

## **Demographic Variable, Social Determinant, Physical Parameter, And Stress Level In Correlation To Quality Of Life In Chronically Ill Elderly Living In Big Cities Of Bangkok and Surabaya**

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### **ABSTRACT**

#### **Introduction**

Age, sex, education level, occupation, and income are often correlated with individual's quality of life (QOL). Adjustment to the new role and physical changes, chronic illnesses, financial insecurity related to retirement, and increased dependence to others are potential causes of increased stress level and decreased QOL in elderly. This study aimed to analyze the correlation between demographic variable (age and sex), social determinant (education level, occupation, and monthly income), physical parameter (blood pressure/ BP and blood sugar/ BS level), and stress level with QOL in chronically ill elderly.

#### **Methods**

This cross-sectional study involved 100 and 96 elderly with hypertension (HT) and/or diabetes mellitus (DM) in communities of Bangkok and Surabaya respectively (n=196). There were 60 DM, 68 HT, and 68 DM&HT cases compiled from both sites. Instruments used were demography questionnaire, SPST-20, and WHOQOL-BREF. Rank Spearman correlation test was used for data analysis ( $\alpha = .05$ ).

#### **Results**

Study sites was not correlated with QOL ( $p=.210$ ). There was no significant correlation between age, sex, occupation, income, BP, BS level, and stress level with QOL ( $p > .05$ ); while there was a weak significant correlation between education level and QOL ( $r = .218$ ;  $p = .002$ ).

#### **Conclusion**

Age, sex, occupation, income, BP, BS level, and stress level are not correlated with QOL. Education level is weakly correlated with QOL in chronically ill elderly.

#### **Keywords**

Age; Blood Pressure; Blood Glucose; Chronic Illness; Demography; Diabetes Mellitus; Education Level; Elderly; Gender; Hypertension; Income; Occupation; Quality Of Life; Sex; Stress.

### **BACKGROUND**

Every individual will experience and face the aging process in the course of his life. This is a natural process happening both biologically and psychologically (Padila, 2013). Gradually, the elderly will experience changes in various organs' function and body systems physiologically. Age-related physiological changes also bring a reduction in functional capabilities resulted in problems with self-care, activities of daily life, and psychosocial problems (Pavlova, et al., 2015). QOL scores tend to decreased with increasing age (Bozkurt & Yilmaz, 2016). QOL reflects how one sees himself about his life satisfaction (Philips, et al., 2013).

A study in Tabriz, Iran, towards 184 elderly proved that there was no significant difference between sex and age variables with QOL total score which measured by WHOQOL-BRIEF instrument (Khaje-Bishak, et al., 2014). Other study in Austria towards 160 elderly proved that sex may have a significant impact on general QOL for both age groups of elderly (younger group: 57-70 years old, older group: >70 years old) and also significant impact on physical capacity (physical domain) and social relationship (social domain) in the younger group; QOL was measured by WHOQOL-BREF (Kirchengast & Haslinger, 2008). A study in South Korea towards 1,666 elderly revealed that scores of QOL differed according to each age group (young-old, middle-old, and old-old); QOL was measured by EQ-5D-3L instrument (Hong, 2015). We could see that different sites showed different results. Demographic variable of age and sex are still being potential variables affecting elderly's QOL.

Due to biological changes, elderly will face many problems, such as the occurrence of chronic illness or known as non-communicable disease (NCD). The four main types of NCD are cardiovascular disease (e.g. hypertension/HT), cancer, chronic respiratory disease, and diabetes mellitus (DM) (WHO, 2015). Xavier, et al., (2003) stated that elderly with poor QOL was equivalent to low health status, and vice versa. In elderly who are living with HT and/or DM, physical parameter like blood pressure (BP) and/or blood glucose/sugar (BS) level could be a good indicator for monitoring elderly's health status.

Due to various stressors, elderly were prone to stress. Carmody & Baer (2007) stated that adult with chronic illness often feel stressful because of the disease burden, chronic pain, anxiety, personal problem, and work-related stress. In elderly, those stressors are added by physical changes in appearance, decline organ function, new role adjustment, and other age-related limitations. Along with the increasing number of NCDs prevalence, incidence, and complication in elderly, some adjustment needs to be made, such as dietary change, regular physical exercise, frequent drugs administration, scheduled health status monitoring, early detection of disease complications, stress management, etc. Failure or problems in making such adjustment, NCD burden, added by some other stressors related to late life experiences potentially increase elderly's stress level and decrease their QOL.

QOL has been used as an indicator of how well a society meets the needs of its elderly. The society living in big cities are facing many challenges nowadays, such as aging society and inequalities in health (Lawrence, 2012). Demographic challenges happening in the big city

has led the government to meet the increasing demand for ventures related to elderly care (Golata & Kuroпка, 2016). Generally, QOL is influenced by living standard. In a society with inequalities in living standard, there is elevated stress level, especially in the lowest socio-economic status, leading to poorer health and even lower life satisfaction or QOL (Marmot & Richard, 2006). Standard of living could be assessed by economic status and housing conditions in which for a single-living older women low standard of living seems to be a more serious obstacle than poor health (Hosrtmann, et al., 2012). Various social determinants potentially influence elderly's living standard and QOL. In this study context, we determined education level, occupation, and monthly income as parameters of social determinant.

This study aimed to analyze the correlation between demographic variable, such as age and sex; social determinant, such as education level, occupation, and monthly income; physical parameter, such as BP and BS level; and stress level with QOL in hypertensive and/or diabetic elderly who are living in the big cities of Bangkok and Surabaya.

## METHODS

This was a cross-sectional study involving 196 elderly with DM and/or HT in communities of Surabaya and Bangkok. There were 96 and 100 cases compiled from Surabaya and Bangkok respectively. Sample distribution between two sites is presented in Table 1.

**Table 1: Sample distribution**

Case	Bangkok	Surabaya	Total
DM	30	30	60
HT	35	33	68
DM & HT	35	33	68
Total	100	96	196

Sample was chose by criteria then totally included in the study (total sampling). Inclusion criteria consist of: (1) willing to participate in the study proved by informed consent, and (2) fluently communicate by using Pasa Thai or Bahasa Indonesia.

Age, sex, education level, occupation, and monthly income were measured by demography questionnaire developed by researchers. Category of age was made based on World Health Organization (WHO, 2015) standard: 60-74 years old = elderly, 75-90 years old = old, and more than 90 years old = very old. Category of sex, education level, and occupation were fix. Category of monthly income was made based on socioeconomic class standard of World Bank (Educational Bodies and Financial Training / BPPK, Ministry of Moneytary, Republic of Indonesia, 2015): low class = less than IDR 2.6 million (THB 6,500), first middle class = IDR 2.6-5.2 million (THB 6,500-13,000), second midlle class = IDR 5.21-7.8 million (THB 13,025-19,500), third middle class = IDR 7.81-13 million (THB 19,525-32,500), and fourth middle class = IDR 13,01-26 million (THB 32,525-65,000).

BP was measured by calibrated digital sphygmo-manometer. Category of BP was made based on the New ACC/AHA Blood Pressure Guidelines (American College of Cardiology / ACC,

2017): normal = less than 120/80 mmHg, elevated = systolic between 120-129 mmHg and diastolic less than 80 mmHg, stage 1 = systolic between 130-139 mmHg or diastolic between 80-89 mmHg, stage 2 = systolic at least 140 mmHg or diastolic at least 90 mmHg, and hypertensive crisis = systolic over 180 mmHg and/or diastolic over 120 mmHg.

BS level was measured by calibrated DTX instrument. Based on PERKENI consensus (Association of Indonesian Endocrinologist / PERKENI, 2015), normal value of BS level if measured by using capillary blood as specimen was less than 200 mg/dL (without fasting). Therefore, the category of BS level was hyperglycemia =  $\geq$  200 mg/dL, euglycemia = 71-199 mg/dL, and hypoglycemia =  $<$  70 mg/dL.

SPST-20 was used to measure stress level (Artsanthia & Sari, 2017). It consisted of 20 items assessed in Likert scale format: 1 = no stress, 2 = mild stress, 3 = moderate stress, 4 = high stress, and 5 = severe stress. It is a valid and reliable instrument for measuring stress level (IOC = .78; Cronbach's Alpha = .94). The category of stress level was 0-23 = mild stress, 24-41 = moderate stress, 42-61 = high stress, and  $\geq$  62 = severe stress.

WHOQOL-BREF was used to measure four domains of QOL, such as physical, psychological, social, and environmental domain (WHO, 2004). It consisted of 26 items assessed in Likert scale format from 1 to 5; various terminologies were used to define the score of Likert in each item. It is a valid and reliable instrument for measuring individual QOL (IOC = .83; Cronbach's Alpha = .84). The category of overall QOL was made based on the raw score: 26-60 = poor, 61-95 = moderate, and 96-130 = good.

Descriptive statistic and Spearman Rank correlation test were used for data analysis ( $\alpha = .05$ ). Ethical clearance was issued by Ethical Committee of Saint Louis College (SLC), Bangkok, Thailand (November, 2016), with certificate number: E.038/2559.

## RESULTS

In total (n=196), most respondents were female (84.18%) elderly (73.47%). The educational level was mostly secondary school (44.39%), in which most of Surabaya respondents have higher degree than Bangkok respondents. Most of them has no job at the moment (86.73%), they are retire person or a housewife. Respondents are mostly come from low class (57.65%), in which there is no Surabaya respondents who come from the class more than 1st middle class. Their monthly income mostly less than IDR 2.6 million (THB 6,500). They got the income from various resources, such as profit of home business (11.22%), farming (0.51%), salary of permanent job (1.53%), and mainly from the relatives (86.73%) considered as monthly allowance. Table 2 presents the data of demography characteristic and social determinant of study respondents.

**Table 2: Demography characteristic and social determinant of study respondents**

Characteristic	Bangkok (100)		Surabaya (96)	
	n	%	n	%
<b>1. Sex</b>				
a. Male	20	20	11	11.4
b. Female	80	80	85	88.5

				4
<b>2. Age</b>				
a. Elderly	69	69	75	78.1
b. Old	27	27	21	3
c. Very old	4	4	0	21.8 7 0
<b>3. Education level</b>				
a. Primary school	53	53	25	26.0
b. Secondary school	25	25	62	4
c. Bachelor degree	8	8	9	64.5
d. No study (uneducated)	14	14	0	8 9.38 0
<b>4. Occupation</b>				
a. Farmer	1	1	0	0
b. Businessman	10	10	12	12.5
c. Government officer	2	2	1	0
d. Other (retire, housewife)	87	87	83	1.04 86.4 6
<b>5. Socioeconomic status based on monthly income</b>				
a. Low class	62	62	51	53.1
b. 1st middle class	15	15	45	3
c. 2nd middle class	15	15	0	46.8
d. 3rd middle class	6	6	0	7
e. 4th middle class	2	2	0	0 0 0

In total (n=196), mostly we found stage 2 of HT (44.39%) but Mean value of BP was higher in Bangkok. Mean value of BP in Surabaya is considered as stage 1 of HT. The data of systolic BP was more various in Surabaya, but the data of diastolic BP was more various in Bangkok (based on SD value). Table 3 presents the comparison of BP between two study sites.

**Table 3: Comparison of BP**

Category	Bangkok (100)		Surabaya (96)	
	n	%	n	%
Normal	15	15	15	15.6 3
Elevated	22	22	2	2.08
Stage 1	20	20	27	28.1 3
Stage 2	39	39	48	50
Hypertensive crisis	4	4	4	4.17
Mean	141.82/ 77.64		138.56 / 81.95	

Std. Deviation (SD)	18.59/ 11.27	22.95/ 10.60
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In total (n=196), mostly we found euglycemia condition (81.63%), and the Mean value of BS was also considered as euglycemia in both sites. The data of BS level was more various in Bangkok (based on SD value). Table 4 presents the comparison of BS level between two study sites.

**Table 4: Comparison of BS Level**

Category	Bangkok (100)		Surabaya (96)	
	n	%	n	%
Hyperglycemia	12	12	21	21.88
Euglycemia	86	86	74	77.08
Hypoglycemia	2	2	1	1.04
Mean	155.62		137.90	
SD	65.71		49.34	

In total (n=196), there were 3.06% mild stress, 46.94% moderate stress, 45.41% high stress, and 4.59% severe stress found. There was no mild stress found in Surabaya. Majority, we found moderate stress in Bangkok and high stress in Surabaya. The data of stress level was more various in Bangkok (based on SD value). Table 5 provides the comparison of stress level between two study sites.

**Table 5: Comparison of Stress Level**

Category	Bangkok (100)		Surabaya (96)	
	n	%	n	%
Mild	6	6	0	0
Moderate	64	64	28	29.17
High	24	24	65	67.71
Severe	6	6	3	3.13
Mean	36.82		48.42	
SD	13.29		8.89	

In total (n=196), there were 12.76% poor QOL, 71.43% moderate QOL, and 15.82% good QOL found. Majority, we found moderate QOL in Bangkok and Surabaya. The data of overall QOL was more various in Bangkok (based on SD value). Table 6 provides the comparison of overall QOL between two study sites.

**Table 6: Comparison of Overall QOL**

Category	Bangkok (100)	Surabaya (96)
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	n	%	N	%
Poor	25	25	0	0
Moderate	52	52	88	91.67
Good	23	23	8	8.33
Mean	78.83		60.91	
SD	18.96		8.15	

The result of Rank Spearman correlation test showed that there was no correlation between study sites and QOL ( $p = .210$ ), therefore the further statistical analysis was not separated between two study sites. From statistical test results, it could be concluded that there was no correlation between age, sex, occupation, monthly income, BP, BS level, and stress level with QOL ( $p > .$ ). There was a weak significant correlation between education level and QOL in chronically ill elderly ( $r = .218$ ;  $p = .002$ ). Table 7 presents the result of statistical analysis.

**Table 7: The Result of Rank Spearman Correlation Test (n=196)**

Variable		(Rho Coefficient)	p Value
Independent	Dependent		
Age	QOL	-.118	.099
Sex		-.058	.419
Education		<b>.218**</b>	<b>.002</b>
Occupation		-.014	.842
Income		.093	.193
BP		-.041	.569
BS level		-.004	.956
Stress level		.082	.253

## DISCUSSION

Nowadays, ageing becomes a major problem in the world and it exists in both the developed and developing countries. It is worst due to lack of sufficient government social welfare programme (Kumar, 2012). There are two key drivers of population ageing: 1) the decline in fertility rates to below replacement levels, and 2) a fall in mortality (Walker, 2009). Driven by falling fertility rates and remarkable increases in life expectancy, population aging will continue, even accelerate. The remarkable improvements in life expectancy over the past century were part of a shift in the leading causes of disease and death. Currently, NCD more commonly affects adults and older people impose the greatest burden on global health. In today's developing countries, the rise of chronic NCD, such as heart disease (including HT), cancer, and DM reflects changes in lifestyle and diet, as well as aging (WHO, 2011).

Results showed that there was no correlation between age, sex, occupation, monthly income, BP, BS level, and stress level with QOL in elderly who are living with HT and/or DM in Bangkok and Surabaya ( $p > .$ ). There are many internal and external factors influence QOL in elderly; physically, psychologically, socially, and environmentally. A study on Global Ageing and Adult Health (SAGE), a national survey program in India from 2007-2008, showed that the QOL of elderly was affected by some domains/factors, such as physical and psychological health condition, the level of independent, a social relation or the environment,

etc.; QOL was assessed by 31-questions of W.H.O. QOL (Kumar, 2012). In this study, we found more elderly perceived their QOL as moderate and good in both sites. This is supported by a narrative review by Netuveli & Blane (2008) which revealed that the majority of elderly evaluate their QOL positively on the basis of social contacts, dependency, health, material circumstances and social comparisons. Adaptations and resilience might play a part in maintaining good QOL.

Regarding NCD, a study of Khaje-Bishak, et al. (2014) found that QOL in elderly is more affected by chronic disease, such as having cardiovascular diseases (CVD), respiratory and gastrointestinal diseases, hearing and visual impairments; QOL was assessed by WHOQOL-BRIEF. A study of Chin, et al. (2014) found that elderly with one of the chronic diseases of HT, DM, and/or CVD had lower QOL than others who don't; QOL was assessed by EuroQoL-5. The impact of comorbid diseases was greater than that of any single disease except DM. CVD had a stronger negative impact on QOL than did any other single disease studied. Whereas the physical elements of QOL were influenced by all diseases, the psychological components were influenced only by HT plus DM and HT plus CVD.

Our previous study results showed that there was a significant difference of QOL in elderly who are living with HT and/or DM between Bangkok and Surabaya; QOL was assessed by WHOQOL-BREF. This difference was mostly existed in psychological and social domain of QOL. The difference was influenced by working satisfaction (physical domain); enjoyment of life, life meaning, concentration, self-satisfaction, and negative feeling (psychological domain); personal/social relationship, sexual life, and social support (social domain); living environment, access to health care facility, and transportation (environmental domain) (Sari & Artsanthia, 2018).

#### **4.1 Demographic Variable and QOL**

Age and sex were proved to be uncorrelated with QOL in chronically ill elderly. This finding was supported by the study of Khaje-Bishak, et al. (2014) in Tabriz, Iran, towards 184 healthy elderly. They concluded that there was no significant difference between sex and age variables with QOL total score. However male elderly had slightly higher QOL score. Although QOL scores tend to decreased with increasing age, we found that QOL scores were not varied greatly between the three age groups of samples in this study context: elderly, old, and very old groups. Higher variation of QOL score was found in Bangkok (based on SD value).

Regarding age, Trief, et al. (2003) compared QOL between adults (30-64 years old) and elderly ( 65 years old) spesifically in DM case; QOL was measured by SF-36. They found that elderly participants reported greater role limitations due to physical problems, but better social function than adults participants. Elderly also reported higher satisfaction with DM-related aspects of their life, less DM-related emotional distress, and better ability to cope with DM. The differences that did emerge between the two groups suggest that although experiencing more limitations in their ability to function in their roles, elderly individuals with DM may still feel that they can cope with these limitations and thus manage the distress and lifestyle demands of DM.

In the case of HT and HT plus DM, similar study analyzed the differences of QOL between elderly and adult was not found yet, but a fundamental study of Zhang, et al. (2017) towards 3,509 adults ( 18 years old) showed that health-related quality of life (HRQoL) in



hypertensive individuals was poorer than that of normotensive individuals; HRQoL was assessed by EQ-5D. In addition, education, complications, household income, and family history of high BP were associated with HRQoL among the hypertensive patients. Factors including age, education, household income, health expenditure, place of residence, and family history of high BP were found to be associated with HRQoL in normotensive individuals.

Regarding sex/gender, women elderly have many disadvantages in societies across the world, both economically and socially. Political and cultural factors have made women elderly experience cumulative economic barriers since youth making them short of resources and contributing to the deterioration in QOL (Kumar, 2012). Let us take an example from Japan which is being a nation characterized by a gender-asymmetric society and multigenerational family settings. Japanese Study of Aging and Retirement (JSTAR) from January to April 2007 found that men are less satisfied with life when living without their spouse; women are less satisfied with life when they live and/or have close relations with their parents-in-law; coresidence with an unmarried son is negatively associated with life satisfaction for both men and women; and, a larger number of friends and social activities enhance life satisfaction for women but not for men. Men are more sensitive than women to overall family relations, while the relative importance of social relations is higher for women. These results confirmed gender differences in the associations of life satisfaction with family and social relations in Japan (Oshio, 2012). Emotional nature of females' gender could be one of the causes of their vulnerability (Ahangaran, et al., 2007). In this study, the elderly who reported their QOL as poor were all females in Bangkok. We found no poor QOL in Surabaya.

We have study limitations also. In this study context, more female elderly participated as respondents than male (female : male = 5.3 : 1). This happened due to demography changes over time. Since for the past decades more baby girls borned than boys so that nowadays we could find more female elderly than male, as well as more chronically ill women than men. If the sample proportion was 50:50 for male : female, there is still a possibility that sex/gender correlates with QOL in chronically ill elderly. Similarly, we collected more elderly than the other age groups. The proportion was 36 : 12 : 1 for elderly : old : very old age groups. If the proportion was balanced between all age groups, there is still a possibility that age correlates with QOL.

#### **4.2 Social Determinant**

Education level was proved to be weakly correlated with QOL in chronically ill elderly; this is the only variable we found to be correlated with QOL in this study ( $r = .218$ ;  $p = .002$ ). Most of the respondents in both sites were not experienced any college life. If we could assumed that the higher individual's educational background means the more information or knowledge about NCD he has, it means most of study respondents have low knowledge about HT and/or DM, and this low knowledge possibly correlates with elderly's QOL because education level correlates with QOL in fact.

Hemming & Langille (2006) stated that a person's educational level accounts for 60% of his or her health literacy level. This study result was supported by a study of Macha-Quillama, et al. (2017) which showed that variables such as senior age and poor education have a significant association with inadequate levels of health literacy. Health literacy exerted an indirect effect on HRQoL (16% of the variance), especially in type 2 DM (Lee, et al., 2016).

In HT case, this study result was supported by a study of Zhang, et al. (2017) which concluded that education was associated with HRQoL among the hypertensive adults. People with higher educational levels tended to have higher levels of health literacy, which was considered helpful for improving HRQoL.

A study of Qin & Xu (2016) towards elderly with prediabetes showed that the level of diabetes health literacy among men was lower than among women and lower among respondents with 1–6 years of education than among those with 6 years or more of education. Those with less than one year of education had the lowest health literacy. The level of diabetes health literacy among elderly individuals with prediabetes but no history of hyperglycaemia was lower than among those with a history of hyperglycemia.

Education is a variable determining individual's living standard, together with housing, income, jobs, community, environment, civic engagement, health, life satisfaction, safety, and work-life balance. A study of Madzik, et al. (2015) found that there was a strong correlation between variables of living standard and variables of international competitiveness. In ASEAN region, Thailand and Indonesia are the same developing countries in which their level of competitiveness varied among variables of institutions, infrastructure, macroeconomic environment, health and primary education, higher education and training, goods and labor market efficiency, financial market development, technological readiness, market size, business sophistication, and innovation. Government of both countries consistently make various efforts to keep improving the value of each competitiveness variables in the country. Strong correlation were identified between life satisfaction and job, between life expectancy and job, and between life expectancy and environment (Madzik, et al., 2015). Education level potentially has a big influence in determining an individual living standard for chronically ill elderly, and together with life satisfaction, life expectancy, jobs, and environment could influence perceived QOL.

As education for elderly being crucial for improving their QOL, especially in chronically ill condition, researchers were asked to develop methods for improving education level of elderly informally. A study of Nistor (2014) towards elderly in Romania stated that strategies to educate elderly people regarding social-medical need to be found in order to improve their QOL. Social pedagogy can bring a significant contribution by adapting the pedagogic methods of teaching adults to the new informatics and communication technologies. The necessity of medical services and social protection is determined by progress, technology, the increasing complexity of co-morbidity correlated to age. All social actors have to take part and concentrate their efforts in order to ease and improve the mechanism of maintaining the adult in his family. The social policies in the area of elderly social protection need to foresee the development of complex programmes of adults' education by promoting certain proactive attitudes regarding the prolonged behaviour and psychological-social-medical care at home. Where there is a possibility, the public and private suppliers would take care of these needs.

Oppositely, occupation and monthly income were proved to be uncorrelated with QOL in chronically ill elderly in this study context. Work is an important economic, social, and psychological ingredient of human life. Higher work intensity may lead to deterioration of health and simultaneously less likely to be able to afford the time needed for health care due to work obligation. Less amount of free time also affects life satisfaction, happiness, depressed feeling, problem solving capacity, and self-confidence of individual (Zajc &

Kohont, 2017). Work is important for gaining income useful for survival. Most of study respondents has no permanent job at the moment, they are retire person or housewife. Their monthly income mostly less than the minimum wage of Bangkok and Surabaya. They got the income mainly from the relatives considered as monthly allowance. Other important expences could be assumed that it is paid by the other family member.

### **4.3 Physical Parameter**

BP and BS level were proved to be uncorrelated with QOL in chronically ill elderly. Aside from physical parameter, QOL in elderly was more affected by psychosocial factor. A study of Mauceri & Marco (2014) towards 95 Italian and Spanish elderly found that high scores of QOL relating to all of the considered QOL dimensions, especially for those concerning the subjective and inter-subjective dimensions. Spaniards, however, were much more satisfied with their lives than Italians. The participants were unsatisfied with their sexual lives, but there was a positive correlation between self-efficacy for coping with the negative emotional and sexual satisfaction among Spanish elders. A study of Kim & Kang (2015) showed that QOL had significant positive correlations with body image and sexual QOL, but a significantly negative correlation with depression. Body image, depression, education level, sexual QOL, and stressor, which accounted for 42.0% of the variance, were significant predictors influencing QOL in middle-aged adults in the community. From both studies, it could be assumed that as long as impaired physical condition did not affect the elderly psychosocially, or being a stressor affecting coping strategy, then QOL of elderly potentially unaffected by physical parameter.

Life satisfaction is a variable of living standard affecting individual QOL (Madzik, et al., 2015). A study of 529 elderly living in community dwellings of Macau using a single measure of life satisfaction and self-reported common chronic medical illness diagnosed by a physician showed that respondents who indicated the lowest life satisfaction were those with fracture after the age of 60, eye illness, chronic bronchitis/emphysema, and metabolic arthritis/arthritis. For men, prostate problems was also significantly related to low life satisfaction. Lowest life satisfaction was reported among Macau elderly people living with mobility related health problems, impaired eye health and neuromuscular weaknesses, all related to chronic medical illness (Hu, et al., 2016). High BP and BS related to HT and/or DM are potentially being minor to mobility problem, impaired eye health, and neuromuscular weaknesses in determining life satisfaction and QOL in chronically ill elderly.

A bit different to this study context, a study of Ma, et al. (2015) towards 112 elderly with osteoporosis in China found that QOL and social support was correlated. This proved that social domain has greater effect towards QOL in elderly. Familial respect and care, spiritual support, and material support can consciously encourage the elderly to increase availability of and initiate social support (Cong & Silverstein, 2011). The elderly might increase their utilization of social support if they are encouraged to spend more time with family and friends, actively participate in collective activities, and actively talk to family members or friends when encountering troubles or are confused with something (Wu, et al., 2015). Moreover, increased socialization is advantageous for emotional health.

### **4.4 Stress Level**

Stress level was proved to be uncorrelated with QOL in chronically ill elderly. This fact was surprising because many literatures stated opposite conclusion regarding correlation of stress level and QOL, although not all paper specifically targeting chronically ill elderly in their studies. Supporting studies showing similar result to this study context was not found. Prevalence of stress in elderly was not well-discussed in the literature. However, a study of Manaf, et al. (2016) about emotional stress in 230 Malay elderly who lives in rural community identified the correlation of marital status, general health status, and living with family with emotional stress, in which they found that there was no significant factor associated with emotional stress in elderly.

A previous study of Sari & Artsanthia (2018) about comparison of stress level and QOL between chronically ill elderly in Bangkok and Surabaya found that there was significant difference of stress level and QOL between two sites. The difference of stress level was influenced by anxiety, finance, muscular pain, appetite loss, headache, anger, low concentration, and fatigue. Although significant differences were found between two study sites regarding stress level and QOL, this study result showed that stress level and QOL was not correlated in chronically ill elderly.

One of the stressor in elderly people is low or no income related to retirement, impaired physical function due to chronic disease, mental illness, etc. A study from rural China towards the oldest old showed that economic stress is negatively associated with indicators of QOL, such as the quality of medical care and mental well-being. The poor QOL contributes to the higher mortality rate for the oldest old who are under economic stress. Results also showed that perceived economic strain increases the risk of mortality by 42% in rural areas, even after controlling for basic demographic characteristics, life style factors, and major health events. However, in urban areas, economic stress has no direct impact on the hazard of mortality (Yeung & Xu, 2011).

Stress in elderly could be reduced by doing some leisure activities, such as spending a holiday by visiting new places or touring. The role of leisure as a context for realizing and utilizing human strengths and resilience is important. A review by Iwasaki (2006) stated that the major pathways or mechanisms that can facilitate meaning-making and lifequality-enhancement in leisure – QOL relationship include: (a) positive emotions and well-being experienced from leisure, (b) positive identities and self-esteem gained from leisure, (c) social and cultural connections and a harmony developed through leisure, and (d) leisure's contribution to learning and human development across the life-span. The benefits of meaning-making through leisure involve both "remedying the bad" and "enhancing the good." Leisure experiences are socially and culturally constructed and shaped by the inequalities of society. The reality of power imbalance and inequalities should be acknowledged and appropriately addressed socially, culturally, and politically.

## **CONCLUSIONS**

Age, sex, occupation, income, BP, BS level, and stress level are not correlated with QOL, while education level has a weak significant correlation with QOL in chronically ill elderly. Educational background correlates with health literacy level in chronically ill elderly. Education level could also influence the determination of individual living standard, and

together with life satisfaction, life expectancy, jobs, and environment could influence perceived QOL in chronically ill elderly.

### **Declarations**

All authors have contributed equally to this research and publication (50:50). Regarding the initial research conception, 2nd author had the original idea then developed by 1st author. Regarding data collection process, 1st author was responsible for the data collection in Surabaya, while 2nd author was responsible for data collection in Bangkok. Regarding manuscript writing, 1st author wrote the whole paper then consulted to the 2nd author. 2nd author agreed to all statements written in this manuscript and proved this publication.

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### **Ethical consideration**

Ethical clearance was issued by Ethical Committee of Saint Louis College (SLC), Bangkok, Thailand (November, 2016), with certificate number: E.038/2559. Prior to data collection, all respondents have agreed to research protocol or gave their consent. It was proved by signature in informed consent form.

### **Consent for publication**

All authors agreed to this publication. No conflict of interest assured. The copyright transfer agreement will be signed after the acceptance of this manuscript, or prior to “in press” process.

### **Availability of data and materials**

All data was confidential, it was kept by both researchers. We cannot share our data to public because of ethical issue. Only study results presented in this manuscript considered to be appropriate to share.

### **Competing interest**

Both authors declare no conflict of interest.

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