Meta-Analytic Structural Equation Modeling (MASEM) Analysis Of The Elderly's Quality Of Life (Qol) In ASEAN

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Abstract

In 2019, the number of elderly individuals (aged 65 or above) in ASEAN nations was reported to be nearly 47 million, and globally, it reached 703 million, with expectations of doubling by 2050. Therefore, great interest has been generated among researchers to understand better which factors influence the quality of life (QoL) of the elderly. To address this, the authors conducted a meta-analysis of ASEAN-related QoL studies. They identified 108 online studies published in international English language journals between January 2006 and December 2021. The synthesis of research findings was then applied in a structural equation model (SEM) analysis to explore the various factors affecting the QoL of the elderly in ASEAN. The analysis results indicated a consistent pattern of empirical data in the meta-analytic SEM (MASEM) of the elderly's QoL in ASEAN. The most influential factor was the individual variable, with a path coefficient of 0.414, followed by public health, social support, and environmental support, with path coefficients of 0.210, 0.120, and 0.103, respectively. These findings can help inform individuals and organizations involved in enhancing the QoL of the elderly, highlighting the importance of focusing on the individual aspect, followed by public health, social support, and environmental factors.

KEYWORDS: ASEAN Elderly, Elderly Quality of Life (QoL), Meta-Analytic Structural Equation Modeling (MASEM), Thailand.

INTRODUCTION

Science and technology's rapid advancement has led to significant

breakthroughs in medical and health sciences, such as nutrition, sanitation, healthcare, treatment technologies, and the development of effective medicines and preventive vaccines. As a result, people are enjoying improved health and longer lifespans, leading to significant demographic changes. Developed countries have already transitioned into aging societies while developing countries are witnessing a rapid increase in the elderly population or are on the brink of becoming aging societies (Foundation of Thai Gerontology Research and Development Institute, 2019).

With increasing awareness of the elderly issue worldwide, including in ASEAN countries, researchers and agencies are motivated to investigate various aspects of the elderly's health, mental well-being, nutritional status, living conditions, environment, and sanitation (Ditsuwan & Sukkamart, 2022; Yurayat & Tuklang, 2023). All these factors contribute to their perception and satisfaction in daily life, commonly called ‘Quality of Life’ (QoL). Hamsupho et al. (2000) defined QoL as encompassing health, society, economy, politics, and religion. It should be noted that there are no fixed rules or regulations, as individual needs and country-specific standards may vary. Moreover, QoL is subject to change over time and circumstances.

Numerous studies on the elderly's QoL in ASEAN have been conducted in education, health sciences, science and technology, social sciences, and humanities. However, these findings have yet to be integrated to form comprehensive conclusions regarding all aspects of the elderly's QoL in ASEAN.

Research synthesis is a scientific methodology used to address research problems. It involves gathering, examining, and analyzing research on a specific problem using statistical or qualitative data analysis methods. Standardized indices are created to ensure consistency across different studies by systematically presenting the findings. The collected data is then analyzed to synthesize information and draw conclusions applicable to all population groups (Sutton & Austin, 2015).

To ensure the validity of the causal model, the author utilized a meta-analytic structural equation model (MASEM), as suggested by Jak et al. (2021). The model's accuracy was verified by synthesizing

the results of the relationship between each pair of variables in the model. Additionally, a structural equation model (SEM) analysis was conducted to examine the influence of independent variables on dependent variables.

The authors examined studies on the quality of life (QoL) among the elderly in ASEAN using the research synthesis method. Correlational and experimental research articles published in international English journals between January 2006 and December 2021 were reviewed. These studies focused on variables related to the QoL of the elderly in ASEAN countries, covering various fields such as education, health sciences, science and technology, social sciences, and humanities—the selected studies provided sufficient statistics for estimating standardized values in meta-analytic research synthesis.

Meta-analysis was employed to synthesize the findings of these studies, while index values were derived from studying the factors influencing different aspects of the elderly's QoL in ASEAN. The relationship between variables was also investigated. To achieve the development of the elderly's QoL in ASEAN, the author combined structural equation model analysis with meta-analytic research synthesis. Correlation matrices were created to analyze the structural equation model further and identify influential factors affecting the elderly's QoL.

Research Objective

To develop and validate a MASEM of the elderly’s QoL in ASEAN

LITERATURE REVIEW

Individual Factors (IN)

Wilson and Cleary (1995) indicated that an individual’s response to biological and physiological change and their perception of the resultant QoL depends on their environmental and individual characteristics, which provide explanatory causal pathways at every level. Sousa et al. (1999) specified that an individual’s characteristics include the qualities or traits that identify them as human being. These include their gender and age, whereas environmental characteristics are the combination of external factors that affect a human’s life.

Suh and Choi-Kwon (2010) examined 215 Korean stroke victims' QoL and determined that functional dependency, social support, and post-stroke biobehavioral changes were essential to enhancing QoL. In another study, Oh and Yi (2014) also revealed that personal factors, health awareness, and social support directly affected QoL. This agreed with the research of Santos et al. (2018) on 213 patients, which indicated that personality promotion had a statistically significant direct effect on happiness. Also, happiness had a statistically significant direct effect on QoL, with the impact of disease having a significantly stronger impact on QoL than happiness.

Consequently, the authors defined population (IPOP), mind (QPSY), (IPHY), and body (IPSY) as the observed variables influencing the latent variable individual (IN).

Society (SO)

The World Health Organization (WHO) has suggested that one social relationship factor is the perception of one's relationship with others in society. This included how one perceived their reception of help from their community and how they contributed back to others. In a more contemporary context of the Covid-19 pandemic, some scholars have referred to this idea as 'social collectiveness (Ottoni et al., 2022).

Moon et al. (2016) added to the discussion by showing that social support, directly and indirectly, affected QoL through physical health. This was consistent with the research of Tangsathapornphanich et al. (2017), which revealed that family relationships and community environment had direct and indirect effects on happiness through mental health. Similarly, Hongthong et al. (2015) explored QoL issues amongst the rural elderly in Thailand and reported that there were four risk factors. These include alcohol consumption, physical capacity, health status, and financial security acted as QoL predictors of Thai elderly. Gupta (2014) also revealed that society indirectly affected QoL through health awareness.

Therefore, social relations (SREL) and social support (SSUP) were

thus specified by the authors as the observed variables for the latent variable society (SO).

Public Health Support (PH)

Gupta (2014) commented on the QoL of adults and indicated that socio-economic status, mental health, and health perception directly impact QoL. Suh and Choi-Kwon (2010) indicated the direct impact of physical health on QoL. This was in line with the research of Jantacumma (2018), who examined QoL among pregnant Thai teenagers and argued that mental health and health literacy directly affected QoL.

Santos et al. (2018) showed that personality promotion had a statistically significant direct effect on happiness. Likewise, happiness has a statistically significant direct effect on QoL.

As a result, the authors determined that public health support (PH) relied on physical health (HPHY) and mental health (HPSY) supports.

Environment (EN)

Once again, WHO has commented on QoL environmental factors and suggested that the elderly's QoL way of life was affected by environmental factors such as living freely, safely, and stably without restraint. WHO also reported that the elderly required a healthy and pollution-free physical environment, convenient transportation, a secure income, health facility, and social work accessibility. They also added that receiving news, skill training, and recreational and free-time activities was essential for QoL experiences.

Jhantasena and Naknok (2018) queried 461 residents on five Thai islands concerning how they felt tourism affected their local QoL. The study's outcome showed that cultural and economic factors are essential to their QoL. These factors then positively affect material, emotional, and community well-being.

Therefore, the authors selected housing (EHAB) and safety (ESAB) as the observed variables for the latent variable environment (EN).

Quality of Life (QoL)

The World Health Organization (WHO) has reported that an

individual's QoL comprises four main factors. These are mental and physical mental health, emotional well-being, and social functioning (Baernholdt et al., 2012; Skevington et al., 2004). This is consistent with Halvorsrud's (2010) research from Norway, in which the Norwegian WHOQoL-Old module adopted aspects similar to WHO, including six facets, each having four items.

In Dorothea Orem's 'Self-Care Deficit Theory,' the author proposed that QoL is influenced by various fundamental factors, including an individual's age, sex, society, traditions, customs, housing, and family conditions, among others (Orem et al., 1995).

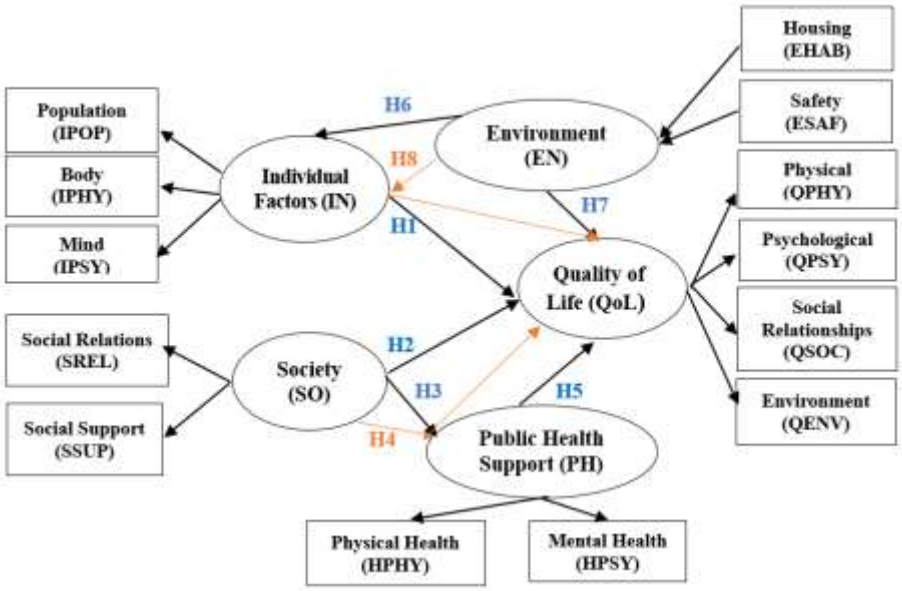
Lamb (1996) examined the QoL of elderly individuals in nine developing countries and categorized them into six disablement types. These types included emotionally healthy individuals, functionally healthy individuals with minor depressive symptoms, individuals with some strength problems, severely depressed individuals, individuals with mobility problems, and functionally frail individuals.

Consequently, the authors defined physical (QPHY), psychological (QPSY), social relationships (QSOC), and environment (QENV) as the observed variables influencing the individual's quality of life (QoL).

Conceptual Framework of Research

After the review of relevant documents and research, the author developed Figure 1's MASEM model of causal relationship factors for elderly quality of life in ASEAN.

Figure 1: Conceptual framework of MASEM of the elderly's QoL in ASEAN



Note: Blue indicates direct hypotheses, and Orange indicates indirect hypotheses.

The following eight direct and indirect hypotheses are proposed for the study.

Hypotheses

H1: Individual factors (IN) directly influence the elderly quality of life (QoL).

H2: Society (SO) directly influences the elderly quality of life (QoL).

H3: Society (SO) directly influences public health support (PH).

H4: Society (SO) indirectly influences the elderly quality of life (QoL)

through public health support (PH).

H5: Public health support (PH) directly influences the elderly quality of life

(QoL).

H6: Environment (EN) directly influences individual factors (IN).

H7: Environment (EN) directly influences the elderly quality of life (QoL).

H8. Environment (EN) indirectly influences the elderly quality of life (QoL)

through individual factors (IN).

METHODS

Research Population

The research population consisted of correlational and experimental studies focusing on variables related to the quality of life (QoL) of the elderly in ASEAN countries. These studies were written by Thai and foreign authors and published in international English journals available in online databases between January 2006 and December 2021—the selected studies provided sufficient statistics for estimating standardized indices used in meta-analytic research synthesis. Various fields were covered, including health science, science and technology, social science, and humanities.

Research Sample

The sample for this research comprised 108 articles (see Appendix 1) that were selected from correlational and experimental studies investigating variables related to the QoL of the elderly in ASEAN countries. These articles were written by Thai and foreign authors and published in international English journals available in online databases between January 2006 and December 2021—the chosen studies provided sufficient statistics for estimating standardized indices used in meta-analytic research synthesis. The papers covered various disciplines, such as health science, science and technology, social science, and humanities.

Research Tools

The researchers utilized two primary research tools. These tools included a research attribute form that employed the Index of Item Objective Congruence (IOC) with a range of 0.60-1.00. Additionally, Cronbach's alpha coefficient was used to assess the reliability between assessors, with a coefficient value of 0.88 (Ditsuwan & Sukkamart, 2022).

Research and Data Collection Methodology

This research encompassed three stages. Stage 1 involved conducting surveys and gathering relevant studies on the QoL of the elderly in ASEAN countries. This stage also encompassed quality assessment, selection, and data recording for research synthesis. Stage 2 focused on meta-analysis, including effect size and descriptive statistics

analysis. Lastly, to develop and validate the MASEM of the Elderly's QoL in ASEAN.

Data Analysis

The statistical analysis utilized in developing and validating the MASEM of the elderly's QoL in ASEAN involved fundamental statistical values to verify the consistency of the model's empirical data. Hooper et al. (2008) suggest that convergent validity (CV) analysis should include the following measures: Goodness of Fit Index (GFI), Root Mean Square Error of Approximation (RMSEA), Comparative Fit Index (CFI), and the chi-square/degrees of freedom (χ2/df) statistic. Schumacker and Lomax (2010) recommend the following threshold values for critical tests: GFI ≥ 0.95, Adjusted Goodness of Fit Index (AGFI) ≥ 0.95, and CFI ≥ 0.95. Furthermore, the p-value for the chi-square test (χ2) is recommended to be ≥ 0.05, and the relative chi-square (χ2/df) value should be ≤ 2.00 (Tabachnick & Fidell, 2007). Hu and Bentler (1999) also suggest that values for RMSEA, Root Mean Square Residual (RMR), and Standardized Root Mean Square Residual (SRMR) should be ≤ 0.05.

RESULTS

Correlation Coefficient Analysis Results

The results of the correlation coefficient analysis of variables indicated that all 78 variable pairs had positive correlation coefficients. Social support and safety were the variables with the highest correlation coefficient at 0.596, while the ones with the lowest correlation coefficient at 0.187 were physical QoL and safety.

The development and validation of MASEM of the elderly's QoL revealed that a MASEM of the elderly's QoL in ASEAN was consistent with the empirical data as χ^2=2.93, df = 2.00, χ^2/ df = 1.465, p = 0.231, GFI = 1.000, AGFI = 0.997, RMSEA = 0.008, RMR = 0.002.

Table 1 details the component weight of variables in the MASEM causal model of the elderly's QoL in ASEAN. It shows that the standard component weight of all observed variables had a positive value. Safety was the observational variable with the highest standard weight of 0.902, followed by mental health support with a standard weight of

0.737. Meanwhile, housing was the observed variable with the lowest standard component weight of 0.434.

Table 1: Component weights of variables in a causal model of MASEM of the elderly's QoL in ASEAN

Latent Variables	Observed variable	Component weight		
		b_{SC}	SE.	t
QoL	QPHY	0.576	- -	- -
	QPSY	0.530	0.022	24.291
	QSOC	0.733	0.027	27.583
	QENV	0.538	0.024	22.609
IN	IPOP	0.517	- -	- -
	IPHY	0.630	0.027	22.207
	IPSY	0.628	0.031	19.969
PH	HPHY	0.640	- -	- -
	HPSY	0.737	0.027	27.502
SO	SREL	0.654	0.013	51.704
	SSUP	0.666	0.012	53.607
EN	EHAB	0.434	0.016	26.999
	ESAF	0.902	0.030	29.793

Note: - - with mandatory parameters, no SE and t values were reported

Table 2 reveals that society (SO) directly influenced public health support (PH) at a statistical significance level of 0.05 with an influence coefficient of 0.764. This causal variable could explain public health support (PH) at 58.40%. Moreover, environmental (EN) directly influenced the individual (IN), with a statistical significance level of 0.05 and an influence coefficient of 0.695. This causal variable could explain the individuals (IN) at 48.30%.

Society (SO), environmental (EN), individual (IN), and public health support (PH) variables had a direct influence on the elderly's QoL in ASEAN at a statistical significance level of 0.05 with influence coefficients equivalent to 0.120, 0.103, 0.414 and 0.210, respectively. Society (SO) indirectly influenced the elderly's QoL in ASEAN through public health support (PH) at a statistically significant level of 0.05 with an influence coefficient of 0.165. Likewise, the environment (EN) also indirectly influenced the elderly's QoL in ASEAN through individuals (IN) at a statistically significant level of 0.05 with an influence coefficient of

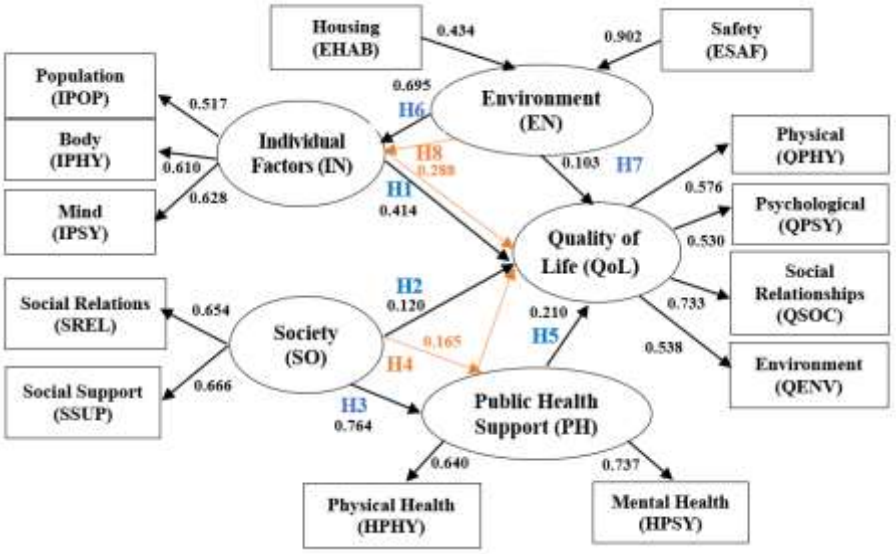
0.288. All causal variables, when combined, could explain the elderly's QoL in ASEAN at 71.90% (Table 2).

Table 2: Direct (DE), indirect (IE), and total effect (TE) of the MASEM causal model of the elderly's QoL in ASEAN

Causal variables	Dependent variables								
	QoL			IN			PH		
	DE	IE	TE	DE	IE	TE	DE	IE	TE
SO	0.120*	0.165*	0.285*	-	-	-	0.764*	-	0.764*
EN	0.103*	0.288*	0.391*	0.695*	-	0.695*	-	-	-
IN	0.414*	-	0.414*	-	-	-	-	-	-
PH	0.210*	-	0.210*	-	-	-	-	-	-
R^2	0.719			0.483			0.584		

Note: * p ≤ 0.05

Figure 2: F i n a l MASEM of the elderly's QoL in ASEAN



H1: Individual factors (IN) directly influence the elderly quality of life (QoL).
H2: Society (SO) directly influences the elderly quality of life (QoL).
H3: Society (SO) directly influences public health support (PH).
H4: Society (SO) indirectly influences the elderly quality of life (QoL) through public health support (PH).
H5: Public health support (PH) directly influences the elderly quality of life (QoL).
H6: Environment (EN) directly influences individual factors (IN).
H7: Environment (EN) directly influences the elderly quality of life (QoL).
H8. Environment (EN) indirectly influences the elderly quality of life (QoL)

through individual factors (IN).

DISCUSSION

Index and statistical values were used in examining whether the Index and statistical values were used to assess the alignment between the meta-analytic structural equation modeling (MASEM) causal model of the elderly's quality of life in ASEAN and the empirical data.

The results indicated that the model exhibited consistency with the empirical data, as the chi-square statistics were not significantly different from zero ($\chi2 = 2.930$, df = 2.00, $\chi2/df = 1.465$, $p = 0.231$). Other statistical values were as follows: goodness of fit index (GFI) = 1.000, adjusted goodness of fit index (AGFI) = 0.997, root mean square error of approximation (RMSEA) = 0.008, and root mean square residual (RMR) = 0.002. From these findings, it can be concluded that the MASEM causal model is consistent with the empirical data. This aligns with the suggestion by Wiratchai and Wongwanich (1999) that MASEM analysis indices, such as chi-square statistics, GFI, AGFI, and RMR, can be used to verify the consistency of structural equation models (SEMs) with empirical data.

Regarding the influence of social variables on public health support, a direct influence coefficient of 0.764 was observed. This finding is consistent with Baernholdt et al. (2012), who argued that the composition of public health support factors affects the quality of life. Additionally, factors related to health, daily life activities, exercise, healthcare, and emotions impacted the elderly's QoL. Similar results were reported by Tangkawanich et al. (2008), demonstrating that social support, directly and indirectly, affects QoL through physical care strategies. Furthermore, social support was found to have a statistically significant direct effect on physical care strategies.

The environmental influence directly influences the individual (IN) with an influence coefficient of 0.695. This observation aligns with the World Health Organization's claim that individual factors impact QoL regarding the environment (Skevington et al., 2004). QoL is affected by perceptions of freedom, safety, stability, a healthy and pollution-free physical environment, and convenient transportation.

Regarding the direct influences on the elderly's QoL in ASEAN, social, environmental, individual, and public health support variables exhibited statistical significance ($p < 0.05$) with influence coefficients of 0.120, 0.103, 0.414, and 0.210, respectively. Moreover, the social variable indirectly influenced the elderly's QoL through public health support ($p < 0.05$) with an influence coefficient of 0.165. Similarly, the individual variable indirectly affected the elderly's QoL through the individuals themselves ($p < 0.05$) with an influence coefficient of 0.288.

These findings are consistent with Skevington et al. (2004), who categorized QoL into four aspects: physical, mental, social relationships, and environment, according to the World Health Organization QoL-BREF (WHOQOL-BREF).

The findings of Halvorsrud (2010) further support that the ideal environment has a direct and indirect impact on Qandgh's physical health and a statistically significant direct effect on both physical and mental health. Additionally, it was found that mental health not only influences QoL directly and indirectly through its impact on physical health but also has a statistically significant direct effect on physical health. These findings are consistent with the research conducted by Wu (2012), which demonstrated that both physical and mental health have a statistically significant direct effect on QoL. Furthermore, the research indicated that social support directly affects physical health with statistical significance.

CONCLUSION

Due to changes in demographic structure, many developed countries have become a wholly aged society. Many other countries are approaching an aging society. The results of this research showed that social, environmental, individual, and public health support factors were the influencing factors that affected the elderly's QoL. These findings serve, therefore, as a guideline for relevant persons and agencies to further improve the elderly's QoL within the ASEAN community.

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CONFLICT OF INTEREST

The authors declare that they have no competing interests.

AUTHORS' CONTRIBUTIONS

All authors contributed equally to the conception and design of the study.

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