



MONITORING TUBERCULOSIS PATIENT: THE EFFECTIVENESS OF DIRECTLY OBSERVED THERAPY (DOT) OR PMO

Ni Made Ernita Refayanti^{1*}, Ni Made Novi Purnami², Meuthia Faralita Annisa³

¹Faculty of Medicine, Universitas Udayana, Jl. P.B. Sudirman, Dangin Puri Klod, Denpasar Barat, Denpasar, Bali 80232, Indonesia

²Sigerongan Primary Health Care, Jl. Karang Bayan No.184, Sigerongan Lingsar, Lombok Barat, Nusa Tenggara Barat 83237, Indonesia

³Faculty of Medicine, Universitas Indonesia, Jl. Salemba Raya No.6, Kenari, Senen, Jakarta Pusat, Jakarta 10430, Indonesia

*ernitarefayanti@gmail.com

ABSTRACT

Although global incidence and mortality rates of tuberculosis (TB) have declined, TB remains the second leading cause of death worldwide after HIV/AIDS. To improve treatment adherence, the World Health Organization (WHO) recommends the Directly Observed Treatment, (DOT) strategy, known in Indonesian as the Pengawas Minum Obat (PMO). PMOs are expected to support, remind, and motivate patients to complete their treatment regimen effectively. This study aimed to determine the prevalence of PMO use, identify PMO characteristics, assess medication adherence among active TB patients, and evaluate the relationship between PMO presence and adherence. A descriptive-analytic study with a cross-sectional design using total sampling of all TB patients who were actively undergoing treatment at the Sigerongan Primary Health Care. Data were collected through structured interviews and analyzed using the chi-square statistical test. The study found no significant difference in medication adherence between patients with a PMO and those without ($p = 1.000$; $p > 0.05$). Interestingly, 21.7% of patients with a PMO were still non-adherent to their treatment. The study found no significant difference in medication adherence between patients with a PMO and those without. This may be influenced by the small sample size and suboptimal role execution of PMOs.

Keywords: medication adherence; PMO; sigerongan; tuberculosis (TB)

How to cite (in APA style)

Refayanti, N. M. E., Purnami, N. M. N., & Annisa, M. F. (2026). Monitoring Tuberculosis Patient: the Effectiveness of Directly Observed Therapy (DOT) or PMO. *Indonesian Journal of Global Health Research*, 8(3), 997–1002. <https://doi.org/10.37287/ijghr.v8i3.1342>.

INTRODUCTION

Tuberculosis (TB) is an infectious disease caused by *Mycobacterium tuberculosis* (Mtb). (Linh et al., 2021). A bacterium that is resistant to acid and alcohol. Due to this characteristic, it is commonly referred to as an acid-fast bacillus (AFB) (Sari et al., 2022). TB is transmitted from person to person through the respiratory route and although it can affect any organ in the body, it most commonly infects the lungs (Linh et al., 2021). Transmission occurs when an individual with active TB expels the bacteria into the air through droplets, which are then inhaled by others (Global Tuberculosis Report 2024, 2024; Sari et al., 2022). Common symptoms of TB include a productive cough lasting two weeks or more This may be accompanied by blood-streaked sputum, fatigue, shortness of breath, fever, malaise, weight loss, loss of appetite, and night sweats (Sari et al., 2022).

According to the World Health Organization (WHO) 2023, Indonesia ranked as the country with the second highest number of TB cases globally after India with 322,806 reported cases (Luh et al., 2024). Eight countries collectively account for more than two-thirds of the global TB burden: India (26%), Indonesia (10%), China (6.8%), the Philippines (6.8%), Pakistan (6.3%), Nigeria (4.6%), Bangladesh (3.5%), and the Democratic Republic of the Congo (3.1%). TB can affect individuals of all ages and genders. However, the highest incidence is found among adult males aged 15 years and older (Global tuberculosis report 2024, 2024). In Indonesia, TB remains a significant public health issue, particularly in the province of West Nusa Tenggara. According to data from the NTB

Provincial Health Office in 2021, there were 5,890 reported TB cases in the region. In 2017, there were 4,187 confirmed TB cases, and in 2020, 250 pediatric TB cases were recorded in NTB (Pembayun Al-Zahid et al., 2024).

Globally, the incidence and mortality rates associated with TB have shown a decline. However, TB continues to be the second leading cause of death due to infectious disease, following HIV/AIDS. (Linh et al., 2021). Without appropriate treatment, the mortality rate for TB can reach nearly 50%. However, WHO recommended treatment regimens consisting of a 4–6 month course of anti-TB medications can achieve a cure rate of approximately 85% (Global tuberculosis report 2024, 2024).

Most TB cases can be cured with timely and accurate treatment. However, improper or incomplete treatment can result in therapeutic failure, ongoing transmission, and the emergence of drug-resistant TB strains (Linh et al., 2021). To mitigate these risks and ensure patient adherence to treatment, WHO recommends the implementation of Directly Observed Therapy (DOT), known in Indonesia as the Pengawas Minum Obat (PMO). PMOs can be healthcare workers, family members, or trained community volunteers who supervise patients during treatment to improve compliance and treatment success rates. (Yanti et al., 2023)

METHOD

This study employed a descriptive-analytical design with a cross-sectional approach. The research was conducted in 2025 within the working area of the Sigerongan Primary Health Care, located in West Lombok Regency, Indonesia. The study population consisted of 26 active TB patients registered in the Sigerongan Primary Health Care service area during the period from December 2024 to May 2025, all of whom were included as the study sample using a total sampling technique. Data were collected through interviews using a questionnaire adopted from previous studies that had been tested for validity and reliability (Octavia et al., 2024) in which the researcher directly interacted with the respondents to obtain data, following informed consent procedures. The inclusion criteria were patients diagnosed with active tuberculosis, while the exclusion criteria included patients who declined to participate in the study. Data analysis was conducted using bivariate analysis. The Shapiro–Wilk test was used to assess data distribution. For hypothesis testing, the chi-square test was applied when assumptions were met, otherwise, Fisher’s exact test was used.

RESULT

Table 1.

Sample Characteristics Based on the Presence of a PMO and the PMO’s Gender

Characteristics	Results
age, mean $\pm$ SD	46,5 $\pm$ 4,1
PMO, f (%)	
Present	23 (88,4)
Not Present	3 (11,5)
Gender, f (%)	
Male	9 (34,6)
Female	14 (53,8)

Based on the sample characteristics regarding the presence or absence of a PMO, 23 participants (88.4%) had a PMO, whereas 3 participants (11.5%) did not. Regarding the PMOs gender among the 23 participants, 9 (34.6%) were male and 14 (53.8%) were female.

Table 2.

Sample Characteristics Based On Age of PMO

Characteristics (Age of PMO)	f (%)
20-25	4 (17,4)
26-30	6 (26,1)
31-35	3 (13,0)
41-45	5 (21,7)
46-50	1 (4,3)
51-55	3 (13,0)
66-70	1 (4,3)

Based on the sample characteristics regarding the age of the PMOs, the results showed that 4 PMOs (17.4%) were aged 20–25 years, 6 PMOs (26.1%) were aged 26–30 years, 3 PMOs (13.0%) were aged 31–35 years, 5 PMOs (21.7%) were aged 41–45 years, 1 PMO (4.3%) was aged 46–50 years, 3 PMOs (13.0%) were aged 51–55 years, and 1 PMO (4.3%) was aged 66–70 years.

Table 3.

Sample Characteristics Based on Education Level of PMO

Characteristics (Education Level of PMO)	f (%)
No Formal Education	3 (13,0)
Elementary School	4 (17,4)
Junior High School	6 (26,1)
Senior High School	9 (39,1)
College	1 (4,3)

Based on the sample characteristics regarding the education level of the PMO's, among the 23 samples, 3 PMOs (13.0%) had no formal education, 4 PMOs (17.4%) had completed elementary school, 6 PMOs (26.1%) had completed junior high school, 9 PMOs (39.1%) had completed senior high school, and 1 PMO (4.3%) had attended college.

Table 4.

Sample Characteristics Based on Occupation of PMO

Karakteristik (Occupation of PMO)	f (%)
Unemployed	12 (52,2)
Private Employee	2 (8,7)
Traders	3 (13,0)
Laborer	4 (17,4)
Housewife	1 (4,3)
Farmer	1 (4,3)

Based on the sample characteristics regarding the occupation of the PMOs, among the 23 samples, 12 PMOs (52.2%) were unemployed, 2 PMOs (8.7%) were private employees, 3 PMOs (13.0%) were traders, 4 PMOs (17.4%) were laborers, 1 PMO (4.3%) was a housewife, and 1 PMO (4.3%) was a farmer.

Table 5.

Sample Characteristics Based on the Relationship of TB Patients with the PMOs

(Relationship Between PMOs and TB patients)	f (%)
Husband	2 (8,7)
Wife	7 (30,4)
Children	4 (17,4)
Parents	4 (17,4)
Siblings	2 (8,7)
Grandchildren	3 (13,0)
Nephew	1 (4,3)

Based on the sample characteristics regarding the relationship between PMOs and TB patients, the results showed that 2 PMOs (8.7%) were husbands, 7 PMOs (30.4%) were wives, 4 PMOs (17.4%) were children, 4 PMOs (17.4%) were parents, 2 PMOs (8.7%) were siblings, 3 PMOs (13.0%) were grandchildren, and 1 PMO (4.3%) was a nephew.

Table 6.

Distribution of Medication Adherence Based on the Presence or Absence of a PMO

	Adherent (+)	Non Adherent (-)	P-value
Age, mean $\pm$ SD	43,7 $\pm$ 18,6	56,0 $\pm$ 27,3	0,204
PMO			
PMO (+)	18	5	1,000
PMO (-)	2	1	

Among the participants who were adherent to medication, 18 individuals had a PMO, while 3 individuals did not. Among the participants who were non-adherent to medication, 5 had a PMO and 1 did not. These data indicate that the presence of a PMO tended to have no significant influence on medication adherence, as confirmed by the statistical test showing no difference between participants with and without a PMO ($P = 1.000$ or $P > 0.05$).

Table 7.

Distribution of Medication Adherence Based on the Education Level of the PMO

	Adherent (+)	Non Adherent (-)	P-Value
Education Level of PMO			
No Formal Education	4	1	0,746
Elementary School	4	0	
Junior High School	4	2	
Senior High School	7	2	
College	1	0	

Based on the distribution data of medication adherence according to the education level of the PMOs, it was observed that the PMO's education level tended to have no significant influence on medication adherence. This finding was supported by the statistical test, which showed no significant difference ($P = 0.746$ or $P > 0.05$).

Table 8.

Distribution of Medication Adherence Based on the Occupation of the PMO

	Adherent (+)	Non Adherent (-)	P-Value
Occupation of PMO			
Unemployed	10	2	0,431
Private Employee	2	0	
Traders	2	1	
Laborer	3	1	
Housewife	0	1	
Farmer	1	0	

Based on the distribution data of medication adherence according to the occupation of the PMOs, it was observed that the PMO's occupation tended to have no significant influence on medication adherence. This finding was supported by the statistical test, which showed no significant difference ($P = 0.431$ or $P > 0.05$).

DISCUSSION

Based on the sample characteristics related to the presence of a PMO, it was found that 23 participants (88.4%) had a PMO, while 3 participants (11.5%) did not. Regarding the gender of the PMOs, among the 23 samples, 9 (34.6%) were male and 14 (53.8%) were female. This finding is consistent with the study conducted by Afifah et al in Pengaruh Pemberian Edukasi terhadap Pengawas Menelan Obat Pasien TB Paru di Puskesmas Kota Lhokseumawe, which showed that the majority of PMOs were female (70%) compared to males (30%) (Afifah., et al 2023). Similarly, Nu'im Haiya N et al. reported that most PMOs were female (60.7%) rather than male (39.3%) (Nu'im Haiya., et al 2023).

Regarding the age distribution of PMOs, 4 PMOs (17.4%) were aged 20–25 years, 6 PMOs (26.1%) were aged 26–30 years, 3 PMOs (13.0%) were aged 31–35 years, 5 PMOs (21.7%) were aged 41–45 years, 1 PMO (4.3%) was aged 46–50 years, 3 PMOs (13.0%) were aged 51–55 years, and 1 PMO (4.3%) was aged 66–70 years. The majority of PMOs were aged 26–30 years. This finding

aligns with Nu'im Haiya et al who reported that most PMOs were within the productive age range of 26–35 years. Age is considered an important factor, as it contributes to individual maturity in psychological, physical, and social aspects (Nu'im Haiya., et al 2023). However, this finding differs from Afifah et al who reported that most PMOs were aged 41–60 years. (Afifah., et al 2023). In terms of education, among the 23 PMOs, 3 (13.0%) had no formal education, 4 (17.4%) had completed elementary school, 6 (26.1%) had completed junior high school, 9 (39.1%) had completed senior high school or vocational school, and 1 (4.3%) had attended college. The majority of PMOs had completed senior high school (39.1%). This finding is consistent with Anggiani et al. (2023), who reported that most PMOs had completed senior high school (30.8% of 52 respondents)⁸ Similarly, Nurwina et al. (2023) found that most PMOs had a senior high school education (48% of 102 respondents). (Isabella Josephine Nurwina et al., 2024)

Regarding occupation, 12 PMOs (52.2%) were unemployed, 2 (8.7%) were private employees, 3 (13.0%) were traders, 4 (17.4%) were laborers, 1 (4.3%) was a housewife, and 1 (4.3%) was a farmer. This differs from Nurwina et al. (2023), who found that the majority of PMOs were unemployed (59.8% of 102 respondents) (Isabella Josephine Nurwina et al., 2024). and from Anggiani et al who reported that 51.9% of PMOs were unemployed. (Anggiani et al., 2023)

In terms of the relationship between PMOs and TB patients, 2 PMOs (8.7%) were husbands, 7 (30.4%) were wives, 4 (17.4%) were children, 4 (17.4%) were parents, 2 (8.7%) were siblings, 3 (13.0%) were grandchildren, and 1 (4.3%) was a niece/nephew. The most common relationship was that of a wife. This differs from Haiya et al. (2022), who reported that the majority of PMOs were mothers (35.9% of 117 respondents). (Nu'im Haiya., et al 2023).

Regarding medication adherence, among the 20 participants who were adherent, 18 had a PMO and 3 did not. Among the 6 participants who were non-adherent, 5 had a PMO and 1 did not. These data suggest that the presence of a PMO did not significantly influence medication adherence, as supported by statistical analysis showing no significant difference between participants with and without a PMO ($P = 1.000$, $P > 0.05$). This contrasts with Komariah et al, who found a significant association between the role of PMO and medication adherence among TB patients ($P = 0.002$) (Dede Komariah et al., 2023).

The distribution of medication adherence by PMO education level indicated no significant relationship between PMO education and adherence ($P = 0.746$, $P > 0.05$). This aligns with Marwan (2022), who also found no statistically significant relationship between PMO education level and adherence ($P = 0.382$, $P > 0.05$) (Marwan, 2021) Similarly, the distribution of medication adherence by PMO occupation showed no significant association ($P = 0.431$, $P > 0.05$). This finding is consistent with Wulandari et al. (2022), who reported no statistically significant relationship between TB patient characteristics, including age, and medication adherence ($P = 0.083$, $P > 0.05$) (Wulandari et al., 2020)

CONCLUSION

The prevalence of active tuberculosis in this study was 26 individuals, of whom 23 had a PMO. Among the 23 PMO participants, the majority were aged 26–30 years, female, had completed high school, were laborers, and had a spousal relationship with the patient. The distribution of medication adherence based on the presence or absence of a PMO was not statistically significant ($P = 1.000$, $P > 0.05$).

REFERENCES

Afifah, S., Sofia, R., Herlina, N., & Rizaldy, M. B. (2023). Pengaruh pemberian edukasi terhadap pengetahuan PMO (Pengawas Menelan Obat) pasien TB paru di Puskesmas Kota Lhokseumawe tahun 2022. *Galenical Journal of Pharmacy Science*, 2(4).

- Anggiani, S., Safariyah, E., & Novryanthi, D. (2023). Hubungan Pengawas Menelan Obat (PMO) dengan kepatuhan minum obat pada pasien tuberkulosis paru di Puskesmas Kayu Manis Kota Bogor. *Journal of Public Health Innovation*, 4(1), 84–92.
- Komariah, D., Hamid, O. G., & Garus, V. A. (2023). Peran PMO dan kepatuhan minum obat pada pasien tuberkulosis paru. *Watson Journal of Nursing*, 2.
- Linh, N. N., Viney, K., Gegia, M., Falzon, D., Glaziou, P., Floyd, K., et al. (2021). World Health Organization treatment outcome definitions for tuberculosis: 2021 update. *European Respiratory Journal*, 58(2).
- Marwan. (2021). Hubungan tingkat pendidikan pengawas menelan obat (PMO) terhadap kepatuhan minum obat penderita TBC paru di wilayah kerja Puskesmas Sukomoro Kabupaten Magetan. *Jurnal Penelitian Keperawatan*, 7.
- Nu'im Haiya, N., Luthfa, I., Aspihan, M., et al. (2023). Hubungan kepuasan hidup dengan kualitas hidup keluarga PMO pasien TB paru. *Nurscope*, 8, 15–20.
- Nurwina, I. J., Triana, N. Y., & Haniyah, S. (2024). Gambaran karakteristik pengawas minum obat (PMO) anti tuberkulosis pada anak dengan tuberkulosis di RSUD Ajibarang. *Journal of Innovation Research and Knowledge*, 4(4).
- Octavia, D. R., Sholikha, J., & Utami, P. R. (2024). Uji validitas dan reliabilitas kuesioner Medication Adherence Report Scale (MARS) terhadap pasien tuberkulosis (TB). *Journal Pharmasci (Journal of Pharmacy and Science)*, 9(1), 7–19.
- Pembayun Al-Zahid, A., Pranata Sari, B., Sanitadewi, D., Sriwahyuni, D. W., Novita Sari, I. A., Muamaroh, J. R., Dewi, J. K., & Rizkiawati, K. P. (2024). Persebaran kasus tuberkulosis terdaftar dan diobati berdasarkan kabupaten/kota di NTB tahun 2021. *JHIMI Journal*, 3(3).
- Sari, G. K., Sarifuddin, & Setyawati, T. (2022). Tuberkulosis paru post Wodec pleural effusion: Laporan kasus. *Journal of Medical Profession (MedPro)*, 4.
- Wulandari, M., Rantung, J., Malinti, E., et al. (2020). Faktor yang berhubungan dengan kepatuhan minum obat pasien TBC di wilayah kerja Puskesmas Parongpong. *Jurnal Keperawatan Muhammadiyah*, 5.
- World Health Organization. (2024). Global tuberculosis report 2024. World Health Organization.
- Yanti, N. L. D., Jati, S. P., Arso, S. P., et al. (2023). Peran dan efektivitas pengawas minum obat (PMO) dalam pengobatan tuberkulosis: Scoping review. *Jurnal Kesehatan Masyarakat*.