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THE ASSOCIATION BETWEEN SOCIOECONOMIC STATUS AND DEPRESSION IN VIETNAMESE ADULTS: PILOT STUDY

Vuong Diem Khanh Doan, Vo Van Thang
College of Medicine and Pharmacy, Hue University
Gavin Turrell, Michael Dunne
Queensland University of Technology

SUMMARY

This study examined the prevalence of depressive symptoms and elucidated the causal pathway between socioeconomic status and depression in a community in the central region of Vietnam. The study used a combination of qualitative and quantitative research methods. In-depth interviews were applied with two local psychiatric experts and ten residents for qualitative research. A cross sectional survey with structured interview technique was implemented with 100 residents in the pilot quantitative survey. The Center for Epidemiological Studies-Depression Scale (CES-D) was applied to evaluate depressive symptoms (CES-D score over 21) and depression (CESD score over 25). Ordinary Least Squares Regression following the three steps of Baron and Kenny's framework was employed for testing mediation models. There was a strong social gradient with respect to depressive symptoms. People with higher education levels reported fewer depressive symptoms (lower CES-D scores). Incomes were also inversely associated with depressive symptoms, but only the ones at the bottom of the quartile income. Low level and unstable individuals in terms of occupation were associated with higher depressive symptoms compared with the highest occupation group. Employment status showed the strongest gradient with respect to its impact on the burden of depressive symptoms compared with other indicators of SES. Findings from this pilot study suggest a pattern on the negative association between socioeconomic status and depression in Vietnamese adults.

1. Introduction

International research concerning the association between depression and socioeconomic status (SES) has revealed a consistent pattern of an inverse relationships between SES and depressive symptoms. However, the mechanisms underlying this association are not well understood. The limited scientific literature constitutes a significant barrier to the development of successful strategies for the prevention of depression among disadvantaged social groups.

Most of the research examining the association between SES and depression has emanated from developed countries. There are very few studies of this association from low- income nations, where different socio-cultural systems may contribute to differences in the major aetiologies of common mental disorders. In Vietnam, there is a serious dearth of research on depression and no investigation of the association between SES and depression. As a consequence, it is impossible to obtain an accurate picture of the extent of the SES- depression gradient and the nature of this association in the country.

The main purpose of this study is to document the prevalence of depression in a community in the central region of Vietnam and to elucidate the causal pathways between SES and depression. The study uses a combination of qualitative (interviews) and quantitative methods (survey). The qualitative research is used to inform a theoretical model of the social determinants of depression and also to develop culturally appropriate instruments for the quantitative survey. The survey will estimate the prevalence of depression in Vietnamese adults and examine the nature and extent of the association between SES and depression in this population. The study will contribute new evidence regarding the burden of mental distress in Vietnam. The findings will have practical relevance for advocacy for mental health promotion and health care services. More broadly, the work will contribute to international scientific literature on the social determinants of depression.

This article presents the main findings of the pilot study, which include two parts: the exploratory qualitative research and the pilot quantitative research.

2. Methodology

2.1. Setting

The study was carried out in Hue city, the capital of Thua Thien Hue province. The city is located in central Vietnam on the banks of the Perfume River, and lies 20 km inland from the Pacific Ocean. Hue city is about 540 kms south of the national capital of Hanoi and it has a total population of more than 350,000 inhabitants. The city is divided into 27 administrative units called quarters.

One quarter of the city was selected randomly for conducting the pilot study between November and December 2008. This quarter- Phu hoi-lies in the centre area of the city, has a total population of 10,121 and is divided into 16 subdivided administrative units.

2.2. Data collection

Exploratory qualitative research: The principle investigator conducted in-depth interviews with 2 local psychiatric experts and with ten randomly selected residents of Phu hoi quarter in Hue city.

Pilot quantitative study:

Among the total of 16 subdivided administrative groups in Phu hoi quarter, 5 groups were randomly chosen. From the census household booklets of each subdivided administrative group, every 5^{th} household was systematically selected. In total, 20 households from each booklet were sampled. Only households which had individuals aged from 25-55 years old were recruited in the study. Where this criterion was not met, the next household in the booklet were selected. From each household, individuals aged 25-55 whose the birthday was closest to the date of starting data collection were recruited into the pilot survey. In total, 100 participants completed the interview from 104 households approached (response rate = 96%).

There were 5 interviewers, who collected data for the pilot study. Each interviewer collects data for a total of 20 individuals. Interviewers came to participant's households that had been selected, and conducted face-to-face interviews using structured questionnaires. First of all, researchers explained the purposes of the research to respondents and asked their agreement to participate in the research. Four individuals from households selected refused to participate in the study: in these instances the nearest household to the left were recruited. The interview took place around 45 minutes.

2.3. Data screening

Two returned questionnaires were missing on items about household income. Predicted income was substituted for the missing values. Respondents were subdivided by gender and income was estimated based on the respondent's marital status, occupation, and year of education.

2.4. Data analysis

Statistical analysis was performed using the statistical Package for Social Sciences-SPSS (version 16.0) Ordinary Least Squares Regression was employed follow three steps in Baron and Kenny 's Framework to evaluate the mediation models. Beyond Baron and Kenny 's causal steps approach, estimating the size and significance of the mediated effects was performed using the Sobel test . All hypotheses were tested using $\alpha < 0.05$ as level of statistically significance.

2.5. Measures

Demographic variables include age, sex and marital status. Marital status was classified into 3 categories, which include married, never married and others (widowed, divorced and separated).

Socioeconomic status: Four indicators of socioeconomic status were performed separately to measure socioeconomic status in this pilot study

Education: Exact year of education and level of schooling achieved were

collected. Based on data collected, this variable was also divided into 4 categories, which were above high school, high school, secondary school, primary or no school.

Income: The sum of net monthly salaries and other incomes (e.g. dividends, interests or rents) contributed by all household members divided by the total number of members in the household was used. Per capita household income level was originally measured ordinally, coded from 1 to 13. Further classification of income variable into four quartile groups: lowest, middle low, middle high and highest was applied for data analysis.

Occupation: Occupation status was classified according to Araya (2003) and includes 4 groups: low unstable (i.e. low status and unstable occupation, involving casual manual nonspecialized workers), low stable (i.e. low status but stable occupation, involving employed manual non-specialized workers), medium (involving non-manual workers, with no professional qualifications), high status occupation (involving non-manual professional or business people with prestigious post).

Employment status: *Employment status* was originally classified into five groups: (I) unemployed, (II) loss ability to work, (III) attending school (IV) housewives and (V) employed. However, there was no data for 'loss ability to work' and 'attending school', the final employment variable included 3 groups: employed, housewives and unemployed.

Mediators:

Stress: Questions measuring three types of stress were developed. These scales were derived from the work of Tuner, Wheaton, and Lloyd (1995) and the Life Event schedule of the World Mental Health Survey that were previously used internationally. In order to apply these scales in the context of Vietnam, some modifications were undertaken based on information from the in-depth interviews with psychiatrist experts and community residents in the pilot qualitative survey.

Lifetime trauma was measured through 12 items investigating events that could occur at any time in participants' lives.

Recent life events: This investigated events during the previous 12 months in 13 areas based on whether the participant had experienced (1) illness or injury; (2) physical attack; (3) robbery; (4) death of someone close; (5) separation from spouse or partner; (6) end of another close relationship; (7) being fired from a job; (8) retiring from a job against the participant's will; (9) losing a job for another reason; (10) searching for employment without success for over a month; (11) major financial crisis; (12) problems with the police; or (13) whether someone close to the participant had experienced illness, injury or physical attack

The lifetime trauma and recent life events scales are coded in the same way- in a

binary format, where those who are exposed to a stressor receive a score of 1 and those who have not encountered a stressor are assigned a score of 0. For these indices, higher scores indicate greater stress.

Chronic stress: consisted of 21 items using a 3-point scale (not true, somewhat true, very true) The scores on this chronic strain scale range from 0 to 42. Because the questions are not relevant to all respondents (e.g., if the respondent was not married, questions about partners may not have been applicable), the original index was adjusted by multiplying the score from the index by the total number of items and then dividing by the total number of questions relevant to the individual participant . Higher scores indicate greater chronic stress

Self-esteem: The Rosenberg self-esteem scale (RSES) is a 10-item measure which uses a 4-point response format ranging from strongly agree to strongly disagree. A cumulative score can range from 0 to 30 (higher scores indicate higher self-esteem). This scale has been validated in Vietnamese language using confirmatory factor analysis.

Mastery: This is a 4-point, 7-item Likert type scale that measures the belief in one's capability to overcome life adversities . Participants are asked to indicate how much they agree or disagree with each of seven statements. Items were responded to on a 4-point scale [ranging from strongly disagree (1) to strongly agree (4)], Negatively phrased items were reverse coded. Total scores range from 7 to 28, with a higher score indicating a greater sense of mastery. The instrument has shown evidence of validity and reliability

Social support: The Multidimensional Scale of Perceived Social Support (MSPSS) was applied. This is a self-administered measure of social support, which includes 12-item with a seven point scale (from 1=strongly disagree to 7=strongly agree) measuring three sources of support: from family, friends, and significant others.

Depression:

The Centre for Epidemiological Studies-Depression Scale (CES-D) was applied for this study. This scale has been designed primarily for epidemiological research. High internal consistency has been reported with Cronbach's alpha coefficient ranging from 0.85 to 0.90 in the general population samples tested. This is a 20- item self-reported instrument that assesses severity of depressive symptoms over the past week on a 4-point scale. Items are scored either 0-3 or 3-0, with a range of 0-60; the higher score indicates greater depressive symptomatology. This scale has been validated in Vietnamese language using confirmatory factor analysis.

3. Results

3.1. Exploratory qualitative research

Opinions of psychiatric experts about the relationship between SES and depression in Vietnam: Two psychiatric experts expected that SES has an inverse relationship with depression in Vietnam

There are very few available data about depression, especially no research on the association between SES and depression in Vietnam so that I don't have obvious evidence about the relationship between SES and depression in our country. However, in my experience, as I am in charge of working as director of the provincial program on mental illness at community level in Thua thien Hue province, I think that individuals from low SES in Vietnam are more likely to suffer from depression compared with those in the higher hierarchy of SES. Low SES individuals usually have to experience more risk factors for depression than do those in the high SES group. (psychiatrist expert-psychiatric hospital of Thua thien Hue province)

Low SES individuals are more likely to experience depression compared with high SES, but only with regards to mild and moderate depression, severe depression probably do not relate to SES. For example, poor economic condition can bring about mild condition of depression.(psychiatrist expert- psychiatric clinic of Hue central hospital)

Besides the educational level and household income, we can rely on occupation to measure SES in Vietnam. For example, regarding occupation, manual labourers are considered at lower levels of SES compared with the non-manual occupation. The less trained occupation belongs to the lower SES group.(psychiatrist expert-psychiatric hospital of Thua thien Hue province)

With the same level of household income, I think that residents in urban areas undergo more possibility of tolerating depression than do those in the rural areas, as the competency is higher in the city than in the rural areas. (psychiatrist expert-psychiatric hospital of Thua thien Hue province)

Explanations for the relationship between SES and depression in Vietnam

The two psychiatric experts agreed that multiple factors can be explained for the association between SES and depression. For example low education, low income, adverse life circumstances, family and community support, the issue of funding children's food and study, diseases…

** Explanations for the relationship between educational level and depression:*

Individuals from primary school backgrounds or illiterate and lower level of education is easier to acquire depressive disorder, but the reasons for this relationship is

difficult to explain. Possibly low educational level leads to lower capacity of responding to diverse life circumstances in an adaptive and timely manner. It is difficult for them to cope with stress effectively. (psychiatrist expert- psychiatric hospital of Thua thien Hue province)

Low education individuals lead to low occupational skills, which make them more vulnerable to experiencing stressors, which can result in more depression. (psychiatrist expert- psychiatric hospital of Thua thien Hue province)

Low educational level lead to the absence of skills for solving situational problems and hence meet with more stressors. Also low education usually lead to the absence of good skills in occupation, this in turn results in low income and hence obtaining not enough resources for solving many problems in their lives. (psychiatrist expert- psychiatric clinic of Hue central hospital)

Individuals can have enough money, but little knowledge can create stressors for them. (psychiatrist expert-psychiatric clinic of Hue central hospital)

** Explanations for the relationship between poverty and depression*

Poor people have to be worried very much, it seems that this is normal status of worries, but when it lasts for a long period, day after day, it can create a psychological trauma without any way to solve the problems. While people surrounding them are richer; and they feel that they are not successful in their lives; this feelings can create their low self-esteem. This is a risk factor for depression. (psychiatrist expert-psychiatric hospital of Thua thien Hue province)

Individuals with high knowledge level, but with little income can bring about no financial resources and this can create stressors.

(psychiatrist expert- psychiatric clinic of Hue central hospital)

Low income can lead people to no resources for solving many problems in their lives; and this will lead individuals to 'living in frustration', no satisfaction with all daily issues and aspects; which in turn create stressors. For example, people may wish very much to have their own houses for living or their own vehicles for travelling, but they can not afford these things; so how can they tolerate those sorrowful feelings or situations.(psychiatrist expert- psychiatric clinic of Hue central hospital)

** Explanations for the relationship between occupation and depression*

People in the classification of occupation that require some level of training usually feel more safety because employers usually employ them for longer period of time; and they also have more opportunities to enhance their working positions. On the contrary, manual labourers can become unemployed at any time as it is very easy to find another person in replace of their duties. In government sectors, there are very few

long-term contract for low educational persons. Similarly, in private sectors, employers also set priorities for enrolling well educated or well trained persons. Individuals in the low status of occupation, mainly manual labourers, usually must be worried for their future: they often do not know how is the day after the present day; low salary and low income from this low occupational status also make them feel worried for the future of their children.(psychiatrist expert-psychiatric hospital of Thua thien Hue province)

Unstable jobs, unemployed persons usually establish a feeling of instability in their lives and therefore enhance long-term pressure for their future, which in turn can bring about depressive disorder. (psychiatrist expert- psychiatric clinic of Hue central hospital)

3.2. Pilot quantitative research

Study characteristics

Table 1. *Pilot study: Sociodemographic characteristics of the sample*

	Number of respondents (n=100)	**Percents of sample**
Sex		
Male	47	47
Female	53	53
Age Mean (SD): 42.5 (8.5)		
25-35	22	22
36-45	35	35
46-55	43	43
Marital status		
Married	72	72
Never married	17	17
Other	11	11
Ethnic group		
Kinh	100	100
Others	0	0
Education Mean(SD): 10.5 (4.5), min:0, max:21		
	32	32
Above High school	29	29

High school	23	23
Secondary school	16	16
Primary school/ No education		
Occupation		
High	37	37
Medium	5	5
Low stable	27	27
Low unstable	15	15
Monthly income (thousand VND)		
Highest (1,401 +)	22	22
Middle high (801-1,400)	31	31
Middle low (501-800)	26	26
Lowest (260-500)	21	21
Employment status		
Employed	84	84
Housewives	12	12
Unemployed	4	4

Table 1 displays the basic sociodemographic characteristics of the pilot sample. This sample consisted of 47 per cent females and 53 per cent males. All respondents were aged between 25-55 years (mean = 42.5; SD = 8.5). Regarding marital status, 'married' respondents constituted 72%, 'never married' comprised 17% and others (widowed or divorced) 11%. All participants belong to the Kinh ethnic majority group.

Year of education was between the range of 0 and 21, in which mean value was 10.5 (SD=4.5). Above high school respondents constituted thirty two percent of the total sample. High school respondents constituted 29%. Twenty three percent of respondents had attended secondary school and 16% attended primary or never gone to school.

Income were divided into 4 quartile group. Highest quartile income comprised 22%, middle high income 31%, middle low 26% and lowest 21%.

With respect to occupation status, 37% was high status (non manual professional or business with prestigious post), 5% was medium status (non manual workers with no professional qualification), 27% was low stable (manual and stable job) and 15% was low unstable (manual and unstable job). Employment status consisted of 84% employed, 12% housewives and 4% unemployed.

Prevalence of depressive symptoms and depression

Table 2. *Pilot study: Mean CESD score and Prevalence of depressive symptoms and depression according to demographic variables (sex, age , marital status) and SES*

	CESD score			Depressive symptom (CESD> 21)			Depression (CESD>25)		
	mean	**SD**	**p-value**	**N**	**%**	**p-value**	**N**	**%**	**p - value**
Total	10.4	9.3		13	(13.0)		10	(10.0)	
Sex									
Male(n=47)	10.8	9.4	NS+	6	(12.8)	NS+	5	(10.6)	NS+
Female(n=53)	10.1	9.3		7	(13.2)		5	(9.4)	
Age									
25-35	8.0	6.4	NS+	1	(4.5)	NS+	1	(4.5)	NS+
36-45	10.3	8.7		5	(14.3)		3	(8.6)	
46-55	11.7	10.9		7	(16.3)		6	(14.0)	
Marital status									
Married	9.2	7.8	<.05	6	(8.3)	<.05	4	(5.6)	<.05
Never married	11.0	10.4		4	(23.5)		3	(17.6)	
Other	17.3	13.9		3	(27.3)		3	(27.3)	
Education									
Above high school	6.6	7.5	<.001	2	(6.3)	<.05	4	12.5	NS+
High school	9.8	9.8		2	(6.9)		2	6.9	
Secondary	11.0	8.6		3	(13.0)		2	8.7	
Primary or no school	18.3	8.3		6	(37.5)		2	12.5	
Income									
Highest	6.4	6.5	<.001	1	4.5	<.05	1	4.5	<.05
Middle high	9.2	8.5		3	9.7		2	6.5	
Middle low	8.6	7.2		2	7.7		1	3.8	
Lowest	18.7	10.8		7	33.3		6	28.6	
Occupation									
High	6.9	7.0	<.001	2	5.4	<.05	2	5.4	p=.06

Medium	5.8	5.6		0	0		0	0	
Low stable	8.4	4.5		0	0		0	0	
Low unstable	16.7	9.3		6	40.0		3	20	
Employment									
Employed	9.1	7.6	<.001	8	9.5	<.001	5	6.0	<.001
Housewives	11.5	10.3		1	8.3		1	8.3	
Unemployed	34.7	6.8		4	100		4	100	

+ Not significant.

Table 2 presents mean score for depression and prevalence of depressive symptoms and depression corresponding to CESD scores at two cut points (> 21 and > 25) by demographic and SES variables.

For the total population, mean CES-D score was 10.4 (SD: 9.3); proportion of individuals with CESD score above 16 was 19% (result not shown in the table), CESD score above 21 was 13 % and CESD above 25 was 10%

The mean CES-D score did not differ statistically in men and women, or among age groups but was associated with marital status. The prevalence of depressive symptoms in men and women did not differ statistically, being 12.8% and 13.2%, respectively. The prevalence of depression also did not differ statistically, being 10.6% and 9.4%, in men and women. Prevalence of depression and depressive symptoms were also not statistically different among age groups but differed significantly according to marital status ($p < 0.05$)

Regarding socioeconomic status, mean CES-D score and prevalence of depressive symptoms were all statistically different among various groups of education, income, occupation and employment. The prevalence of depression also differed statistically among groups of income and employment, but not differed statistically among education groups. Difference among occupation groups in prevalence of depression was just non significant (p=.06)

The Mediation Analysis

Step 1: Association between depressive symptoms and SES indicators

Bivariate regression and multiple regression analyses revealed associations between depressive symptoms and various independent demographic and SES variables are reported in table 3 and table 4 respectively. Standardized coefficients and 95% CI are presented. Table 4 reports regression coefficients of SES variables on depressive symptoms; without and with controlling for the effect of demographic variables (age, sex and marital status).

With regard to demographic indicators, table 3 shows that increased levels of depressive symptoms were associated with previously married compared to married individuals; and no statistically significant associations between age or sex and depressive symptoms have been found.

Table 3. *Pilot study: Simple linear associations between demographic variables and CESD score*

	CESD score	
	b	**95% CI**
Age	0.1	-0.1, -0.3
Sex		
Female (ref)		
Male	0.8	-2.9, 4.5
Marital status		
Married (ref)		
Never married	1.8	-3.1, 6.6
Other	8.1**	2.3, 14.0

** p<0.01

With regard to SES predictors, table 4 indicates that higher levels of depressive symptoms were associated with lower levels of education, lowest household income compared to highest household income, low and unstable occupation status compared to high status occupation; and unemployed compared to employed individuals (unadjusted and adjusted for demographic variables)

Table 4. *Pilot study: Linear associations between SES variables and CESD score*

	CESD score			
	Unadjusted		Adjusted for age, sex and marital status	
	b	95% CI	b	95% CI
Education	-0.9***	-1.2, -0.5	-0.8***	-1.2, -0.4
Income				
Highest (reference)	-		-	
Middle high	2.8	-1.8, 7.4	2.9	-1.8, 7.6

Middle low	2.2	-2.6, 7.0	2.2	-2.8, 7.2
Lowest	12.3***	7.2, 17.3	11.7***	6.0, 17.5
Occupation				
High (reference)	-		-	
Medium	-4.3	-12.7, 4.1	-4.0	-12.3, 4.4
Low stable	-1.6	-5.9, 2.6	-1.7	-6.0, 2.7
Low unstable	6.7*	1.4, 11.9	5.3JNS	-0.2, 10.7
Employment				
Employed (ref)	-	-	-	-
Housewives	2.4	-2.5, 7.3	2.5	-2.8, 7.9
Unemployed	25.6***	17.6, 33.7	23.8***	15.3, 32.3

*p<0.05; ***p<0.001; JNS p= 0.

Step 2: Association between SES indicators and possible mediators (stress, social support, self esteem and mastery)

To examine the mediating effects of stress scales, social support and psychological resources on the association between various SES indicators and depressive symptoms, step 2 in Baron and Kenny's framework are followed. For the interest of testing mediation effects, only those association that reached statistical significant levels as required in the first step (see table 4) will be relevant to be examined in the step 2, regression coefficients with levels of statistical significant are presented in tables 5 and table 6. The association between CES-D scores and low – unstable occupation vs. high occupation have p values of just non significant (p=.056) in the first step was also taken into account for the analysis in this step 2

Table 5. *Pilot study: Ordinary Least Squares Regression of stress score on SES (adjusted for demographic variables: age, sex and marital status)*

	Lifetime trauma		**Chronic stress**		**Recent life events**	
	b	**95% CI**	**b**	**95% CI**	**b**	**95% CI**
Education	-0.05*	-0.1, -0.01	-0.2**	-0.3, -0.1	-0.06*	-0.1, -0.01
Income						
Highest (ref)						
Middle high						

Middle low						
Lowest	0.8**	0.2, 1.4	4.0***	2.6, 5.6	1.1**	0.4, 1.7
Occupation						
High (ref)						
Medium						
Low stable						
Low unstable	-0.01	-0.5, 0.5	1.3	-0.2, 2.8	0.6*	0.0, 1.2
Employment						
Employed(ref)						
Housewives						
Unemployed	1.2*	0.3, 2.1	1.2	-1.6, 3.9	1.6**	0.6, 2.6

*p<0.05; **p<0.01, ***p<0.001; JNS: p=0.06

Table 5 presents the regression coefficients of multivariable analyses on the associations between different indicators of SES and various stress scales variables when controlling for demographic variables. Main findings of this table are:

- Higher education was associated with lower levels of lifetime trauma, chronic stress and recent life events ;

- Lowest income individuals were associated with increased all stress scores compared to highest income groups;

- Respondents with low and unstable occupations reported higher numbers of recent life events than high occupation status.

- Unemployed participants had increased scores of lifetime trauma and recent life events compared to employed respondents

Table 6. *Pilot study: Ordinary Least Squares Regression of social support, self-esteem and mastery score on SES (adjusted for demographic variables: age, sex and marital status)*

	Social support		**Self esteem**		**Mastery**	
	b	**95% CI**	**b**	**95% CI**	**b**	**95% CI**
Education	1.6***	1.0, 2.2	0.4***	0.2, 0.5	0.4***	0.3, 0.5
Income						
Highest (ref)						
Middle high						

Middle low						
Lowest	-10.9*	-19.9, -1.7	-3.1**	-4.8, -1.4	-4.5***	-6.0, -2.9
Occupation						
High (ref)						
Medium						
Low stable						
Low unstable	-12.1**	-20.3, -3.9	-2.7**	-4.4, -1.1	-2.6**	-4.1, -1.1
Employment						
Employed(ref)						
Housewives						
Unemployed	-13.5jns	-27.9, 0.9	-4.8**	-7.7, -1.9	-5.2***	-7.9, -2.6

*p<0.05;**p<0.01,***p<0.001;jns:p=.057

Table 6 shows differences in social support and psychological resources (mastery and self esteem) scores by SES indicators. The results show significant socioeconomic differences in social support, mastery and self esteem as follow:

- Higher education level was associated with more social support, higher self esteem and mastery

- Lowest income individuals reported less social support, and lower self esteem and mastery compared to highest income groups

- Low unstable and unemployed respondents had less social support, less self esteem and mastery compared to those with high occupation status and employed respondents respectively (notice that the association between social support and unemployed vs. employed was just non significant: p=0.057)

- *Step 3: Ordinary Least Squares Regression of CESD score on stress, social support, and psychosocial resources controlling for the effect of various indicators of SES and demographic indicators*

Step 3 in Baron and Kenny's framework are followed in this section. Only those association that reached statistical significant levels in the first two steps (see table 4; table 5 and 6) were examined in the step 3. Regression coefficients with levels of statistical significant are presented in tables 7, table 8, 9 and table 10. Those associations that have p values of just non significant in the first two steps were also taken into step 3 for the mediation analysis in this study

Table 7. *Pilot study: Ordinary Least Squares Regression of CESD score on stress, social support, and psychological resources when controlling for the effect of education and demographic variables (age, sex and marital status)*

	CESD score *(Controlling for education and demographic variables)*	
	b	**95% CI**
Stress		
Lifetime trauma	0.7	-1.3, 2.7
Chronic stress	1.2^{**}	0.5, 1.9
Recent life events	3.7^{***}	1.9, 5.3
Social support	-0.1^{JNS}	-0.3, 0.01
Psychosocial resources		
Self esteem	-1.3^{***}	-1.9, -0.6
Mastery	-1.9^{***}	-2.6, -1.3

$^{*}p<0.05$; $^{**}p<0.01$, $^{***}p<0.001$; JNS: p=.07

Table 7 summarizes the results of the analyses that examine whether stress indicators (lifetime trauma, chronic stress, recent life events), social support and psychological resources mediate the relationship between education and depressive symptoms. Tables 8, 9 and 10 present the analyses of the relationship between household income, occupation, employment and depressive symptoms respectively. The main findings of these tables are that all the partial regression coefficients for stress, social support and psychological resources with depressive symptoms reached statistical significance when controlling for the effect of separate indicators of SES and demographic variables (age, sex and marital status) except for the partial regression coefficients examine the relationships between lifetime trauma and depressive symptoms when controlling for the effects of education, household income, and employment status separately. The effect of social support on depressive symptoms is just non significant when controlling for the effect of education and demographic variables (p=0.07)

Table 8. *Pilot study: Ordinary Least Squares Regression of CESD score on stress, social support, and psychosocial resources when controlling for the effect of household income and demographic variables (including age, sex, marital status)*

	CESD score *(Controlling for household income and demographic variables)*	
	b	95% CI
Stress		
Lifetime trauma	0.5	-1.5, 2.6
Chronic stress	1.1***	0.3, 1.8
Recent life events	3.5***	1.7, 5.3
Social support	-0.2**	-0.3, -0.1
Psychosocial resources		
Self esteem	-1.6***	-2.2, -1.0
Mastery	-1.9***	-2.6, -1.3

*p<0.05; **p<0.01, ***p<0.001

Table 9. *Pilot study: Ordinary Least Squares Regression of CESD score on stress, social support, and psychosocial resources controlling for the effect of occupation status and demographic variables (including age, sex, marital status)*

	CESD score *(Controlling for occupation and demographic variables)*	
Stress	b	95% CI
Lifetime trauma	-	-
Chronic stress	-	-
Recent life events	4.0***	2.3, 5.8
Social support	-0.2**	-0.3, -0.1
Psychosocial resources		
Self esteem	-1.6***	-2.2, -0.9
Mastery	-2.0***	-2.6, -1.4

*p<0.05; **p<0.01, ***p<0.001

Table 10. *Pilot study: Ordinary Least Squares Regression of depressive symptoms on stress, social support, and psychosocial resources controlling for the effect of employment status and demographic variables (including age, sex, marital status)*

	CESD score *(Controlling for employment status and demographic variables)*	
	b	**95% CI**
Stress		
Lifetime trauma	0.4	-1.5, 2.3
Chronic stress	-	-
Recent life events	3.3***	1.6, 4.9
Social support	-0.2**	-0.3, -0.1
Psychosocial resources		
Self esteem	-1.2***	-1.8, -0.7
Mastery	-1.7***	-2.2, -1.1

*p<0.05; **p<0.01, ***p<0.001

The size and significance of mediated effects:

Table 11. *Pilot study: Ordinary Least Squares Regression of CESD score on SES indicators – controlled for demographic variables - with and without controlling for possible mediators*

Predictors	**CESD score**							
	Controlled for demographic variables		**Controlled for demographic & Chronic stress**			**Controlled for demographic & Recent life events**		
	b	**95% CI**	**b**	**95% CI**	**Mediated effect**	**b**	**95% CI**	**Mediated effect**
Education	-0.8***	-1.2, -0.4	-0.6**	-0.9, -0.2	**-0.2***	-0.6**	-0.9, -0.2	**-0.2***
Income								
Highest(ref)	-		-			-		
Middle high								
Middle low	-							

Lowest	11.7***	5.9, 17.5	7.4*	1.1, 13.8	**4.3***	8.0**	2.3, 13.6	**3.7***
Occupation								
High(ref)	-		-				-	
Medium					-			
Low stable	-							
Low unstable	5.3JNS	-0.1, 10.7	-			2.9	-2.1, 7.9	*2.4ins*
Employment								
Employed(ref)	-	-						
Housewives	-							
Unemployed	23.8***	15.2, 32.3	-			18.7***	10.3, 27.0	**5.1***

Table 11. (cont.): *Pilot study: Ordinary Least Squares Regression of CESD score on SES indicators – controlled for demographic variables - with and without controlling for possible mediators*

Predictors	**Depressive symptoms**								
	Controlled for demographic & Social support			**Controlled for demographic & Self esteem**			**Controlled for demographic & Mastery**		
	b	**95% CI**	**Mediated effect**	**b**	**95% CI**	**Mediated effect**	**b**	**95% CI**	**Mediated effect**
Education	-0.6**	-1.1, -0.2	-0.2	-0.4	-0.8, 0.1	**-0.4*****	-0.1	-0.5, 0.3	**-0.7*****
Income									
Highest(ref)	-			-			-		
Middle high									
Middle low									
Lowest	9.5**	3.9, 15.1	*2.2ins*	6.6*	1.2, 11.9	**5.1****	2.9	-2.7, 8.6	**8. 8*****
Occupation									
High(ref)									
Medium									

Low stable									
Lowunstable	2.9	-2.6, 8.3	**2.4***	0.9	-4.1, 6.0	**4.4****	0.1	-4.8, 4.6	**5.2****
Employment									
Employed(ref)									
Housewives									
Unemployed	21.5**	13.1, 29.8	2.3	17.9***	9.6, 26.2	**5.9****	15.0**	7.1, 22.9	**8.8****

Table 11 describes partial regression coefficients, as indicating the impact of independent SES variables on depressive symptoms; when controlling for the effect of demographic variables but not controlling for the effect of mediators (stress, social support, psychosocial resources); and when controlling for both demographic variables and mediators. Only associations that imply the existence of mediation effects are presented in this table.

4. Discussion

The findings of this pilot study suggested that there was a strong social gradient with respect to depressive symptoms. People with higher education levels reported fewer depressive symptoms (less CES-D score). Incomes were also inversely associated with depressive symptoms, but only the ones at the bottom of the quartile income, who were very poor, were strongly associated with higher depressive symptoms compared with the highest income groups. Similarly, low level and unstable individuals in term of occupation were associated with higher depressive symptoms compared with the highest occupation group. Interestingly, the medium and low stability groups in terms of occupation seemed to suffer lower depressive symptoms compared with the individuals in high level occupations. There seemed to be a U shape in the relationship between occupation and depressive symptoms. Employment status showed the strongest gradient with respect to its impact on the burden of depressive symptoms compared with other indicators of SES (education, income, occupation)

Results from the pilot study showed that life time trauma did not have mediating effects on the relationship between SES and depression. One explanation was that the effects were not large enough and our sample size was just too small and did not have enough power to test for such effects. This could lead to no statistically significant results. In addition, life time trauma that happened a long time ago could have a weaker effect or no effect on individual's mood status in the present. As pain could be relieved over time, also depressive symptoms usually happened in episodes which can include recovery.

Self esteem and mastery had very strong mediating effects on the association

between all indicators of SES and depression. Recent life events had mediating effects on the relationship between three indicators of SES with depressive symptoms (except for occupation). Chronic stress had mediating effects on the relationship between two indicators of SES with depressive symptoms (except for occupation and employment). Also, social support just had a mediating effect on the association between occupation and depressive symptoms. This result could suggest that our internal capacity, mastery and self esteem, had a stronger effect, although did not saying that it played the decisive role, on our mood state, rather than any other external factors, like stressors or social support.

5. Conclusion

Although we cannot firmly establish all the relationships found in this pilot study as our sample size in the pilot survey is just too small to have enough power for testing our hypotheses. Findings from the exploratory qualitative study and the pilot quantitative survey presented in this article can suggest a pattern on the negative association between socioeconomic status and depression in Vietnamese adults that we can predict will probably be replicated in the main survey.

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