by WHO member states to address the needs of the increasing older adults in the society. Strengthening information systems, evidence and research for mental health is one of the key objectives of these responses.

This paper aimed to assess the predictors of loneliness, depression and social isolation from the analysis of data within a sample of 312 older adults aged 65 and over living in the capital city of Maldives, Male' city. With a population density of 1718 people per square kilometer, Maldives ranks sixth in the world as one of the most densely populated countries in the world [2]. More than two thirds of its population lives in the capital city [3]. According to the latest census, 5% of the total population is identified in the elderly age group [4]. In Male' city, most families live in small congested accommodations as a result of costly rents and are usually in high story buildings with stairs not elevators. As a result, the elderly may have to regularly climb up to ten floors or be confined to the living quarters for considerable periods of time. Furthermore, the congestion of the roads does not make it safe for the elderly to move about within the city. Mental disorders are on the rise

in the island nation but studies of geriatric mental disorders are rare. Contrary to many of the developed countries, the Maldives advocates the concept of free-living older citizens with close proximity to their families as opposed to the concept of nursing homes for the elderly. The aim of this paper was to document the associations between demographic and social determinants and three mental health issues (loneliness, depression and sociability) among the older adults living in the small island city.

## Methods

### Research design and setting

This is a descriptive quantitative study conducted in Male' city of the Maldives. According to the Department of National Registration (DNR), the current elderly population of permanent residents in Male' city is 2572 of which 1605 were between 65 to 75 years. The study was targeted to Male' city because a large population from all age groups and from all inhabited islands live in the capital city Male.

### Study sample

Samples were selected through a stratified random sampling process. Each of the four wards of Male' city represented a stratum. Lists of households and addresses along with names of elderly age group between 65 to 75 years were obtained from the DNR. The online sample size calculator Raosoft was used to calculate the total sample size of 311, which was equally divided among the 4 wards; estimation for each ward was 77.75 samples. Households for data collection were selected randomly from the DNR list. The exclusion criteria

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were older adults suffering from chronic illnesses such as cancer, renal failure and paralysis, hospitalized patients and mentally ill or diagnosed patients.

### **Instrumentation**

Data was collected using 3 standard tools which are commonly used to assess loneliness, depression and social isolation of adults in similar studies. The UCLA loneliness scale [5] was used to measure loneliness using 10 positively worded and 10 negatively worded items. The total score of this scale ranges from 0 (never lonely) to 3 (often lonely). Scores are calculated by summing up the answers to all the statements and a score of 50–60 (60 being the highest) is considered as a moderately high degree of loneliness, score between 35–49 is moderate degree of loneliness, 20–34 is low degree of loneliness and less than 20 indicates no loneliness. The Centre for Epidemiologic Studies Depression (CES-D) scale [6] was used as a screening tool to assess depressive feelings experienced in the past week. The people with scores ranging from 0-9 indicate not experiencing any signs of depression. While people with scores from 10-15 are mildly depressed, scores between 16-24 is a moderate indication of being depressed and more than 25 is considered as severely depressed. The Eysenck Personality Questionnaire Revised [7] EPQ-R revised version is a sociability subscale which is recognized as a multi-dimensional modular inventory. The 4-scale inventory measures the personality traits includes P-Psychoticism (Tough- Mindedness), E-Extraversion (Sociability), N-Neuroticism (Emotionality) and L-Lie. A score of 0-10 on the E- scale (Sociability) is considered as severe introversion and greater than 10 as extreme extroversion.

### **Data collection procedure**

Questions were administered verbally and read aloud, and participant's answers were recorded by the researcher on the questionnaire. Clear explanation was given to the participants and if participants had any difficulty in answering, proper guidance and further explanation were given. Participants were interviewed in a comfortable environment in a convenient place of their choice.

### **Data analysis, reliability and validity**

Data was entered into and analyzed using SPSS, 20th version. The 3 scales used in the study are internationally validated tools and are freely available online. A Maldivian psychotherapist confirmed that the UCLA loneliness scale and EPQ-R are generally used in clinical practices in the Maldives too. Questionnaires were translated into Dhivehi language to maintain consistency and to limit interviewing biases. The translation was done by an experienced and qualified Dhivehi language lecturer with 21 years of teaching experience.

The translation was rechecked and revised by an independent proofreader, who was an experienced translator. The questionnaire was pilot tested on 15 participants of the same age group that tested the cultural sensitivity of the questions, sequence and pattern of the questions.

### **Ethics**

This study probed the personal information of participants. Hence, participants were assured their privacy, anonymity and confidentiality. The participants were given a code to ensure anonymity and were informed that their answers will be confidential, and that the findings will be presented on an aggregate basis. Interviews were conducted on a voluntary basis and participants were given the right to withdraw at any time during the study. A written informed consent was obtained from all participants. Electronic data were stored on an encrypted storage drive and backups of the data were encrypted and only accessible by the researcher. Therefore, any risks of physical, psychological, social and legal were minimized to the extent to which they are negligible. The ethical approval to conduct the study was given by the International Research Institute of Villa College / Maldives on 18 March 2018 under Ref no: VC/IRI/2018/036.

### **Result**

Analysis of the characteristics of the sampled elderly in Table 1 shows that the physical condition (p value=0.05) and living condition (p value=0.01) had significant association with sociability scores. The elderly who have a very low physical condition and who lives alone had lower sociability scores compared to their counterparts. No demographic characteristic, health condition or living arrangement was found to have a significant relationship with loneliness and depression.

Using the cutoff points in the loneliness, depression and sociability scales on Figure 1 shows that the average loneliness score was 23 which indicate low degree of loneliness among the elderly. Average depression score was 11 which specify mild depression among majority of the elderly. Sociability score was 16 indicating that the majority of Maldivian elderly were social (extroverts) (Table 2).

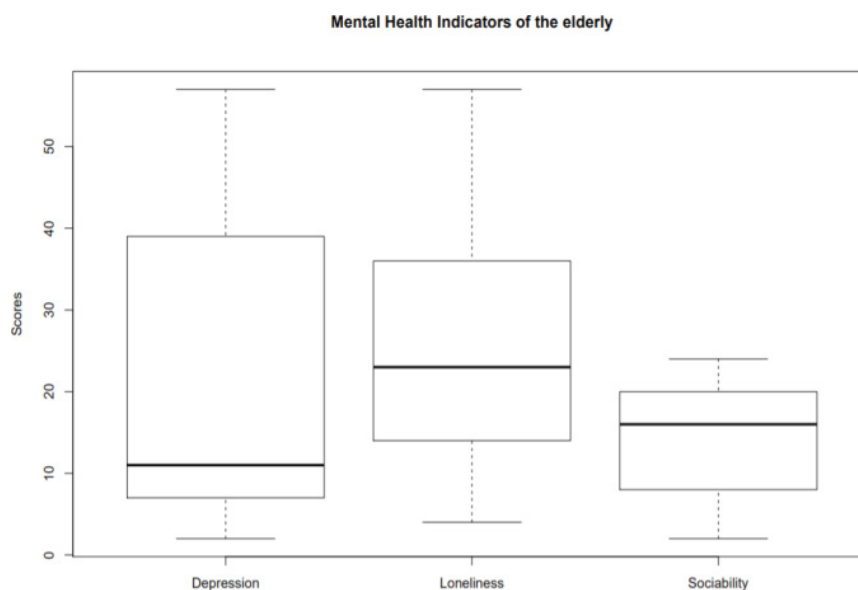
Further subgroup analysis shows that 29% of the elderly are suffering from depression and 35% are not sociable (Table 3).

Due to the level of multicollinearity observed among loneliness, depression and sociability, three distinct multiple linear regression models were fitted to each of the mental health indicators. As the standard error of the collinear variable did not increase prominently, the two beta variables were kept in the model. Of the three models, the model fitted for depression explained the largest percentage of the variations in the dependent variable (73%). Mental health of the older adults was not associated with demographic factors or with their health conditions or their living arrangements. After adjusting for demographic variables, health conditions and living arrangements, a strong relationship was observed between loneliness, depression and sociability. One unit increase in the loneliness score was associated with an increase of 0.77 units of the depression score [Adj coeff: 0.77, 95%CI: 0.68, 0.86, *P-value*<0.001]. An increase in the sociability score of 1 unit was associated with a reduction of 0.82 units in the depression score [Adj coeff: -0.82, 95%CI:-1.02, -0.62, *P-value*<0.001] and 0.20 units in the loneliness score [Adj coeff: -0.2, 95%CI: -0.4, 0, *P-value*: 0.03].

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**Table 1:** Characteristics of the elderly Maldivians by loneliness, depression, and sociability scores.

Predictors	N (%)	Loneliness Score Median (IQR)	P value	Depression Score Median (IQR)	P value	Sociability Score Median (IQR)	P value
<b>Total</b>	<b>312</b>	<b>23</b>		<b>11</b>		<b>16</b>	
<b>Gender</b>							
Female	151	29 (23.5)	0.58	12.0 (32.0)	0.07	14	0.37
Male	161	21 (20.0)		9 (30.0)		16	
<b>Marital Status</b>							
Married	235	21 (21.0)	0.24	10.0 (31.0)	0.92	16	0.87
Divorced	41	32 (18.0)		12.0 (34.0)		17	
Widowed	36	26.5 (23.5)		10.5 (33.25)		17	
<b>Education</b>							
Basic literacy	107	30.0 (21.0)	0.39	12.0 (31.5)	0.06	14	0.12
Grade 7	108	30.0 (22.75)		11.5 (32.25)		14	
Grade 8	34	13.5 (7.75)		8.0 (4.0)		19	
Grade 9	18	14.5 (8.25)		8.5 (5.0)		18	
Grade 10	3	30.0 (28.0)		11.5 (34.25)		11	
>Grade 10	8	35.0 (20.75)		18.5 (32.25)		8	
<b>Living Condition</b>							
Alone	25	19.0 (28.0)	0.18	11.0 (32.0)	0.65	12	0.01
With Family	201	21.0 (22.0)		10.0 (31.0)		18	
With partner	86	28.0 (20.75)		11.0 (32.75)		14	
<b>Relationship with Family</b>							
Good	209	24.0 (22.0)	0.88	11.0 (32.0)	0.11	15	0.52
Moderate	31	19.0 (20.5)		11.0 (32.5)		18	
Low	43	22.0 (20.5)		11.0 (21.5)		16	
Very low	29	21.0 (21.0)		10.0 (33.0)		16	
<b>Relationship with Relatives</b>							
Good	193	24.0 (22.0)	0.58	11.0 (31.0)	0.22	16	1
Moderate	41	21.0 (29.0)		10.0 (33.0)		16	
Low	38	22.5 (24.25)		10.0 (30.5)		16	
Very low	40	20.0 (20.25)		11.0 (34.25)		16	
<b>Relationship with neighbors</b>							
Good	147	24.0 (23.5)	0.32	11.0 (31.5)	0.12	16	0.47
Moderate	25	29.0 (24.0)		10.0 (37.0)		18	
Low	100	20.0 (20.0)		9.5 (9.25)		16	
Very low	40	23.5 (20.0)		12.0 (33.25)		14	
<b>Physical Condition</b>							
Good	166	25.0 (22.0)	0.74	12.0 (33.0)	0.34	16	0.05
Moderate	71	20.0 (21.0)		9.0 (5.0)		16	
Low	34	17.0 (19.75)		10.0 (23.5)		17	
Very low	40	30.5 (19.25)		12.0 (34.0)		11	
<b>Social communication</b>							
Good	130	23.0 (22.0)	0.85	10.0 (32.75)	0.71	16	0.49
Moderate	58	26.0 (20.75)		10.5 (29.75)		16	
Low	84	22.0 (21.0)		11.0 (32.0)		15	
Very low	40	25.5 (23.0)		12.0 (31.75)		14	
<b>General Health</b>							
Good	121	22.0 (20.0)	0.26	11.0 (11.0)	0.69	16	0.5
Moderate	71	21.0 (22.5)		9.0 (10.5)		16	
Low	61	30.0 (21.0)		11.0 (33.0)		16	
Very low	59	30.0 (27.0)		12.0 (33.0)		14	
<b>Long term medication</b>							
Yes	165	22.0 (24.0)	0.26	11.0 (32.0)	0.64	14	0.1
No	147	24.0 (20.5)		11.0 (31.0)		16	



**Figure 1:** Mental Health Indicators of the Maldivian older adults.

**Table 2:** Mental Health Indicators of the Maldivian older adults.

	Low	Mild	Moderate	High
	N (%)	N (%)	N (%)	N (%)
Loneliness	225 (72.1)	----	76(24.4)	11(3.5)
Depression	137 (43.9)	73(23.4)	11(3.5)	91(29.2)
Less Sociable: 111 (35.6%)				
Sociable: 201 (64.4%)				

**Table 3:** Predictors of Loneliness among the Maldivian elderly.

Predictors	Adjusted Coeff (95%CI)	P-value (t.test)	P-value (F.test)	Adj R-squared
<b>Model 1: Predictors of Loneliness</b>				
Depression	0.63 (0.55,0.7)	< 0.001	< 0.001	0.682
Sociability	(-0.2 ) (-0.4, 0)	0.051	0.037	
<b>Model2: Predictors of Depression</b>				
Loneliness	0.77 (0.68, 0.86)	< 0.001	< 0.001	0.7357
Sociability	(-0.82) (-1.02, -0.62)	< 0.001	< 0.001	
<b>Model 3: Predictors of Sociability</b>				
Depression	(0.22) (-0.27, -0.16)	< 0.001	< 0.001	0.4947
Loneliness	(-0.06) (-0.13, 0)	0.051	0.034	
Marital Status	0.71 (-0.06, 1.48)	0.072	0.041	

## Discussion

Majority of the Maldivian elderly were social, experienced low degree of loneliness and mild levels of depression. However, 29% of the elderly suffer from depression, 35% were not sociable and 3.5% suffer high degrees of loneliness, which calls for customized interventions for these subgroups. High levels of depression and loneliness have been observed among the elderly living in institutional care such as old age homes [8, 9]. Although none of the elderly in the Maldivian sample was in institutional care, more than a quarter of the sample has suffered from depression and a third are introversive, which calls for targeted measures. In the context of community dwelling elderly, people with an integrated social network have been found to have comparatively better mental health indicators than those without such a network

[10, 11]. Even among community dwellers, factors such as living alone, female gender and visual impairments (Inoue K and Matsumoto M, 2001) have forced home boundedness that would negatively affect their mental status. Interventions such as group therapy to enhance self-esteem [12] contact with family [13] have resulted in lower mean loneliness and raised self-satisfaction levels among the elderly.

In this study, no association was found between the demographic characteristics, the living arrangement, the health of the elderly against levels of depression and loneliness. However, the physical condition of the elderly and the living arrangements were significantly associated with their sociability scores. A study conducted as long as 35 years ago have also demonstrated that perceived health and housing satisfaction to contribute to the well-being among

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the elderly [14]. Contradictory to the findings of this study, many literature have observed that gender, education [15], widowhood, negative health status [16], income and living with extended families [17] makes a difference in the mental health indicators of the elderly. This may be explained by the homogeneity of the elderly sample that was taken for this study where education and health care is universally provided by the government.

A strong association was observed among depression, loneliness and sociability among the elderly; whereby an increase in loneliness score prompted an increase in depression and an increase in the sociability score decreased the depression score. A review of psychological aspects of loneliness confirms the findings of this study that loneliness can lead to various other psychiatric disorders like depression, alcohol abuse, child abuse and sleep problems [18]. Similar findings have been observed among Indians [19, 20] and Japanese elderly that self-rated health was associated with their ability to go out alone [21]. Also, the United States of America and the Sweden [22] and the Ireland [23] showing loneliness as a significant mediator for many other mental health parameters among the elderly. These evidences prompt the call for strategies that target combined determinants of health of the elderly [24].

## Conclusion

The study concludes that even in the urbanized and congested small city, the majority of the Maldivian elderly were social, suffered from mild levels of depression and low levels of loneliness. The Maldivian concept of free-living older citizens where most lives close to their families as opposed to the concept of elderly in nursing homes apart from families may have contributed to this ideal depiction. However, it has highlighted the need for targeted interventions to trace and locate the elderly vulnerable-populations who are desperate for social support and care. Loneliness, depression and sociability among the elderly were found to be strongly associated although there were no correlations with demographic or health factors of the elderly. Due to this multi-collinearity among loneliness, depression and sociability, the design of geriatric health policies, care strategies and response interventions for the elderly need to target all the three mental health indicators together. Prioritizing sociability of the older adults can reduce loneliness and depression.

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