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# Quality of Life of COVID-19 Pfizer® Booster Vaccine Recipients Using Short Form-8 Instrument in Palu City

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**ABSTRACT:** The COVID-19 pandemic continues, and vaccination initiatives are still underway. Booster vaccinations are administered to enhance antibodies that decline after several months of receiving the primary vaccine doses. It is important to understand the impact of these vaccinations on recipients' quality of life. This study aims to examine the influence of demographic and clinical characteristics on the quality of life of the population in Palu City who received the Pfizer® COVID-19 booster vaccine. This research is an observational, cross-sectional study. The sampling was conducted using the consecutive sampling method, and a total of 400 individuals who met the inclusion criteria were included as the sample. This study used the Short Form-8 questionnaire to assess quality of life. Data analysis was performed using multiple linear regression. The study found that the quality of life of individuals who received the Pfizer® COVID-19 booster vaccine in Palu City was good, as evidenced by average domain scores≥50. An individual's quality of life can be assessed in terms of physical and mental aspects. Post-vaccination symptoms and a history of COVID-19 infection ($p<0.05$) influenced the physical aspect. Age, occupation, and a history of COVID-19 infection ($p<0.05$) influenced the mental aspect. The quality of life of the population in Palu City who received the Pfizer® COVID-19 booster vaccine showed a greater improvement in mental health than in physical health.

**Keywords:** COVID-19 Vaccine; Quality of Life; Short Form-8

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## INTRODUCTION

COVID-19 is an infectious disease caused by the SARS-CoV-2 virus that has caused a global pandemic for some time (Lai et al., 2020). At the beginning of the pandemic, countries around the world adopted policies to control the pandemic that focused on preventive behavior at the individual level (washing hands, keeping distance, wearing masks) and at the general level (large-scale social restrictions) (Chung et al., 2022).

The key to handling a pandemic is mass vaccination of the population in an area (Goldberg et al., 2021). According to the Minister of Health Regulation Number HK.01.07/MENKES/9860/2020, several types of vaccines are used in Indonesia, namely COVID-19 vaccines from PT Bio Farma (Persero), AstraZeneca®, Sinopharm®, Moderna®, Pfizer®, and Sinovac® (Indonesian Ministry of Health, 2020).

Sinovac® is the primary vaccine type used by the Indonesian government, with an efficacy of 65.3%, meaning that recipients of this vaccine have a 65.3% lower risk of developing COVID-19 than unvaccinated individuals (Ophinni et al., 2020). Antibodies decline rapidly after vaccination. In addition, protection against infection decreases over time after the second vaccine dose (Khoury et al., 2020). The type of booster vaccine recipients receive is Synovac® as the primary dose: either a half dose of AstraZeneca® vaccine (0.25 milliliters) or a half dose of Pfizer® vaccine (0.15 milliliters) (MENPAN, 2022). The mRNA booster vaccine was shown to be safe and effective in randomized controlled trials, administered homologously or heterologously. After receiving a booster dose, protection against symptomatic infection increased by 93.1% or more. Therefore, a booster dose six months after the second dose is recommended (Menni et al., 2022).

COVID-19 vaccination has no adverse effects on the daily lives and health of those who receive it (Romero-Brufau et al., 2021). Essentially, individuals who receive a COVID-19 vaccine feel physically safer (i.e., less likely to contract COVID-19), which can lead them to experience positive feelings about their health despite potential vaccination side effects. (Garcia et al., 2022). One of the side effects of vaccines is anaphylaxis, which makes a person feel uneasy, causing hesitation to vaccinate (Chen et al., 2022).

Vaccines can significantly mitigate declines in quality of life (Yoshino et al., 2021). Quality of life is the perception of one's health, including physical, mental, social, and role functions in society, which must be known and evaluated by oneself (Haris et al., 2019). Based on the SF-36 questionnaire, 62 post-COVID-19 booster vaccination patients (69.66%) were classified as having a good quality of life. Meanwhile, the SF-12 questionnaire showed that 67 patients (72.28%) fell into the good category. The Mann–Whitney test demonstrated no significant difference between the SF-36 and SF-12 results, as indicated by a p-value of 0.671 (> 0.05) (Endey et al., 2024). In this study, the assessment of quality of life was not limited to a single type of booster vaccine but evaluated all booster vaccine recipients collectively. The primary focus was to compare the use of the SF-36 and SF-12 instruments.

The Short Form-8 is an example of a general health survey instrument used to assess clinical health status regardless of age, disease, and treatment (Suryonegoro et al., 2021). The Short Form-8 includes eight items that reflect the key domains of quality of life. It provides two summary scores: the Physical Component Score (PCS) and the Mental Component Score (MCS), which represent the physical and mental health dimensions, respectively. Since the responses are self-reported by patients, the Short Form-8 serves as a practical and effective instrument for evaluating the quality of life, particularly in large-scale observational studies where respondents' input is crucial (Lang et al., 2018).

The main objective of this study was to determine the quality of life, both physical and mental, of the people of Palu City after receiving the Pfizer® booster vaccine, and to

identify demographic and clinical predictors of QoL among Pfizer booster recipients in Palu City.

## METHODS

This study analyzed observation sheets and quality-of-life questionnaires (Short Form-8) completed by recipients of the Pfizer® Booster vaccine in Palu City (PMI Central Sulawesi Province, Puskesmas Singgani and Puskesmas Lere) over six months (June 2022 - December 2022) using consecutive sampling. Consecutive sampling was selected for this study because it is a non-probability sampling method that allows researchers to include all subjects who meet the inclusion criteria throughout the study period. Vaccine recipients who met the inclusion criteria, such as Palu city residents who have received the first Sinovac® vaccine, the second Sinovac® vaccine and continued with a Pfizer® booster, the time of injection of the Pfizer® booster is a maximum of 3 months from the time of filling out the Quality of Life questionnaire (Short Form-8) and are willing to be respondents and the exclusion criteria, respondents who did not fill out questions about quality of life. This study was ethically approved by the Medical and Health Research Ethics Committee of the Faculty of Medicine, Tadulako University, with letter number: 9089/UN 28.1.30/KL/2022. Information on quality of life is derived from 8 domains: physical function, physical role, pain, general health, emotional role, energy, social function, and mental health. Each question was assessed using a 5-point Likert scale, with scores converted to a 1–100 range and categorized as good (>50) and poor (<50). Demographic information on gender, age, occupation, and education, and then clinical information, including congenital diseases, post-vaccination symptoms, injection time, and history of COVID-19 infection, were included as independent variables. Everything was collected as research data and was analyzed using multiple linear regression.

## RESULT AND DISCUSSION

Of the 400 total samples, the majority were found to be female, as many as 253 people (63.25%), adult (18 - 40 years), as many as 301 people (75.3%), college (Diploma / Bachelor / Postgraduate) as many as 255 people (63.7%) and working as many as 358 people (89.5%). Table 1 shows that most vaccination recipients were female (63.2%). Therefore, there are more female vaccination recipients than male vaccination recipients in Palu City. The majority of vaccination recipients were adults (75.3%). This is justified because, at the initial stage of vaccination, according to the Indonesian Ministry of Health (2021), healthy adults aged 18-59 are the age group most frequently exposed to COVID-19. It is also widely recognized that individuals over 50, as well as those aged 18–50 with pre-existing conditions such as diabetes, hypertension, or cardiovascular, kidney, and liver diseases, face a greater risk of fatal outcomes from COVID-19 infection. COVID-19 vaccination recipients can be protected against COVID-19 during activities and socializing outside the home. The educational level of Pfizer® booster vaccine recipients in Palu City was dominated by university graduates (63.7%). The demographic characteristics of booster vaccine recipients were 55% from higher education compared to other education levels (ASPE, 2022). The educational story affects a person's interest and attention, which can lead them to do this. The majority of vaccination recipients were employed (89.5%). Respondents who work and those who do not both desire the COVID-19 vaccine (Wulandari et al., 2020).

**Table 1.** Distribution of Demographic Characteristics of Vaccination Recipients (Doses 1 and 2 of COVID-19 Sinovac® followed by a booster of COVID-19 Pfizer®) in Palu City

| Demographic Characteristics | Number of Respondents (n=400) | Percentage (%) |
|---|---|---|
| **Gender** | | |
| Men | 147 | 36,8 |
| Female | 253 | 63,2 |
| **Age** | | |
| Adult (18-40 years) | 301 | 75,3 |
| Pre Elderly (41-59 years) | 49 | 12,3 |
| Elderly (≥60 years) | 50 | 12,5 |
| **Education** | | |
| University (Diploma/Scholar/Postgraduate) | 255 | 63,7 |
| Non University (Elementary School / Junior High School / Senior High School) | 145 | 36,3 |
| **Job** | | |
| Employed | 358 | 89,5 |
| Not Employed | 42 | 10,5 |

A total of 400 samples, the majority were obtained without comorbidities as many as 398 people (99.5%), muscle/joint pain after being vaccinated as many as 248 people (58.8%), injection time (≤1 month) as many as 165 people (41.2%) and never infected with COVID-19 as many as 397 people (99.3%). Table 2 shows that 398 vaccination recipients (99.5%) had no comorbidities, and only 2 (0.5%) had comorbidities. The comorbidities that these vaccination recipients had were hypertension and asthma. As previously noted, comorbidities are a significant concern for people considering vaccination. Before vaccination, people must undergo a screening stage conducted by health workers. This screening stage includes a physical examination, during which temperature and blood pressure are checked, and a brief interview about health conditions undertaken by local health workers. For people with uncontrolled hypertension (≥ 180/110 mmHg), if the blood pressure remains>180/110 mmHg, it should be repeated 5-10 minutes later. If it remains high, the vaccine needs to be postponed (Rondunuwu, 2021). Muscle or joint pain is a common side effect of vaccination, and this is normal because the COVID-19 vaccine is administered intramuscularly into the arm, which requires the muscles to remain relaxed; thus, the patient must be comfortable. (Saeidi, 2022). Of 357,387 subjects, 13,444 had abnormal or elevated blood pressure after COVID-19 vaccination.

The combined proportion of abnormal/increased blood pressure or stage III hypertension recorded after vaccination was 3.20% and 0.6%, respectively (Angeli et al., 2022). The safety statement for the Pfizer® vaccine and the Moderna® vaccine states that these vaccines should be administered in a healthcare setting for rapid treatment of anaphylaxis and should not be given to patients with a history of severe allergic reactions to polyethylene glycol or other vaccine additives, so it is necessary to inquire about a history of allergy to any of the vaccine components before vaccination. If the patient has a fever or other infection, vaccination may be postponed until the patient recovers (GINA 2022). The most common symptom felt after the Pfizer® vaccine was muscle/joint pain in 248 people (58.8%). Unlike viral vector-based vaccines, local side effects are more common in mRNA-based vaccines (Mathioudakis et al., 2021). The most dominant time interval for vaccination recipients was ≤ 1 month, with 165 people (41.4%).

**Table 2.** Distribution of Clinical Characteristics of Vaccination Recipients (Doses 1 and 2 of COVID-19 Type Sinovac® followed by COVID-19 Booster type Pfizer®) in Palu city

| Clinical Characteristics | Number of Respondents (n=400) | Percentage (%) |
|---|---|---|
| **Comorbid** | | |
| Comorbidity | 2 | 0,5 |
| Without Comorbidity | 398 | 99,5 |
| **Symptoms felt after being vaccinated** | | |
| Cough | 2 | 0,5 |
| Nausea | 4 | 0,9 |
| Fever | 30 | 7,1 |
| Muscle/Joint Pain | 248 | 58,8 |
| Sore Throat | 2 | 0,5 |
| Nasal Congestion | 1 | 0,2 |
| Headache | 14 | 3,3 |
| No symptoms | 121 | 28,7 |
| **Injection Time** | | |
| ≤ 1 month | 165 | 41.2 |
| ≤ 2 months | 134 | 33.5 |
| ≤ 3 months | 101 | 25.3 |
| **COVID-19 History** | | |
| Ever | 3 | 0.7 |
| Never | 397 | 99.3 |

Another study confirmed that a booster vaccine can neutralize antibodies and elicit cell responses within 28 days of administration. After eight days of vaccination, vaccine recipients can be asked about their daily life and how they feel after vaccination (Menni et al., 2022). A total of 397 COVID-19 booster vaccination recipients reported never having been infected with COVID-19 after vaccination; the remaining three who admitted being infected were male. Those infected with COVID-19 after vaccination have higher ACE2 (the virus's receptor) concentrations in men's blood than in women's, making men more susceptible to COVID-19 than women (Chang, 2020).

Of the 8 quality of life domains measured, the domain values of physical function (97.5), physical role (98.6), pain (65.3), general health (61.6), emotional role (84.6), energy (83.2), social function (81.3), and mental health (83.3) were obtained. The average Physical Component Summary Score (PCS) is 80.8. (good). The average Mental Component Summary Score (PCS) is 83.1 (good). Table 3 indicates that receiving the Pfizer® booster vaccine had no negative impact on the recipients' quality of life, as they maintained stable scores across all eight assessed domains. Similar findings have been reported in studies involving the Taiwanese population, which also showed that neither COVID-19 nor influenza vaccination is associated with diminished quality of life. This suggests that post-vaccination side effects generally do not result in significant health issues. Adults under 50

have the highest mean quality-of-life scores for physical rather than mental aspects (Lin et al., 2022).

**Table 3.** Average Quality of Life of Vaccination Recipients (Doses 1 and 2 of COVID-19 Sinovac® followed by a booster of COVID-19 Pfizer®) in the city of Palu

| Component | Domain | Average | Description |
|---|---|---|---|
| *Physical Component Score* (PCS) | Physical Functioning | 97.5 | Good |
| | Physical Role Functioning | 98.6 | Good |
| | Bodily Pain | 65.3 | Good |
| | General health perceptions | 61.6 | Good |
| | **Average** | 80.8 | Good |
| **Component** | **Domain** | **Average** | **Description** |
| *Mental Component Score* (MCS) | Emotional role functioning | 84.6 | Good |
| | Vitality | 83.2 | Good |
| | Social role functioning | 81.3 | Good |
| | Mental Health | 83.3 | Good |
| | **Average** | 83.1 | Good |

Of the four variables included in the demographic characteristics, age (p=0.000) and occupation (p=0.046) have P-values <0.05, indicating a significant effect on the quality of life of vaccination recipients in Palu City, especially the mental aspect (MCS). Table 4 shows that age and occupation of vaccination recipients affect their quality of life, especially the mental aspects (P-value < 0.05). Age is significantly associated with mental quality of life (MCS). This indicates that age differences contribute to variations in mental health status. The confidence interval ranging from –2.177 to 0.647 indicates that, in certain age groups, there is a tendency for a decrease in MCS scores, although the effect is not uniform across all age groups.

**Table 4.** Effect of Demographic Characteristics on the Quality of Life of Vaccination Recipients (Doses 1 and 2 of COVID-19 Sinovac® followed by a booster of COVID-19 Pfizer®) in Palu city

| Variable | PCS (*P-Value*) | MCS (*P-Value*) | Lower 95% | Upper 95% |
|---|---|---|---|---|
| **Gender** | 0.086 | 0.866 | -0.234 | 3.496 |
| **Age** | 0.287 | 0.000 | -2.177 | 0.647 |
| **Education** | 0.234 | 0.174 | -0.756 | 3.087 |
| **Work** | 0.431 | 0.046 | -4.436 | 1.897 |

Another study also found that COVID-19 vaccination activities are significant for a person's mental health because they can overcome the anxiety of being infected with the coronavirus, which can be quite a deep psychological pressure for most people during this pandemic, especially for people who are elderly or have special health conditions (Chaudhuri & Howley, 2022). A study conducted in Sweden evaluating the mental health effects of COVID-19 vaccination revealed that adults experienced immediate improvements in symptoms of depression and anxiety following vaccination during the pandemic

(Chourpiliadis et al., 2023). Additionally, individuals employed in public settings reported higher scores in the social relationships domain (Ghazy et al., 2022).

The 4 variables included in the clinical characteristics were the variable of symptoms felt after being vaccinated (p= 0.000) and the history of being infected with COVID-19 (p= 0.001) have a P-Value <0.05, which means that the variables have a significant effect on the quality of life of vaccinated recipients in Palu city, precisely the physical aspect (PCS). In contrast, only the variable of history of COVID-19 infection (p=0.048) has a P-value <0.05, indicating that this variable affects the quality of life of vaccinated recipients, specifically the mental aspect (MCS). Table 5 shows that the symptoms felt after vaccination and the history of COVID-19 infection affect the quality of life, especially the physical aspect; only the history of COVID-19 infection affects the quality of life, especially the mental aspect (P-Value <0.05). Studies on the duration of vaccine reactions in British athletes for ten days after COVID-19 vaccination found that 94% of athletes reported pain in the arm (injection site), which lasted an average of 2 days. Only 6% of athletes felt unable to train; one returned to training after one day, proving the effect on physical activity (training) (Bruyère et al., 2023).

**Table 5.** Effect of Clinical Characteristics on the Quality of Life of Vaccination Recipients (Doses 1 and 2 of COVID-19 Sinovac® followed by COVID-19 booster Pfizer®) in Palu city

| Variable | PCS (*P-Value*) | MCS (*P-Value*) | Lower 95% | Upper 95% |
|---|---|---|---|---|
| **Comorbid** | 0.277 | 0.357 | -19.323 | 5.551 |
| **Symptoms felt after being vaccinated** | 0.000 | 0.083 | 1.751 | 2.504 |
| **Injection Time** | 0.148 | 0.945 | -0.291 | 1.931 |
| **COVID-19 History** | 0.001 | 0.048 | 7.780 | 28.288 |

Previous studies have found that the COVID-19 vaccine does not have a significant impact (or only a minor one) on participants' daily routines, overall health, and physical activity levels. (Laar et al., 2022). Physical and mental health differ for people infected with COVID-19, with the physical domain most affected, suggesting that a history of COVID-19 infection affects the physical component (Ghazy et al., 2022). More severe symptoms of depression and anxiety are experienced by people vaccinated and infected with COVID-19 due to a higher prevalence of depression or anxiety in these people (Lee et al., 2023). Limitations of this study include a cross-sectional design, potential recall bias, an unrepresentative sample, limited representation of comorbidities, and reliance on self-reported quality of life.

## CONCLUSION

This study showed that Pfizer® COVID-19 booster vaccination did not lead to poor quality of life among vaccination recipients in Palu City. The booster vaccination significantly predicted their mental quality of life (i.e., those who received the COVID-19 booster vaccine had higher MCS scores than PCS scores). Therefore, several factors identified in the study are considered to have a significant influence on the quality of life of vaccination recipients (age and occupation).

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## AUTHOR CONTRIBUTION

All authors have contributed equally

## ETHICS APPROVAL

The in vivo test had been approved by the ethics commission of Faculty of Medicine Tadulako University with number of 9089/UN28.1.30/KL/2022.

## CONFLICT OF INTEREST

Author declare no conflict of interest

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