RESEARCH

Long COVID-19 prevalence and quality of life among older adults: A cross-sectional study

Wichitra Kusoom[1], Malinee Jumnian[2]

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ABSTRACT

BACKGROUND: Long COVID prevalence is a severe health problem that is associated with poorer Quality of Life (QoL) in older adults. This study was to investigate the long COVID prevalence and QoL among older adults and examine the relationship between long COVID and QoL.

METHODS: A cross-sectional study was employed with a total of 220 older adults. Descriptive statistics, Pearson correlation coefficient, and independent t-test were used.

RESULTS: The prevalence of long COVID was 57.7%. Older adults' QoL was at a moderate level. They had 53.6 % anxiety and fear, 43.6% fatigue/dyspnea, 43.2 allergy, 30.5% loss of appetite, 24.5% brain fog, 21.4 flu/fever, 20.9% memory impairment, 12.3% palpitation, 1.36% SLE, etc. Most of them had more than two conditions. The long COVID had an inverse effect on the QoL ($p<0.001$, r -0.295). Mean differences between Long COVID of males and females, ages (categorized as younger than 65 and older than 65), and vaccination and non-vaccination were different. Mean differences between QoL of males and females, ages (categorized as younger than 65 and older than 65), and vaccination and non-vaccination were also were not different. However, the long COVID impacted older adults with hospitalization than with non-hospitalization ($p<0.001$). The QoL with non-hospitalization was higher than those with hospitalization ($p<0.001$).

CONCLUSIONS: Older adults were at risk of long-COVID and QoL impairment. Nurses can play a crucial role in collaborating with the multidisciplinary team to create a health care services program to prevent COVID-19, and improving their QoL.

Keywords: *Long COVID-19; Quality of life; Older adult*

INTRODUCTION

The COVID-19 pandemic is a global health crisis and high mortality rate. Most of the people recovered after SARS-CoV-2 infection but still reported long COVID. Long COVID or Post-COVID Syndrome (PCS) is a poorly understood condition, with a broad spectrum of effects on multiple body systems and variable presentation in different individuals [1]. There is particular concern among older adults aged 65 years or older who are at greater risk than younger persons of persisting symptoms associated with COVID-19. The World Health Organization (WHO) defined long COVID as developing new symptoms three months after the initial SARS-CoV-2 infection, lasting at least two months without explanation [2]. Symptoms of long COVID include fatigue, shortness of breath and cognitive dysfunction in over 200 different. Those reported symptoms can have an impact on everyday functioning [2]. The prevalence of long COVID was reported from 0% to 93% [3]. The most common long COVID symptoms were activity tolerance fatigue, anxiety and fear of abnormal lungs, dyspnea, allergy, sleep disturbance [4]. A long period of hospitalization resulted in many long-COVID prevalence. Those affect survivors of COVID-19 at all disease severity scales and have gained attention in the medical and political community [3]. Older adults are at higher risk for comorbidity of Non-Communicable Diseases (NCDs) such as hypertension, Diabetes Mellitus (DM), heart disease, etc. Another study found that long COVID symptoms following acute COVID-19 infection seriously impact health-related QoL [5]. Thus, older adults are a vulnerable group with a higher risk for severe conditions and high persistence of long COVID related to QoL. QoL is an individual's perception of their position in life in the context of the culture and value systems in which they live and concerning their goals, expectations, standards and concerns [6]. Thailand became an aged society in 2023 when older adults represented 14 million (aged 60 and older), which accounted for 20 per cent of the total population [7]. Meanwhile, the prevalence of older adults with infected COVID-19 was approximately 170,861 [8]. Addressing

[1]*Faculty of Nursing Science, Bangkokthonburi University, Thailand,* [2]*Faculty of Nursing Science, Bangkokthonburi University, Thailand*

Correspondence: Malinee Jumnian, Faculty of Nursing Science, Bangkokthonburi University, Thailand, Phone: (813) 574-5218, E-mail: malinee.jum@bkkthon.ac.th

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physical, psychological, and functional sequelae will mitigate the effects of long COVID and improve the health and QoL of older people [1]. Only a few studies have investigated long COVID and QoL levels among older adults. The researchers are nursing students' instructors working in adult and gerontological nursing. We intend to investigate long COVID and QoL issues among older adults with post-COVID-19 infection. Thus, this study aimed to:

1. Investigate long COVID prevalence and QoL among older adults.
2. Examine the relationship between long COVID and QoL among older adults.

METHODS

Study design, setting, and participants

A cross-sectional survey study was employed. The data was collected using questionnaires of the long COVID, and WHOQOL–BREF–THAI instruments. For a quantitative procedure, a checklist of STROBE statements was used. Convenience and snowball sampling techniques were used. The setting was the participants' home in the communities or senior healthcare centers in Bangkok, Thailand. Family members or caregivers were present with the participants during the data collection. The inclusion criteria were Thai older adults and those older than 60 years who had been infected with COVID-19 and recovered within ≤ 6 months, not only through hospitalization but also non-hospitalization. They were not cognitively impaired and were willing to provide information. The inclusion criteria were written informed consent. The exclusion criteria included cognitive impairment and visual and hearing impairment. A sample size was calculated using G* power 3.1.9.7, based on an acceptable power level of 0.99, with a medium effect size of 0.30 and α of 0.01 [9]. For the correlation, the estimated sample size was 220 participants. Therefore, this number comprised 220 participants.

Instruments

Data was collected using either Google Forms or conventional questionnaires. The instruments were as follows.

1. Long COVID questionnaires are divided into 15 items with two domains: physical conditions (12 items) and psychological conditions (3 items). This instrument was applied from "The Post COVID-19 Effects" of Hengyotmark and Kusoom [4]. Each item contains score ranges 0-1, with the total score ranging from 0 to 15. A pilot test was conducted, and Cronbach's α was 0.74.
2. The WHOQOL–BREF–THAI questionnaire is a standard tool in Thai version used to assess the self-perceived quality of life [10]. The scale has 26 items with four domains: physical health (7 items), psychological health (8 items), social relations (3 items), and environment (8 items). Each item contains different score ranges (1-5), with the total score ranging from 26 to 130. The question score ranged from 1 (strongly disagree) to 5 (strongly agree). The total score ranges are grouped into very good (96-130), moderate (61-95), and poor QoL (26-60). A pilot test was conducted, and Cronbach's α was 0.94.

Procedure and data collection

After the Institutional Review Board (IRB) approval, we contacted the senior healthcare centers' administrators or leaders of communities for permission to speak with participants. Rapport and trust were established. Data were collected between October 1, 2022 and August 30, 2023. Once eligibility was confirmed, the study's purpose and methodology were explained to older adults with infected COVID-19. Participants who agreed to participate in the study provided written informed consent. They were requested to complete self-report questionnaires on health issues and QoL. Surveys were administered directly in the patient's home and the community senior healthcare centers. The process took approximately 10-15 minutes.

Data analysis

Data were analyzed using the software SPSS version 18 (IBM Corp. Released 2019. IBM SPSS Statistic for Windows, Version 28.0 (Armonk, NY, USA: IBM Crop). Descriptive statistics, Pearson correlation coefficient, and independent t-test were used. Statistical significance was analyzed by setting a two-tailed test at a significance of 0.05.

RESULTS

Demographic characteristics

Totally, 220 participants, they were 61.4% female, educational level: 57.2% elementary, occupation: 69.1% retirement, average monthly income: 48.2% with lower than 5,000 Baht/month, comorbidities: 95.9% with comorbidities, hospitalization history: 64.1% non-hospitalization, and 89.5% with vaccination.

The findings revealed that long COVID prevalence was 57.72%. They were 35.45% of female. They had 53.6% anxiety and fear of complication, 43.6% fatigue/dyspnea, 43.2% allergies, 30.5% loss of appetite, 24.5% brain fog, 21.4% flu/fever, 20.9% memory impairment, 12.3% palpitation, 5% inattention, 1.36% SLE, etc. Most of them had more than two conditions (Table 1).

QoL was at a moderate level. Additionally, out of 220 participants, the QoL of 182 participants (83.1%) was at a moderate level, and for 17 participants (7.8%), was at a high level. While for 20 participants (9.1%), the QoL was at a low/poor level. Meanwhile, long COVID and QoL had an inverse relation ($r = -0.295$, $p < 0.001$) (Table 2).

The Long COVID and QoL difference between hospitalization and non-hospitalization was significant ($p<0.001$) (Table 3). However, the long COVID and QoL difference between males and females was not significant (Table 4).

Table 1
Description of COVID-19 Prevalence (N=220)

Variables	Frequency	%
Long COVID		
Non-long COVID	93	42.3
Yes	127	57.7
Gender with long COVID		
Female	78	35.45
Male	49	22.27
Physical		
Fatigue/ activity intolerance	96	43.6
Allergy	95	43.2
Loss of appetite	67	30.5
Brain fog	54	24.5
Flu/ fever	47	21.4
Sleep disturbance	46	20.9
Memory impairment	46	20.9
Cough/ sore throat	38	17.3
Muscle pain/joint pain/back pain	34	15.5
Hair loss/ skin integrity impairment	32	14.5
Palpitation/ chest pain	27	12.3
Weight loss	2	0.9
Other: (SLE =3)	3	1.36
Psychological		
Anxiety and fear of complication	118	53.6
Inattention	11	5
Low self-esteem	9	4.1

Note: SLE: Systemic Lupus Erythematosus, Most participants had more than two conditions

Table 2
Description Variables and Correlation between long COVID and QoL

Variables	Min-Max	M ± SD	95% CI		r	p-value
			Lower	Upper		
Health issues	0-14	3.14 ± 75.46	2.79	3.52	-0.295	< 0.001**
QoL	53-112	75.46 ± 12.75	73.76	76.97		

Note: QoL: Quality of Life, M: Mean, SD: Standard Deviation, CI: Confidence Interval,

Table 3
Differences in Variables of Long COVID between (1) Male and Female, (2) Age Ranged <65 and ≥ 65, (3) Non-hospitalization and Hospitalization (4) Vaccination and Non-vaccination (N=220)

Variables	QoL		
	M ± SD	t	p-value
Gender			
Male	2.84 ± 2.49	-1.28	0.202
Female	3.32 ± 2.82		
Age (years)			
<65	3.22 ± 3.04	0.34	0.728
≥ 65	3.09 ± 2.49		
Hospitalization History			
Hospitalization	4.26 ± 3.21	4.85	<0.001***
Non-hospitalization	2.51 ± 2.13		
Vaccination History			
Vaccination	3.16 ± 2.71	0.35	0.723
Nonvaccination	2.96 ± 2.63		

Table 4
Differences in Variables of Long COVID between (1) Male and Female, (2) Age Ranged <65 and ≥ 65, (3) Non-hospitalization and Hospitalization (4) Vaccination and Non-vaccination (N=220)

Variables	QoL		
	M SD	t	p-value
Gender			
Male	76.97 ± 14.28	1.39	0.164
Female	74.51± 1.64		
Age (years)			
<65	78.51± 14.56	2.71	.007**
≥ 65	73.72 ± 11.28		
Hospitalization History			
Hospitalization	68.39 ± 9.9	-6.75	<.001***
Non-hospitalization	79.43 ± 12.47		
Vaccination History			
Vaccination	78.28 ± 17.83	1.17	0.242
Non-vaccination	76.1 ± 11.96		

Note: M: mean, SD: standard deviation

DISCUSSION

Among the 220 participants, 127 (57.7%) experienced symptoms of long COVID during six months. Most of the symptoms were fatigue/dyspnea, allergy, muscle pain, loss of appetite, sleep disturbance, brain fog, memory impairment, anxiety, fear of complications, etc. [4]. Previous studies revealed that the most frequently reported symptoms were fatigue (34.8%), amnesia (30.3%), concentration difficulties (24.2%), insomnia (20.5%), and depression (19.7%) [11]. Similarly, the effects of long COVID significant factors were fatigue, worsened pain, difficulties in activities of daily living and cognitive-communication problems [12].

Most participants' QoL was at a moderate level. In contrast, the QoL of the remaining 20 (9.1%) participants were at a poor level due to serious health issues from contracting COVID-19. In addition, 79 participants (35.9%) were hospitalized. Three participants (1.36%) experienced Systemic Lupus Erythematosus (SLE). SLE is an autoimmune disease in which the immune system attacks its own tissues, causing widespread inflammation and tissue damage in the affected organs [13]. The long-term complications of COVID-19 infection on the immune system are still unknown. Although extremely rare, autoimmune diseases can develop after COVID-19 infection [14]. Patients with SLE, vulnerable to physiological stressors, are especially predisposed to more risk of anxiety and depression when they contract COVID-19 disease [15]. Another study suggested various aspects of available and recent data regarding SLE and COVID-19 infection and vaccination [16]. Therefore, they experienced health issues, not only physical but also mental. Anxiety/depression, pain/discomfort, and inattention were the major problems encountered by the participants with long COVID. Long-COVID symptoms following acute COVID-19 infection have a severe impact on health-related quality of life [5]. Mental health was associated with days of hospitalization and cognitive communication problems [12]. In addition, another study found that age-related diseases can cause a decline in physical and mental functions and the ability to perform activities of daily living, as well as the loss of roles in society and a sense of fulfilment in life [17]. Therefore, older adults had severe diseases leading to long COVID conditions and affecting their QoL.

The long COVID has an inverse effect on the QoL ($r=-0.295$, $p< 0.001$). Patients experienced a lot of health conditions, not only physical but also mental, which affected their QoL. Most participants with hospitalization experienced high levels of long COVID. Previous studies suggested that health-related QoL is impaired after hospitalization due to COVID-19 [18], and a long period of hospitalization resulted in many residual symptoms of long COVID [19]. Symptomatic infection was also associated with poorer QoL [18]. Comparisons of the mean differences in long COVID between males and females, age (categorized as younger than 65 and older than 65), and vaccination and non-vaccination were also negligible. On the other hand, the long COVID of older adults with hospitalization was higher than non-hospitalization ($p<0.001$). These participants were elderly with comorbidity who were a vulnerable group at higher risk for severe conditions and developing long COVID. Similarly, several studies suggested that older patients have a greater risk of morbidity and mortality from COVID-19 and are also generally at a higher risk of long COVID than younger patients [1,20]. The symptoms of long COVID tend to persist over time, and COVID-19 vaccination or the number of vaccinations received may not significantly affect the incidence of long COVID [11].

Comparisons of the mean differences of QoL between males and females, age (categorized as younger than 65 and older than 65), and vaccination and non-vaccination were insignificant. On the other hand, the QoL of non-hospitalization was higher than hospitalization

(p<0.001). Another study found that anxiety/depression and pain/discomfort were the major problems experienced by the participants with long COVID, which had a severe impact on health-related quality of life [5]. However, a previous study found that females had a higher risk of developing long COVID syndrome [21]. Survivors of COVID-19 needing hospitalization had persistent symptoms and a decline in their QoL. Therefore, health-related QoL is impaired after hospitalization due to COVID-19.

LIMITATIONS

This study's participants were older adults infected with COVID-19 in Bangkok Metropolitan of Thailand. The sample was convenient, and the snowball sampling technique totaled 220 participants. Therefore, it could not be generalized to a broader area in Thailand. The number of participants in the hospitalization group was lower than that of the non-hospitalization group. These limitations should be considered when interpreting the findings and indicate areas for improvement in future studies. Finally, the results of cross-sectional studies are subject to influence from factors such as sample size and the potential for bias.

CONCLUSION

This study confirmed that long COVID among older adults still causes many health problems. There were 57.7% of long COVID for whom the QoL was moderate. In contrast, the QoL of the remaining 20 (9.1%) participants was at a poor level due to serious health issues from contracting COVID-19. They had 53.6% anxiety and fear of complication, 43.6% fatigue/ dyspnea, 43.2 allergies, 30.5% loss of appetite and memory impairment, 21.4% flu/fever, 12.3% palpitation/chest pain, 5% inattention, 5% low self-esteem, 1.36% SLE respectively. The mean differences in long COVID between males and females, age (categorized as younger than 65 and older than 65), vaccination and non-vaccination were not significant. Moreover, QoL between males and females, age (categorized as younger than 65 and older than 65), vaccination and non-vaccination were not substantial either. The long COVID of older adults with hospitalization was higher than with non-hospitalization (p<.001). Moreover, the QoL of older adults with non-hospitalization was higher than with hospitalization (p<0.001). Finally, the long COVID has an inverse effect on the QoL (p<0.001, r-0.295). Therefore, older adults were at higher risk of long COVID and QoL impairment, especially older adults with hospitalization. Implication: Nurses can play a crucial role in collaborating with the multidisciplinary team to create a health promotion, prevention, and care services program tailored to older adults, which is important for improving their QoL.

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DATA AVAILABLE

Data available on request due to privacy/ethical restrictions.

ETHICAL APPROVAL

The study was approved by the Institutional Review Board of Bangkokthonburi University (approval No. 10/2022).

CONSENT

Informed consent was obtained from all subjects involved in the study. They could withdraw from the study at any time without negative consequences. All questionnaires were stored securely to protect confidentiality. Participants who agreed to participate in the study provided written informed consent.

CONFLICT OF INTEREST

The authors declare that they have no conflicts of interest associated with this work.

AUTHOR'S CONTRIBUTIONS

Conceptualization and methodology: W.K and M.J, IRB submission: W.K., data collection, data analysis, prepared manuscript: M.J. and W.K. All authors have read and agreed to the published of the manuscript.

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