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Hindawi

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Research Article

Channa striata (Ikan Gabus) Extract and the Acceleration of Tuberculosis Treatment: A True Experimental Study

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Tuberculosis is international health problem, which is classifed in Global Emergency disease since 1992. e objective of the study is to determine the e ect of *Channa striata* extract toward the acceleration of tuberculosis treatment. e study used true experiment, in which the intervention of the study was *Channa striata* supplementation to respondent. In addition, Chi-square was used to analyze the data with SPSS version 22. e result is the proportion of respondent classifed in negative category in intervention group within week 0, week 1, week 2, week , and week being 10.7%, 5.9%, 5 . %, 70.9%, and 90. %, respectively. Besides, the proportion of respondent cl assifed in negative category in control group within week 0, week 1, week 2, week , and week was 1 . %, 2 .7%, 7.1%, 9.5%, and 8%, respectively. Based on Chi-square test, the P value of *Channa striata* supplementation toward the acceleration of tuberculosis treatment week 1, week , and week is 0.0 5, 0.019, and 0.005 (P< ; =0.05), respectively. It means that there were di erences between *Channa striata* supplementation and acceleration of tuberculosis treatment among respondent. erefore, *Channa striata* treatment was signifcantly related to the acceleration of tuberculosis recovery.

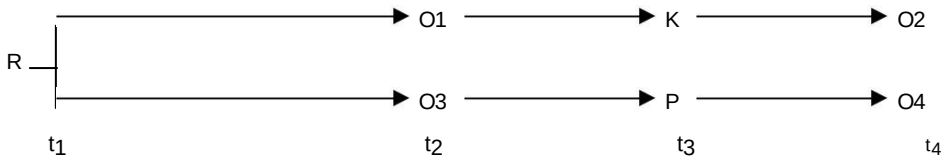
1. Introduction

Tuberculosis (TB) is an international health problem, which is classifed as Global Emergency Disease since 1992. Based on WHO report 200 , there are 8.8 million of new tuberculosis cases in 2002 [1], and one-third of world population has been infected by *Mycobacterium tuberculosis* [2]. Global Tuberculosis Report 2017 noted that 10. million people (90% adults; 5% male; 10% people living with HIV) su ered TB and caused 1.7 million people dead in 201 [ ]. In 201 , most of tuberculosis cases occur in South-East Asia (5%), in which 1,020 cases are found in every 2 1,000 populations [ ]. erefore, tuberculosis becomes important health issue worldwide.

Tuberculosis is deadly disease worldwide [ ], which caused .5 dead per 100,000 populations on low-income countries in 2015 [5]. In Indonesia, tuberculosis is the main occasion of death in infectious disease [ ]. According to Global Tuberculosis Report 2017, Indonesia has the highest incident of tuberculosis in worldwide a er India [ ] whose rank elevated from 201 [7]. East Java is one of provinces in Indonesia that has high number of tuberculosis cases with 1, 0 cases. Furthermore, Surabaya that is one of the biggest cities in East Java has contributed with the high tuberculosis incidents followed by Jember and Banyuwangi with ,990 cases, , cases, and 1,7 0 cases, respectively. In 2011, the incident of tuberculosis in Jember is reported in 2,182 cases, which is increased from 2010 with 1,9 cases.

e risk factors of the development of tuberculosis are (1) the risk of *Mycobacterium tuberculosis* infection and (2) the risk of the progressivity of tuberculosis infection [8, 9]. ose risk factors have correlation toward the defciency of macro- and micronutrient [9, 10]. Furthermore, the vulnera- ble individual of tuberculosis su ers malnutrition [11] toward immunodefciency mechanism [12]. Besides, tuberculosis is decreasing the body mass and micronutrient defciency through increasing the energy-need, changing the metabolic process, and decreasing the appetite level [11].

e nutrient supplement can improve the recovery of tuberculosis patient [12]. e micronutrient supplements that had been investigated related to tuberculosis treatment are zinc, arginine, selenium, iron, copper, vitamins A, C, D, and



F 1: e study design of *Channa striata* and the acceleration of tuberculosis treatment. Description: R: randomize, K: control group (tuberculosis patient without treatment), P: intervention group (tuberculosis patient with treatment), O1,2: observational of control group, and O , : observational of intervention group.

E, and their combination [11, 12]. Paton describes that the e ect of macronutrient (high-energy supplements; protein .25 g; carbohydrate 20.2 g; fatty .92 f; 150 kkal/100 mL; Ensure Plus; Abbott Laboratories, Columbus, OH) toward the increasing of body mass of tuberculosis patient is signifcantly di erent from control group (2.57 ±1.78 compared with 0.8 ± 0.89 kg; P= 0.001) in Singapore [1]. e result of that study is confrmed positively by a systematic review on e Cochrane Library that is conducted by Abba [11]. erefore, it can be reference as Evidence-Based Medicine (EBM).

Channa striata (Ikan Gabus) is one of essential fatty acid and essential amino acid (protein) sources that is cheap and comprehensive. e extract of *Channa striata* contains 1 kinds of amino acids and 8 kinds of essential amino acid such as arginine, threonine, valine, methionine, isoleucine, leucine, phenylalanine, and lysine [1]. Furthermore, the extract of *Channa striata* has 8 kinds of fatty acid and two kinds of essential fatty acid that is classifed in omega-group such as linoleate acid (C18:2) and arachidonic acid (C20:) [1].

e study of *Channa striata* supplement related to clinical aspect has been conducted twice in Indonesia. e frst research that was conducted among patients in Wahidin Sudirohusodo Hospital was written by Nurpudji Astuti [15]. e result of this study is not published on both national and international events; however the result has already registered to authorize as patent product. e patent number is P00200 001 and published on 8 March 2009 by Ministry of Justice. e second research was simply conducted with quasiexperimental method toward 1 chronic pulmonary respiratory disease patients (n control= 7, n intervention=7) in RS. Paru Jember [1].

e objective of the study is to determine the e ect of *Channa striata* (Ikan Gabus) extract toward the acceleration of TB patient treatment, in which the acceleration of tuber-culosis treatment in this study is shortening the tuberculosis treatment's duration by supplementation of *Channa striata*. e result of study is useful to the government to create appropriate policy related to accelerate the treatment of tuberculosis in Jember regency and Situbondo Regency, especially in East Java Province-Indonesia.

2. Materials and Methods

. . *Study Area and Time*. e study was conducted in work area of primary health care in Jember Regency and Situbondo Regency. Jember and Situbondo had 9 units and 17 units of primary health care, respectively. e study was held in May-December 2017. e sputum test of tuberculosis patient was examined in Jember Chest Hospital (Rumah Sakit Paru Jember), in which Jember Chest Hospital was the only government hospital in 7 regencies (Eastern Pasuruan, Probolinggo, Lumajang, Jember, Situbondo, Bondowoso, and Banyuwangi), East Java-Indonesia, where the service focused on lung disease, particularly tuberculosis.

. . *Method and Study Design*. e study was truly exper-imental, in which all of in uential variables except inter-vention can be controlled. e author used true experiment to get the valid result, and the intervention of the study can be managed randomly. e treatment of the study was by supplementation of *Channa striata* (ikan gabus) extract to respondent (intervention or treatment group), in which control group was administered placebo. In addition, the respondent's sputum was examined in Jember Chest Hospital to recognize the availability of *Mycobacterium tuberculosis* each week within a month. e design of the study used randomized pretest-posttest only control group design that was showed by Figure 1. e randomized pretest-posttest only control group: the authors used randomization to determine the sample group of the study, where control group was used as comparator with intervention group. In addition, the author also examined the e ect of *Channa striata* supplemen-tation before and a er administered to respondent.

e study was conducted on an ambulatory basis, where all respondents performed antibiotic treatment for tubercu-losis in their house. e procedure of this study referred to the policy of Health Ministry of Indonesia, in which all new tuberculosis patients must get -month-full antibiotic treatment for tuberculosis in Indonesia. e medication for tuberculosis patient only with *Channa striata* is not appropri-ate in Indonesia, where there is no policy that regulated this issue. erefore, this study used the policy of Health Ministry of Indonesia related to tuberculosis diagnosis and treatment as guidelines, in which the new tuberculosis patient must get standard antibiotic treatment for tuberculosis.

e prescription of tuberculosis antibiotic treatment was classifed into two categories, namely, (a) primary drug (isoniazid, rifampicin, ethambutol, streptomycin, and pyrazi-namide) and (b) secondary drug (exyonamid, para aminosal-icylate, cycloserine, amikacin, capreomycin, and kanamycin). e function of *Channa striata* extract was as complementary supplement to accelerate tuberculosis treatment by increasing the nutritional status, and the *Channa striata* extract of this study is permitted to consume by Health Ministry of Indonesia (Registered Number: P-IRT: 202 50901 20).

. . *Population and Sampling*. e population of the study was all of new positive pulmonary tuberculosis patient that performed standard antibiotic treatment for tuberculosis in primary health care of Jember and Situbondo Regency, and respondent agreed to participate in research voluntarily. e total of pulmonary tuberculosis patients was 2,7 cases, in which the distribution of patients in Jember and Situbondo was 2,17 patients and 557 patients, respectively. Based on Kelsey, the total samples of control and interven-tion group are 100 respondents, respectively (Confdence Interval: 95%; Power: 90%; Ratio 1:1); therefore the total sample of the study was 200 respondents. In addition, the proportionated to size method was used to distribute the sample. e total samples of control and intervention group in the study is 97 respondents and 10 respondents, respectively.

ere were exclusion criteria in this study, where the exclusion criteria were used to control the potential con-founding variables, such as tuberculosis similar disease. erefore, the authors can ensure the positive e ect of *Channa striata* supplementation within the acceleration of tuberculosis treatment by shortening the tuberculosis duration recovery. e exclusion criteria of this study are (a) HIV/AIDS patients, (b) diabetes mellitus patients, (c) MDR patients, (d) respondent who did not take *Channa striata* sup-plement or placebo regularly (x1 day), and (e) tuberculosis patients who fail drug treatment. ose respondents will be drop out of study or lost to follow-up.

. . *Channa striata Supplementation*. All respondents of this study were divided into 2 group by randomization, namely, intervention group and control group, where all respondents did not know their status in the group (blinding process). e intervention group performed not only stan-dard antibiotic treatment for tuberculosis but also *Channa striata* supplementation. Meanwhile, the control group per-formed standard antibiotic treatment for tuberculosis and placebo supplementation. e tuberculosis antibiotic drug, *Channa striata* supplement, and placebo were administered to respondent by nurse in primary health care, in which the supplementation of *Channa striata* was times a day during a month.

e 500 mg of extract or supplement of *Channa striata* that was registered in Health Ministry of Indonesia was administered to intervention group, in which the *Channa striata* supplement contains 90% *Channa striata* extract and 10% others. In addition, the supplement of *Channa striata* had several nutrients such as protein (80.9%), albumin (12.5%), and polyphenol bio avonoid (. %). During study, the authors also used feld research assistant to supervise and to monitor antibiotic drug-, *Channa striata*-, and placebo-used among respondent daily, where the respondent will be a dropout if they did not take standard tuberculosis antibiotic treatment and *Channa striata* extract or placebo regularly. In addition, the feld research assistant also asked the respondent about the e ect or complaint a er taking *Channa striata*, in which respondent who got negative e ect a er administered with *Channa striata* will be referred to hospital under specialist doctor's control.

. . *Collection, Handling, and Microscopic Examination of Sputum*. e process of collection, handling, and micro-scopic examination of sputum was conducted by trained sta s, where the collection and handling process was per-formed by nurse in primary health care and the microscopic examination was conducted by health sta in Jember Chest Hospital. e sputum of respondent was collected every week (week 0-) in a month or Day-0 (week-0), Day-7 (week-1), Day-1 (week-2), Day-21 (week-), and Day-28 (Week-), in which respondent should check the sputum in health primary care in Jember and Situbondo. e sputum was collected and putted on safety container (cylinder-form container) and directly delivers to Jember Chest Hospital. erefore, this procedure can prevent the sputum damaged. e steps of microscopic examination of respondent's sputum consist of sputum culture, sputum-coloured culture, and fnally the microscopic examination of sputum's smear. e process of sputum-coloured culture was conducted based on ziehl-neelsen technique, and the authors used International Union against Tuberculosis and Lung Disease (IUATLD) guideline to determine the availability of acid fast bacilli on the smear with 1,000x magnitude of microscopic examination. In addition, the authors used the number of acid fast bacilli in smear as indicator of acceleration of tuberculosis treatment a er administered by *Channa striata* supplement. If there is an acid fast bacilli (AFB) in the smear, the smear is positive *Mycobacterium tuberculosis*.

e indicator of *Mycobacterium tuberculosis* availability in this study consists of negative, positive 1, positive 2, positive , and positive > . e value of positive *Mycobacterium tuberculosis* in sputum was based on stage of sputum examination, namely, sputum examination during a visit, in morning, and sputum collection. If the AFB was found within stages, it is classifed as positive . Meanwhile, positives 2 and 1 mean AFB was found in 2 stages and 1 stage of sputum examination, respectively. In addition, the sputum was classifed as negative if the AFB was not found in these stages.

. . *Data Analysis*. e study used Chi-square to analyze the data in SPSS version 22. Chi-square was used to determine the e ect of *Channa striata* supplementation toward the acceleration of tuberculosis treatment. e signifcance level of the study is 5% (= 0.05), and the confdence level is 95%.

3. Results and Discussion

. . *e Characteristic of Respondent*. Figure 1 presents the characteristic of respondent of all groups. Based on Table 1, the proportion of male is higher than female with 52%, and 7.5% of respondent age is >50 years old. Furthermore, most of respondents have low education (elementary level) with 8%, in which 18.5% of respondent are not educated.

. . *e Distribution of Tuberculosis Sputum Status*. Based on Table 2, the proportion of respondent with positive 2 on intervention group is high with 7.9% in week 0, which is higher than positive 1 (2 .2%), positive (2 %), and negative

T1: e respondent characteristics.

Respondent Characteristic			
	Categories	Number	Percentage (%)
Sex	Male	10	52.0
	Female	9	8.0
Age	<20	1	8
	20-29	7	18.5
	0- 9	29	1 .5
	0- 9		21.5
	>50	75	7.5
Education	None	7	18.5
	Elementary	7	8
	Junior High School	7	18.5
	Senior High School	7	2 .5
	University		1.5

T 2: e distribution of tuberculosis sputum status at week 0.

Categories	Negative (%)	Positive 1 (%)	Positive 2 (%)	Positive (%)	Positive > (%)	Total
Intervention	10.7	2 .2	7.9	2	0	100
Control	1 .	20.	0.9		1	100
Total	12	2 .5	.5	29.5	0.5	100

T: e sputum test of tuberculosis patients at week 1.

Categories	Negative (%)	Positive 1 (%)	Positive 2 (%)	Positive (%)	Positive > (%)	Total
Intervention	5.9	5.9	21.	.9	2	100
Control	2 .7	29.9	27.8	1 .5	2	100
Total	0		2 .5	10.5	2	100

(10.7%) category. Furthermore, the proportion of respondent with positive on control group is high with %, which is higher than positive 2, positive 1, and negative category with 0.9%, 20. %, and 1 . %, respectively.

Based on statistical test, the P value is 0. 01 (P> ; =0.05). H0 is accepted, which means that there are no di erences between intervention and control group related to sputum test result among tuberculosis patient at week 0.

. . *Channa striata and the Acceleration of Tuberculosis Treatment*. Based on Table , the proportion of respondent of both negative and positive 1 category on intervention group is higher than other categories with 5.9%. In control group, the proportion of respondent classifed in positive 1 (29.9%) is higher than positive 2 (27.8%), positive (1 .5%), and negative category (2 .7%).

Based on statistical test, the P value is 0.0 5 (P< ; =0.05). erefore, H0 is rejected, which means that there are di erences between *Channa striata* supplementation and the acceleration of tuberculosis treatment among patients at week 1.

Based on Table , the proportion of respondent of negative category in intervention group is higher than other categories with 5 . %. In control group, the proportion of respondent classifed in positive 1 is high with 9.2%. It is higher than negative category (7.1%).

Based on statistical test, the P value is 0.08 (P > ; =0.05). erefore, H0 is accepted, which means that there are no di erences between *Channa striata* supplementation and the acceleration of tuberculosis treatment among patients at week 2.

Based on Table 5, the proportion of respondent classifed in negative category in intervention group is higher than other categories with 70.9%. Furthermore, the proportion of respondent of negative category in control group is high with 9.5%. It is higher than positive 1, positive 2, and positive with 2%, 9. %, and 7.2%, respectively.

Based on statistical test, the P value is 0.019 (P < ; =0.05). erefore, H0 is rejected, which means that there are di erences between *Channa striata* supplementation and the acceleration of tuberculosis treatment among patients at week .

Based on Table , the proportion of respondent classifed in negative category in intervention group is the highest with 90. %. Furthermore, the proportion of respondent of negative category in control group is high with 8%. It is higher than positive 1, positive 2, and positive with 21. %, .2%, and 2.1%, respectively.

Based on statistical test, the P value is 0.005 (P < ; =0.05). erefore, Ho is rejected, which means that there are di erences between *Channa striata* supplementation and the

T: e sputum test of tuberculosis patients at week 2.

Categories	Negative (%)	Positive 1 (%)	Positive 2 (%)	Positive (%)	Positive > (%)	Total
Intervention	5 .	0.1	10.7	2.9	0	100
Control	7.1	9.2	1 .	7	1	100
Total	7	.5	12.5	5	0.5	100

T 5: e sputum test of tuberculosis patients at week .

Categories	Negative (%)	Positive 1 (%)	Positive 2 (%)	Positive (%)	Positive > (%)	Total
Intervention	70.9	21.	.9	1	1.9	100
Control	9.5	2	9.	7.2	2	100
Total	0.5	2 .5	7		2	100

T: e Sputum test of tuberculosis patients at week .

Categories	Negative (%)	Positive 1 (%)	Positive 2 (%)	Positive (%)	Positive > (%)	Total
Intervention	90.	8.7	1	1	0	100
Control	8	21.	.2	2.1	2	100
Total	77	17	.5	1.5	1	100

acceleration of tuberculosis treatment among patients at week .

Tuberculosis (TB) is communicable disease caused by bacteria called *Mycobacterium tuberculosis*, in which the bacteria usually attack not only the lung but also any part of the body such as the kidney, spine, brain [17], nerve, circulation, skeleton, and joint [11]. *M. tuberculosis* has square shape, which is classifed in gram-positive basil. e bacteria are easy to disappear a er contact with sunlight directly [ ]. Tuberculosis is classifed as chronic disease, and the bacteria are spread by air [18]. Based on socioeconomic aspect, the transmission of tuberculosis is also a ected by urbanization, crowded area, and poverty [19]. Tuberculosis is one of public health problems in worldwide especially in developing countries [2] that has high level of morbidity and mortality of tuberculosis [18]. e major incident of tuberculosis (85%) in worldwide occurred in Asia and Africa [20].

e sputum of tuberculosis respondent is collected periodically by primary health o cer of Jember and Situbondo on week 0, week 1, week 2, week , and week , in which the sputum is examined in Jember Chest Hospital. Jember Chest Hospital (Rumah Sakit Paru Jember) is one of chest-concerned hospitals in East Java Province that the work area of the hospital is Eastern Pasuruan, Probolinggo, Lumajang, Jember, Situbondo, Bondowoso, and Banyuwangi—Indonesia. In addition, the sputum is examined to determine the level of the tuberculosis.

e distribution of tuberculosis level of intervention and control group without *Channa striata* supplementation is shown by Table 2, in which most of respondents of intervention and control group are classifed in positive 2 (7.9%) and positive (%), respectively. Besides, based on Table 2, the proportion of respondent with negative category in intervention and control group is 10.7% and 1 . %, respectively, with the result that respondent in control group that has negative status of tuberculosis is higher than intervention group. Furthermore, based on Chi-square test, the P value is 0. 01 (P> ; =0.05). It shows that there are no di erences between intervention and control group related to sputum test result of tuberculosis patient at week 0.

e distribution of tuberculosis level subsequent to *Channa striata* supplementation of intervention and control group is shown by Tables – , in which the sputum was collected and examined in week 1, week 2, week , and week . Table showed the distribution of tuberculosis sputum test between intervention and control group in week 1. Based on Table , respondent that is classifed in negative category of tuberculosis level in intervention group is high with 5.9%. It is higher than the proportion of respondent with negative category in control group (2 .7%). Furthermore, the distribution of tuberculosis sputum test between intervention and control group in week 2 is shown by Table . Respondent that is classifed in negative category of tuberculosis level in intervention group is high with 5 . %. It is higher than the proportion of respondent with negative category in control group (7.1%). Table 5 showed the distribution of tuberculosis sputum test between intervention and control group in week . Respondent that is classifed in negative category of tuberculosis level in intervention group is high with 70.9%. It is higher than the proportion of respondent with negative category in control group (9.5%). Table showed the distribution of tuberculosis sputum test between intervention and control group in week . Respondent that is classifed in negative category of tuberculosis level in intervention group is high with 90. %. It is higher than the proportion of respondent with negative category in control group (8%).

Generally, *Channa striata* supplementation in this study is signifcantly related to the acceleration of tuberculosis recovery. It is caused by the elevating distribution of respondent classifed in negative category of tuberculosis in intervention

group on week 1, week 2, week , and week with 5.9%, 5 . %, 70.9%, and 90. %, respectively. Furthermore, based on statistical test, the P value of *Channa striata* supplementation toward the acceleration of tuberculosis treatment week 1, week , and week is 0.0 5, 0.019, and 0.005 (P< ; =0.05), respectively. erefore, there are di erences between *Channa striata* supplementation and the acceleration of tuberculosis treatment among respondent.

Channa striata is cheap resource in ailand [21], which is cultivated restrictedly in ailand and Indonesia [22]. *Channa striata* is vulnerable to aquatic Mycobacterium [21, 22]. However, *Mycobacterium tuberculosis* is not founded in *Channa striata* [2]. e extract of *Channa striata* through chloroform solvent contains several amino acids (aspartate acid, glutamate acid, serine, glycine, histidine, arginine, threonine, alanine, proline, tyrosine, valine, methionine, leucine, phenylalanine, and lysine) and fatty acid (myristic acid, palmitate acid, stearate acid, heptadecanoic acid, palmitoleic acid, oleate acid, linoleic acid, and arachidonic acid) [1]. e major amino acid found in *Channa striata* extract is glycine (5.77% of protein total) and alanine (10.19% of protein total). Besides, the major fatty acid found in *Channa striata* extract is palmotoleic acid (5.9 % of fatty acid total), oleate acid (22.9 % of fatty acid total), stearate acid (15. 1% of fatty acid total), and linoleate acid (11. 5% of fatty acid total) [1]. Based on pharmacology activities, the aqueous extract of *Channa striata* on male mice (25- 0 g) possessed a concentration-dependent antinociceptive activity [2].

e extract of *Channa striata* was administered orally to osteoarthritis-induced rabbits (OA), in which the result is that there was a signifcant improvement in the density of Protein Gene Product (PGP) of 9,5-immunoreactive nerve fbers in the synovial membrane of treated animals [25]. Furthermore, the extract of *Channa striata* possesses antifun-gal activities in restricted spectrum[2]; however the acid extract of mucus has bactericidal activity that reduced the bacteria pathogen growth among human, such as *Klebsiella pneumoniae, Pseudomonas aeruginosa,* and *Bacillus subtilis*
[27]. e cream formulation of *Channa striata* extract can heal the wound in Sprague-Dawley rats (250- 00 g) [28]. Besides, the *Channa striata* is also formulated in spray form to heal the wound [29, 0]. e aerosol form is created from butane, propene, and the combination of butane-propene as propellant [0]. Furthermore, Maj Jais [1] noted that the extract of *Channa striata* without bone is unable to decrease the blood sugar and HDL (High Density Lipoprotein) level toward Sprague-Dawley rat and mice.

e limitation of study is that the authors cannot provide the information about the e ect of *Channa striata* among multidrug-resistant (MDR) tuberculosis patients. erefore, future research is needed to fnd the e ect of *Channa striata* supplementation with standard antibiotic for MDR patients related to accelerating the MDR TB recovery.

4. Conclusions

Based on the result of the study, the proportion of respondent classifed in negative category in intervention group within week 0, week 1, week 2, week , and week is 10.7%, 5.9%, 5 . %, 70.9%, and 90. %, respectively. Besides, the proportion of respondent classifed in negative category in control group within week 0, week 1, week 2, week , and week is 1 . %, 2 .7%, 7.1%, 9.5%, and 8%, respectively. Furthermore, based on Chi-square *test*, the P value of *Channa striata* supplementation toward the acceleration of tubercu-losis treatment week 1, week , and week is 0.0 5, 0.019, and 0.005 (P< ; =0.05), respectively. erefore, there are di erences between *Channa striata* supplementation and the acceleration of tuberculosis treatment among respondent, in which *Channa striata* treatment in this study is signifcantly related to the acceleration of tuberculosis recovery.

Data Availability

e data used to support the fndings of this study are available from the frst author and corresponding author upon request.

Conflicts of Interest

e authors declare that they have no con icts of interest.

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References

[1] WHO, *Global Tuberculosis Report*, Geneva, Switzerland, 200 .

[2] D. R. Silva, D. M. Menegotto, L. F. Schulz, M. B. Gazzana, and P. T. R. Dalcin, "Mortality among patients with tuberculosis requiring intensive care: a retrospective cohort study," *BMC Infectious Diseases*, vol. 10, article no. 5 , 2010.

[ ] WHO, *Global Tuberculosis Report* , Geneva, Switzerland, 2017.

[ ] WHO, *Tuberculosis*, 2018, http://www.who.int/mediacentre/factsheets/fs10 /en/.

[5] WHO, *e Top Causes of Death*, 2018, http://www.who.int/mediacentre/factsheets/fs 10/en/index1.html.

[ ] R. I. Depkes, *Pedoman Nasional Penanggulangan TBC (e Guidelines of Tuberculosis Management in Indonesia)*, Jakarta, Indonesia, 2007.

[7] WHO, *Global Tuberculosis Report* , Geneva, Switzerland, 201 .

[8] P. D. O. Davies, "Risk factor for tuberculosis," *Monaldi Arch Chest*, vol. , no. 1, pp. 7–, 2005.

[9] J. P. Cegielski and D. N. McMurrat, " e relationship between malnutrition and tuberculosis: evidence from studies in humans and experimental animals," *e International Journal of Tuberculosis and Lung Disease*, vol. 8, no. , pp. 28 –298, 200 .

[10] K. L¨onnroth, B. G. Williams, P. Cegielski, and C. Dye, "A consis-tent log-linear relationship between tuberculosis incidence and body mass index," *International Journal of Epidemiology*, vol. 9, no. 1, pp. 1 9–155, 2010.

[11] K. Abba, T. D. Sudarsanam, L. Grobler, and J. Volmink, "Nutritional supplements for people being treated for active tuberculosis," *Cochrane Database of Systematic Reviews*, no. , 2008.

[12] K. Gupta, R. Gupta, A. Atreja, M. Verma, and S. Vishvkarma, "Tuberculosis and nutrition," *Lung India*, vol. 2 , no. 1, pp. 9–1 , 2009.

[1] N. I. Paton, Y.-K. Chua, A. Earnest, and C. B. E. Chee, "Randomized controlled trial of nutritional supplementation in patients with newly diagnosed tuberculosis and wasting," *American Journal of Clinical Nutrition*, vol. 80, no. 2, pp. 0–5, 200 .

[1] Z. A. Zakaria, A. K. Arifah, A. M. Mat Jais, M. R. Sulaiman, and M. N. Somchit, "G09 Amino acid and fatty acid compositions of the aqueous extract of Channa striatus," *Journal of Veterinary Pharmacology and erapeutics*, vol. 29, pp. 208-209, 200 .

[15] R. A. Taslim, *Nurpudji astuti dan nilai tambah ikan gabus*, 2018, http://nurpujiastuti.wordpress.com/2009/10/2 /nurpudji-astuti-dan-nilai-tambah-ikan-gabus/.

[1] N. Munfatahatin, *Pengaruh pemberian ekstrak ikan gabus ter-hadap kenaikan berat badan pasien rawat jalan penyakit paru obstruktif kronik (PPOK) di Rumah Sakit Paru Jember (e effect of Channa striata supplementation toward the increasing of body mass of chronic obstructive pulmonary disease patient in Rumah Sakit Paru Jember)*, Jember, Indonesia, Universitas Jember, 2010.

[17] CDC, *Tuberculosis*, 2018, https://www.cdc.gov/tb/topic/basics/ default.htm.

[18] K. Zaman, "Tuberculosis: A global health problem," *Journal of Health, Population and Nutrition*, vol. 28, no. 2, pp. 111–11 , 2010.

[19] E. Karyadi, C. E. West, R. H. H. Nelwan, W. M. V. Dolmans, J.W. Schultink, and J. W. M. Van Der Meer, "Social aspects of patients with pulmonary tuberculosis in Indonesia," *Southeast Asian Journal of Tropical Medicine and Public Health*, vol. , no. 2, pp. 8– 5, 2002.

[20] K. Floyd and C. Lienhardt, *e Global Plan to Stop TB - : Transforming the Fight towards Elimination of Tuberculosis*, Geneva, Switzerland, 2010.

[21] S. Puttinaowarat, K. ompson, A. Kolk, T. Somsiri, and A. Adams, "Mycobacteriosis: detection and identifcation of aquatic Mycobacterium species," *Fish Veterinary Journal*, vol. 5, pp. –21, 2000.

[22] S. Chinabut, C. Limsuwan, and P. Chanratchakool, "Mycobacteriosis in the snakehead, Channa striatus (Fowler)," *Journal of Fish Diseases*, vol. 1 , no. , pp. 5 1–5 5, 1990.

[2] S. Puttinaowarat, K. D. ompson, A. Kolk, and A. Adams, "Identifcation of Mycobacterium spp. isolated from snakehead, Channa striata (Fowler), and Siamese fghting fsh, Betta splen-dens (Regan), using polymerase chain reaction-reverse cross blot hybridization (PCR-RCBH)," *Journal of Fish Diseases*, vol. 25, no. , pp. 2 5–2 , 2002.

[2] Z. A. Zakaria, A. M. Mat Jais, Y. M. Goh, M. R. Sulaiman, and M. N. Somchit, "Amino acid and fatty acid composition of an aqueous extract of Channa striatus (Haruan) that exhibits antinociceptive activity," *Clinical and Experimental Pharmacol-ogy and Physiology*, vol. , no. , pp. 198–20 , 2007.

[25] N. Y. T. Michelle, G. Shanthi, and M. Y. Loqman, "E ect of orally administered channa striatus extract against experimentally-induced osteoarthritis in rabbits," *e International Journal of Applied Research in Veterinary Medicine*, vol. 2, no. , pp. 171– 175, 200 .

[2] A. M. Mat Jais, Z. A. Zakharia, A. Luo, and Y. X. Song, "Antifungal activity of channa striatus (haruan) crude extracts," *International Journal of Tropical Medicine*, vol. , pp. – 8, 2008.

[27] O. Y. Wei, R. Xavier, and K. Marimuthu, "Screening of antibacte-rial activity of mucus extract of snakehead fsh, Channa striatus (Bloch)," *European Review for Medical and Pharmacological Sciences*, vol. 1 , no. 8, pp. 75– 81, 2010.

[28] S. H. Baie and K. A. Sheikh, " e wound healing properties of *Channa striatus*-cetrimide cream—tensile strength measure-ment," *Journal of Ethnopharmacology*, vol. 71, no. 1-2, pp. 9 –100, 2000.

[29] Febriyenti, A. M. Noor, and S. Baie, "Formulation of Aerosol concentrates containing haruan (channa striatus) for wound dressing," *Malaysian Journal of Pharmaceutical Sciences*, vol. , pp. –58, 2008.

[0] F. Febriyenti, A. Mohd Noor, and S. Bin Bai Baie, "Physical evaluations of Haruan spray for wound dressing and wound healing," *International Journal of Drug Delivery*, vol. , no. 1, pp. 115–12 , 2011.

[1] A. M. Mat Jais et al., "E ect of haruan (Channa striatus) fllet extract on blood glucose and cholesterol concentration and di erential white blood cells counts in rats and mice," in *Proceedings of the Regional Symposium on Environment and Natural Resources*, R. Omar et al., Ed., Kuala Lumpur, Malaysia, 2002.