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THE RELATIONSHIP BETWEEN SELF-MOTIVATION IN COMPLIANCE IN TAKING OAT AND ARV MEDICATION TOWARDS SIDE EFFECTS IN TB-HIV PATIENTS

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ABSTRACT
TB-HIV patients are expected to routinely undergo OAT and ARV treatment simultaneously, this causes the side effects of drugs in patients to be double, resulting in many patients who are not compliant in undergoing treatment. Non-compliance will result in treatment resistance. The purpose of this study was to determine the relationship between self-motivation in adherence to taking OAT and ARV drugs and side effects in TB-HIV patients at Dr. M. Djamil Padang General Hospital. The study design was observational with a cross-sectional approach. The number of samples was 60 people, the sampling technique used Total Sampling. With the respondent criteria that have been determined according to the inclusion and exclusion criteria. The test results showed that patient motivation has a p value of 0.000, drug side effects (0.000), It can be concluded that services for TB-HIV patients must provide education to patients and their families about the need to have medication adherence. With this education, patients will have good adherence so that the success rate of treatment is higher.

Keywords: drug side effects; motivation; compliance; TB-HIV

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INTRODUCTION

Tuberculosis(TB) is a preventable and usually curable disease. However, in 2023, TB will again become the leading cause of death worldwide from a single infectious agent, after being replaced by the coronavirus disease (COVID-19) for 3 years, 1 and causing almost twice as many deaths as HIV/AIDS. More than 10 million people continue to fall ill with TB each year and the number has been increasing since 2021. Urgent action is needed to end the global TB epidemic by 2030(World Health Organization, 2024).

*Tuberculosis*is a chronic infectious disease caused by mycobacterium tuberculosis which can attack the kidneys, liver, brain, bones and most importantly affects the lungs, which can cause damage to body organs and even result in death if the treatment is not carried out in accordance with established procedures.(World Health Organization, 2020).Based onThe Ministry of Health Republic of Indonesia 2023TB patients who receive Anti-TB Drugs (OAT) will undergo treatment for 6 months, namely 2 months of intensive phase and continued for 4 months of continuation phase and must be taken every day without missing a single day (Department: Health Republic of South Africa, 2014). During the process of undergoing TB treatment, patients must undergo a series of tests, one of which is an HIV test (*Human Immunodeficiency Virus*)(World Health Organization, 2024).

TB patients with HIV or often known as TB-HIV must undergo an OAT treatment program for pulmonary TB and ARV for HIV (UNAIDS, 2019). ARV treatment is given after OAT is given for 2-8 weeks after pulmonary TB treatment can be tolerated if the CD4 level is less than 50 cells/mm3 (World Health Organization, 2018). What needs to be considered by patients or Drug Supervisors (PMO) is the interval or break between taking OAT and ARV is done for 12 hours(Arda Yuni, 2016). However, in some patients, the administration of OAT and ARV often causes severe side effects, such as toxicity and drug interactions. Patients often feel anxious, afraid due to the side effects felt after consuming OAT and ARV for a long period of time.(Kasa et al., 2019). This is one of the causes of patients becoming lazy, afraid and bored so that they become non-compliant with the treatment given.(Sundari Gunawan et al., 2017). Several factors that influence the compliance of TB patients with HIV infection in undergoing treatment include treatment factors (duration of treatment, side effects, availability of drugs), other comorbidities, health workers, and social support, individual factors (patient attitudes and motivation)(Irwadi et al., 2022).

Motivation is one of the factors that plays a role in the success of patient treatment (Moriarty et al., 2019). Low motivation felt by TB-HIV patients can be*gap*barriers to successful treatment (Naidoo, 2019). Motivation given to TB-HIV patients can help reduce the psychological problems faced by TB-HIV patients (Chirambo, Valeta, Banda Kamanga, & Nyondo-Mipando, 2019). Strong motivation is obtained from several social supports, one of which is support from family members (Mcmahon et al., 2019). If patients are not compliant with TB-HIV treatment, then it becomes one of the risks of therapy failure which leads to drug resistance (Trinh, Nguyen, Nguyen, & Nguyen, 2015). The effects of the drugs felt are also getting stronger.

A study conducted in Mumbai, India, described the incidence of side effects and their severity in TB patients with HIV co-infection undergoing treatment with second-line OAT and ART. The results showed that 71% experienced severe side effects, 63% moderate, and 40% mild side effects found were gastrointestinal symptoms (45%), peripheral neuropathy (38%), hypothyroidism (32%), psychiatric symptoms (29%), and hypokalemia (23%).(Elfira & Irwadi, 2022). Patient compliance in consuming OAT plays an important role in achieving successful TB treatment, especially TB-HIV. HIV disease will have an impact on psychology which affects the patient's motivation to recover. while OAT treatment requires a fairly long process accompanied by side effects of treatment. in the form of nausea, hepatitis, peripheral neuropathy, impaired kidney function, redness, neuropsychiatric complications. This causes patients to be lazy and non-compliant in taking OAT.(Irwadi & Elfira, 2022). . therefore the researcher wants to see whether there is anyThe relationship between self-motivation in adherence to taking OAT and ARV drugs and the side effects of drugs in TB-HIV patients at Dr. M. Djamil Padang General Hospital

METHOD

This study is an observational descriptive study with a cross-sectional design, which was conducted in August 2023 at the TB polyclinic of Dr. M. Djamil Padang Hospital with 60 people. The population taken was patients with the inclusion criteria for research subjects being patients diagnosed with HIV and suffering from TB and undergoing OAT and ARV drug treatment. The research sample was taken usingTotal sampling techniqueThe collected data was then subjected to univariate analysis, the results of which were distributed in frequency and the magnitude of the risk of side effects from the drug was analyzed using the chi square test and prevalence ratio..The questionnaire used to see compliance was the Morisky Medication Adherence Scale Questionnaire (MMAS-8 and had previously

undergone validation testing with an alpha value of 0.908 (≥ 0.361) while the motivation factor questionnaire had undergone validity testing by Widianingrum (2017) with a correlation coefficient of 0.361. Demographic data consisted of age and gender.

RESULTS

Table 1.
Frequency Distribution of Respondent Characteristics Age, Gender (n=60)

Variables	Category	f	%
Age	Teenagers (15-25)	2	3.34 %
	Adults (26-60)	36	60.00%
	Elderly (61-100)	22	36.66%
Gender	Man	33	55 %
	Woman	27	45%

Table 1. The number of respondents in this study was 60 people. The characteristics of the respondents show that the number of respondents wasthat TB-HIV patients at Dr. M. Djamil Padang General Hospital are dominated by adolescents (2) 3.34% of adults with 36 (60.00%) patients, 22 (36.66%) elderly respondents. Based on gender, there are 33 male patients (55%), 27 female respondents (45%).

Table 2.
Relationship between Self-Motivation in Compliance with Taking OAT and ARV Medication and Side Effects of TB-HIV Patients' Medication (n=60)

Variable	Obedient		No Obedient		Total		P value
	f	%	f	%	f	%	
Motivation							
Not Enough	1	10	9	90	10	100	0.000
Enough	2	14.3	12	85.7	14	100	
good	32	88.9	4	11.1	36	100	
Drug side effects							
There is any	7	24.1	22	75.9	29	100	0,000
There isn’t any	28	90.3	3	9.7	31	100	

Based on table 2, it can be seen that out of 60 respondents, there were 32 (88.9%) respondents who stated that they had good motivation to feel compliant in taking medication, while those who stated that they had sufficient motivation to feel compliant in taking medication were 2 (14.3%) respondents and those who stated that they had less motivation to feel compliant in taking medication were 1 (10%) respondents. The results of the statistical test obtained a p value = 0.000, this states that there is a significant relationship between motivation and compliance in taking OAT and ARV in TB-HIV patients at Dr. M. Djamil Padang Hospital. Of the 60 respondents, 31 respondents, 28 (90.3%) respondents stated that they did not have any side effects from their medication, they were compliant in taking medication, 3 (9.7%) respondents were not compliant. While 29 respondents who stated that they had side effects felt compliant, 7 (24.1%) respondents. The results of the statistical test obtained a p value = 0.000, this states that there is a significant relationship between side effects of drugs and compliance in taking OAT and ARV in TB-HIV patients at Dr. M. Djamil Padang Hospital.

DISCUSSION

Based on the results of the study, it showed that in the group without a history of COVID-19 before (96.50% ± 2.0) after surgery (95.80% ± 2.50) with a difference in the decrease obtained -0.8% with a p value of 0.000. While in the group with a history of COVID-19 SpO2 before surgery (94.30% ± 3.20) and after surgery (92.30% ± 4.50) with a difference in the decrease obtained -2.0% with a p value of 0.000. From the results of the Independent Sample

t-test, there was a comparison between the two groups which showed a significant difference in post-operative oxygen saturation between patients with and without a history of COVID-19 infection, with a p-value = 0.000. It can be seen that patients with a history of COVID-19 infection tend to experience a greater decrease in oxygen saturation after surgery compared to patients who do not have a history of infection. The results of this study are also in line with research conducted by Laigaard et al., (2022) explaining that the results of the study showed lower oxygen saturation before surgery (94.8% ± 2.1) in patients with a history of COVID-19 while the group without COVID-19 (97.2% ± 1.4) and the results after surgery, SpO_2 of patients with a history of COVID-19 decreased to 92.5% ± 2.4, while in the control group it remained relatively high at 95.8% ± 1.8. These results prove that those at high risk of hypoxemia are patients with a history of COVID-19 compared to patients without a history of COVID-19.

Decreased oxygen saturation in surgical patients infected with COVID-19 is caused by damage to the lung parenchyma and disruption of the vascular endothelium, as well as systemic effects of an excessive inflammatory response (Swenson & Swenson, 2021). The lung parenchyma consists of alveoli and tissues that function in exchanging oxygen and carbon dioxide, the disruption of its function is caused by SARS-CoV-2 attacking alveolar epithelial cells, especially those expressing the Angiotensin Converting Enzyme (ACE2) receptor (Wiersinga et al., 2020). COVID-19 infection causes disruption of ACE2 function which can cause narrowing of blood vessels and increased blood pressure due to the inability of the angiotensin 2 enzyme to become angiotensin 1-7 so that patients experience vasodilation resulting in decreased blood pressure, and impaired oxygenation and can worsen inflammation, increase the risk of thromboembolism, and cause organ dysfunction and if the infection is not controlled it will become Acute Respiratory Distress Syndrome (ARDS) (Beyerstedt et al., 2021).

Uncontrolled infection in COVID-19 patients can develop into Acute Respiratory Distress Syndrome (ARDS) where the alveoli of the small air sacs in the lungs fill with fluid due to inflammation. This event will reduce lung elasticity and the lungs' ability to take in oxygen and cause acute respiratory failure (Tzotzos et al., 2020). If the lungs experience ongoing damage due to inflammation, it can cause scar tissue or fibrosis, and result in decreased function and damage to the lung parenchyma (Fan et al., 2020). As a result of damage to the patient's lung parenchyma, the lungs' ability to oxygenate the blood is disrupted, causing hypoxemia where oxygen levels are low in the blood (Stergaard, 2021). In patients undergoing surgery, hypoxemia is at high risk because vital organs, such as the brain and heart, may not receive enough oxygen (Fan et al., 2020). Patients with a history of COVID-19 and lung damage are very important in the provision of preoperative, intraoperative, and postoperative oxygen and the use of mechanical ventilation or non-invasive oxygen therapy to maintain oxygen saturation stability during surgical procedures (Marini & Gattinoni, 2020).

The decrease in oxygen saturation in patients with a history of COVID-19 will also be exacerbated by the effects of anesthesia where the action of anesthetic drugs can suppress the respiratory response and affect the slow recovery of oxygen saturation after surgery (Sewell et al., 2021). Decreased oxygen saturation after surgery in patients with a history of COVID-19 can cause the need for prolonged ventilation, and cause patients to be hospitalized in the ICU, have a long recovery, and have a higher risk of death (Bhangu et al., 2020). Administration of anesthesia, especially general anesthesia techniques, can suppress respiratory drive and reduce lung volume, leading to atelectasis and ventilation-perfusion mismatch. This effect is more pronounced in patients who have a history of previous lung infections, such as patients

recovering from COVID-19 infection, making them susceptible to intraoperative and postoperative hypoxemia (Ong et al., 2020). Anesthetic drugs that affect breathing include propofol, thiopental, etomidate, sevoflurane, fentanyl, ketamine midazolam, rocuronium and vecuronium (Ong et al., 2020). General anesthesia can cause respiratory depression by reducing the speed and depth of breathing. This is because the effect of the anesthetic drug will disrupt the respiratory center in the brain, thereby reducing the body's response to increased carbon dioxide levels. Patients with a history of lung damage due to COVID-19 tend to be more sensitive to respiratory depression, which worsening hypoxemia (Hoyler et al., 2021).

The explanation above is in line with research conducted by Navas-Blanco & Dudaryk, (2020) stating that patients with a history of COVID-19 can experience decreased lung function and impaired diffusion capacity. This residual effect can worsen the respiratory depression effect of anesthesia, thereby increasing the risk of perioperative hypoxemia (Navas-Blanco & Dudaryk, 2020). And also supported by research conducted by Argandykov et al., (2023) showing that patients with COVID-19 infection undergoing surgery have a higher mortality rate compared to patients without COVID-19. Low oxygen saturation can cause hypoxia and the risk of multiple organ failure and poor postoperative outcomes (Vallamkondu et al., 2020). Prolonged hypoxemia can cause ischemia in vital organs such as the kidneys, heart, liver, and brain due to insufficient oxygen supply, causing Multiple Organ Dysfunction Syndrome (MODS) or failure (Liang et al., 2020). Patients with low postoperative oxygen saturation are at higher risk of developing MODS due to pre-existing respiratory problems and potential damage from the initial COVID-19 infection (Grasselli et al., 2020). Therefore, appropriate perioperative management of surgical patients with COVID-19 is essential to minimize complications and improve prognosis (El-Boghdadly et al., 2020). Conducting appropriate monitoring and intervention strategies is very effective in optimizing oxygen saturation in surgical patients with a history of COVID-19 by using supplemental oxygenation, mechanical ventilation support, and intensive hemodynamic monitoring to prevent intraoperative hypoxemia (McEnery et al., 2020).

Factors that cause decreased SpO2 in surgical patients include age, which is an important factor affecting oxygen saturation in surgical patients with a history of COVID-19 with an older age range tending to have different responses to COVID-19 virus infection, where as a person gets older, there will be degenerative lung function and oxygenation capacity which has the potential to cause hypoxemia (Parohan et al., 2021). Judging from the results of the study, it was found that of the two age groups of respondents in the group without a history of COVID-19, 32 (84.2%) were young adults, and those with a history of COVID-19 were young adults, 37 (97.4%) were female. In addition, gender factors also affect oxygen saturation in COVID-19 patients where men are more susceptible to COVID-19 infection and often experience more severe symptoms than women. This is due to differences in the immune system and hormonal factors where the role of the hormone estrogen in women can increase the immune response to viral infections. Estrogen has also been reported to have a protective effect on the lungs, which contributes to lower rates of respiratory complications in women than men (Jin et al., 2020). Men with a history of COVID-19 tend to experience a more significant decrease in oxygen saturation than women due to differences in hormones and lifestyle so that patients with a history of respiratory tract infections recover faster. In addition, habits such as smoking can also worsen lung function and cause decreased oxygen saturation. This can be seen from the results of the study, it was found that most of the respondents in both groups were female, where the group without a history of COVID-19 was 35 (92.1%) female, while in the group with a history of COVID-19, 37 (97.4%) were female.

COVID-19 infection causes damage to the lungs, especially the alveoli, resulting in impaired gas exchange and can cause hypoxemia. Patients with a history of COVID-19 may experience decreased lung function and impaired diffusion capacity. This condition can also be exacerbated by the effects of anesthesia where the work of anesthetic drugs can suppress the respiratory response and affect the slow recovery of postoperative oxygen saturation. Awareness of this impact emphasizes health workers for the importance of conducting an initial assessment in preanesthesia, better monitoring and management strategies for patients with a history of COVID-19 with close monitoring of oxygen saturation, careful management of anesthesia, and comprehensive preoperative evaluation can help minimize the risk of hypoxemia and improve postoperative patient recovery.

CONCLUSION

Patients with a history of COVID-19 infection can affect significant changes in postoperative oxygen saturation (SpO2) compared to uninfected patients, this is due to lung damage due to infection that interferes with effective gas exchange. The results obtained in patients with a history of COVID-19 infection showed a significant decrease in SpO2 after surgery. The results of this study provide direction for further research to develop and discuss the problem of respiratory disorders caused by infection, both hemodynamic stability and perioperative risks in intra and postoperatively.

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