ORIGINAL ARTICLE

Factors associated with mild cognitive impairment among the community-dwelling elderly in the urban area of Kyauk Tan Township, Myanmar

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Abstract

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Dementia and its related cognitive impairment diseases are one of the main contributors of disability in older people. This study is aimed for screening of the elderly population with mild cognitive impairment (MCI) in the urban area of Kyauk Tan Township in Yangon Region, Myanmar and also identifying the important associated factors of MCI in the local context. A cross-sectional study design was conducted in the form of household visit interviews by using the structured questionnaires for 350 elderly in the urban area of Kyauk Tan Township.

The prevalence of mild cognitive impairment was 21% with the mean age of 70 years. Using Chi-square test for association, significantly associated factors with MCI included four socio-demographic factors (age, gender, education, and occupation), five life-style factors (alcohol drinking, physical activeness, regular meal, leisure activities and fish intake), one comorbid factor (depression), three family factors (individual income, family income and family support) and all three social factors (social network, social activities, and religiousness). Five factors including age, education level, physical activities, leisure activities and social network size were detected to have significant association with MCI when multiple logistic regressions was performed.

Investigation of MCI and associated factors is important for planning the intervention programs effectively for the cognitive functional ability among the elderly.

Keywords: mild cognitive impairment, elderly, associated factors, Myanmar

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ปัจจัยที่มีความสัมพันธ์กับการหลงลืมระยะเริ่มต้นของผู้สูงอายุในชุมชนเขตเมืองในเมืองกักตาลประเทศพม่า

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บทคัดย่อ

ซูเลมน ศริยามน ติรพัฒน์ และอิสรีย์ฐิกา ชัยสวัสดิ์
ปัจจัยที่มีความสัมพันธ์กับการหลงลืมระยะเริ่มต้นของผู้สูงอายุในชุมชนเขตเมืองในเมืองกักตาล ประเทศพม่า
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ภาวะสมองเสื่อมและกลุ่มอาการหลงลืม เป็นสาเหตุสำคัญของความพิการในผู้สูงอายุ การศึกษาครั้งนี้มีวัตถุประสงค์เพื่อคัดกรองประชากรผู้สูงอายุที่มี ภาวะอาการหลงลืมเริ่มต้น ในเขตเมือง กัก ตาล อำเภอ ย่างกุ้ง ประเทศพม่า นอกจากนี้การศึกษายังต้องการทราบถึงปัจจัยที่เกี่ยวข้องกับภาวะอาการหลงลืมเริ่มต้น การศึกษาภาคตัดขวางถูกสร้างขึ้นในรูปแบบของการสัมภาษณ์โดยใช้แบบสอบถามสำหรับผู้สูงอายุ 350 ราย ในเขตเมืองในเขตเมืองกักตาล

พบว่าความชุกของการหลงลืมระยะเริ่มต้น มีค่าเท่ากับ 21% จากอายุเฉลี่ยของประชากรเท่ากับ 70 ปี การทดสอบไคสแควร์ชี้ให้เห็นว่า ปัจจัยที่เกี่ยวข้องอย่างมีนัยสำคัญสำหรับการหลงลืมเระยะเริ่มต้น ได้แก่ ปัจจัยทางสังคมและประชากร (อายุ เพศ การศึกษา และ อาชีพ) ปัจจัยวิถีชีวิต (การดื่มเครื่องดื่มแอลกอฮอล์ กิจกรรมมทางกายภาพ อาหารที่รับประทาน กิจกรรมสันทนาการ และการบริโภคปลา) ปัจจัยที่ เกี่ยวเนื่องกับโรคร่วม (โรคซึมเศร้า) ปัจจัยครอบครัว (รายได้บุคคล รายได้ของครอบครัว และการสนับสนุนของครอบครัว) และปัจจัยทางสังคม (เครือข่ายสังคม, กิจกรรมทางสังคม และการเคร่งศาสนา). การวิเคราะห์การถดถอยโลจิสติกหพหุคูณพบว่าปัจจัยเสี่ยงที่สำคัญของ การหลงลืมระยะเริ่มต้นมีห้าปัจจัย ได้แก่ อายุ ระดับการศึกษา กิจกรรมการออกกำลังกาย กิจกรรมสันทนาการ และขนาดเครือข่ายทางสังคม

การศึกษาภาวะการหลงลืมและปัจจัยที่เกี่ยวข้องเป็นสิ่งสำคัญสำหรับการวางแผนเพื่อช่วยให้ผู้สูงอายุมีความสามารถในการทำงานของสมองอย่างมีประสิทธิภาพ

คำสำคัญ: การหลงลืมระยะเริ่มต้น ผู้สูงอายุ ปัจจัยที่มีความสัมพันธ์ ประเทศพม่า

Introduction

Population aging is occurring in all regions and all countries of different developmental status with the fastest progress in developing countries[1]. In Myanmar, according to 2014 census data, the population distribution for the old-aged group (65 years and over) has increased up to 5.8 per cent from 3.7 and 3.9 per cent in 1973 and 1983 respectively and it is expected to reach 21.4% in 2050[2]. In accordance with the population aging, the age-related health problems become an important issue of public health concern[3]. Dementia takes place one of the main contributors of disability in older people[4] and mild cognitive impairment (MCI) has a linear progression of conversion to dementia over time[5-8] although MCI can probably return to normal cognitive ability[9-11]. In Myanmar, the elderly care is substantially relied upon the family members, the caregivers have to face high social, financial and psychological burdens in their daily lives if they have demented patients.

Mild Cognitive Impairment(MCI) is defined as a transitional stage of the cognitive decline between normal aging process and dementia[5]. It is a syndrome in which the cognitive decline exceeds the expected level for healthy aging with a specified level of education status but cannot be yet defined as dementia[5, 12-13]. Recommendations for MCI criteria were formulated by the International Working Group on Mild Cognitive Impairment in 2004 and it includes three factors which are 1) the individual must not be normal or dementia, 2) it is needed to have a clinical manifestation of cognitive deterioration, either with objective measures or subjective complaints, and 3) preservation of basic activities of daily life and normal or minimum deficit of instrumental functions[14].

The prevalence of MCI is quite varied around the globe, having a range from around 3% to 42% according to a recent review of the studies of MCI prevalence[15]. This substantial variance in MCI prevalence is thought to be due to application of inconsistent diagnostic criteria and different methodologies for assessment as well as divergent demographic characteristics and recruitment processes[16]. Among MCI screening tools, a standardized screening tool for MCI called Montreal Cognitive Assessment (MoCA) was designed as a rapid screening instrument for mild cognitive dysfunction and widely used in over 100 countries all over the world and available in many translated versions in 46 languages and dialects. This scale is well suited for the screening of MCI for researchers with minimal training and only takes around 10-15 min so best fit for the studies with time limitation[17-18].

Many studies were finished in other countries showing various results of that the relationship between MCI and increasing age, education level, lifestyle factors, comorbidities, family factors and social factors. Several studies proved that increasing age and low education attainment are strong risk factors for the occurrance of cognitive impairments in low and middle income countries[19-22]. Unhealthy behaviors such as smoking, alcohol drinking and physical inactiveness were also found as risk factors of MCI[23-25]. Many studies also have confirmed that family and/or social support has a positive relationship with physical and mental health of older parents[26]. Although many research examined risk factors associated with MCI globally, there is a lack of study in Myanmar investigating the prevalence and risk factors of MCI, especially in community based older population.

The objectives of this study were to screen the elderly population with MCI in the urban area of Kyauk Tan Township in Yangon Region, Myanmar and to identify the important associated factors of MCI in the local context. Although a series of studies have conducted in many countries worldwide, the awareness of cognitive-related problems is very low in Myanmar and few study about dementia and mild cognitive impairment (MCI) is currently accessible in Myanmar. Therefore, this study is a good start for the screening of MCI and assessment of its associated factors in Myanmar context.

Methods

All dementia-free elderly (60 years and above) living in the community of the urban areas of Kyauk Tan Township were the target population for this study. The respondents were invited for the study after explaining about the nature of the study and getting the informed consent. Individuals were excluded if they had communication difficulties like mute or deaf, intelligent disability and acute psychotic stage, had severe medical problems causing physical distress, were totally unable to read/write or if they were not permanently residing in study area (visitors) and religious personnel.

Sampling procedure followed the 2-stage sampling framework. Kyauk Tan Township is composed of six wards in the urban area. Firstly the wards were purposively selected 4 out of 6 according to the highness of the elderly population. The sample population was then randomly selected from elected four wards. From each ward, the sample population was collected according to the calculated proportion. According to the Yamane's formula, the calculated sample size was about 333 and to cover data incompleteness, extra 5% was added to this population and became 350.

An ethical approval was sought from the Committee for Research Ethics (Social Sciences), Mahidol University, Thailand, certificate of approval number: 2016/072.0103 and Ethics Review Committee of Department of Medical Research, Myanmar, Letter No. 1273/Yangon/Research. A written/verbal consent (which state overall purpose and any risks or benefits of participating) was obtained from each participant before administration of the questionnaire. In order to ensure the privacy concern for the participants during answering the screening test, an appropriate space for the interview was created at the place of residents.

The specific study area was in the urban area of the remote township of Yangon Region and so the mixed features of urban and rural characteristics could be observed. Kyauk Tan Township was comprised of the elderly population about 9,000 elderly with urban and rural ratio was about 1:2.5.

The required information for the resident lists of elderly population was received from the Township Hospital records. Nurses from the respective areas introduced the research teams to the local authorized persons for understanding the objectives of the study. The participants who fulfilled the inclusion and exclusion criteria were explained thoroughly about the nature of the research and the interview was started after receiving informed consent from the individuals.

This study was carried out by a main researcher and four research assistants who were given a one-day intensive training by the major researcher. The research assistants with skills and experiences in data collection for the community field during the academic work were graduated with medicine and vol-

untarily helped for the research. The major researcher took the examination of cognitive assessment for the elderly by using the standardized assessment tool called "Montreal Cognitive Assessment (MoCA)" and the research assistants continued for the rest part of the questionnaires by means of face-to-face interview. All the questionnaires were collected at the end of the day back from the interviewers and attached with the examination part of the paper. Approximately 40 minutes was taken to complete the whole set of questionnaire. The data collection period took five weeks from 1st week of April to 2nd week of May in 2016.

For dependent variable, screening test for MCI among the elderly was performed by using the standardized screening assessment tool called "Montreal Cognitive Assessment (MoCA)". Before conducting the screening test for MCI, the elderly who were filtered with the exclusion criteria were firstly assessed for the daily functional status by using Katz Index of Independence in Activities of Daily Living (Katz's ADL). The Montreal Cognitive Assessment (MoCA) was designed as a rapid screening instrument for mild cognitive dysfunction. Many studies which assessed the best instrument for the screening of cognitive impairment also strongly recommend this MoCA with the sensitivity of 90% and specificity of 87% (www.mocatest.org).

For independent variables, the pre-structured questionnaires were used by the research assistants in the form of interviews. These included five components – socio-demographic factors (age, gender, marital status, education level and occupational status), life-style factors (smoking, alcohol, physical activeness, leisure activities and dietary habits), comorbidities (history of hypertension, diabetes mellitus and stroke and depression was assessed using Geriatric Depression Scale-GDS), family factors (monthly income, living arrangements and family support) and social factors (social network size and social activity participation).

Validity was checked and improved by the advisory committee and language clearness for translation was done by two language experts. The reliability was checked after the pilot study by the senior psychiatrist. Cronbach α scale was calculated, for family support and religiousness questionnaires, showing the initial score of 0.34 and 0.51 after some modification, the score was increased to 0.75 and 0.65. Physical activeness and leisure activities were the alpha of 0.76 and 0.61 respectively. Depression was assessed with Geriatric Depression Scale (GDS-15) and the reliability coefficient was 0.81. For the assessment screening tools – Katz's Index of ADL and MoCA, the Cronbach α scale was shown as 0.92 and 0.71 respectively.

With the permission from the clinic director of MoCA clinic and institute, MoCA assessment tool was translated to Myanmar by supervision of 2 language experts (Myanmar and English professors) and one senior psychiatrist for the language consistency and technical interpretation. The present study followed the scoring interpretation of the original criteria, which was that score more than 26 (25 if less than 12 years of education) was considered as normal.

Statistical analysis was performed with SPSS version 22. Descriptive analysis was done firstly for each variable. Mean, medium and mode were analyzed for quantitative data and number and percentage were used for description of qualitative data. Pearson's Chi-square test was used to examine

the association for each factor with the MCI. After analysis by Chi-square test, the significant factors were put together to analysis for the full model by multiple logistic regression. Then, only the significant risk factors from the full model were analyzed again for the final model of MLR. P-value less than 0.05 was considered as statistically significant result.

Results

For cognitive assessment by MoCA, the total score showed the overall prevalence of MCI as 21%. Age of the respondents ranged from 60 to 89 years old with an average age of 70 years. Males constituted 34% of the participants while a larger proportion of 66% was females. For each specific age group, males were dispersed in the proportion of 16%, 12% and 6% corresponding to the different three groups of 60-69 years, 70-79 years and 80-89 years and on the other hand; females were 37%, 23% and 6% respectively. About half of the elderly (51%) were still married while 37% had lost their spouse. On the other hand, 6% were single and 5% were separated.

About half of the elderly attained medium level of education with the percentage of 57.4 while both low education level and high education level were almost equal as 20.3% and 22.3% accordingly. Only 18% of the elderly were currently working either for a paid job or non-paid volunteer work. The rest of the elderly (82%) were dependent and they just did house chores. Regarding the types of occupation, highest number of elderly was working for their own household business (35%). Farmers constituted 15%. 20% of the respondents worked as civil servants or were doing their profession. 12% of the elderly did other job types which were not included in the list and 18% were dependent.

Chi-square test was used to examine the association between the MCI and the factors of interest. The significantly associated factors were four socio-demographic factors (age, gender, education, and occupation), five life-style factors (alcohol drinking, physical activeness, regular meal, leisure activities and fish intake), one comorbid factor (depression), three family factors (individual income, family income and family support) and all three social factors (social network, social activities and religiousness). The analysis results of Chi-square test and univariate logistic regression are summarized in Table 1, 2 and 3.

In multiple logistic regression full model, age, education, physical activeness, social network and leisure activities were significantly associated with MCI. The advanced age showed about five times higher risk to have MCI (Adj. OR=5.18, 95%CI=1.76-15.30) than the younger elderly. Elderly group with low education level was about fifty-one times (Adj. OR=51.18, 95%CI=5.97-438.80) and medium level was almost twenty-three times (Adj. OR=23.76, 95%CI=2.91-193.89) higher risk of MCI compared to those with high education level. Physically inactive elderly people were three times higher chance of getting MCI than physically active ones (Adj. OR=3.40, 95%CI=1.53-7.55). Elderly who did the least leisure activities were seven times (Adj. OR=7.49, 95%CI=3.04-18.49) more likely to have MCI than the group with more leisure activities. Elderly who had small size of social network were nearly six times higher risk of MCI than those having large size of social network (Adj. OR=5.89, 95%CI=2.78-12.45). Table 4 shows the summary results of full model of multiple logistic regressions (MLR) and final model of MLR is shown in Table 5.

Table 1 Association of socio-demographic factors with MCI

Factors	n	Yes %	No %	Mild Cognitive Impairment Unadjusted OR (95% CI)	Chi-square p-value
Age groups (years)					**<.001** **
60-69	185	13.0	7.0	1	
70-79	124	24.2	75.8	2.14 (1.18-3.88)	**0.012**
80 and above	41	53.7	46.3	7.77 (3.67-16.42)	**<.001** **
Gender					**0.016** *
Male	119	14.3	85.7	1	
Female	231	25.5	74.5	2.06 (1.76-2.36)	**0.017**
Marital status					0.165
Single	21	23.8	76.2	1.46 (0.91-2.00)	0.494
Married	181	17.7	82.3	1	
Separated	19	15.8	84.2	0.87 (0.21-1.53)	0.837
Widow	129	27.9	72.1	1.80 (1.53-2.08)	**0.033**
Education levels					**<.001** **
Low	71	49.3	50.7	74.86(9.86-568.16)	**<.001**
Medium	201	19.9	80.1	19.13(2.58-141.75)	**0.004**
High	78	1.3	98.7	1	
Working status					0.331
Yes	64	17.2	82.8	1	
No	286	22.7	77.3	1.42 (1.06-1.78)	0.333
Occupation					**0.007** **
Dependent	63	20.6	79.4	0.69 (0.22-1.71)	0.430
Farmer (inc. livestock)	52	26.9	73.1	0.98 (0.40-2.42)	0.970
Own account worker	122	27.0	73.0	0.99 (0.46-2.15)	0.980
Civil servant/ professional	69	5.8	94.2	0.16 (0.05-0.55)	**0.003** **
Others	44	24.4	75.6	1	

*p-value < 0.05, ** p-value < 0.01

Table 2 Association of lifestyle factors and comorbidities with MCI

Factors	n	Yes %	No %	Mild Cognitive Impairment Unadjusted OR (95% CI)	Chi-square p-value
Smoking					0.772
Never	195	21.0	79.0	1	
Current smoker	78	20.5	79.5	0.97 (0.64-1.30)	0.925
Stopped	77	24.7	75.3	1.23 (0.91-1.55)	0.514
Alcohol					**0.038** *
Never	296	24.0	76.0	1	
Current drinker	11	0	100	0.000	0.999
Stopped	43	11.6	88.4	0.42 (0.16-1.10)	0.077
Physical activeness					**<.001** **
Inactive	61	39.3	60.7	9.88 (9.57-10.19)	**<.001** **
Active	289	13.5	86.5	1	
Regular meal					**0.007** **
Yes	321	19.9	80.1	1	
No	29	41.4	58.6	2.84 (2.43-3.24)	0.010 **
Leisure activities					**<.001** **
Less	83	55.4	44.6	18.76 (18.38-19.14)	**<.001** **
Medium	90	21.1	78.9	4.04 (3.63-4.44)	**0.001**
High	177	6.2	93.8	1	
Intake of fish					**0.009** **
Low	86	32.6	67.4	3.02 (2.63-3.40)	**0.004** **
Medium	177	20.3	79.7	1.60 (0.78-3.25)	0.198
High	87	13.8	86.2	1	
Intake of eggs					0.176
More	174	24.7	75.3	1.42 (0.85-2.37)	
Less	176	18.8	81.3	1	0.177
Vitamins					0.848
Yes	167	22.2	77.8	1.05 (0.79-1.31)	0.848
No	183	21.3	78.7	1	
Coffee/tea					0.561
More	153	20.3	79.7	1	
Less	197	22.8	77.2	1.17 (0.90-1.43)	0.561
Diabetes Mellitus					0.242
Yes	41	14.6	85.4	1	
No	309	22.7	77.3	1.71 (1.25-2.17)	0.247
Hypertension					0.152
Yes	168	25.0	75.0	1.45 (0.87-2.42)	0.153
No	182	18.7	81.3	1	
Stroke					0.869
Yes	15	20.0	80.0	1	
No	335	21.8	78.2	1.12 (0.46-1.77)	0.869
Depression					**<0.001** **
Yes	15	73.3	26.7	11.42 (10.82-12.02)	
No	335	19.4	80.6	1	**<0.001** **

*p-value < 0.05, ** p-value < 0.01

Table 3 Association of family and social factors with MCI

Factors	n	Yes %	No %	Mild Cognitive Impairment Unadjusted OR (95% CI)	Chi-square p-value
Own monthly income					**0.009** **
Yes	147	15.0	85.0	1	
No	203	26.6	73.4	2.06(1.19-3.57)	**0.010** **
Family history					0.914 *
Yes	24	20.8	79.2	0.95 (0.43-1.47)	0.914
No	326	21.8	78.2	1	
Family income					**<.001** **
Low	32	53.1	46.9	4.66 (4.15-5.17)	**0.003**
Medium	272	18.4	81.6	0.93 (0.52-1.33)	0.849
High	46	19.6	80.4	1	
Family support					**0.006** *
Good	159	15.1	84.9	1	
Poor	191	27.2	72.8	2.10 (1.83-2.38)	**0.007**
Social network		12.6			**<.001** **
Large	269	51.9	87.4	1	
Small	81		48.1	7.44 (7.16-7.73)	**<.001** **
Social activities					**<.001** **
Less	214	29.4	70.6	3.95 (3.62-4.28)	**<.001** **
More	136	9.6	90.4	1	
Religiousness					**<.001** **
More religiousness	316	18.7	81.3	1	
Less religiousness	34	50.0	50.0	4.36 (3.98-4.73)	**<.001** **

*p-value < 0.05, ** p-value < 0.01

Table 4 Factors associated with MCI by multiple logistic regressions (full model)

Variables		Adj. OR	95% CI for OR		
			Lower	Upper	p-value
Age groups	60-69	1			
	70-79	2.60	1.06	6.39	**0.038** *
	80 and above	5.92	1.65	21.23	**0.006** **
Gender	Male	0.65	0.20	2.07	0.460
	Female	1			
Marital status	Single	1.86	0.74	4.71	0.188
	Married	0.52	0.08	3.43	0.495
	Separated	0.65	0.11	3.69	0.625
	Widow	1			
Education level	Low	86.50	6.79	1102.13	**0.001** **
	Medium	34.67	2.98	403.20	**0.005** **
	High	1			
Occupation	Dependent	1.45	0.29	7.16	0.649
	Farmer(inc. livestock)	1.51	0.32	7.25	0.604
	Own account worker	2.03	0.51	8.12	0.318
	Civil servant/ professional	3.59	0.45	28.35	0.226
	Others	1			
Physical activeness	Inactive	2.84	1.12	7.17	**0.027** *
	Active	1			
Regular meal	Yes	1.25	0.39	4.08	0.707
	No	1			
Leisure activities	Less	8.99	2.99	26.96	**<.001** **
	Medium	2.25	0.82	6.18	0.116
	High	1			
Intake of fish	Low	2.42	0.77	7.55	0.129
	Medium	1.14	0.43	3.07	0.791
	High	1			
Depression	Yes	1			
	No	0.21	0.04	1.11	0.067
Own monthly income	Yes	1			
	No	1.83	0.77	4.35	0.170
Family income	Low	1.43	0.24	8.46	0.691
	Medium	0.45	0.13	1.58	0.212
	High	1			
Family support	Good	1			
	Poor	1.14	0.45	2.88	0.778
Social network	Large	1			
	Small	7.16	2.84	18.02	**<.001** **
Social activities	More	1			
	Less	0.63	0.23	1.73	0.374
Religiousness	More	1			
	Less	2.08	0.58	7.47	0.263

*p-value < 0.05, ** p-value < 0.01

Table 5 Factors associated with MCI by multiple logistic regressions (final model)

Variables		Adj. OR	95% CI for OR		
			Lower	Upper	p-value
Age groups (years)	60-69	1			
	70-79	2.26	1.86	2.66	**0.041**
	80 and above	5.18	4.63	5.74	**0.003**
Education level	Low	51.18	5.97	438.80	**<0.001**
	Medium	23.76	2.91	193.89	**0.003**
	High	1			
Physical activeness	Inactive	3.40	1.53	7.55	**0.003**
	Active	1			
Leisure activities	Less	7.49	3.04	18.49	**<0.001**
	Medium	2.21	0.89	5.45	0.086
	High	1			
Social network	Large	1			
	Small	5.89	2.78	12.45	**<0.001**

Discussion

Mild cognitive impairment (MCI) can be regarded as the transitional area between the normal range of cognitive decline due to older age and dementia. Although it does not make significant limitations for daily activities, the presence of MCI can be a foretelling condition for transition into dementia in the future[12]. The definite cause of MCI cannot be identified but MCI is believed to have etiological heterogeneity[27].

The major population-based studies according to the expanded Mayo Clinic Criteria showed the average prevalence of MCI as 18.9% (range from 7.7% to 42%), where most of the studies were in developed countries[27]. More recent studies in the Asian countries also indicated high prevalence of MCI, which were 20.8% in epidemiological study in China, 24.1% in nation-wide survey in South Korea and 18.9% in one study of general community in Japan[28-30]. The MCI prevalence reached a significant level in one cross-sectional study at the Universiti Kebangsaan Malaysia Medical Center as high as 64.7% among a fairly large sample population of 357[31]. Reasons for being much variant prevalence were different employed methodologies and diagnostic criteria as well as different socio-cultural and demographic features.

The overall prevalence of MCI in this study was 21% though the prevalence rate can be over-estimated, mainly attributed to the low education level of the local people and also being high sensitivity and rather low specificity of the assessment scale. The criteria was defined for being positive of the screening according to the formulation done by Albert MS, et al in 2011[32] consisting of 4 factors - preservation of basic activities of daily life, absence of dementia and subjective complaint for cognition and objective impairment in one or more cognitive domains.

Currently, there is no official data accessible for the cognitive problems in the elderly. This paper is

the first step into the field of required data for elderly cognitive problems. The prevalence was observed to be variable with the following factors: age, gender, education, occupation, alcohol drinking, physical activeness, regular meal, leisure activities, fish intake, depression, individual and family income, family support, social network, social activity participation and religiousness; based on the analysis results from the chi-square test for association. Out of the aforementioned factors, the factors of the significant association with the prevalence of MCI ($p<0.001$) were found out as age, education, physical activeness, leisure activities, depression, family income, social network, social activity and religiousness.

Being consistent with the findings of previous literatures, advanced age was found out as a significant associated factor ($p=0.003$) of the MCI prevalence in this study. The advanced age group (80 years and over) was about five times more likely to have MCI than the younger elderly group. Increasing age is more likely to have cognitive impairment and also a non-modifiable factor for intervention. However, aging does not necessarily result in impairment of all cognitive functions[33]. Cognitive ability in healthy aging can be maintained by improving other modifiable factors.

According to the cognitive reserve theory in which cognitive reserve is an important factor for the cognitive outcomes, cognitive reserve (CR) in turn is an accumulated result from the combination of lifetime experiences[34]. Education attainment is one of the most common conventional proxies for CR[35]. Agreeing to the findings from the previous studies[22, 35-37], current findings also proved that education was the highest associated factor for the cognitive ability.

There are many literatures showing the possible concepts and mechanisms for how the physical exercise protects the cognitive functional ability among the elderly. Possible protective action of the physical exercise upon the cognitive ability includes promoting positive neuroplasticity[38-39] , enhancement of cerebral blood flow[40], promoting brain angiogenesis[41], effects of neurotrophins and cytokines[42- 43], increasing brain volume and optimizing cognitive reserve[44]. These concepts were also agreed in the previous studies[45-47] as well as in this current study too. This study also showed the physical inactiveness as a significant risk factor ($p=0.003$) for MCI. Physically inactive persons had over three times higher chance of getting MCI than physically active persons .Therefore, the elderly should be encouraged to do more physical activities and intervention programs should be considered to embrace the exercise programs.

This study approved that doing any kind of activities during the pastime had beneficial effects upon the cognitive ability improvement for the elderly ($p< 0.001$). Elderly doing least favorite pastime activities showed very high risk comparing to those doing more activities. This observation agreed with the other studies in US and Chongqing showing that cognitive leisure activities had significant effects on the reduction of MCI risk[48-49]. There was also another study in Japanese community-dwelling elderly showing the supportive result that non-participation in a hobby was significantly associated with the cognitive decline[50].

Several studies also have extensively produced supportive results for the socially-engaged lifestyle showing a postive association with higher scores of

memory and intelligence tests and among community-residing older individuals[51-55]. Size of social network is a good indication of social engagement for the elderly. Social network also played an important role in protection of cognitive ability and also for its enhancement. This study results also approved the great significance of social network size in favour of cognitive performance. Size of social network shows how much the elderly integrate into social community, proposing the meaningful social roles and expecting social support. The larger the social network size creates the more effectiveness in cognitive ability among the elderly. Elderly who had small size of social network were nearly six times higher prevalence of MCI than those having large size of social network.

There were some limitations to this study. Firstly, the nature of cross-sectional study cannot confirm the causal relationships between the predictors and MCI. Secondly, employing only one screening tool was a limitation of this study due to restricted time frame and limited budget for the data collection. Thirdly, other related factors associated with mild cognitive impairment, such as sleeping habits, vitamin consumption are not included in this study. However, the present study has its strength as a pioneer community based study providing information for the prevalence of mild cognitive impairment and its risk factors towards the older population in developing country.

Recommendations

The prevalence of MCI by using a screening tool called "MoCA" in the urban areas of Kyauk Tan Township was 21%. Five factors were associated with MCI including age, education level, physical activeness, leisure activities and social network size which also were in line with the ecological model for the cognitive functioning.

Due to very little community awareness of MCI and similar cognitive problems of the elderly, cognitive problems are still neglected for the elderly assuming as a normal process and only diagnosed in the late stage as a full-blown disease and sometimes, even regarded as social stigmatization. Therefore, community awareness should be increased about elderly cognitive issues and also further research with more complicated cognitive assessment batteries should be conducted in the other areas of Myanmar, including the rural areas.

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