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Situation of dementia measured by Revised Hasegawa's Dementia Scale and its associated factors in Thaibinh, Vietnam

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ABSTRACT

As Vietnam's population has been aging, dementia is becoming more prevalent. This study aims to identify the prevalence of dementia and its related factors among older adults in Thaibinh Province, Vietnam. A cross-sectional study was conducted among 762 older adults living in two communes of Thaibinh Province, Vietnam. The Revised Hasegawa's Dementia Scale (HDS-R) Vietnamese version was used as a screening instrument for dementia. Participants were interviewed using face-to-face method. Descriptive statistics and multivariable logistic regression analyses were calculated in this study. The overall rate of dementia among older adults was 22.7%. Female were more likely to develop dementia than male participants (adjusted odds ratio [AOR] = 6.5; 95% confidence interval (95% CI), 2.71–15.64). Participants aged 70 or older, who had personal income of 3 million Vietnam Dong and higher (AOR = 5.7; 95% CI, 3.01–10.77), who smoke or used to smoke, who had poor vision ability (AOR = 8.9; 95% CI, 1.77–44.77), who had hypertension (unadjusted odds ratio [UOR] = 2.0; 95% CI, 1.24–3.38), and who with less ability of self-eating (UOR = 10.6; 95% CI, 3.31–33.73) were more likely to have dementia. Participants who had education levels of primary school and higher and who self-rated health as healthy (AOR = 0.5; 95% CI, 0.23–0.95) were less likely to have dementia. The prevalence of dementia among older adults was quite high in Vietnam. Associated factors including education level and smoking should be considered in future studies to prevent dementia among aging population.

Keywords: dementia, older adults, Vietnam, HDS-R, associated factors

Abbreviations:
AOR: adjusted odds ratio
CI: confidence interval
HDS-R: Revised Hasegawa's Dementia Scale

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UOR: unadjusted odds ratio
VND: Vietnam Dong

INTRODUCTION

Vietnam is one of countries with the fastest aging population in the world.[1] The most striking feature is that the aging population is the fastest growing compared to all other population groups.[2] Demographic statistics from General Office for Population and Family Planning of Vietnam showed that the number of people age 60 and above made up about 11.9% of the country's population in 2017, equaling 11 million. It is forecasted that by 2029, Vietnam would have about 16.5 million aging citizens, accounting for 17.0% of the entire population.[3,4]

As Vietnam's population has been aging, dementia is becoming more prevalent. It not only affects seriously the patient's quality of life but also physical, psychological and socioeconomic impact on caregivers, family members and society.[5,6] However, dementia or mental health in general has not been recognized as a health priority in Vietnam.[7,8] Not many available researches were studied in Vietnam on the prevalence of dementia and its associated factors among people age 60 and above.[9]

In the study conducted in 6 communes of the Northern, Central and Southern regions of Vietnam among people aged 60 and more in 2019, the prevalence of cognitive symptoms of dementia was assessed by Mini Mental State Evaluation questionnaire. The results showed that the symptoms of dementia were recognized among 46.4% of the sample population. The symptoms were observed more in subjects who were older, female, had a lower educational level, were not physically active, or had stroke.[10]

In a cross-sectional study on dementia prevalence among hospitalized patients aged 60 and more in the geriatrics departments at three acute care hospitals in Ho Chi Minh City in 2019, dementia was diagnosed by Diagnostic and Statistical Manual-5 (DSM-5) criteria, the results indicated that the prevalence of dementia was 24.3%.[11]

To measure the prevalence of dementia in Asian, some tools in Asian languages have been used. Among them, Mini Mental State Examination, Montreal Cognitive Assessment, Revised Hasegawa's Dementia Scale (HDS-R), and Clock Drawing Test were identified to be relatively common, among which only HDS-R has been developed on an Asian population sample.[12,13] Vietnamese version of HDS-R has been tested for its validity and reliability in the previous research, the Cronbach Alpha value[14] was 0.73. To assess dementia among the older adults at community level in Vietnam, however, there have not been any studies using Hasegawa scale. This study examined the prevalence of dementia and some associated risks with HDS-R in Thaibinh Province, Vietnam to provide important evidence regarding the burden of this syndrome and the related factors in the country. The results of this study would also be references for comparison between scales in measuring dementia.

MATERIALS AND METHODS

Study area and participants

This research was a cross-sectional study conducted at Thaibinh Province, located in Northern part of Vietnam. Thaibinh is about 110 km away from the capital Hanoi. The total population in Thaibinh Province[15] was about 1,942,000 people in 2019. The study participants were people

aged 60 years and older. The reason for targeting this area was that Thaibinh Province is one of the most crowded provinces/cities of the country and the proportion of older adults was the highest compared to other provinces/cities according to data[16] from the Population and House census 2019. By 2019, Thaibinh Province had 274,382 aged people, accounting for 15.1% of the population. The number of people from 60 to 79 years old was 222,562 people. There were 46,503 people from 80 to 100 years old and 588 people over 100 years old.[17] In Thaibinh, we purposely selected 2 communes as Trungan and Vietthuan because these two communes had higher number of aged people as compared to other communes in the province. The population of Vietthuan commune was 10,992 people, the number of aged people was 2,018, accounting for 18.4% of the population. In Trungan commune, the population was 8,133 people, the number of older adults was 926, accounting for 11.4%.

Sampling procedure and data collection

We used questionnaires to collect the data at two communes at Thaibinh Province. The list of target population containing name, gender, age was obtained from the head of community health station in each commune. This database of the members was regularly maintained (such as removing the name after the death of a person). The specific sample criteria included people aged 60 years and older living in Thaibinh Province and available at the time of the survey. The data collection was taken from March to May 2020. We worked with staff at community health stations and village health volunteers to eliminate cases that had problems such as limited hearing/vision/speech ability, schizophrenia, stroke, being hospitalized. From the remaining lists, 800 participants were randomly drawn. During the interview process, we further excluded subjects with missing demographic information or unable to subtract the value. In the end, 762 people were selected to participate in the study (Figure 1).

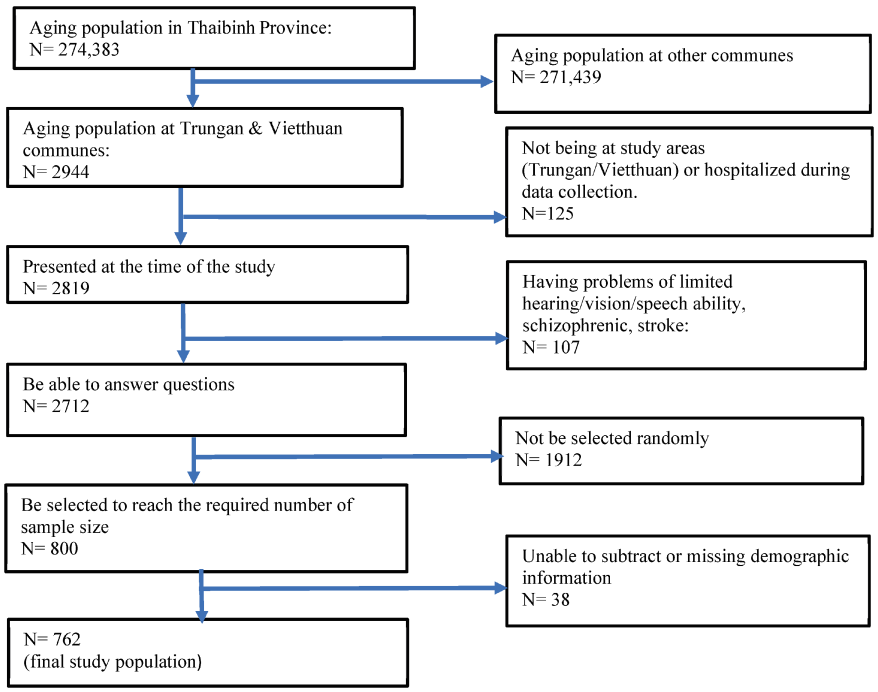

Fig. 1 Flowchart displaying study inclusion and exclusion criteria of participants

The survey was conducted through face-to-face interview using structured questionnaires. Each interview was expected to last for about 45 minutes. The participants' height and weight were measured, and body weight was recorded up to the first decimal point. In total, 762 aged people (males, 284 [37.3%]; females, 478 [62.7%]) provided verbal informed consents and participated in this survey. We used the data of these 762 individuals for the final data analysis.

Study measures

Dependent variable. To measure the proportion of dementia among aging participants, we used the HDS-R Vietnamese version.[14] The HDS-R consists of nine questions: Q1, age (1 point); Q2, the date of interview (4 points); Q3, the place of interview (2 points); Q4, ability to repeat three familiar words (3 points); Q5, subtracting 7 from 100 for twice (2 points); Q6, backward repetition of three and four digits (2 points); Q7, recall of the three words memorized in Q4, (6 points); Q8, immediate recall of five objects in pictures shown and hidden (5 points); and Q9, listing of 10 vegetable names (5 points). The highest score of the HDS-R is 30 points; a score of 20 points or lower is considered as an indicator of dementia. The dependent variable was dementia. In logistic regression analysis, dementia was dichotomized into "≤20 points" (presence of dementia) and "≥21 points" (absence of dementia).

Independent variable. Characteristics of the respondents such as age, gender, marital status, education, personal income, living status, participant's status in family, substance use behaviors, health-related characteristics, social support, and daily activities were considered as independent variables. Age was categorized into five groups (60–64, 65–69, 70–74, 75–79, and ≥80) with 5-year age intervals. Marital status of the respondents was categorized into four groups of single, married, separated/divorced, and widow/widowed. Education level of respondents was divided into five groups: illiterate, primary school, secondary school, high school, and college/university to determine the effects of education level on the situation of dementia among the participants.

Smoking and drinking habit were divided into 4 groups from never use to daily use. Self-rated health was divided into 5 categories (very poor, poor, fair, good, and very good). Later in the multivariate logistic regression analysis, it was re-divided into 2 categories of not healthy (very poor, poor) and healthy (fair, good, and very good). Body mass index (BMI) was categorized into four groups of underweight (<18.5), normal (18.5–24.9), overweight (25–29.9), and obese (≥30). Later in the multivariate logistic regression analysis, it was re-divided into 2 categories of abnormal (underweight, overweight, obese) and normal.

Vision and hearing ability of the respondents were characterized by 3 groups: good, fair, and poor. Social support was divided into two: low, and high. There were 8 daily activities of participants as walking, dressing, feeding, bathing, grooming, toileting, shopping, and cooking. They were characterized by 2 groups depending on whether the participants needed support or not.

Statistical analysis

Data processing was conducted using SPSS version 20.0 (IBM SPSS Inc). To examine the association between respondent's characteristics such as socio-demographic status, health problems according to sex and scores of cognitive functions, the study performed descriptive and chi-squared tests. To investigate the association between dementia and related factors, logistic regression analysis was conducted. Adjusted odds ratios (AORs) were calculated to assess the power of the associations between dementia and related factors. The significance level of all the analyses was at $p<0.05$ (two-tailed).

Ethical considerations

This study was approved by the ethical committee board at Thaibinh University of Medicine

and Pharmacy, Vietnam (Approval number, 126/Ethical Review Board (ERB); issued on February 24, 2020) and the Ethical Review Committee of Nagoya University Graduate School of Medicine (Approval number, 2020-0238; issued on 15 September, 2020). Before the survey, the study participants were explained about the objectives of the study as well as the contents of the questionnaire. The data were anonymous: data collection and confidentiality of all data were carefully maintained. Participants needing further investigation and treatment were referred to the nearest public hospitals.

RESULTS

Of the total 762 participants, 284 (37.2%) were males and 478 (62.8%) were females, with a mean age of 74.0 years (standard deviation [SD] = 8.6) and 74.4 years (SD = 8.4), respectively. More than one-fourth of them were 80 years and older (27.5% in males and 30.8% in females), whereas only 11.3% (11.6% in males and 11.2% in females) were aged 60-64 years (p=0.902). More than half (55.9%) of the participants were married, and more than one-third of them were widow/widower (39.2%; p<0.001). Regarding education level, about 5.8% of the participants were illiterate, 6.0% were at college/university level (8.8% in males and 4.4% in females). More than half of the participants completed primary education (52.2%; p<0.001). Majority of the older adults (73.0%) had personal income of less than 3 million Vietnam Dong (VND) per month (63.0% in males and 8.9% in females; p<0.001). Concerning living status, most of the respondents lived with their family members (89.6%), only 6.7% males and 12.6% females reported themselves as living alone in this study (p=0.010). More than half of male participants (62.0%) indicated themselves as head of their family while only 32.2% of females considered themselves as house leader (p<0.001; Table 1).

Table 1 Socio-demographic characteristics of the participants

Characteristics	Total (N=762)		Male (n=284)		Female (n=478)		p-value*
	N	%	n	%	n	%	
Age							
60–64	86	11.3	33	11.6	53	11.1	0.902
65–69	163	21.4	61	21.5	102	21.3	
70–74	192	25.2	74	26.1	118	24.7	
75–79	96	12.6	38	13.4	58	12.1	
≥ 80	225	29.5	78	27.5	147	30.8	
Marital status							<0.001
Single	17	2.2	6	2.1	11	2.3	
Married	426	55.9	198	69.7	228	47.7	
Separate	9	1.2	5	1.8	4	0.8	
Divorced	11	1.4	3	1.1	8	1.7	
Widow/widower	299	39.2	72	25.4	227	47.5	

Education							<0.001
Illiterate	44	5.8	10	3.5	34	7.1	
Primary school	398	52.2	127	44.7	271	56.7	
Secondary school	192	25.2	85	29.9	107	22.4	
High school	82	10.8	37	13.0	45	9.4	
College/University	46	6.0	25	8.8	21	4.4	
Personal income							<0.001
< 3 million VND	556	73.0	179	63.0	377	8.9	
≥ 3 million VND	206	27.0	105	37.0	101	21.1	
Living status							0.010
Live alone	79	10.4	19	6.7	60	12.6	
Not live alone	682	89.6	265	93.3	417	87.4	
Participant's status in family							<0.001
Being head of family	330	43.3	176	62.0	154	32.2	
Not head of family	432	56.7	108	38.0	324	67.8	

VND: Vietnam Dong

* A chi-squared test for the difference between males and females

This study participant data showed that, three-fourths of them (75.1%) had never smoked (39.1% in males and 96.4% in females). Only 16.2% of males and 1.0% of females were occasional smokers. The proportion of daily smokers were low (4.1% in total, 9.9% in males and 0.6% in females; p<0.001). Regarding drinking habit, most of females (93.5%) had never drunk in their lives. Of total, 14.0% (32.4% of males and 3.1% of females) used to drink alcohol. The proportion of daily alcohol drinkers in total was very low (3.3%) while more males (8.1%) reported themselves as daily alcohol drinkers compared to females (0.4%). Among daily activities such as walking, dressing, feeding, bathing, grooming, toileting, shopping and cooking, the participants needed more support for cooking (22.2%) and shopping (21.9%). The activities showed significant differences between males and females were walking (p<0.001), dressing (p=0.007), feeding (p=0.020), and bathing (p=0.029; Table 2).

Table 2 Substance use behaviors and daily activities of the participants

Characteristics	**Total (N=762)**		**Male (n=284)**		**Female (n=748)**		**p-value***
	N	**%**	**n**	**%**	**n**	**%**	
Smoking habit							<0.001
Never smoke	572	75.1	111	39.1	461	96.4	
Used to smoke	108	14.2	99	34.9	9	1.9	
Sometime smoke	46	6.7	46	16.2	5	1.0	
Daily smoke	28	4.1	28	9.9	3	0.6	

Drinking habit							<0.001
Never drink	524	68.8	77	27.1	447	93.5	
Used to drink	107	14.0	92	32.4	15	3.1	
Sometime drink	106	13.9	92	32.4	14	2.9	
Daily drink	25	3.3	23	8.1	2	0.4	
Daily activity needing support							
Walking	56	7.3	8	2.8	48	10.0	<0.001
Dressing	37	4.9	6	2.1	31	6.5	0.007
Feeding	33	4.3	6	2.1	27	5.6	0.020
Bathing	42	5.5	9	3.2	33	6.9	0.029
Grooming	50	6.6	15	5.3	35	7.3	0.271
Toileting	44	5.8	11	3.9	33	6.9	0.083
Shopping	167	21.9	113	23.6	54	19.0	0.136
Cooking	169	22.2	56	19.7	113	23.6	0.208

* A chi-squared test for the difference between males and females

More than half of the respondents (55.1%) rated themselves as in fair health condition (53.5% of males and 56.1% of females). None of the female participants rated their health status in very good condition, meanwhile, only 0.7% of males reported the same condition. Only 0.4% of males and 1.9% of females stated their health condition as very poor (p=0.114). One fourth of both males and females reported they had no disease, while more than half of them (63.6%) stated that they had at least one disease (p=0.878). More male participants reported having hypertension (36.3%) compared to the females (27.6%; p=0.012). More than three-fourths of participants (78.1%) reported having fair to good vision. Of total, over half (53.3%) reported having fair hearing and over one-fourths (27.3%) reported having good hearing. Majority of the participants (85.2%) had high social support with a significant gender difference in receiving social support (p=0.033). The proportion of female (29.9%) reporting underweight was higher than that of males (15.1%), meanwhile, more male participants (82.4%) had normal weight compared to females (67.2%) with p<0.001 (Table 3).

Table 3 Health-related characteristics of the participants

Characteristics	**Total (N=762)**		**Male (n=284)**		**Female (n=748)**		**p-value***
	N	**%**	**n**	**%**	**n**	**%**	
Self-rate health							0.114
Very poor	10	1.3	1	0.4	9	1.9	
Poor	115	15.1	43	15.1	72	15.1	
Fair	420	55.1	152	53.5	268	56.1	
Good	215	28.2	86	30.3	129	27.0	
Very good	2	0.3	2	0.7	0	0.0	

Number of current diseases							0.878
No disease	207	27.2	75	26.4	132	27.6	
At least one disease	485	63.6	184	64.8	301	63.0	
Not know	70	9.2	25	8.8	45	9.4	
Hypertension							0.012
No	527	69.2	181	63.7	346	72.4	
Yes	235	30.8	103	36.3	132	27.6	
Vision ability							0.651
Good	138	18.1	55	19.4	83	17.4	
Fair	457	60.0	171	60.2	286	59.8	
Poor	167	21.9	58	20.4	109	22.8	
Hearing ability							
Good	208	27.3	79	27.8	129	27.0	0.733
Fair	406	53.3	154	54.2	252	52.7	
Poor	148	19.4	51	18.0	97	20.3	
Social support							0.033
Low	113	14.8	32	11.3	81	16.9	
High	649	85.2	252	88.7	397	83.1	
BMI							<0.001
Underweight	186	24.4	43	15.1	143	29.9	
Normal	555	72.8	234	82.4	321	67.2	
Overweight	19	2.5	7	2.5	12	2.5	
Obese	2	0.3	0	0.0	2	0.4	

BMI: body mass index

* A chi-squared test for the difference between males and females

The total mean score of dementia assessed by HDS-R, according to age group was 24.4. The highest mean score was found in the age group of 60–64 years (mean = 27.8) followed by 65–69 years (mean = 27.2). The lowest mean score was found in the age group of 80 and older (mean = 19.7). The results showed that the mean scores for the ability of temporal and spatial orientation, registration and recall of words and objects, attention/calculation, counting backward, and ability to speak words fluently were highest in the age group of 60–64 years and lowest in the age group of 80 years and above (Table 4).

Table 4 Scores of Revised-Hasegawa Dementia Scale by age group among respondents

Items	Total (N=762)		60–64 (n=86)		65–69 (n=163)		70–74 (n=192)		75–79 (n=96)		≥ 80 (n=225)	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Total score	24.4	6.4	27.8	3.3	27.2	4.0	25.7	4.6	24.9	5.3	19.7	7.7
Age	1.0	0.2	1.0	0.0	1.0	0.0	1.0	0.1	1.0	0.1	0.9	0.3
Temporal orientation	3.6	0.9	3.9	0.4	3.8	0.6	3.9	0.4	3.7	0.6	3.0	1.2
Spatial orientation	1.9	0.3	2.0	0.0	2.0	0.2	2.0	0.2	2.0	0.2	1.8	0.5
Registration (words)	2.4	0.9	2.6	0.7	2.7	0.7	2.4	0.9	2.4	0.8	2.1	1.0
Attention/ Calculation	1.5	0.7	1.7	0.5	1.7	0.5	1.7	0.5	1.6	0.6	1.1	0.8
Digit span backward	1.2	0.9	1.6	0.6	1.5	0.7	1.3	0.8	1.3	0.8	0.8	0.9
Recall (words)	4.7	1.7	5.5	1.1	5.5	1.1	5.1	1.3	4.9	1.6	3.6	2.1
Registration (objects)	4.1	1.3	4.8	0.7	4.6	0.8	4.3	1.1	4.1	1.1	3.3	1.6
Word fluency	3.8	1.6	4.4	1.3	4.3	1.4	4.0	1.6	3.9	1.5	3.1	1.8

SD: standard deviation

In bivariate analysis, the following characteristics were positively associated with dementia: being older than 70 years, personal income of 3 million VND and higher (unadjusted odds ratio [UOR] = 1.7; 95% confidence interval [CI], 1.2–2.5), used to smoke in the past (UOR = 2.8; 95% CI, 1.8–4.3), used to drink (UOR = 2.5; 95% CI, 1.6–3.9), abilities of vision and hearing as fair and lower, hypertension (UOR = 2.7; 95% CI, 1.9–3.8), and no ability of self-eating (UOR = 14.7; 95% CI, 6.3–34.5). Meanwhile, the following characteristics were negatively associated with dementia: education levels of primary school and higher, sometime drink (UOR = 0.5; 95% CI, 0.2–0.9) or self-rated health as healthy (UOR = 0.2; 95% CI, 0.1–0.3).

As the results of adjusted analysis, participants who were females (AOR = 6.5; 95% CI, 2.7–15.6); who were in the age group from 75 and older; who had personal income of 3 million VND and higher (AOR = 5.7; 95% CI, 3.0–10.8); who daily smoke (AOR = 8.3; 95% CI, 1.8–9.4), sometimes smoke (AOR = 17.0; 95% CI, 3.6–80.4), and used to smoke (AOR = 7.4; 95% CI, 2.1–26.3); who had poor vision ability (AOR = 8.9; 95% CI, 1.8–44.8); who had hypertension (UOR = 2.0; 95% CI, 1.2–3.4), and who with less ability of self-feeding (UOR = 10.6; 95% CI, 3.3–33.7) were more likely to have dementia. Meanwhile, participants who had education levels of primary school and higher and who self-rated health as healthy (AOR = 0.5; 95% CI, 0.2–0.9) were less likely to have dementia (Table 5).

Table 5 Multivariate logistic regression analysis of factors associated with dementia among participants

	Variables	OR	95% CI	p	AOR	95% CI	p
Age	60–64						
	65–69	3.3	(0.73–15.27)		3.2	(0.58–17.62)	
	70–74	6.6	(1.53–28.38)	*	6.0	(1.14–31.61)	
	75–79	10.4	(2.33–45.96)	**	8.2	(1.47–45.50)	*
	≥ 80	43.1	(10.36–179.61)	***	33.1	(5.99–182.63)	**
Gender	Male						
	Female	1.3	(0.89–1.82)		6.5	(2.71–15.64)	***
Marital status	Single						
	Married	0.5	(0.18–1.54)		0.1	(0.03–1.16)	
	Separate	1.2	(0.21–6.80)		0.4	(0.03–6.73)	
	Divorced	0.2	(0.02–2.40)		0.2	(0.01–3.36)	
	Widow/widower	1.0	(0.33–2.88)		0.2	(0.03–1.04)	
Education	Illiterate						
	Primary school	0.2	(0.11–0.41)	***	0.3	(0.11–0.69)	**
	Secondary school	0.1	(0.06–0.26)	***	0.2	(0.08–0.69)	**
	High school	0.0	(0.01–0.12)	***	0.0	(0.01–0.25)	***
	College/University	0.1	(0.03–0.27)	***	0.1	(0.03–0.51)	**
Personal income	< 3 million VND						
	≥ 3 million VND	1.7	(1.20–2.48)	**	5.7	(3.01–10.77)	***
Living status	Not live alone						
	Live alone	0.7	(0.38–1.29)		0.5	(0.20–1.10)	
Smoking habit	Never smoke						
	Used to smoke	2.8	(1.78–4.27)	***	7.4	(2.11–26.34)	**
	Sometime smoke	1.0	(0.48–2.01)		17.0	(3.60–80.38)	***
	Daily smoke	0.8	(0.29–2.05)		8.3	(1.77–39.44)	**
Drinking habit	Never drink						
	Used to drink	2.5	(1.64–3.93)	***	1.2	(0.36–3.89)	
	Sometime drink	0.5	(0.25–0.87)	*	0.3	(0.07–1.01)	
	Daily drink	0.7	(0.23–2.05)		1.2	(0.22–6.04)	
Self-rate health	Not healthy						
	Healthy	0.2	(0.13–0.30)	***	0.5	(0.23–0.95)	*
Vision ability	Good						
	Fair	8.0	(2.88–22.18)	***	4.2	(0.97–18.45)	
	Poor	31.5	(11.16–89.25)	***	8.9	(1.77–44.77)	**
Hearing condition	Good						
	Fair	6.0	(3.10–11.88)	***	1.7	(0.67–4.40)	
	Poor	16.8	(8.25–34.33)	***	1.0	(0.32–3.29)	

Social support	Low						
	High	0.8	(0.52–1.31)		0.9	(0.48–1.83)	
BMI	Abnormal						
	Normal	0.7	(0.52–1.08)		1.5	(0.89–1.89)	
Hyper-tension	No						
	Yes	2.6	(1.87–3.77)	***	2.0	(1.24–3.38)	**
Self-feeding	Yes						
	No	14.7	(6.26–34.54)	***	10.6	(3.31–33.73)	***

OR: odds ratio
AOR: adjusted odds ratio
CI: confidence interval
BMI: body mass index
VND: Vietnam Dong
* $p<0.05$; ** $p<0.01$; *** $p<0.001$.

DISCUSSION

This is the first study in Thaibinh, the province located in northern Vietnam, to examine the proportion of dementia using the HDS-R and its related factors among the participants aged 60 years and older. The ease of obtaining a high response rate is itself an indication of interest in the prevalence of dementia and associated factors in the aging population. The rate of dementia among the aged people was 22.7% (males, 20.1%; females, 24.3%). The results revealed that female was significantly more likely to develop cognitive impairment than male participants. Participants aged 75 or older, who had personal income of 3 million VND and higher, who were smokers or used to smoke in the past, who reported lower vision, who had hypertension or who could not eat meals by themselves were found to be at higher odds of developing dementia. Meanwhile, participants who had education level of higher than illiterate and who reported being in good health were less likely to develop dementia.

Regarding the age in the association with dementia, the participants older than 70 years had higher odds of developing dementia as compared to those aged 60–69 years. The older the age the higher the prevalence of dementia. This finding was consistent with a previous study which indicated that dementia incidence increases exponentially with age between the ages of 65 and 90 years and doubles approximately every 5 years.[18] This can be explained by biological mechanisms of aging that lead to reduced nerve function and decline in motor functions. The progression of dementia would be faster and more severe as the body ages over time. In the study among older adults in the United States, the incidence of all-cause dementia was found to be very high in people aged 90 years and older and continued to increase exponentially with age in both men and women.[19] There have been important advances in understanding that both normal and abnormal aging is associated with deterioration of cognitive function and accumulation of neuropathological lesions that can also occur in dementia.[20]

In this study, the participants suffering from hypertension had a higher odd of developing dementia as compared to those without hypertension. Nearly 31% of the participants reported having hypertension. Hypertension leads to decreased blood flow to brain cells as well as disruption of the "blood-brain barrier," both of which may lead to increased production or decreased clearance of amyloid-beta, resulting in neurodegeneration, loss of synapses and neurons, and

eventual cognitive decline and dementia.[21,22] However, this finding was inconsistent with the study among participants in United Kingdom which revealed that blood pressure elevation at 60 or 70 years old was not a significant risk, even in those with severe high blood pressure.[23] However, systolic blood pressure elevation in age of 50s was associated with increased risk of dementia. A systolic blood pressure level of 130 mmHg or lower[23] has been shown to significantly prevent dementia at age 50. Brain aging is considered to be induced not via neural aging, but via dysfunction of a coordinated and interactional system of neurons, astrocytes, and micro vessels in the brain called the "neurovascular unit". A chronic hypertensive state induces cerebrovascular degeneration such as vascular remodeling, vascular hypertrophy, atherosclerosis, endothelial dysfunction, and increased blood brain barrier permeability, resulting in disorder of the neurovascular unit.[24]

Significant associations between education level of participants and dementia were reported in this study. Many studies have found a strong relation between education and dementia[25,26]; the previous study in Vietnam using MMSE scale also revealed that people with the education level from primary school to the higher than high school had lower level of dementia as compared to illiterates.[10] It can be explained that attained education level could have impact on the brain structure and development by enhancing synapse number and connections, increasing brain blood flow or vascularization, which could enhance cognitive function.[27] Another mechanism is that since cognitive impairment strongly associates with degradation of brain, the ability that brain can maintain the function could reduce risk of dementia. Higher education is an indication that the person has a larger cognitive reserve that could compensate the damage of the brain and maintain its function as usual.[28]

Respondent had higher personal income showed higher incident of dementia. The result from this study may be explained that in higher income group there were more people in older age group than those in younger age group. This finding was inconsistent with previous the longitudinal cohort study in England which showed that people with fewer financial resources were at higher risk of dementia.[29] In a study with the sample came from the Chinese longitudinal healthy longevity survey, the result indicated that higher incomes were associated with better cognitive functioning at baseline, but this difference diminished during the follow-up.[30] In this study, respondents who rated themselves as in good health condition were less likely to have dementia as compared to their counterparts. This finding was consistent with a previous study which concluded that in older adults with no cognitive impairment, self-rated health predicted dementia.[31] Other previous studies had also found a positive association between self-rated health and cognitive performance in older adults, poorer self-rated health predicts cognitive decline, cognitive impairment, and all-cause dementia.[32,33] Participants who self-rated as in good health condition may have better socio-economic condition and easy access to the health services they need, which could be protective against dementia.[34,35]

Respondents with poor vision reported higher prevalence of dementia as compared to the older adults who had better vision. Visual impairment was common in people living with dementia and regular ophthalmological exams may improve their quality of life.[36]

The result of this study showed that people with ability to self-feed had lower proportion of dementia compared to those who could not eat by themselves. As dementia progresses, difficulties in taking food will occur and about 50% of persons with dementia will have such difficulties within 8 years of disease onset[37]; as people near the advanced stage, a majority will suffer the same experiences.[38]

This study has limitations. Although it is the first study in Vietnam to investigate the prevalence of dementia and related factors, using HDS-R validated in Asian populations,[39,40] there may be other factors that could have also contributed to aging population vulnerability to dementia

besides ours. Due to the exclusion criteria of the study, there may be under-reported cases of dementia. This study relied on respondent's self-report about their medical conditions, rather than confirmation by clinicians and medical records. Screening for dementia using the Vietnamese language version of the HDS-R should be confirmed by the clinical diagnosis in the further studies. Longitudinal studies are needed to observe the causal and protective factors associated with dementia and associated comorbidities in Vietnam.

CONCLUSION

In conclusion, this study elucidated the prevalence of dementia and associated factors among aging people in Thaibinh, Vietnam. Female participants were significantly more likely to show dementia. Being over 75 years old, personal income of more than 3 million VND, current and used to smoke, poor vision, hypertension and not self-feeding were associated with a higher odd of developing dementia. Meanwhile, higher education level and having good self-rated health were protective factors. Therefore, policymakers should consider these factors in their work with such vulnerable older adults. Evidence from this study demonstrates that there is a need for a comprehensive understanding of dementia among Vietnamese aging population.

CONFLICT OF INTEREST

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