PROCEEDING

Women, Family, and Disaster International Conference: Technology and Innovation in Disaster Response

Published by:
CENTER FOR WOMEN, FAMILY, AND DISASTER STUDIES
UNIVERSITAS 'AISYIYAH YOGYAKARTA

Barcode ISSN

www. wofdic.unisayogya.ac.id

Multi-micronutrient supplementation for weight gain of pregnant women with CED in West Lombok Regency

Catur Esty Pamungkas[1*], Siti Mardiyah WD[2], Cahaya Indah Lestari[3], Dwi Kartika Cahyaningtyas[4]
[1234]Faculty Of Health Sciences, Universitas Muhammadiyah Mataram

*email: catur.esty@ummat.co.id

Abstract

Purpose: This study aims to determine the effectiveness of multi-micronutrient supplementation with increasing body weight in pregnant women with CED in West Lombok Regency

Method: This study aims to determine the effectiveness of multi-micronutrient supplementation with increasing body weight in pregnant women with CED in West Lombok Regency. This study used a quasi-experimental design with 1 group design and a sample of 30 KEK pregnant women , with the *consecutive sampling* technique . Statistical test analysis used the *Peiret T*- test . For clinical significance, the Δ *mean* with a 95% *confidence interval* with a P value <0.05 was used.

Results: The results showed that most of the respondents were aged ≥ 21 years, namely 73.3%, with the highest level of education in higher education, namely 17 people (56.7%). The most income respondents are low income, namely 19 people (63.3%). The highest gestational age in this study was the second trimester of 17 women (56.7%). Bivariate analysis found a significant difference with a p value > 0.05, which means that there was a significant difference between the weight of pregnant women before and after the intervention with the average increase in body weight of pregnant women in this study 5.83.

Keywords: Micronutrien, Pregnant women CED

Introduction

Chronic lack of energy (CED) that lasts a long time in pregnant women will affect the fulfillment of nutrients needed by the body and have an impact on the fulfillment of fetal nutrition in the womb. This can increase maternal and fetal morbidity and mortality rates are increasing. based on Riskesdas in 2018 shows the high prevalence of malnutrition in pregnant women in Indonesia, which is as many as 17.3% of pregnant women in conditions of Chronic Energy Deficiency (CED) [1] NTB is included in the 10 provinces that have the highest CED prevalence of 21.5%, the prevalence is still high from the national average prevalence of CED incidence, so intervention is still needed in efforts to overcome CEDs in NTB [2] (Riskesdas NTB 2018).

Chronic low energy pregnant women are pregnant women who have a pre-pregnancy body mass index or in the 1st trimester (< 12 weeks) of < 18.5 kg/m2 [3]. Indicators and targets of public health programs in the National Medium-Term Development Plan (RPJMN) and Strategic Plan (Renstra) for 2020-2024 place CEDs as one of the medium-term programs, the percentage of pregnant women with Chronic Energy Deficiency (CED) is 14.5% [4], and The pre-pregnancy and pregnancy period must be well prepared by accelerating the improvement of community nutrition with the main focus on the first 1000 days of life (1000 HPK).

CEDs on Lombok Island are still high from the average prevalence of CEDs in Indonesia, 3 districts with the highest prevalence were West Lombok as much as 25.92%, North Lombok as much as 29.19%, East Lombok as much as 20.17%. West Lombok is the district with the highest number of CEDs with the highest prevalence. This data is still above the average prevalence of CEDs in NTB, which is 21.50% [2]. Chronic lack of energy has an impact on the pregnancy process will cause late baby growth (IUGR), labor will affect contractions (his) so that it will inhibit the progress of labor, Low Birth Weight (BBLR), and Asphyxia [5], these impacts are very detrimental to maternal and fetal health during the pregnancy period.

CEDs are caused by many influencing factors, based on the characteristics of pregnant women who experience CEDs in Indonesia in the most age groups experiencing CEDs during pregnancy, namely at the age of 15-19 years by 33.5%, Education for pregnant women who experience the most CEDs at the Senior High School Education (SLTA) level by 19.4%, Pregnant women's work is in the category of being in school by 25.9% and seen from the location of pregnant women who experience CEDs in Indonesia the most 19, 3 % [1].

Research conducted by [6] (Supadmi, Kusrini, and Kusumawardani 2020) found CED and anemia were found in pregnant women and pregnant women with hypothyroidism and without hypothyroidism in Ponorogo Regency. Normal and healthy pregnancy outcomes can be achieved by evaluation of thyroid function and adequacy of iron and other nutrients during pregnancy. Therefore, efforts to improve nutrition in an integrated and continuous manner since preconception and during pregnancy should be carried out and advised to screen pregnant women to prevent thyroid dysfunction and to carry out continuous supplementation in relation to urgent needs during pregnancy due to physiological and hormonal changes.

The government's effort to overcome CEDs is by providing Micronutrients (MN) as much as 30 tablets for 1 month to 90 tablets [7]. Pregnant women consume 1 tablet daily. Pregnant women are advised to take supplements of folic acid, iodine and vitamin D. Multivitamins are a combination of various minerals and vitamins usually in tablet form. Some multivitamins are made specifically for pregnant women (prenatal multivitamins). If you are pregnant, it is recommended to avoid taking multivitamins that are not for pregnant women. Taking high doses of vitamin A, C and E supplements can harm pregnancy. We recommend avoiding consumption of this vitamin while pregnant including avoiding foods that are high in A, such as liver and its products.

Research conducted by [8] (Mires et al. 2022) based on a systematic review study conducted on 726 articles with maternal respondents who consumed 8 nutrients in micronutrients obtained 1,199 pregnant women from 2,427 or 49% gave birth to babies with congenital heart defects. Further studies are needed to see the effectiveness of micronutrients on pregnancy.

The prevalence of CEDs in West Lombok was obtained by 3 highest Puskesmas, namely Dasan Tapen Health Center with 186 cases (20.62%), Meninting Health Center with 156 cases (14.38%) and Sekotong Health Center with 147 cases (18.97%) (Dinkes Lobar 2022). The problem of CED in pregnant women worsens the condition of their pregnancy, Based on the explanation above, the author is interested in raising research on "Multi-Micronutrient Supplementation Against Weight Increase of Pregnant Women with CED in West Lombok Regency in 2023".

Methods

This research will use a quasi-experimental research design with a pretest posttest one group design research design. The study began by identifying pregnant women in West Lombok Regency, then given intervention by providing Multi Micronutrients. The study was conducted on CED pregnant women in West Lombok Regency. The research will be conducted from February to April 2023.

In this study using dependent and independent variables. The dependent variable in this study was multi-micronutrient supplementation. While the independent variable in this study is weight increase in CED pregnant women. The inclusion criteria in this research were being willing to take part in the research until the end. Exclusion criteria are respondents who cannot and have contraindications to multi micronutrients. The sampling technique used in this study using Consecutive sampling is the choice of researchers who do not get a sample frame. The trick is to take samples that meet certain criteria until a number of samples are obtained. In this study using a minimum sample of 30 samples.

This research is ethically feasible based on a Certificate of Ethical Eligibility from NTB Provincial Hospital with No: 075.1/18/KEP/2022. The data collected in this study are secondary and primary data. Secondary data consists of an overview of the location of the study, data on the number of CED pregnant women in West Lombok. Primary data consists of maternal age, maternal education, family income, maternal occupation, chronic energy deficiency and the results of measuring the weight of pregnant women. The study was conducted by identifying CED patients then given a micronutrient intervention (Lexavit) with a maximum of 90 tablets. The composition of lexavit is Vit A 6,000 IU, vit D 400 IU, vit C 100 mg, vit B_1 10 mg, vit B_2 2.5 mg, vit B_6 15 mg, vit B_{12} 4 mcg, nicotinamide 20 mg, Ca pantothenate 7.5 mg, folic acid 0.25 mg, Fe fumarate 90 mg, Ca lactate 250 mg, copper 0.1 mg, iodine 0.1 mg, simeticone 20 mg, fluoride 1 mg. Respondents were given 30 micronutrient tablets 3 times and consumed micronutrient tablets once a day [10].

Results

Table 1. Frequency Distribution of CED Pregnant Women Characteristics

No	Karakteristik	n	%
1	**Mother's age**		
	Young age	8	26.7
	Age of majority	22	73.3
2	**Education Level**		
	Low	13	43.3
	Hight	17	56.7
3	**Income**		
	Low	19	63.3
	Hight	11	36.7
3	**CED**		
	Risk	30	100
	No Risk	-	-
4	**Gestational Age**		
	Trimester I	5	16.7

Trimester II	17	56.7
Trimester III	8	26.7

Source: primary data, Mei 2023

Based on this, it shows that most respondents are aged ≥ 21 years, which is 73.3% with the highest level of education in higher education, which is 17 people (56.7%). The highest income of respondents with low income is 19 people (63.3%). All restaurants have a LILA of less than 23 cm which is risk. The most gestational age in this study was the second trimester as many as 17 people (56.7%).

Table 2. Effectiveness of Multi Micronutrient Supplementation on Weight Increase of Pregnant Women with CED.

Variabel Intervensi	N	Mean	SD	*P*-Value
Weight Loss Before	30	40.30	4.677	0.002
Weight Loss After		46.12	4.974	

Source: primary data, Mei 2023

In Table 1. shows that most respondents are aged ≥ 21 years, which is 73.3% with the highest level of education in higher education at 17 people (56.7%). The highest income of respondents with low income is 19 people (63.3%). All restaurants have a LILA of less than 23 cm which is risk. The most gestational age in this study was the second trimester as many as 17 people (56.7%).

The normality test using analysis to determine between the independent variable of multi-micronutrient supplementation against the dependent variable of increasing the body weight of pregnant women with CED was carried out using an indepndent t-test. Before the independent t test, a data normality test was carried out. data normality test results with Shapiro-wilk test. The results of the normality test obtained a p-value of > 0.05, namely the p-value of pregnant women's weight before the intervention of 0.07 and the weight of pregnant women after micronutrient administration of 0.92.

Based on table 2. The results of this study found a significant relationship with a p-value of < 0.05 which means there is a significant influence between the provision of micronutrients on the increase in body weight of CED pregnant women. The results showed that micronutrient intervention in CED pregnant women obtained an average of 40.30 in body weight before the intervention and after micronutrient administration obtained an increase in body weight with an average of 46.12. So the difference in the average increase in body weight of pregnant women before the intervention and after the intervention in this study was 5.83.

Discussion

In this study, the highest age of respondents was obtained at the age of ≥ 21 years with an average age of 24 years. The highest income level in the low category is below MSEs, and the highest level of education of respondents is 17 respondents (56.7%). based on research conducted by [11] shows that the probability of the incidence of CED pregnant women to low economic status is 115 times higher than pregnant women not CED. And showed that the probability of incidence of CED pregnant women to low education levels was 2.3 times higher than that of non-CED pregnant women. Therefore, it can be concluded that low education levels increase the risk of CED in pregnant women 2.3 times stronger than pregnant women with higher education levels.

A significant relationship was obtained with a p-value of < 0.05 which means that there is a significant influence between the provision of micronutrients on the increase in body weight of CED pregnant women. supported by research conducted by [12], it was found that there was a relationship between the weight of pregnant women with KEK and the birth weight of the baby, then the relationship between Hemoglobin and the birth weight of the baby was significant. Providing nutrients such as DHA supplements, iron, calcium, lactobacillus cassei and sufficient calories affects the baby's birth weight, even though the intervention is only carried out in the 3rd trimester.

The results showed that micronutrient intervention in CED pregnant women obtained an average of 40.3 in body weight before the intervention and after micronutrient administration obtained an increase in body weight with an average of 46.12. So the difference in the average increase in body weight of pregnant women before the intervention and after the intervention in this study was 5.83.

Supported by research conducted by [13] it was found that the effect of multi-micronutrient supplementation (MMS) was greater in pregnant women with less weight than women who were not underweight in reducing the risk of preterm birth (16% for women with underweight versus 6% for women who were not thin with a P Value for heterogeneity of 0.01), and the effect of MMS was greater in women who started supplementation after 20 weeks gestation than those who started it before 20 weeks in reducing the risk of stillbirth (19% reduction after 20 weeks versus a 3% reduction before 20 weeks with a P value for heterogeneity of 0.05).

Multi-micronutrient supplementation interventions benefit pregnant women and newborns, research conducted by [14] of 17 trials (involving 137,791 women) obtained good results from the effects of multi-micronutrient supplementation (MMN) during pregnancy on the outcomes of fetus, baby, and mother. MMN supplementation with iron and folic acid versus supplementation with iron (with or without folic acid) showed an 8% reduced risk of small birth for gestational age (SGA) and a 12% reduced risk of low birth weight (BBLR).

In this study, an increase in pregnant women's weight was obtained from all semesters before and after micronutrient administration with an average amount of 5.83. The benefits of providing micronutrients do not have a long impact on the health of the fetus born, based on research [15] there were improvements in the characteristics of upper arm circumference (CED), fundus uteri height growth, Biparietal biometric size diameter and Hb levels among CED pregnant women given micronutrient supplementation in the 3rd trimester and showed that micronutrient supplementation and adequate caloric intake can improve infant outcomes in mothers pregnant with CED with the results of the analysis of the relationship between increased LILA and normal birth weight outcomes, a positive correlation was obtained with a value of p: 0.0106; 95%CI with R: 0.4595. So that a relationship was obtained between the increase in LILA and good baby outcomes.

Conclusion

There is a significant difference between the body weight of pregnant women before and after taking multi-micronutrient supplementation. Monitoring of pregnant women during micronutrient consumption still needs attention. A balanced menu is very important in supporting micronutrient interventions, so it is necessary to follow up the influence of nutrition with the success of micronutrients to increase the body weight of CED pregnant women.

Acknowledgment
The researcher would like to thank LPPM University of Muhammadiyah Mataram and all who have contributed to this research

Author Contributions

Table 3. Author Contributions

Author	Contributions
Catur Esty Pamungkas	- Conceptualization - Methodologi - Writing original draf - Supervision - Resources - Funding acquisition - Writing review and editing
Siti Mardiyah WD	- Project administration - Conceptualization - Methodologi - Writing original draf - Resources - Writing review and editing
Cahaya Indah Lestari	- Writing original draf - Project administration - Dokumentation - Investigation - Writing review and editing
Dwi Kartika Cahyaningtyas	- Writing original draf - Dokumentation - Investigation - Funding acquisition - Writing review and editing

References

[1] Riskesdas, "Laporan Riskesdas Nasional," *Laporan Riskesdas Nasional*, 2018.
[2] Riskesdas NTB, "Laporan Provinsi Nusa Tenggara Barat," *Laporan Provinsi Nusa Tenggara Barat*, 2018.
[3] Kemenkes RI, "PETUNJUK TEKNIS Pemberian Makanan Tambahan (PMT) Berbahan Pangan Lokal untuk Balita dan Ibu Hamil," 2023.
[4] Perpres RI, "Lampiran Peraturan Presiden RI Nomor 18 Tahun 2020 Tentang Rencana Pembangunan Jangka Menengah Nasional 2020-2024 Narasi RI," 2020.
[5] D. Nasution, D. Siti Nurdiati, and E. Huriyati, "Berat badan lahir rendah (BBLR) dengan kejadian stunting pada anak usia 6-24 bulan," 2014.
[6] S. Supadmi, I. Kusrini, and H. D. Kusumawardani, "The Influence of Iron Depletion and Chronic Energy Deficiency on the Risk of Hypothyroidism in Pregnant Women Living in Iodine Deficiency Disorders Endemic Areas in

Badegan Ponorogo District East Java, Indonesia," *J Nutr Sci Vitaminol*, vol. 66, pp. 456–462, 2020.

[7] Kemenkes RI, *Pedoman Pemberian Tablet Tambah Darah (TTD) Bagi Ibu Hamil Pada Masa Pandemi Covid-19 TENAGA KE SEHATAN*. 2020.

[8] S. Mires, M. Caputo, | Timothy Overton, and C. Skerritt, "Maternal micronutrient deficiency and congenital heart disease risk: A systematic review of observational studies," 2022, doi: 10.1002/bdr2.2072.

[9] Dinkes Lobar, "Data Anemia dan KEK Lombok Barat," *Laporan Dinas Kesehatan Lombok Barat*, 2022.

[10] BPOM, "Badan Pengawas Obat dan Makanan Republik Indonesia," 2022.

[11] N. A. Teguh, A. Hapsari, P. R. A. Dewi, and P. Aryani, "Faktor-faktor yang mempengaruhi kejadian kurang energi kronis (KEK) pada ibu hamil di wilayah kerja UPT Puskesmas I Pekutatan, Jembrana, Bali," *Intisari Sains Medis*, vol. 10, no. 3, Sep. 2019, doi: 10.15562/ism.v10i3.432.

[12] S. Charles, "Korelasi suplementasi nutrisi terhadap ibu hamil kurang energi kronis untuk pencegahan kejadian stunting," *Jurnal Kedokteran Syiah Kuala*, vol. 23, pp. 122–126, 2023.

[13] M. W. Bourassa *et al.*, "Review of the evidence regarding the use of antenatal multiple micronutrient supplementation in low- and middle-income countries," May 01, 2019, *Blackwell Publishing Inc.* doi: 10.1111/nyas.14121.

[14] B. A. Haider and Z. A. Bhutta, "Multiple-micronutrient supplementation for women during pregnancy," Apr. 13, 2017, *John Wiley and Sons Ltd*. doi: 10.1002/14651858.CD004905.pub5.

[15] S. Charles Siahaan, H. Henderi, N. Pristiwanto Dwi Safitri, B. Ester Wakas, and M. Fadhil Ihsan Pratama, "Intervensi Ibu Hamil Dengan Kurang Energi Kalori Melalui Suplementasi Mikronutrien Di SurabayaTahun 2019," vol. 44, no. 1, pp. 17–27, 2021, [Online]. Available: http://jurnalmka.fk.unand.ac.id

Isolation & Antagonistic Test Of Soil Bacteria Againstm *Rhizoctonia* Sp. A Pathogen Of Rice Plant (*Oryza Sativa* L.)

Lesta Irmanda[1*], Diva Pungky Wicaksono[2], Annisa Khumaira[1], Ika Afifah Nugraheni[1]

[1]Department of Biotechnology, Faculty of Sains and Technology, Universitas 'Aisyiyah Yogyakarta [2] Research and development, PT. Biotek Cipta Kreasi, Sleman, Yogyakarta

*Email: lestairmanda@gmail.com

Abstract

Purpose: This study aims to isolate bacteria from soil that are capable of producing antimicrobial compounds, as well as to test the inhibitory activity against the growth of *Rhizoctonia* sp.

Method: Soil samples were taken at 3 locations of PT Biotek Cipta Kreasi land, then cultured in nutrient agar media with stratified dilutions, then observations of colony morphology and cell morphology were made, then antagonistic tests were carried out in vitro and observations were made.

Results: The results showed that there were 23 isolates of soil bacteria with various characteristics and shapes. Then 17 gram-positive and rod-shaped bacteria were tested for antagonism, showing that the 17 bacteria did not have inhibition against the growth of *Rhizoctonia* sp.

Keywords: *Rhizoctonia* sp., isolation, soil bacteria, antagonistic test

Introduction

Microbial isolation is a way of separating these microbes from their natural environment and growing them as pure cultures in a growth medium. Before carrying out isolation, of course researchers must understand the growth requirements and ways to isolate it, as well as how to purify it. In nature, microbes are rarely found in a pure state, generally they are a mixture of various microbial species. Various ways to isolate and grow microbes are using spread plate, pour plate and streak plate method [1].

Antibiotic-producing microorganisms can be isolated from soil, seawater, mud, compost, rumen contents, domestic waste, rotten food, etc. Antibiotic-producing microbes are mostly obtained from soil microbes. The relationship between microorganisms in the soil can be neutral, competitive or even antagonistic. This antagonistic relationship is actually beneficial for human life, because with antagonism it is possible for one type of microorganism to produce anti-microbial substances which can inhibit the life of other types of microorganisms. Soil is a habitat for microorganisms, in one gram of soil there are millions of bacteria, fungi, protozoa and other microorganisms [2]. One of the bacteria that can produce antimicrobial compounds is the genus Bacillus. This group of bacteria is capable of producing antimicrobial compounds in the form of antibiotics, proteinases and bacteriocins [3]. Diseases in rice plants are very diverse, some of which are classified as important diseases because the resulting loss of yield is quite significant in affecting efforts to meet national rice production. These important types of disease are blast

disease by *Pyricularia oryzae*, bacterial leaf blight by *Xanthomonas oryzae* pv. oryzae, sheath blight by *Rhizoctonia solani*, brown spot by *Drehclera oryzae*, and bacterial grain rot by *Burkholderia glumae* [4]. Blast disease (*Pyricularia oryzae*) is one of the main diseases in rice which can cause losses of up to 61%[5]. Bacterial leaf blight can reduce rice production by 30-40%[6]. Meanwhile Nuryanto stated that yield losses due to sheath blight ranged from 20-35%[7].

One of the pathogens in rice plants is the fungus *Rhizoctonia* sp. which causes rice sheath blight. *Rhizoctonia* sp. is a soil-borne pathogen with a wide range of hosts in forestry and agricultural plant species. *Rhizoctonia* sp. is a fungus in the genus *Basidiomycetes* imperfect fungi[8]. *Rhizoctonia* sp. is a group of sterile fungi (cannot produce spores) but can produce sclerosia as a defensive structure both in the soil and in plant tissue[9].

Farmers' control of rice plant diseases is still dominated by the use of synthetic pesticides, while biological control is still very low. Biological control of rice plants is still limited because there are still few potential biological agents that can be developed as control technology. The limited types of biological agents are a challenge for conducting studies in order to obtain potential biological agents as candidates for developing biological control[4]. Continuous use of fungicides can result in dangerous impacts, so it is necessary to have environmentally friendly forms of control or biological control. One of the biological controls is the use of antagonistic bacteria made singly or in consortia[10].

So, the aim of this research is to isolate bacteria from soil that are capable of producing antimicrobial compounds, and to test their inhibitory activity on the growth of *Rhizoctonia* sp. fungal pathogens of rice plants.

Methods

This research employs an experimental method. This research was carried out in the research and development division at PT. Biotek Cipta Kreasi whose address is Kyai Samiyoredjo street, Jetis, Donolayan, Donoharjo, Ngaglik Subdistrict, Sleman Regency, Special Region of Yogyakarta.

Material and tools

The tools used are digital scales, spatula, aluminum foil, magnetic stirrer, measuring tube, laminar air flow (LAF), hot plate, vortex, petridish, autoclave, Erlenmeyer, test tube, test tube rack, Bunsen, measuring pipette, pipette pump , tube needle, object glass, cover glass, ziplock plastic, micropipette, micro tip, ruler, label and stationery as well as other tools that support this research. The materials used are soil, NA (Nutrient Agar) media, sterile Reverse Osmosis (RO) water, PDA (Potato Dextrose Agar) media, *Rhizoctonia* sp. isolate, 70% alcohol, 3% KOH, methylated spirits, gram dye.

Soil sampling

Soil sampling using a random method at the PT land location. Biotech Cipta Kreasi. Where there are 3 soil sampling locations, namely sample 1 was taken in the southern part of the RnD green house, sample 2 was taken in the chili land near the river and sample 3 was taken from the timun baby land. Soil samples were taken in the area around the plant roots in each field. Soil samples were taken using a spoon by digging the soil to a depth of 0 to 10 cm[11]. Take 1 tablespoon of each sample and

put it in a plastic ziplock.

Isolation and Purification

Isolate soil bacteria by weighing 1 gram of each soil sample. Then put it in a test tube containing 9 ml of sterile RO. Then it is vortexed to make it homogeneous, after which a multilevel dilution is carried out up to $1x10^4$. The resulting dilution was then placed in the oven at 80oC for 10 minutes. Then 0.5 ml was taken and inoculated in NA (Nutrient Agar) media in a petri dish. The petri dish is then covered in plastic wrap and incubated at room temperature. After the bacteria grow, purification is carried out by taking each bacterial colony and then growing it on NA petridish media using the quadrant streak technique. After 24 hours, single colonies were taken and purified by growing them in new NA petri media. After obtaining the pure culture, stock is made by growing it in NA Media so that it is tilted in a test tube. Each isolated bacterial isolate is given a name or code to make it easier to differentiate them[1].

Gram test

After obtaining the isolate from the isolation, it was continued with the KOH test by taking 1 dose of bacterial isolate and then mixing it evenly with 3% KOH which was placed on a glass object. Observations are made by looking at whether or not filaments such as mucus are produced.

Gram staining

Gram staining aims to identify bacteria including gram positive bacteria which are marked with a purple color or gram negative bacteria which are marked with a slightly red color. In this study, gram staining was carried out for selection of Bacillus sp. Gram staining is carried out by fixing the bacteria over a Bunsen flame using a physiological solution. The first stain was given a solution of crystal violet for 1 minute, iodine for 1 minute, sprayed with 70% ethanol, and safranin for 2 minutes, then the bacterial culture was observed under a microscope with 100× magnification[1].

Antagonist test

Fungal isolates need to be rejuvenated, so that the growth media is sufficient and can grow well. Rejuvenation of the fungus Rhizoctonia sp. This is done by taking 1 dose of fungal isolate and then growing it in media by scratching it and then incubating it. To determine the morphology of the fungus, the hyphae were taken, placed on a glass slide, then covered with a cover glass and observed with a microscope at 40x magnification. The selected bacterial isolates were then subjected to an antagonist test against Rhizoctonia sp, a pathogenic fungus on rice plants to see its inhibitory potential. The antagonist test was carried out using the dual culture method. The test was carried out by growing fungi together with soil bacterial isolates on PDA media in petri dishes. Rhizoctonia sp. which had previously been grown on PDA media in a petri dish was taken using a loop needle placed in the double culture test medium. Followed by adding soil bacterial isolates by inscribing them on the lines that have been made according to the Amal procedure (Figure 1)[12]. Then it is incubated and observed every day and the diameter of the pathogenic fungal colony is measured. The inhibitory activity of the fungus was seen whether the fungus passed the line or

not and then compared with the control.

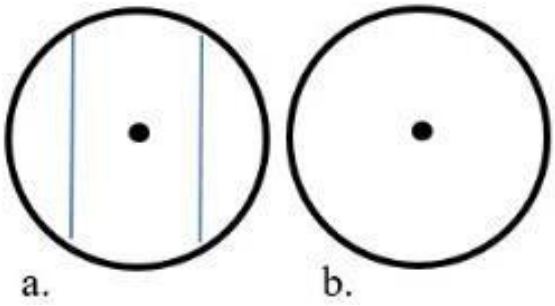


Figure 1. Simulation dual quture methode

Information:

- = *Rhizoctonia* sp.

= isolate soil bacterial

Observation

Observations were made by measuring the diameter of the fungus growing towards the bacteria (r2, vertical) and away from the bacteria (r1, horizontal). Then the percentage of resistance is calculated using the calculation formula[9]:
R= r1+r2/2
Inhibitory power presentation = R control - R treatment x 100%

Result

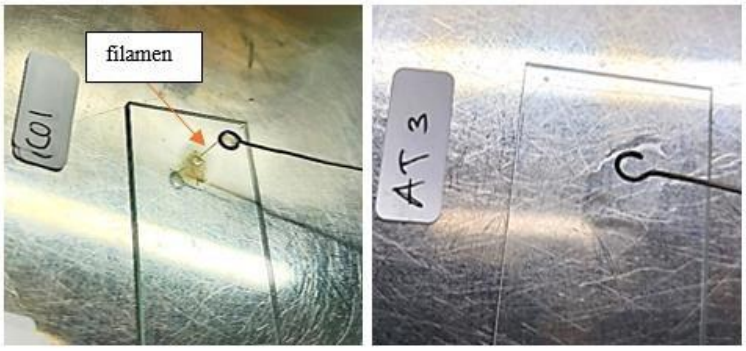
Isolation and purification of soil bacteria using multilevel dilutions then cultured using the spread technique, resulting in 23 single isolates that had been purified.

a b c

Figure 2. Isolation soil bacteria

a) soil sampel 1 (ST1); b) soil sampel 2 (ST2); c) soil sampel 3 (ST3)

Then purification is carried out by taking the growing bacterial colonies and growing them on Petri media using the quadrant streak method to obtain pure cultures with a single colony (Table 1). Then a gram test was carried out with 3% KOH which aims to detect gram negative bacteria. From the gram test with 3% KOH there were 3 gram negative bacteria, namely CT6, CO1, CD1 and CO3 (Figure 3a). The difference in the results of the 3% KOH test can be seen in (Figure 3).



a b

Figure 3. Gram test with KOH 3%

Table 1. Characteristics of Soil Bacterial Isolates

Bakteri	Origin	Color	Colony form	Cell shape	Gram Test (KOH 3%)	Gram staining
AB1	ST1	Transparent White	Small round	Streptobacil	-	+
AC2	ST1	White	Large round	Streptobacil	-	+
AT1	ST1	White	Small irregular	Streptobacil	-	+
AT3	ST1	Transparent White	Spindle	Streptobacil	-	+
AT4	ST1	Dull White	Small irreguler	Streptobacil	-	+
AT2	ST1	White	Spindle	Bacil	-	+
AC1	ST1	White	Spindle	Bacil	-	+
AB2	ST1	White	Small round	Bacil	-	+
BA1	ST2			Bacil	-	+
BA2	ST2	Sparkling white	Spindle	Bacil	-	+
BA3	ST2	White	Small rround	Bacil	-	+
BA4	ST2	Sparkling white	Round	Bacil	-	+
CT1	ST3	Orange	Round	Bacil	-	+
CT2	ST3	Putih	Round	Bacil	-	+
CT3	ST3	Putih	Large round	Bacil	-	+

CT4	ST3	Ivory White	Small round	Bacil	-	+
CT6	ST3	White	Small round	Bacil	+	-
CO2	ST3	White	Small round	Bacil	-	+
CT5	ST3	White	Filament	Cocus	-	+
CT7	ST3	Yellow	Round	Cocus	-	+
CD1	ST3	White	Irreguler	Cocus	+	-
CO1	ST3	Ivory White	Round	Cocus	+	-
CO3	ST3	White	Round	Cocus	+	-

From the results in Table 1, it is known that the 23 soil bacteria have various colors and shapes. Soil bacteria isolates are white, yellow and orange in color and their shapes are large round, small round, rooted, filamentous, irregular and spindle. From the results of the gram test, gram staining is then carried out to see the cell shape and gram color of the bacteria. Where the bacteria that will be tested as antagonists have long stem cells and chains. From the results of gram staining (Table 3), 5 isolates were found in streptobacil form, 12 isolates in bacillus form and 5 isolates in cocus form. These are gram positive bacteria except for 3 gram negative bacteria which produce thread filaments when tested with 3% KOH. So, after the gram staining test, 17 isolates were found with long rod-shaped characteristics and chains as well as gram-positive bacteria which were then tested as antagonists to the fungus *Rhizoctonia* sp.

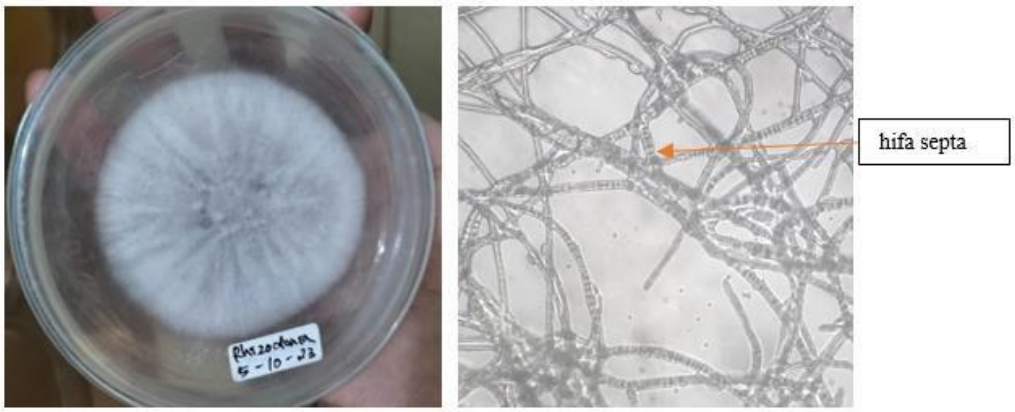


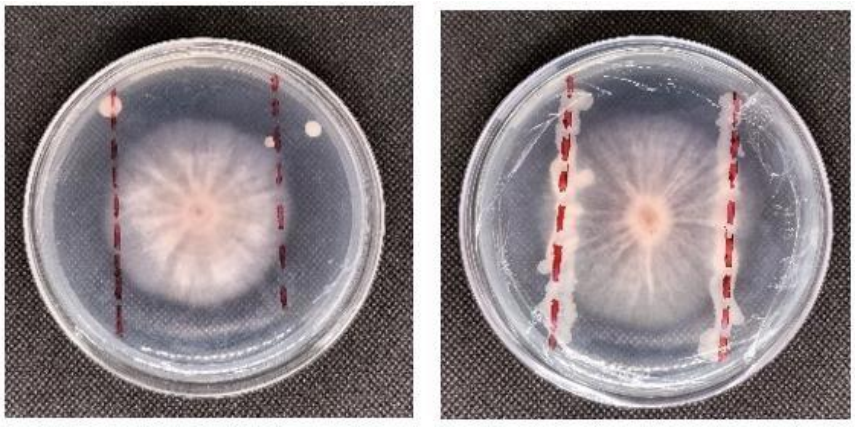
Figure 4. Isolats *Rhizoctonia* sp.

Rejuvenation of the fungus *Rhizoctonia* sp. carried out by culturing isolates of the fungus *Rhizoctonia* sp. on PDA media so that it is slanted 1 cycle. After the culture grows on the agar slant, it is then grown by inoculating it into PDA media in a petri dish (Figure 4). Then to see the fungal hyphae by observing under a microscope at the age of seven days using 40x magnification. The results of the rejuvenation, Rhizoctonia is white fungal isolates are brownish as they get older, have septa hyphae, do not have spores and have sclerotia (Figure 5).

Table 2. Antagonist Test of Soil Bacteria Againts *Rhizoctonia* sp.

Kode	Mean diameter Day 7 (mm)	Inhibitory power %
Control R	42,5	-
AB1	49	0
AC2	51	0
AT1	44	0
AT3	54	0
AT4	52	0
AT2	49,5	0
AC1	44	0
AB2	50	0
BA1	52	0
BA2	52	0
BA3	45	0
BA4	54,5	0
CT1	45	0
CT2	45	0
CT3	50	0
CT4	50	0
CO2	43	0

The 17 soil bacteria were tested for antagonism against *Rhizoctonia* sp. Antagonist test to determine the inhibitory power of soil bacteria on the growth of the pathogenic fungus *Rhizoctonia* sp. This inhibitory power can be seen from the difference in colony diameter of the control fungus *Rhizoctonia* sp. with the diameter of the fungal colony in the treatment of each bacteria. From the results of the soil bacterial antagonist test against *Rhizoctonia* sp. (Table 2) it can be seen that all soil bacterial isolates do not have an inhibitory effect on the growth of *Rhizoctonia* sp. Fungi grow past the line of bacterial growth. In (Table 2) the control *Rhizoctonia* sp. the average growth diameter is 42.5 mm. Meanwhile, all bacterial incision treatments did not produce an inhibition zone. With the average diameter of the fungus *Rhizoctonia* sp. more than 42.5 mm or beyond the bacterial growth line. So the inhibitory power of isolated soil bacteria is zero percent (0%).



a b

Figure 5. Antogonist test

(a) Control negative (b) Soil bacterial incision treatment.

Discussion

Research findings show bacterial colonies have different colors from one bacteria to another. Bacteria colors such as white, yellow, red, purple and so on. The shapes of bacterial colonies include circular (round, with edges), irregular, and rhizoid (like roots, spreading)[13]. Then a gram test was carried out with 3% KOH which aims to detect gram negative bacteria. Where gram-negative bacteria will produce thread-like filaments because they are in a high alkaline solution which causes the bacterial cell walls to rupture and produce thread-like filaments or mucus[14]. In gram staining, gram positive bacteria show a purple color or gram negative bacteria are characterized by a slightly red color[15].

Rhizoctonia sp. has a very wide range of host plants, apart from plants from the *Gramineae* family including cereals, namely corn, sorghum, wheat, grass and rice. This fungus also attacks plants from the *Leguminoceae* (legumes) family, *Solanaceae* and also the *Cucurbitaceae* family[16]. *Rhizoctonia* sp. has characteristics, namely, there is brown pigmentation of the hyphae, branching is formed in the distal septa of young cells as vegetative hyphae, narrowing of the hyphae occurs and septa are formed (Figure 5 b), the cytoplasm is connected through the pores of the septum (delipore)[17]. Multinucleated cells in young vegetative hyphae, there are no conidia, but there are monoloid cells, and there are no clamp connections and rhizomorphs, but there are sclerotia. These morphological characters have shown the characteristics of the fungus *Rhizoctonia* sp. although currently *Rhizoctonia* sp. have been further divided into groups of taxa based on the number of nuclei and their anastomosing ability[8].

In the result, soil bacterial isolates do not have an inhibitory effect on the growth of *Rhizoctonia* sp. Factors such as the production of antibacterial compounds, competition for nutrients, and complex microbial interactions can influence the effectiveness of soil bacterial inhibition in inhibiting the growth of certain pathogenic fungi[9]. Further isolation needs to be carried out with sampling locations in rice fields. And it is necessary to test the antagonists of bacterial isolates that have been isolated against other pathogens such as chili and cucumber plants because they

are suitable for the cultivated commodities in the soil of the sampling location. Also, further tests need to be carried out to identify bacterial isolates.

Conclusion

Based on the results of the research carried out, 23 isolates of soil bacteria were found with various characteristics and shapes. Then 17 gram-positive and rod-shaped bacteria were tested for antagonism, showing that the 17 bacteria did not have inhibition against the growth of Rhizoctonia sp. (0% inhibition power).

Acknowledgment

This research is part of an internship activity which is a program of the Ministry of Education, Culture, Research and Technology which is carried out at PT. Biotek Cipta Kreasi supported by the Biotechnology study program at Aisyiyah University, Yogyakarta in 2023.

References

[1] E. Fachrial, Harmileni, and S. Anggraini, *Pengantar Teknik Laboratorium Mikrobiologi dan Pengenalan Bakteri Asam Laktat*. 2019.

[2] S. Sukmawati and F. Rosalina, "Isolasi Bakteri Dari Tanah Sebagai Penghasil Senyawa Antimikrob," *Biospecies*, vol. 13, no. 1, pp. 46–51, 2020, doi: 10.22437/biospecies.v13i1.8343.

[3] Setiaji, "Analisis Dna Bakteri Heterotrofik Laut Yang Bersifat Antagonis Terhadap Bakteri Patogen Pada Ikan.," in *Prosiding Seminakel*, 2019.

[4] S. Dewi, R, G. Giyanto, S. M, S, D. D, and N. B, "Bakteri agens hayati potensial terhadap patogen penting pada padi," *Fitopatol Indones*, vol. 16, no. 1, pp. 37–48, 2020.

[5] T. Suganda, E. Yulia, F. Widianti, and Hersanti, "Intensitas Penyakit Blas (Pyricularia oryzae Cav.) pada Padi Varietas Ciherang di Lokasi Endemik dan Pengaruhnya terhadap Kehilangan Hasil.," *Agrikultur*, vol. 27, no. 3, 2016.

S. Yanti, Marlina, and Fikrinda, "Pengendalian Penyakit Hawar Daun Bakteri pada Padi Sawah Menggunakan Fungi Mikoriza," *J. Agroecotania*, vol. 1, no. 2, pp. 14–21, 2018.

[6] B. Nuryanto, "Penyakit Hawar Pelepah (Rhizoctonia solani) pada Padi dan Taktik Pengelolaannya," *J. Perlindungan Tanam. Indones.*, vol. 21, no. 2, pp. 63–71, 2017.

[7] Y. Istikorini and O. Yulia Sari, "Survey dan Identifikasi Penyebab Penyakit Damping-Off pada Sengon (Paraserianthes falcataria) di Persemaian Permanen IPB The Cause of Sengon (Paraserianthes falcataria) Damping-off Disease: Survey and Identification in Permanent Nursery, IPB University," *J. Sylva Lestari ISSN*, vol. 8, no. 1, pp. 32–41, 2020.

[8] H. Nurul and T. Yulianti, *Uji Antagonisme Bacillus cereus terhadap Rhizoctonia solani dan Sclerotium rolfsii*, vol. 7. 2015, pp. 1–8.

[9] D. Lestari and L. Q. Aini, "Pengujian Konsorsium Bakteri Antagonis Untuk Mengendalikan Penyakit Bercak Daun Cercospora Dan Virus Kuning Pada Tanaman Cabai Merah Besar (Capsicum annum L.) Di Kecamatan Dampit Kabupaten Malang," *J. Hama dan Penyakit Tumbuh.*, vol. 9, no. 3, pp. 107–114, 2021, doi: 10.21776/ub.jurnalhpt.2021.009.3.5.

[10] D. K. T. Sukmadewi, N. M. A. S. Singapurwa, and I. P. Candra, "Isolasi Dan

Uji Kemampuan Bakteri Pelarut Kalium Dari Tanah Sawah Dengan Sistem Irigasi Subak," *J. Agrotek Trop.*, vol. 10, no. 3, p. 413, 2022, doi: 10.23960/jat.v10i3.5450.

[11] W. Sanjaya, I, G, N, P, S. Wirya, G, N, A, A. Phabiola, T, and M. Winantara, I, "Isolasi dan Seleksi Bakteri Antagonis Sebagai Alternatif Pengendalian Penyakit Layu Stroberi," *J. Agroekoteknologi*, vol. 2301, p. 6515, 2019.

[12] A. D. Kristinanda, "Isolasi Bakteri Pendegradasi Senyawa Hidrokarbon Di Tanah Tercemar Di Balai Yasa Pt. Kai Yogyakarta," *Progr. Stud. Tek. Lingkungan, Univ. Islam Indones.*, pp. 1–11, 2018.

[13] M. Y. Hardiansyah, Y. Musa, and A. M. Jaya, "Identifikasi Plant Growth Promoting Rhizobacteria pada Rizosfer Bambu Duri dengan Gram KOH 3%," *Agrotechnology Res. J.*, vol. 4, no. 1, pp. 41–46, 2020, doi: 10.20961/agrotechresj.v4i1.40875.

[14] S. S. Amin, Z. Ghozali, M. Rusdiana, and S. Efendi, "Identifikasi Bakteri dari Telapak Tangan dengan Pewarnaan Gram Identification of Bacteria from Palms with Gram Stain," *CHEMVIRO:JurnalKimiadanIlmuLingkungan*, vol. 1, no. 1, pp. 30–35, 2023, [Online]. Available: https://doi.org/10.56071/chemviro.v1i1.563

[15] L. Fidalia, "Efektivitas kelompok tani dalam meningkatkan pendapatan usaha tani cabai merah (Capsicum annuum L) dan jagung (Zea mays) di Desa Margototo Kecamatan Metro Kibang Kabupaten Lampung Timur." 2018.

[16] M. A. Firmansyah and B. A. Arsalan, "Identification and disease severity of dieback disease on sengon seedlings in Persemaian Permanen Dramaga Bogor," *IOP Conf. Ser. Earth Environ. Sci.*, vol. 959, no. 1, 2022, doi: 10.1088/1755- 1315/959/1/012009.

A Description Of Natural Extract Methods From Bovine Bone For Dental Implant

Riza Muharni[1], Gunawarman[2*], Yuli Yetri[3] , Oknovia Susanti[4]
[1] Doctoral Student Departement of Mechanical Engineering University Andalas / Departement of Mechanical Engineering University Muhammadiyah Sumatera Barat
[24] Departement of Mechanical Engineering University Andalas, Indonesia
[3] Departement of Politeknik Negeri Padang, Indonesia

*Email: gunawarman @eng.unand.ac.id

Abstract

Purpose: The most widely used material for bone graft substitutes and dental restorations is hydroxyapatite. The weakness of hydroxyapatite is that it cannot resemble the composition of natural apatite, which includes additional elements such as Na, Mg, and Al. To produce hydroxyapatite that can resemble human bone apatite, it is necessary to extract it from natural sources such as cow bones because they contain 93% hydroxyapatite (HA) and 7% β-Tri Calcium Phosphate (β-TCP) which are calcium phosphate compounds that have potential in tissue engineering and as a raw material for making hydroxyapatite. The purpose of this paper is to provide an overview of the best natural extraction techniques to make affordable, good quality, environmentally friendly hydroxyapatite that is suitable for use as a dental implant coating.
Results: The results of the extraction method used are the calcination method because this method produces hydroxyapatite with high crystallinity, faster processing time, cost-effective, minimal chemical use, and environmentally friendly.
Keywords: Hydroxyapatite, Dental Implant, Bovine Bone, Natural Extract Method

Introduction

Hydroxyapatite (HA, HAP, Ca10 (PO4)6 (OH)2) constitutes the primary mineral component of human bones and teeth. It exhibits excellent biocompatibility, biological activity, stability, bone conduction ability, biodegradability, and bone formation induction, making it an almost ideal substitute for dental implants [1][2][3]. However, hydroxyapatite has drawbacks such as low strength, poor toughness, difficulty shaping, and poor corrosion resistance [4][5][6]. Therefore, it is necessary to prepare hydroxyapatite with superior comprehensive properties. One way to achieve this is by extracting hydroxyapatite from natural sources, which is more economical and environmentally friendly [7][8][9]. Another alternative method for producing hydroxyapatite that can imitate human bone apatite is by extracting it from natural sources such as cattle bones, which contain inherent inorganic minerals and are also economical and environmentally friendly [6][10].

Bovine bone contains 93% hydroxyapatite (HA) and 7% β-Tri Calcium Phosphate (β-TCP), a member of calcium phosphate compounds with potential in tissue engineering and as a basic material for making HA [10][11]. Various methods for producing HA from bovine bone extract include calcination, precipitation, hydrothermal, and alkaline hydrolysis [2][4][5]. The research that have extracted bovine bone to produce hydroxyapatite is show in table 1.

Table 1. Presents several research reviews on techniques for extracting hydroxyapatite from bovine bones.

No	Author	Metode	Findings	Objective/aim
1.	D. Canon et al, 2023 [12]	Calcination	Hydroxyapatite was produced at a sintering temperature of 700 °C.	Bone-tissue Engineering.
2.	Anggelica et al, 2023 [13]	Calcination	Hydroxyapatite was produced at a sintering temperature of 600 °C.	Bone-tissue Engineering.
3.	W. Kho et al, 2015 [10]	Calcination	Hydroxyapatite was produced at a sintering temperature of 700 °C & 900 °C that is produced is ≤ 125 µm.	Biomedical
4.	Mohamed et al, 2022 [14]	Calcination	The hydroxyapatite grain size from 21,7 nm	Bone-tissue Engineering.
5.	Arokiasamy et al, 2022 [4]	Mechano chemistry	Hydroxyapatite produced by nano	Bone-tissue Engineering.
6.	Forero et al, 2021 [5]	Thermal	Hydroxyapatite was produced at a sintering temperature of 1100 °C.	Bone-tissue Engineering.
7.	Hassent et al, 2016 [15]	Thermal	Hydroxyapatite was produced at a sintering temperature of 1000 °C with Ca/P 1,67.	Biomedical
8.	Guoqing Ma, 2019 [2]	Hydrothermal	The hydroxyapatite that is produced is crystalline.	Bone-tissue Engineering.
9.	Odusote et al, 2019 [8]	Calcination	The hydroxyapatite that is produced is < 250 µm.	Dental Implant
10.	Nuning et al, 2018 [16]	Alkaline Hydrolysis	Hydroxyapatite carbonate with an average crystal size of 10-12 nm.	Bone graft
11.	July et al, 2018 [3]	Calcination	The resulting hydroxyapatite (HAp) is highly crystalline and its behaviour in vitro is comparable to that of commercially available CHAp.	Bone-tissue Engineering.

12.	Harilal et al, 2018 [17]	Mechano chemistry	The produced hydroxyapatite is non spherical, nano and agglomerated.	Bone-tissue Engineering .
13.	M. Pu'ad et al, 2019 [18]	chemistry	The hydroxyapatite that is produced nano.	Bone graft
14.	Fifi et al, 2020 [11]	Calcinatio n	Cristallity 95 % and group OH^- PO_4^{3-}, CO_3^{2-}	Material precursor
15.	Shemshad et al, 2018 [19]	Calcinatio n	The resulting HA is porous at a sintering temperature of 750 °C	Bone-tissue Engineering .
16.	Yuli et al, 2018 [20]	Calcinatio n	Hydroxyapatite was produced at a sintering temperature of 800 °C that is produced is ± 250 µm.	Bone-tissue Engineering .
17.	Joko et al, 2020 [21]	Calcinatio n	Hydroxyapatite is produced by nano.	bone filler
18.	Reflin et al, 2017 [22]	Wet	Produces HA with a high level of purit	scaffolding

Methods

The research will employ a qualitative method, which can be seen in Figure 1 as follows:

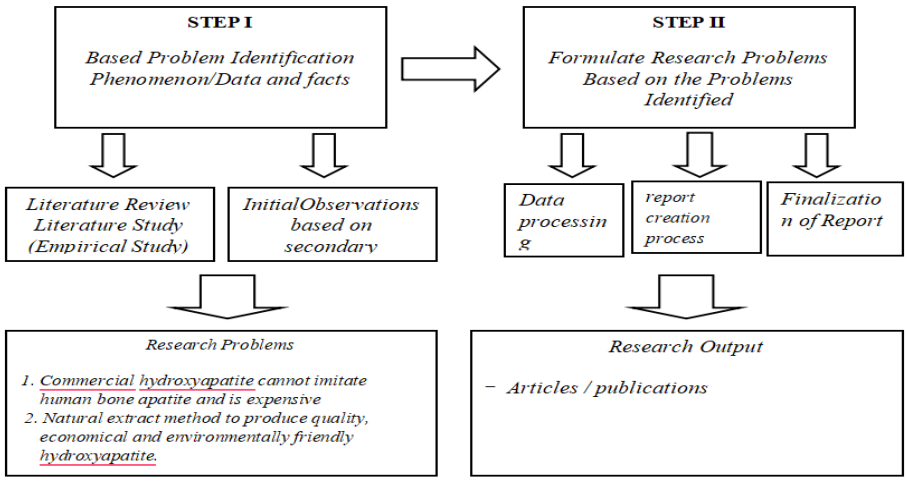


Figure 1. Research Flow Chart

The research flow diagram in Figure 1 is illustrated, where this research was carried out in 2 steps, namely: the first one started with the determination of the problem by searching for literature related to this research through journals and the internet, followed by initial observations of the problems that will be carried out in this research. Step two is problem statement and data preparation and report writing.

Results

Research by Canon et al, 2023 [6] using the calcination method from bovine bone, produces HA at a temperature of 700 ℃ which is used for bone tissue engineering applications. In a research by Anggelica et al, 2023 [17] used the calcination method from bovine trabecular bone, producing HA at 600 ℃ which is used for bone tissue engineering applications. The same method was used by Mohamed et al, 2022 [10] on bovine bone to produces HA at 700°C and 900°C which is used for biomedical applications. Nguyen et al. 2022 [18] also used the method of calcinination on bovine bone, which produced HA with a grain size of 21.7 nm, which is used for bone tissue engineering applications. Jamiu et al, 2019 [11] applied the calcination method from bovine bone and the HA was produced with a size of < 250 μm, which is used for dental implant applications. July et al, 2018 [22] in their research used the calcination method on bovine bone to produce highly crystalline HAp for use in bone tissue engineering applications. Researchers W. Kho et al, 2015 [10] used calcination on bovine bone to produce hydroxyapatite (HA) particles ≤ 125 μm in size for bone grafting applications.
Arokiasamy et al. 2022 [5] also made nano HA for bone tissue engineering applications from bovine bone using the mechanochemical method. In the same way, Harilal et al, 2018 [17] using mechanochemical methods from bovine bone, produced nano HA that was not spherical and agglomerated. Forero et al. 2021 [19] also used thermal methods from bovine bone to produce HA at a temperature of 1100°C, which can be used for bone tissue engineering applications. Hassent et al. 2019 [20] produced hydroxyapatite (HA) at 1000°C with a Ca/P ratio of 1.67 using the same thermal method from bovine bone, which is used for biomedical applications. Gouqing, 2019 [2] using the hydrothermal method from bovine bone, produced crystalline HA which is used for bone tissue engineering applications.

Discussion

The research opinions above, according to Arokiasamy et al, 2022 and Harilal et al, 2018, extracting hydroxyapatite by mechanochemical method is cytoxicity, hazardous chemicals and high cost. On the other hand, Guoqing Ma, 2019 and Aisah et al. 2018 on the "extracting hydroxyapatite by hydrothermal method and alkaline hydrolysis method" is simple, the sintering temperature is relatively low, the reaction conditions are moderate, and the resulting hydroxyapatite has high crystallinity. Forero et al, 2021 and Hassent et al, 2019 extracted hydroxyapatite using the Thermal Method, which is costly and environmentally unfriendly. Calcination methods are commonly used by other researchers, such as D. Canon et al, 2023, Anggelica et al. 2023, Mohamed et al, 2022, Nguyen et al, 2022, Jamiu et al, 2019, July et al, 2018, and W. Kho et al, 2015, due to their economic advantages, production of highly crystalline hydroxyapatite, rapid processing, and environmental friendliness.

Conclusion

The calcination method is a widely used technology for It is a process used to produce hydroxyapatite by heating it to remove water and carbon dioxide. This method is preferred due to its fast and economical production process, minimal chemical requirements, and environmentally friendly nature.

References

[1] R. Muharni, A. U. Berli, A. S. Dewi, Y. Yetri, and F. Earnestly, "Potensi Hidroksiapatit Nano pada Dental Implan," vol. 8, no. 2, pp. 4–9, 2023.

[2] G. Ma, "Three common preparation methods of hydroxyapatite Three common preparation methods of hydroxyapatite," 2019, doi: 10.1088/1757-899X/688/3/033057.
[3] J. A. Rincón-López, J. A. Hermann-Muñoz, A. L. Giraldo-Betancur, A. De Vizcaya-Ruiz, J. M. Alvarado-Orozco, and J. Muñoz-Saldaña, "Synthesis, characterization and in vitro study of synthetic and bovine-derived hydroxyapatite ceramics: A comparison," *Materials (Basel).*, vol. 9, no. 3, 2018, doi: 10.3390/ma11030333.
[4] P. Arokiasamy *et al.*, "Synthesis methods of hydroxyapatite from natural sources: A review," *Ceramics International*. 2022. doi:10.1016/j.ceramint.2022.03.064.
[5] P. A. Forero-Sossa, I. U. Olvera-Alvarez, J. D. Salazar-Martinez, D. G. Espinosa-Arbelaez, B. Segura-Giraldo, and A. L. Giraldo-Betancur, "Biogenic hydroxyapatite powders: Effects of source and processing methodologies on physicochemical properties and bioactive response," *Mater. Charact.*, 2021, doi: 10.1016/j.matchar.2021.110950.
[6] T. Sogabe *et al.*, "Obtention and characterization of nano bio-hydroxyapatite particles by combined hydrothermal alkaline and ultrasonic wet milling methods," vol. 1, no. April, pp. 0–2, 2023.
[7] N. Hossain, M. H. Mobarak, A. Hossain, F. Khan, J. J. Mim, and M. A. Chowdhury, "Advances of plant and biomass extracted zirconium nanoparticles in dental implant application," *Heliyon*. 2023. doi:10.1016/j.heliyon.2023.e15973.
[8] J. K. Odusote, Y. Danyuo, A. D. Baruwa, and A. A. Azeez, "Synthesis and characterization of hydroxyapatite from bovine bone for production of dental implants," *J. Appl. Biomater. Funct. Mater.*, vol. 17, no. 2, 2019, doi: 10.1177/2280800019836829.
[9] J. Yazdani, E. Ahmadian, S. Sharifi, S. Shahi, and S. Maleki Dizaj, "A short view on nanohydroxyapatite as coating of dental implants," *Biomedicine and Pharmacotherapy*. 2018. doi: 10.1016/j.biopha.2018.06.013.
[10] W. kho et al, "Preparation of natural hydroxyapatite from bovine femur bones using calcination at various temperatur." 2015 pp. 2–19.
[11] F Nurfiana, "Synthesis and characterization of hydroxyapatite from duck eggshell modified silver by gamma radiolysis method Synthesis and characterization of hydroxyapatite from duck eggshell modified silver by gamma radiolysis method," *J. Phys.*, 2020, doi: 10.1088/1742-6596/1436/1/012099.
[12] D. F. Cañon-Davila, A. M. Castillo-Paz, S. M. Londoño-Restrepo, H. Pfeiffer, R. Ramirez-Bon, and M. E. Rodriguez-Garcia, "Study of the coalescence phenomena in biogenic nano-hydroxyapatite produced by controlled calcination processes at low temperature," *Ceram. Int.*, 2023, doi: 10.1016/j.ceramint.2023.02.119.
[13] A. M. Castillo-Paz, M. Gomez-Resendiz, D. F. Cañon-Davila, B. A. Correa-Piña, R. Ramírez-Bon, and M. E. Rodriguez-Garcia, "The effect of temperature on the physical-chemical properties of bovine hydroxyapatite biomimetic scaffolds for bone tissue engineering," *Ceram. Int.*, 2023, doi: 10.1016/j.ceramint.2023.08.065.
[14] N. T. H. Anh, T. P. Trinh, L. Van Tan, N. T. M. Tho, and N. Van Cuong, "Facile synthesis of hydroxyapatite from bovine bone and gelatin/chitosan-hydroxyapatite scaffold for potential tissue engineering application," *Vietnam J. Chem.*, vol. 60, no. 2, pp. 198–205, 2022, doi: 10.1002/vjch.202100126.
[15] Hassanen et al, "Preparation and synthesis of hydroxyapatite bio-ceramic from bovine bone by thermal heat treatment," no. May. 2016.

[16] N. Aisah *et al.*, "Synthesis and Characterizations of Hydroxyapatite from Bovine Bone Using Alkaline Hydrolysis Method," *Insist*, vol. 3, no. 1, p. 124, 2018, doi: 10.23960/ins.v3i1.124.
[17] M. Harilal, A. Saikiran, and N. Rameshbabu, "Experimental investigation on synthesis of nanocrystalline hydroxyapatite by the mechanochemical method," in *Key Engineering Materials*, 2018. doi: 10.4028/www.scientific.net/KEM.775.149.
[18] N. A. S. Mohd Pu'ad, R. H. Abdul Haq, H. Mohd Noh, H. Z. Abdullah, M. I. Idris, and T. C. Lee, "Synthesis method of hydroxyapatite: A review," in *Materials Today: Proceedings*, 2019. doi: 10.1016/j.matpr.2020.05.536.
[19] M. S. Firdaus Hussin, H. Z. Abdullah, M. I. Idris, and M. A. Abdul Wahap, "Extraction of natural hydroxyapatite for biomedical applications—A review," *Heliyon*, vol. 8, no. 8, p. e10356, 2022, doi: 10.1016/j.heliyon.2022.e10356.
[20] Y. Yetri, "Karekteristik Hidroksiapatit (HA) Dari Limbah Tulang Sapi dengan Metode Mekanik-Termal Characteristics of Hydroxyapatite (HA) by Mechanical-Thermal Method of bovine bone," vol. 13, no. April, pp. 43–53, 2018.
[21] Joko Triyono etal, "Karakterisasi dan laju biodegradasi biokomposit serbuk tulang sapi/shellac/tepung tapioka sebagai material pengisi tulang," vol. 19, no. February, pp. 22–28, 2020, [Online]. Available: https://dx.doi.org/10.20961/mekanika.v19i1.39913
[22] R. Yuliana, E. A. Rahim, and J. Hardi, "Sintesis Hidroksiapatit Dari Tulang Sapi Dengan Metode Basah Pada Berbagai Waktu Pengadukan Dan Suhu Sintering," *Kovalen*, vol. 3, no. 3, p. 201, 2017, doi: 10.22487/j24775398.2017.v3.i3.9329.

The Influence Of Father's Role In Perception Of Choosing A Life Partner Early Adult Women In Yogyakarta

Nurul Awalia Rusli[1*], Zahro Varisna Rohmadani [1].
[1]Department of psychology, economics, social sciences, and humanities Universitas Aisyiyah Yogyakarta

*Email: *auliarusli12@gmail.com

Abstract

Purpose: The purpose of this initiation is to find out the factors of influence of the father's role in choosing a life partner in early adult women.
Method: This study uses a quantitative survey method in which data collection is filled in by early adult women.
Results: The results in the hypothesis test show the significance value between the father's role on choosing a life partner with the coefficient value R2: 0.108, and in the t test with a significant value smaller than 0.05. or 3.677 greater than 1.658, so there is an influence of the father's role on choosing a life partner.
Keywords: father's role, choosing a life partner

Introduction

In the education of children, parents play an important role in the growth and development of their children, but in reality the role of the mother is more dominant in childcare than a father who is less involved in the child's education process. The lack of a father's care has a very negative impact on children, especially girls, because the absence of a father is the absence of a father's involvement in the role of the child physically and psychologically. Therefore, the lack of relationship between fathers and daughters may make daughters feel incomplete as individuals and can have difficulty interacting socially which negatively impacts on girls' relationships with the opposite sex. [1]

Based on research according to McLanahan, et al. (2013), said the absence or absence of fathers will have a much greater negative impact on children, especially experienced by children from an early age. Because the role of the father is needed since the child in early childhood it can help the child's transition to adolescence to adulthood. In some experts' opinions and research related to fathering studies in childcare, the main cause of the destruction of a generation is because of the father. Fathers are the first men girls meet, so a father becomes the benchmark in assessing the good and bad behavior of men, when the father figure disappears gender roles are disrupted and the togetherness of fathers and children will affect the psychological well-being of girls until adulthood. Therefore, I am interested in conducting this research because I know the importance of the influence of the father's role in choosing a life partner for early adult women.[2]

This study aims to see how influential the father's role is on choosing a life partner in early adult women, whether if the father's role is missing or less involved in girls can result in a low ability of early adult women to determine a life partner, for that I developed an effective handling strategy, namely by making this thesis can be known to the public and provide knowledge that the father's role is very important in parenting, especially girls because it will have an impact on him until the child matures and chooses a life partner. [3]

The picture of father's involvement in childcare can be seen through some of the following research results. Maisyaroh's research (2016), that there is a lack of involvement or participation from a father to a daughter in choosing a life partner, because many women, especially early adults, make a father a figure and benchmark in determining their life partner for the future. Lamb explained that the presence of a father in a child's life will facilitate the stabilization of relationships with others, behavioral adjustment, and success in establishing relationships with the opposite sex. Based on Databoks data in 2017-2021, 53% of divorce cases occurred and 7.04% of children only lived with their mothers. This data shows that many children live without the role of fathers or what is called fatherless Tewar (Ridho, 2022). In line with research according to Mustafa (2023), that early adult women who experience fatherlessness in their lives from childhood affect their views on commitment or relationships with the opposite sex. There is also research that suggests the influence of the father's role on girls in the future is when girls have social relationships with the opposite sex (Dagun, 2002). Poor development due to the loss of the father's role in the child will affect the child's life in adulthood. [4]

Based on what has been described previously, the hypothesis of this study is the influence of the father's role in choosing a life partner in early adult women. Where the higher the role of the missing father, the lower the ability to choose a life partner in early adult women.[5]

Methods

The research method is quantitative is a survey method used to obtain data from a certain natural place which is used by researchers in data collection, namely circulating questionnaires, and interviews, the scope used by early adult women in Yogyakarta, and the analysis technique is validity and reliability tests.

Definitions of research: Choosing a life partner is something that is done for the first time before entering into marriage. The selection of a partner is a process where several people are selected to enter the desired criteria. After entering certain criteria, the next step between two people starts with a casual introduction, then moves on to a more serious relationship. As for this study, the level of father's role is measured based on a scale put forward by Shakeford, in Aulia (2019) which is made based on aspects, namely Love vs status resources, Reliable / stable vs good looks / health, Education / intelligence vs desire to have a home / children, Friendliness vs similar religion. The role of a father is a role played by a father which is directly related to the duties and obligations that a father must fulfill. In the household, the father and mother choose their respective roles in home affairs or caring for children.

The role of the father himself has an important task, one of which is economic and as a family protector, even though the father's role does a lot of work outside so that it limits time with the family but the father is quite directly involved in guiding the child in order to instill moral values and be more responsible for becoming a respectable and respected child. As for this study, the level of father's role is measured based on Hawkins' scale, in Amandha (2016) which is made based on aspects, namely Providing needs, Explaining to children about maternal support, Teaching discipline and responsibility, Encouraging success / achievement at school, Providing prayer and affection, Enjoying time together and sharing, Paying attention to children's daily lives, Reading to children, Supporting children to develop their talents and potential.

Results

The focus of this study is to test the hypothesis, which examines whether there is an influence of the father's role in the perception of choosing a life partner in early adult women.

Based on table 1 shows that there is a significant influence between the father's role in choosing a life partner for early adult women seen in the sig value. 0.000 less than 0.05 or 3,677 > 1,658 concluded that the father's role influences choosing a life partner.

Presentation of t test (partial)

Coefficients[a]

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
(Constant)	38.568	7.203		5.354	.000
X	.384	.104	.328	3.677	.000

Furthermore, table 2 shows how much the influence value between the father's role variable and the variable of choosing a life partner, seen in the R Square value of 0.108, which means that the father's role has an influence of 10.9% on choosing a life partner. For 89.1% influenced by other variables that are outside of this study.

Table 4.9
Presentation of the R2 test

Mode	R	R Square	Adjusted R Square	Sdt. Error of the estimate
1	.328	.108	.100	4.88556

Discussion

Based on the research that has been done, namely in the hypothesis test where there is a significant influence between the role of the father and choosing a life partner.

As obtained in the hypothesis test where the father's role significantly affects the care and life of children in growth and development. where the results of the t test calculation on the father's role variable show a value smaller than 0.05. Or 3.677 which is greater than 1.658, so that the father's role variable has an influence on choosing a life partner, the conclusion that girls make fathers a role model in their relationship with the opposite sex, if girls get a father's role, it can be ensured that children are more assertive in dealing with the opposite sex and want to choose a partner like the father.

This is also in line with Maisyaroh's research (2016), that there is a lack of involvement or participation from a father to a daughter in choosing a life partner, because many women, especially early adults, make a father a figure and benchmark in determining their life partner for the future. Lamb explained that the presence of a father in a child's

life will facilitate the stabilization of relationships with others, behavioral adjustment, and success in establishing relationships with the opposite sex.

According to research also from Muslihatun (2022), that as many as 78.57% of fathers stated that the task of caring for children is a joint task of the father and mother. However, 82.14% of fathers said they had several shortcomings / obstacles in caring for children, including lack of patience, irritability, not adept at meeting children's needs, not knowing what to do when children are fussy. This is the same as what the researcher did that a father is still lacking in parenting because he focuses on the family economy so that many children, especially girls, lack the role of a father.

The researcher feels that this research is far from perfect and has many shortcomings and limitations, which researchers have not found previous research on measuring instruments to measure daughters' perceptions of their fathers that are more in-depth, so the researcher suggests that further research discuss this matter more optimally with more satisfactory results discussing the role of fathers towards daughters.

Conclusion

Based on this research on the influence of the father's role in the perception of choosing a life partner in early adult women in Yogyakarta, which has been described previously, the following conclusions can be drawn:

The role and function of the father in choosing a life partner in adult women is fairly moderate seen in the presentation of the father's role, which is 70.4%, which means that there are other factors that make the father's role in choosing a life partner not yet seen optimally, namely because the factor of the father is still lacking in knowledge or not knowing the real duties of a father in the head of the family who is not only a breadwinner but also related to childcare.

The results show that there is a significant negative relationship between the two variables between the father's role in choosing a life partner for early adult women. This means that the higher the role of the missing father, the lower the ability to choose a life partner in early adult women, in the hypothesis the significant effect is seen from the t test which gets a value of less than <0.05, which means that there is an influence on variable X father's role on variable Y choosing a life partner.

As for what can also be concluded, it can be concluded overall that the father is a figure who will later become a benchmark partner for daughters, with the role that fathers give to daughters such as attention, affection, relating to children's emotional, social, then it can be ensured that a daughter can cross all things in the world because from the father, girls know the meaning of discipline, develop independence, and develop children's self-control.

References

[1] Arifianti, A. D. (2016). Determinants of Life Partner Selection in Students of the Faculty of Education, Yogyakarta State University. Undergraduated Thesis.
[2] Vironica & Yuliastut, (2022). Self-esteem of early adult women who experience fatherlessness due to parental divorce. Indonesian Journal of Guidance and Counseling. Vol 7, No 1. Satya Wacana Christian University.
[3] Muslihatun. (2022). Factors Affecting Father's Involvement in Early Childhood Care. Health Journal, Vol. 5 No. 1. Poltekkes
[4] Dagun, S. M. (2002). Family Psychology. Jakarta: Rineka Cipta.

[5] Amanda, A. R. (2020). The Relationship of Positive Thinking with Anxiety in Facing Marriage in Single Early Adult Women. Pekan Baru: UIN Suska Riau
[6] Andriani, I.G. (2011). Mother's Role in the Life Partner Selection of Eldest Daughter in Minangkabau Culture. Thesis. Faculty of Psychology, University of Indonesia, Depok.
[7] McLanahan, S., Tach, L., & Schneider, D. (2013). The Causal Effects of Father Absence. Annual Review of Sociology, 39,399-427. http://dx.doi.org/10.1146/annurev-soc071312-145704
[8] Muslihatun. (2022). Faktor yang Mempengaruhi Keterlibatan Ayah dalam Pengasuhan Anak Usia Dini. Jurnal Kesehatan, Vol. 5 No. 1. Poltekkes

Pediatric Lopography Examination Procedure In Congenital Megacolon Cases In The Radiology Installation RSUD Dr. Soeroto Ngawi

Widya Mufida [1], Nurlaila Lalopa[2*], Tri Kusdiarto [3]
[1,2)] Departement of Radiology Universitas 'Aisyiyah Yogyakarta
[3)] Clinical Instruktur RSUD Dr. Soeroto Ngawi

*E-mail : nurlailalalopa@gmail.com

Abstract

Purpose: Pediatric lopography examination procedure in cases of congenital megacolon in radiology installation RSUD Dr. Soeroto Ngawi uses Anteroposterior (AP) and Lateral projections, the contrast media used is water soluble contrast media which is inserted through the anus and stoma. The study aimed to determine the pediatric lopography examination procedure in cases of congenital megacolon.
Method: The study aimed to determine the pediatric lopography examination procedure in cases of congenital megacolon.
Results: This research was conducted in the radiology installation RSUD Dr. Soeroto Ngawi,
using a qualitative descriptive method case study approach and interview. The result of the study showed Anteriorposterior (AP) and Lateral projections can show megacolon so there is no need for additional oblique projection, water soluble contrast media has been used since it is safe and has minimal complications.
Keywords: Congenital Megacolon, Lopography, Contrast Media

Introduction

The large intestine is part of the digestive system that extends from the ileocecal junction to the anus.The large intestine is divided into the following four parts, namely caecum and appendix, colon, rectum, and ana canal. The functions of the large intestine are: absorption of water from fluid contents in it to help form the feces, storage, lubrication, and expulsion of feces, synthesis of vitamin B complex by normal bacterial flora present its lumen, protection from invasion by microorganisms by its mucoid secretion which is rich in igA group of antibodies [1]. If food waste moves too slowly or holds in the large intestine for too long, it absorbs too much water, causing the feces become hard [2].

One of the indications, abnormalities or pathologies of disease that can occur in the large intestine is congenital megacolon. Congenital megacolon, also known as Hirschsprung disease is a functional obstruction when neural crest cells fail to migrate and from the myenteric plexus (parasympathetic ganglia) in the sigmoid colon and rectum during embryonic development. This condition results in absence of peristalsis. As a result, the normal proximal colon becomes grossly dilated due to the fecal retention causing abdominal distension [1]. The worldwide incidence of Congenital megacolon or Hirschsprung disease ranges from 1:5000 to 1:10 000 live births and varies among different ethnic groups (Northern European, 1.5:10 000; African American, 2.1:10 000; and Asian, 2.8:10 000)[3]. To determine further medical action supporting examinations such as lopography can be carried out to help the doctor. Lopography or barium enema colostomy is a radiographic examination of the large intestine or colon using contrast

media inserted through the colostomy [4], [5], [6]. The colostomy is the stoma of the colon with the aim of delivering the feces and flatus [6], [7]

The contrast media used in lopography examination or barium enema colostomy is barium sulfate. The usual barium contrast media combination for single contrast lopography is 15% to 25% w/v. The concentrated barium used for double contrast lopography has concentrations from 75% to 95% [8]. If the colon has perforated or there is a leak in the colon, the contrast media used is water soluble [9]. The projections for the lopography examination according to [8] are Antero Posterior (AP), Postero Anterior (PA), Right Posterior Oblique (RPO), Left Posterior Oblique (LPO), and Lateral.

Based in the background that has been explained, researchers are interested in conducting research with the aim of knowing the procedure for pediatric lopography examinations in cases of congenital megacolon.

Methods

This research is a qualitative descriptive case study approach in the radiology installation of RSUD Dr. Soeroto Ngawi. Data collection starts from 7th September 2023 – 28th October 2023. Data collection is carried out by observation, documentation, interviews and literature. The research subjects were one pediatric surgeon specialist, one radiologist, and one radiographer. Then the researcher presents the data in narrative form, then verified based on the theory that has been established and conclusions drawn.

Results

1. Exminations Procedure
   a. Tools and materials

Tools and material used in pediatric lopography examination in cases of congenital megacolon include: X-Ray (Indoray Ceiling), detector, examination table, apron, nierbeken, contrast media water soluble (ultravist-iopromide), underpad, syringe 60cc, tissue, nacl, catheter, jelly, alchohol, and informed consent. No patient preparation is required for this examination, although patient should dressed with hospital gown.

   b. Contrast Media Injection Technique

Contrast media injection in two ways, through the anus and the stoma. The examination table is covered using an underpad so the spill of the contrast media it will be absorbed by the underpad. Contrast media water soluble was mixed with aquades in a ratio of 1:3 with a total volume of 120cc. Contrast media injection through anal as much as 60 cc using a catheter and syringe in the sims position and through the stoma as much as 60 cc in the supine position. After injection the contrast media a radiograph is taken immediately.

   c. Examination technique

1) Plain Abdominal Radiograph Anteroposterior Projection
   Patient Position : the patient was positioned supine on the examination table, because the patient was a pediatrician and was uncooperative. The patient's hands and feet were held by bith parents who were equipped with apron.
   Part Position : the patient's MSP is set in the middle of the examination table
   CR : vertical perpendicular
   CP : MSP at the level of the iliac crest
   FFD : 100 cm
   Exposure factor : 70 kV and 25,6 mAs
   Radiograph Image :

Image 1. Plain abdominal Radiograph

2) Radiograph Anteroposterior Projection post anal contrast 60 cc
   Patient Position : the patient was positioned supine on the examination table, because the patient was a pediatrician and was uncooperative. The patient's hands and feet were held by bith parents who were equipped with apron.
   Part Position : the patient's MSP is set in the middle of the examination table
   CR : vertical perpendicular
   CP : MSP at the level of the iliac crest
   FFD : 100 cm
   Exposure factor : 70 kV and 25,6 mAs
   Radiograph Image :

Image 2. Radiograph AP Projection Post anal contrast 60 cc

3) Radiograph Anteroposterior Projection post contrast stoma 60 cc
   Patient Position : the patient was positioned supine on the examination table, because the patient was a pediatrician and was uncooperative. The patient's hands and feet were held by bith parents who were equipped with apron.
   Part Position : the patient's MSP is set in the middle of the examination table
   CR : vertical perpendicular
   CP : MSP at the level of the iliac crest
   FFD : 100 cm

Exposure factor : 70 kV and 25,6 mAs
Radiograph Image :

Image 3. Radiograph AP Projection Post contrast stoma 60 cc

4) Radiograph Lateral Projetion post contrast
Patient Position : recumbent with one side of the body on the table
Part Position : the patient's MCP is set in the middle of the examination table
CR : vertical perpendicular
CP : MSP at the level of the iliac crest
FFD : 100 cm
Exposure factor : 70 kV and 25,6 mAs
Radiograph Image :

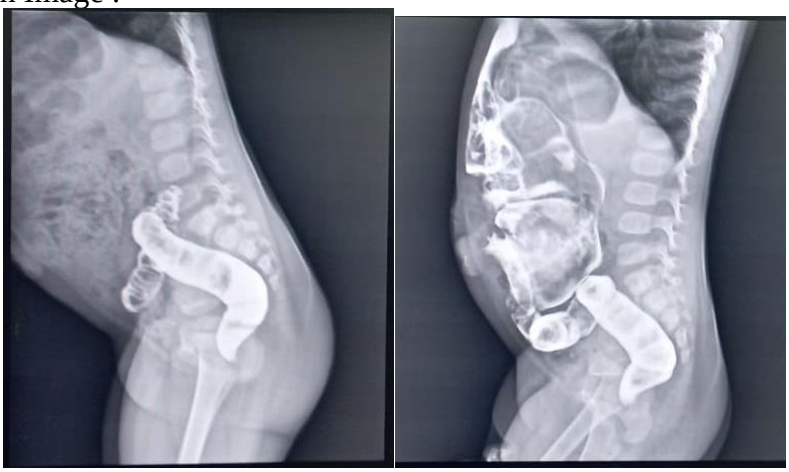


Image 4. Radiograph AP Projection Post anal contrast (left) and post contrast stoma (right)

Discussion

This research was conducted on an outpatient who came to the Radiology Installation at RSUD dr. Soeroto Ngawi brought a letter of request from the sending doctor for a proximal and distal lopography examination. As the patient is a 2-year-old kid, all approvals for the test will be completed by both of the patient's parents, thus the officer educates the parents prior to the examination.

The following stage is to get the patient and the equipment ready when the patient's parents consent to the examination continuing.. Preparation of patients for lopography examination with cases of congenital megacolon at the Radiology Installation of RSUD dr. Soeroto Ngawi, namely that there was no special preparation because the patient was still 2 years old, which is in line with the theory in [8]. According to [8], 2-year-old patients do not need special preparation. Meanwhile, in [5], [10] research, patient preparation was by changing their diet, drinking as much as possible, and fasting for 10 hours before the examination.

The preparation of tools and materials for lopography examinations in cases of congenital megacolon at the Radiology Installation at RSUD dr. Soeroto Ngawi consists of sterile and non-sterile tools and materials, namely x-ray machine, detector, examination table, water soluble contrast media, 60 cc syringe, nierbeken, handscoon, tissue, NaCl, catheter, jelly, alcohol, apron and underpad. In general, the tools and materials used in lopography examinations in cases of congenital megacolon at the Radiology Installation at RSUD dr. Soeroto Ngawi is the same as the theory in [4] but there are differences in the use of post operative colostomy kits and fluoroscopy. According to [5], the use of fluoroscopy can determine the extent to which contrast fills the colon so that abnormalities can be identified and appropriate radiographs can be taken. In a lopography examination study conducted by [11], the use of a post-operative colostomy kit can be more practical because the stoma does not have a sphincter so the contrast medium does not reflux into the patient's body. Tools and materials such as fluoroscopy planes and post-operative colostomy kits can save examination time and ensure patient comfort.

During a lopography examination with a case of congenital megacolon at the Radiology Installation at RSUD dr. Soeroto Ngawi, the contrast media used is water soluble mixed with around 120 cc of NaCl with a contrast media ratio of 1:3. The use of contrast media in lopography examinations in cases of congenital megacolon at the Radiology Installation at RSUD dr. Soeroto Ngawi is different from the theory in [8] which according to [8] the contrast media used in lopography examinations uses barium but there are similarities in the journals of [11],[5], [12] only the volume of contrast media used is different because in the research of [11],[5], [12] their patients were adult patients while the author's patients were pediatric patients where the length of the pediatric and adult colons were different so that the volume of contrast media used was adjusted to the length of the patient's colon. The reason for using water soluble contrast media in lopography examinations in cases of congenital megacolon at the Radiology Installation at RSUD dr. Soeroto Ngawi, namely because water soluble contrast media is easily absorbed by the body, is not dangerous, is safe for use by the body and has minimal complications. Use of barium sulfate may result in deposits in the colon because a megacolon prevents the colon from functioning correctly. Contrast media is delivered first through the anus, then through the stoma.

When the contrast medium has been filled, exposure is then carried out, during a lopography examination with a case of congenital megacolon at the Radiology Installation at RSUD dr. Soeroto Ngawi uses anteroposterior (AP), lateral projections and without using oblique projections (RPO and LPO). This is different from the theory in [8] where there are oblique projections (RPO and LPO) apart from anteroposterior (AP) and lateral. The reason for only using AP and lateral is because with these projections you can already get information about the megacolon so there is no need to add oblique projections (RPO and LPO). According to the radiographer at the Radiology Installation,

Dr. Soeroto Ngawi added an oblique projection to patients with colon tumors where there was a possibility that the tumor could be superposed on another organ. However, according to [11], the addition of oblique projections such as RPO and LPO can add diagnostic value because it can reveal the splenic fluexura and hepatic flexura areas.

Conclusion

Lopographic examination of patients with congenital megacolon cases at the Radiology Installation at RSUD Dr. Soeroto Ngawi started with parent education, followed by patient preparation considering there is no additional preparations were required. Preparation of equipment and materials consists of sterile and non-sterile, the contrast media used is water soluble contrast media with a ratio of 1:3. Insertion of contrast media through the anus and stoma with a total volume of 120 cc. Water soluble contrast media is used because it gets absorbed rapidly by the body, is safe to use, and left little deposits in the colon. The reason for not include oblique projections (RPO and LPO) is that AP and Lateral projections can provide diagnostic information and help the doctor with identifying the next steps.

References

[1] V. Singh, *Textbook of Anatomy Abdomen and Lower Limb; Volume II, Volume 2*, Second Edition., vol. Volume 2. Reed Elsevier India Private Limited, 2014.
[2] M. Juffrie, "SALURAN CERNA YANG SEHAT: ANATOMI DAN FISIOLOGI," 2018. [Online]. Available: http://www.healthhype.com/
[3] L. Ambartsumyan, C. Smith, and R. P. Kapur, "Diagnosis of Hirschsprung Disease," *Pediatric and Developmental Pathology*, vol. 23, no. 1, pp. 8–22, Jan. 2020, doi: 10.1177/1093526619892351.
[4] K. L. Bontrager and J. P. Lampignano, *Textbook of Radiographic Positioning & Related Anatomy*, Edition 8th. 2014.
[5] S. Mulyati, I. Lulu Walidaeni, P. Kemenkes Semarang, and M. Prodi D-III TRR Semarang, "PEMERIKSAAN LOPOGRAFI DENGAN PASIEN POST-HARTMANN PROSEDUR DI DEPARTEMEN RADIOLOGI RSPAU dr. S. HARDJOLUKITO YOGYAKARTA LOPOGRAPHY EXAMINATION WITH PATIENT POST-HARTMANN PROCEDURE AT RADIOLOGY DEPARTMENT RSPAU dr. S. HARDJOLUKITO YOGYAKARTA," *JImeD*, vol. 5, no. 1, pp. 34–38, Jun. 2019.
[6] J. L. Hinkle and K. H. Cheever, *Textbook of Medical-Surgical Nursing*, Edition 14th. 2017.
[7] S. Balouch, "Summaiya Balouch et al, Result Of Colostomy Closure Without Bowel Preparation., Indo Am," *J. P. Sci*, vol. 08, no. 1, pp. 1419–1422, 2021, [Online]. Available: http://www.iajps.com
[8] J. P. Lampignano and L. E. Kendrick, *Bontrager's Textbook of Radiographic Positioning and Related Anatomy*, Edition 9. 2018.
[9] B. W. Long, J. H. Rollins, and B. J. Smith, *Merrill's Atlas of Radiographic Positioning & Procedures*, vol. Volume 1. Elsevier, 2016.
[10] R. A. Azhari, N. Sulaksono, and A. D. Prastanti, "PROSEDUR PEMERIKSAAN LOPOGRAFI DENGAN KLINIS SUSPECT COLON CARCINOMA".
[11] R. Wati, A. Fitria Gemilang, A. Mukmin, I. M. Maulidya, and F. Ilmu Kesehatan, "STUDI KASUS PROSEDUR PEMERIKSAAN LOPOGRAFI PADA KASUS CA

RECTUM DI INSTALASI RADIOLOGI RSPAU dr. S HARDJULUKITO," 2023. doi: https://doi.org/10.36312/jcm.v4i3.1984.

[12] G. Sari, T. R. Putri, S. Samsun, S. Sriyatun, and N. H. Apriantoro, "Loopography Examination For Colon Cancer Cases In Tangerang District Public Hospital," *SANITAS: Jurnal Teknologi dan Seni Kesehatan*, vol. 10, no. 2, pp. 117–127, Dec. 2019, doi: 10.36525/sanitas.2019.12.

[13] Vinay, K., & Robbins, S. L. (2020). Pathologic Basis Of Disease.

Local Community Empowerment Strategy In Developing The Tourism Village Of Pulewulung Sleman

Ulya Khoirunisa[1*], Erni Saharuddin[1]
[1]Public Administration/Faculty of Economics, Social Sciences and Humanities,
'Aisyiyah University, Yogyakarta

Email: ernisaharuddin@unisayogya.ac.id

Abstract

Purpose: Local community empowerment is an effort to increase awareness, capacity and independence of the local tourism village community in developing the Pulewulung Tourism Village. This research aims to determine the empowerment strategies and analyze the inhibiting and supporting factors in the process of empowering the local communities in the Pulewulung Tourism Village.

Methods: The method used in this research is descriptive qualitative with data collecting technique through interview, observation and documentation. This research uses a theory of 3 empowerment processes according to Adriyani (2017), namely the awareness process, capacity building process, and empowerment process.

Result: The results of this research show that tourism villages often do not have sufficient involvement in developing the tourism villages. Likewise, the Pulewulung Tourism Village still needs to optimize the capabilities of the local communities in developing a tourism village. The obstacle of empowering the local communities is the limited human resources (HR) who are competent in the tourism sector and almost all local communities use tourism villages as part-time job. However, local community empowerment also has supporting factor that is adequate infrastructure which supports the empowerment and commitment of the government and the local community of Pulewulung Tourism Village.

Keywords : *Strategy, Tourism Village, Local Community, Empowerment Process*

Introduction

Referring to the Regional Regulation of Sleman Regency No.11 of 2015 concerning the Regional Tourism Development Master Plan for 2015-2025, regarding tourism villages is a form of integration between attractions, accommodation and supporting facilities presented in a structure of community life that blends with applicable procedures and traditions. The development of tourism villages that utilize various attractions shows that it is in line with the concept of sustainable tourism. According to Yoeti and Oka in (Zakaria &; Suprihardjo, 2014) Tourism Village is an area that has special characteristics to become a tourist destination. In this area, the population still has relatively original traditions and culture. Generally, tourism villages offer a unique and interesting rural atmosphere and have the potential to be developed.

Tourism villages that are formed later can be classified into four categories, namely pioneering, developing, developed and independent tourism villages. The classification carried out by the Sleman Regency Tourism Office aims to map and re-record tourism villages spread across Sleman Regency, as well as map problems and independence status

in the hope that it can motivate to continue to innovate and help develop these tourism villages

The classification of Pulewulung Tourism Village in 2022 is categorized as an advanced tourism village in Sleman Regency as the basis for the research conducted. This tourist village has been established since 2017 and is located in Kalurahan Bangunkerto, Kapanewon Turi, Sleman Regency. Pulewulung from decades ago until now is known as salak pondoh farming. The development of this area in addition to salak cultivation, tourism village services are also developed in the form of Salak farming, Outbound, River Crossing, Bedouin Dance, Camping / Makrab/ Homestay. There are also tour packages for those who want to do learning and research on Salak cultivation. The advantage of salak fruit in Pulewulung is a distinctive sweet taste with different qualities from salak in general. When the salak season arrives, visitors can take a salak picking tour along the plantation land that has been specially provided for salak picking tours.

Based on data obtained by the author from the 2022 classification, Pulewulung Tourism Village by the Sleman Regency Tourism Office, in terms of management and development, Pulewulung Tourism Village is said to be advanced. This is supported by adequate accessibility and supporting amenities in the form of sufficient networks and electricity sources, however, the development of tourism in this village is still limited and not optimal. Some of the obstacles faced include lack of attention to empowering local communities in tourism development. This is evidenced in the results of the 2022 classification regarding indicators that must be improved, namely HR and Institutional. The results of the 2022 classification state that there are still overlapping responsibilities, and the involvement of community groups is around 60% and most of them are women. Some of the programs that have been carried out by the Government are tour guide training and counseling on the development of tourism villages.

The improvement of local communities plays a role as a trigger for the success of tourism village development in the management of tourist destinations. However, local communities often do not have sufficient involvement in tourism decision-making and resource management. The development of Pulewulung Tourism Village is carried out by the local community in the tourist village. According to the results of a survey conducted by researchers to Mr. Haris and Mr. Dayat as managers of Pulewulung Tourism Village on September 11, 2023, Pulewulung Tourism Village still needs to optimize the ability of local communities to manage tourism villages. Therefore, researchers are interested in conducting research in Pulewulung Tourism Village with the title "Local Community Empowerment Strategy in the Development of Pulewulung Tourism Village in Kalurahan Bangunkerto, Kapanewon Turi, Sleman Regency".

In this context, this study focuses on empowerment strategies carried out in Pulewulung Tourism Village as recommendations for existing problems, namely the lack of optimal ability of local communities in tourism village management, limited Human Resources (HR), and lack of attention to local community empowerment. This research is a research that examines the empowerment of local communities for the first time in Pulewulung Tourism Village, hopefully it can be a recommendation for local governments and become a reference for future research in Pulewulung Tourism Village.

Methods

The research entitled "Local Community Empowerment Strategy in the Development of Pulewulung Sleman Tourism Village" will be carried out in Pulewulung Tourism Village in November-December 2023. This study used qualitative descriptive method. The form

is based on qualitative descriptive information about information in research about the actual situation in the form of data sources for problems that are occurring. Direct observations made in this study related to local community empowerment carried out by the local community of Pulewulung Tourism Village. In addition, interviews were conducted by collecting information directly from the Head of Human Resources (HR), Chairman, Secretary I, Secretary II, and Treasurer 1 of the Pulewulung Tourism Village Management. The documentation of this research includes the empowerment process carried out by the local community of Pulewulung Tourism Village.

Results.

Local Community Empowerment Process

The description of the results of research obtained in the field using empowerment theory according to (Wrihatnolo &; Dwidjowijoto, 2007) there are 3 (three) empowerment processes (1) Awareness Process (2) Capacitation Process (3) Empowerment Process. The results found by the author in the field are as follows:

1. Awareness

The awareness stage in Pulewulung Tourism Village was carried out through socialization carried out by the empowerment executive and the Sleman Regency Tourism Office. Initially before it was formed into Pulewulung Tourism Village, people in the village worked as farmers who on average also had their own salak plantations. However, because the price of salak which at that time fell caused economic problems in the village. While some mothers do not work or only as housewives. From these problems, the village then seeks solutions by developing existing potential. Mr. Irkham Hidayat as the person who initiated the formation of Pulewulung Tourism Village, had previously wanted to make a brick factory and rent party equipment. However, because it requires a large cost and there is no large enough land, it was then undone. Then, Mr. Irham accidentally had a guest, Mr. Sarjono, who then discussed about tourism, making a hamlet that could be organized, and rural culinary.

Then after discussion, Mr. Irkham gathered the existing local groups to follow up on the idea of the tourism village. This became the root of the formation of Pulewulung Tourism Village which stands until now. The awareness process in Pulewulung Tourism Village is carried out through a special stage to the public, starting from existing groups or institutions. Starting from the cadet reef then widened to farmer groups to PKK mothers and SMEs. The farmer group of Pulewulung Tourism Village has a good reputation and has been widely known in Yogyakarta and its surroundings.

Then, awareness was also carried out by the Sleman Regency Tourism Office as a forum to facilitate new tourism villages in Sleman Regency. The Sleman Regency Tourism Office supports the potential and development of tourism villages through tourism awareness campaigns by bringing in resource persons and also local communities in each tourism village so that understanding of tourism villages is carried out in a structured manner, as well as encouraging local communities to actively participate in the awareness. This campaign provides an overview of tourism villages, the potential of tourism villages, and the development of tourism villages Then, the Sleman Regency Tourism Office always provides information related to programs, resources and opportunities for the development of tourism villages

The awareness carried out by the local community of Pulewulung Tourism Village fostered their desire to establish a tourism village. This proves that the awareness process has been successfully carried out in Pulewulung Tourism Village. The community began to realize to participate in the development of Pulewulung Tourism Village by being involved in expanding the land used for Salak harvest tourism. Farmer groups that participate in incorporating gardens as part of tourism villages, it can be concluded that awareness in Pulewulung tourism village is purely because of their own community. In addition to merging salak plantations to be used as tourist attractions, data collection of houses that are not lived in is also carried out to be used as homestays. The homestay offers a beautiful rural atmosphere, but what is interesting here is that tourists or visitors have daily activities according to what the landlady does.

2. Capacitation

It is a process to enable the empowerment of these local communities through training. Capcapacity aims to develop and improve the expertise possessed by each group. The capacity carried out is in the form of training tailored to the needs and fields of each local group. The existing trainings are a response to the various needs and interests of local groups in the development of tourism villages, so that they are useful for local communities in accordance with their roles and responsibilities in the development of tourism villages The author obtained data on the trainings attended by the Pulewulung Tourism Village Community are below.

Table 1 Pulewulung Community Training

No	Year	Training	Implementers
1	2017	Outbound Guide from Tosca Organizer	Swadaya
2	2018	Region Awareness Campaign	Sleman Regency Tourism Office
3	2019	Concierge Training	DIY Tourism Office
4	2019	Tourism Village Management Training	Sleman Regency Tourism Office
5	2019	Outbound Guide Training	Sleman Regency Tourism Office
6	2019	Culinary Training and Homestay Management	DIY Tourism Office
7	2020	Digital Marketing	DIY communication and information service
8	2020	Culinary Training and Homestay Management	DIY Tourism Office
9	2020	Cultural Independent Village Culinary Training	Bangunkerto Neighborhoods
10	2020	Tourist Destination Governance	Sleman Regency Tourism Office

No	Year	Training	Implementers
11	2021	Digital Marketing	DIY communication and information service
12	2021	Production and processing training as well as packing, branding to marketing	LPPM Universitas Mahakarya Asia Yogyakarta dan Omah Workshop Ma'e Etty (CV Mitha Az-Zahra)
13	2022	Wifi Digital Marketing Mentoring Training for Community Empowerment	DIY communication and information service
14	2022	Facilitate required training and training in making Eco Enzymes	DPPM UII Yogyakarta
15	2023	Human Resources Training (HR) Tourism Village	Sleman Regency Tourism Office
16	2023	Digital Marketing	Kominfo DIY
17	2024	Training and Assistance in Tourism Village Management, Pokdarwis Destination (CBT), Culinary Marketing Institutional Management of Pulewulung Tourism Village, Sleman Regency.	Sleman Regency Tourism Office

3. Empowerment

Empowerment is a stage to provide opportunities for local communities to implement skills based on knowledge and abilities that have been received in accordance with their respective capacities. The empowerment process carried out by the local community of Pulewulung Tourism Village certainly cannot be separated from the support of the local government. However, the implementation of the empowerment also depends on how the local community itself. This includes how local communities independently address problems and make decisions with consideration.

Pulewulung Tourism Village strengthens the participation of existing local community members, by maximizing local community members who are actively involved in the tourism village. That way, Pulewulung Tourism Village can overcome the obstacles of participation and build involvement in the development of tourism villages. In addition, the empowerment process involves the younger generation in Pulewulung Tourism Village to participate in managing the tourism village and join the cadet reef. However, the limited number of young people who join is still lacking, thus hampering the performance of this tourist village. Thus causing an excessive task load because it has to concurrently be from other tasks and hampers its performance.

Then the process of empowering the local community of Pulewulung Tourism Village involves cooperation and collaboration with several parties including the private sector and academics. This collaboration provides benefits in the exchange of knowledge, resources, and experience that can enrich tourism village development efforts
The author obtained on collaboration carried out by local groups of Pulewulung Tourism Village with various related parties. This can be seen in the table below:

Table 2 Collaboration with Pulewulung Tourism Village

No	Name	Forms of cooperation
1	TOSCA Organizer	- Prepare an Outbound trainer complete with tools, if there is a request from Pulewulung Tourism Village and have agreed on the amount of Outbound trainer fees. - Pulewulung Tourism Village provides places and facilities according to the request of Tosca Organizer for outbound guests / participants from Tosca who carry out activities in Pulewulung Tourism Village at an agreed price. - Collaboration between Pulewulung Tourism Village Outbound trainers and Tosca Organizer to complement each other's packages/types of games and provide learning opportunities for tourism village managers.
2	Pancoh Tourism Village, Kelor Tourism Village, and Sangurejo Tourism Village	- Sharing guests when Pulewulung Tourism Village is unable to accommodate the number of guests is transferred to a tourist village that has sufficient location, as well as if the guest schedule is full, and there are guests who want to do activities in the tourist village, they are directed to be able to do activities in the tourist village that has established cooperation - Collaboration as fellow Pulewulung and Sangurejo scout villages, conducting joint activities in order to develop the two areas.
3	LPPM Universitas Mahakarya Asia Yogyakarta and Omah Workshop Ma'e Etty (CV Mitha Az-Zahra)	- Providing assistance by sheltering all lines of the creative industry in Pulewulung Tourism Village.

4	One Hotel One Village dari Hotel Grand Tjokro Yogyakarta	- GM Grand Tjokro provides promotional space in the lobby of Grand Tjokro Hotel Jl. Gejayan Sleman to display Pulewulung Tourism Village products and promotional brochures. - Grand Tjokro prepares an activity package in Pulewulung Tourism Village for group / family guests for outbound / gathering activities, garden tours and education processed salak.
5	DPPM UII Yogyakarta	- Encouraging students to conduct research, field lectures, and preparation of theses / final projects to raise problems in Pulewulung Tourism Village. - Providing training facilitation for community members: eco print and waste management.

Inhibiting and Supporting Factors for Local Community Empowerment

1. Inhibiting Factors

In Pulewulung Tourism Village, there are several factors that hinder the process of empowering local communities. The author found this in the interview results of several informants including the following:

1) Limited Human Resources (HR)

Human Resources (HR) who are competent in the field of tourism are very limited so that local communities have to hold concurrent positions. The limited Human Resources (HR) who have competence in tourism or relevant capabilities in Pulewulung Tourism Village shows that most members of the local community have a medium level of ability in tourism. These limitations affect the effectiveness of tourism village development as a whole. This is due to the lack of qualified expertise and knowledge in utilizing the potential of tourism villages. Limited Human Resources (HR) who have competence in the field of tourism cause local communities not to have adequate capabilities in developing tourism villages. So that local communities are unable to understand the potential and challenges related to tourism villages, as well as lack of skills to plan, implement, and promote Pulewulung Tourism Village properly.

2) Tourism Village as a Part-Time Job

The local community of Pulewulung Tourism Village almost entirely has permanent jobs outside the tourist village. So that it can cause limited time and energy to actively participate in tourism village development activities. This can be an obstacle in developing Pulewulung Tourism Village, especially making the empowerment carried out not exactly according to needs or interests. This can lead to a lack of interest or relevance of empowerment carried out with the needs and potential actually owned by the local community in the development of Pulewulung Tourism Village.

2. Supporting Factors

These factors will support or promote the participation, independence, and growth of the local community of Pulewulung Tourism Village.

1) Adequate infrastructure

Adequate infrastructure is a major factor in the development of Pulewulung Tourism Village. The infrastructure includes supporting facilities and facilities to support tourism villages and supporting comfort. This includes good road access, quality lodging facilities, good accessibility to tourist attractions and other places. An organized environment facilitates access and mobility of local communities, and supports various empowerment activities. In addition, good accessibility ensures local communities are connected to the various resources and opportunities that exist. Good accessibility helps expand the tourism market, increase local community participation in empowerment activities and facilitate collaboration between parties. That way, an organized environment and good accessibility can be a strong foundation for the development of Pulewulung Tourism Village, as well as building a competitive local community.

2) Government and Local Community Comics

There is a high commitment from several related parties in Sleman Regency to the empowerment of local communities. This commitment is a driver in supporting empowerment for local community participation in the development of tourism villages. Strong support from the local government, especially the Sleman Regency Tourism Office, can be realized in various forms, such as adequate budget allocation, and even providing a Decree (SK) directly if it has become a tourist village. The existence of a decree (SK) and the existence of a master plan shows that local governments understand the importance of developing tourism villages to provide strong support. Then also support from the Regional Apparatus Organization (OPD) which has approved the proposal submitted. This includes a commitment to provide resources and other support to implement such empowerment, such as financial assistance. The approved financial assistance for Pulewulung Tourism Village will help in improving the quality fund facilities of the tourism village. The funds are used to improve infrastructure, improve services to visitors, and develop various training and Human Resources (HR) development that can increase the capacity and skills of local groups in developing tourism villages and promoting tourism villages.

3) Collaboration with External Parties

Collaboration is the foundation for the development of Pulewulung Tourism Village. By involving various parties, Pulewulung Tourism Village can expand relationships, obtain additional resources, and get the support needed to overcome the problems faced in the development of tourism villages. In addition, it can also be a forum for exchanging knowledge and helping each other between collaborating parties.

collaboration carried out in Pulewulung Tourism Village to meet the needs and expectations of visitors. The collaboration begins by responding to requests from guests, which in this case is a need for appropriate activities. The tourism village cooperated with outside facilitators, but the team was replaced by the local community of Pulewulung

Tourism Village. So in this case it shows participatory collaboration, where the village not only relies on outside assistance, but also still participates in providing these activities. That way, local communities can learn about how outside facilitators do this by participating directly.

Discussion

Local Community Awareness Process

1. Awareness

According to Pranarka in (Syarifuddin, 2022) Growing awareness is a picture that the community has the strength, authority, and ability to build itself and its territory

Referring to the Regulation of the Governor of the Special Region of Yogyakarta No. 40 of 2020, Tourism Villages are community groups that strive in the field of tourism which includes attractions, accommodation, and supporting facilities within the village/kelurahan area with the principle of community-based tourism and managed under the auspices. Then when viewed through the context of tourism, service becomes the main thing in the tourism business, including within the scope of tourism villages.

Pulewulung Tourism Village is a tourist village that already has awareness of the existence of a tourist village, the local community of the tourism village conducts awareness starting with cadet reefs and then expanding it to other groups in Pulewulung Tourism Village. This is an effort to create participation in Pulewulung Tourism Village, so that the awareness process can create strong support and synergy for the community in Pulewulung Tourism Village. Then, Pulewulung Tourism Village has a farmer group that is widely known in Yogyakarta. This helps shape the identity of the takal community, encourages participation in tourism village development activities, and to establish partnerships with other parties.

Following up on this, the local community of Pulewulung Tourism Village continues to improve their knowledge with resource persons to find out about tourism management, digital marketing and also relevant market opportunities. In addition, they also involve themselves with field visits, workshops and exchange ideas or discussions with other tourism village communities to share experiences of tourism village management with each other. The local community of Pulewulung Tourism Village has a high synergy and responsibility in the tourism village. This can be seen from the results of the classification carried out by the Sleman Regency Tourism Office every two years. Where the development of Pulewulung Tourism Village is very rapid. Starting from a pilot in 2018, then rising to a developing position in 2020, then getting a developed tourism village position in 2022.

In addition, the awareness process of Pulewulung Tourism Village was also facilitated by the Sleman Regency Tourism Office. This shows the active role of the Regional Government in supporting the development of tourism villages. The awareness was carried out through the Tourism Awareness Campaign by bringing in quality speakers. In addition, the Sleman Regency Tourism Office provides information about programs, opportunities, resources that can be used by the local community of Pulewulung Tourism Village for the development of tourism villages. Through the information provided, the Sleman Regency Tourism Office provides direction to Pulewulung Tourism Village which also includes training programs, financial resources, technical support or partnership opportunities.

2. Capacity

According to (Wahyuni, 2018) Captivation includes increasing human capacity, organization and value systems. Human capacity is carried out through the provision of skills and knowledge about tourism village management. Capacity in Pulewulung Tourism Village is carried out by training and coaching to develop skills needed by local communities for tourism village development.

The Sleman Regency Tourism Office is a facilitator for the development and training of tourism villages. According to (Wahyuni, 2018) government participation is needed, the government must invite, motivate, and encourage the community to be able to develop their villages. Capacity starts from preparing Human Resources (HR). In line with this, the Sleman Regency Tourism Office strengthens the Human Resources (HR) of tourism villages, namely through DAK in six (6) training activities including tourism village management, culinary offerings, homestay management, digital marketing, cultural tour guide training, ecotourism guide training. The training was attended by the local community of Pulewulung Tourism Village very well, they followed a series of training activities that were held very well.

In 2021, Kalurahan Bangunkerto was confirmed as one of the Cultural Independent Villages in the Special Region of Yogyakarta. Preparations to become a Cultural Independent Village were carried out, one of which was training needed by tourism villages in Bangunkerto district. The DIY Tourism Office followed up this with the assistance of Human Resources (HR) as a whole. The trainings went smoothly because almost all local communities of tourist villages in Bangunkerto enlivened and participated in the training activities very well.

In addition, the development of Pulewulung Tourism Village cannot be separated from the involvement of external parties or the private sector in the capacity carried out. As well as what was done by LPPM Universitas Mahakarya Asia Asia Yogyakarta and Omah Workshop Ma'e Etty (CV Mitha Az-Zahra) who provided assistance by sheltering all lines of creative industries in Pulewulung Tourism Village from processing to product packing. Furthermore, DPPM UII Yogyakarta facilitated training for the local community of Pulewulung Tourism Village, namely eco print training and waste management.

The existing capacity is tailored to the needs and fields of each local group, so that it is appropriate to increase relevant knowledge and local communities get concrete and relevant benefits for their role in tourism villages. The Sleman District Tourism Office identifies specific needs in each local community, so training is focused as needed

3. Empowerment

Empowerment gives responsibility to local communities to improve the quality of tourism villages and activities related to tourism village management. According to Rajaratnam in (Prasiasa &; Widari, 2019) there are eight main attributes in influencing the quality of destinations, namely facilities, accessibility, logistics, experience, cleanliness, information, safety, and hospitality. The local government also provides support to tourism villages to be able to manage tourism villages effectively and independently, improve facilities and also experience in providing services to tourists. Especially the Sleman Regency Tourism Office which provides space for each tourist village to further discuss the problems that may be faced by tourism villages. This is done by active

communication between the government and local communities in every tourist village in Sleman Regency.

Pulewulung Tourism Village strengthens the active participation of existing local communities, possibly because in every community the lack of Human Resources (HR) is always a problem that must be faced. Therefore, Pulewulung Tourism Village overcomes these problems by maximizing existing members. This makes local communities have overlapping positions because they still have to handle each other. The author conducted field research on this subject, and indeed only a few local communities are on the ground to be responsible when there are visitors.

Empowerment is the provision of power or empowerment in the narrow sense. At this stage the target is given power, power, authority or opportunity. This award is in accordance with the quality of skills that have been possessed (Wrihatnolo &; Dwidjowijoto, 2007).

Empowerment encourages all local communities in Pulewulung Tourism Village to actively participate in tourism village management, including decision making. However, in this case, the local community of Pulewulung Tourism Village is less actively involved in the development of tourism villages if it is calculated to reach around 86%. However, over time the number of participants decreased to 60%. This is because of the busyness of each member who is not only in the management of tourist villages. In addition, the contribution of the younger generation is also very limited. That's because they study and also work outside the area so they don't join the local community. In addition, the development of Pulewulung Tourism Village has an impact on the lives of local residents. They can still maintain their profession as salak farmers because agriculture is integrated as part of tourism.

Empowerment provides Pulewulung Tourism Village with opportunities and resources to involve several private parties and academics by collaborating. This is an effort by the local community of Pulewulung Tourism Village in exchanging knowledge, resources, and experience. Collaboration with private parties such as TOSCA Organizer and Grand Tjokro Hotel Yogyakarta plays an important role in helping the availability of facilities in tourism activities and for product marketing.

Empowerment is also given to local communities in running their businesses such as culinary businesses or homestays. Pulewulung Tourism Village is quite good in utilizing processed salak from salak agricultural products. The local community of Pulewulung Tourism Village processes quality salak into processed products that are of selling value. Such as salak chips and also wajik salak.

Pulewulung Tourism Village in relation to promotion, such as the promotion of Pulewulung Tourism Village is carried out by implementing digital marketing, namely through social media. Social media including Facebook, Instagram and also websites. For now, social media has become intensively promoted for tourism villages because the reach is very wide and easy to help provide information on tour packages. Especially for the Facebook marketplace and website, tourists only have to go to the tour package page to find out the price of each package in Pulewulung Tourism Village. There are even contacts that can be contacted by tourists to book tour packages. However, in this case, the use of digital marketing in Pulewulung Tourism Village has not penetrated all aspects, for example for the sale of processed Salak products. That's because almost all parts of SMEs are mothers who have not been able to market their products through social media such as shopee. So far the marketing of processed salak products is offered to tourists

who come to visit, deposited in the shop by – by and assisted by collaboration with Grand Tjokro Hotel which displays these processed products in the hotel lobby.
The development of the tourism industry implements sustainable tourism, along with this the Ministry of Tourism in 2018 is increasingly eager to develop the development of tourist destinations. One of them is the ISTA (Indonesia Sustainable Tourism Award). The inclusion of Pulewulung Tourism Village into the nomination category at ISTA for two consecutive times, proves that Pulewulung Tourism Village is able to compete in the development of tourism villages.

Inhibiting and Supporting Factors for Local Community Empowerment

1. Inhibiting Factors

1. Limited Human Resources ,

According to Hausler in (Wibhisana, 2021) community-based tourism is a form of tourism that provides opportunities for local communities to control and be involved in tourism management and development. Human Resources in Tourism Village is a problem that must be faced by Pulewulung Tourism Village. The lack of competent Human Resources in the field of tourism results in the difficulty of local communities who manage tourism villages effectively and are experienced in managing those related to tourism. In line with Sunaryo in (Masitah, 2019) stated that to realize tourism development that runs and is managed properly, the fundamental thing is to facilitate broad involvement of local communities in the development process".
If the existing empowerment is not followed by local communities who have competence in their fields. This can lead to problems, such as lack of innovation for the community to come up with new ideas that can improve the development of tourist villages and lead to inefficient use of resources. Therefore, it is very important that a local community in a tourism village has several competent Human Resources (HR) in the field of tourism. Empowerment programs are designed with the needs and competencies of local communities in mind, and provide the necessary training and support to develop the needs and competencies of the community, and provide the training and support needed to develop capabilities in relevant areas.

2. Tourism Village as a Part-Time Job

Almost the average local community of Pulewulung tourism village makes a tourist village into a part-time activity, they have the main activity or main job besides being a tourism village manager. In this case, the empowerment of local communities is hampered because of the availability of time and energy of the local community. In fact, according to Tikson in (Supriatna, 2020) stated that the empowerment process is very important to be carried out so that those who follow have the ability both individually and together to achieve independence. Often empowerment activities are adjacent to their main activities so that local communities find it difficult to participate consistently and effectively in empowerment. Their attention is divided between following empowerment and their busy life outside the tourist village.

1. Supporting Factors

1) Adequate infrastructure

Pulewulung Tourism Village has adequate infrastructure in supporting the empowerment of existing local communities. The existing infrastructure in Pulewulung Tourism Village includes facilities and infrastructure such as access roads that have been paved smoothly from entering Pulewulung Village to tourist sites, lodging facilities are also well available, then for road signs have also been installed so that new visitors who come will not be lost. In addition, the availability of wifi access for tourists who come to Pulewulung Tourism Village is also a support for the convenience of tourists. In addition, the provision of wifi access makes it easier for local communities to upload documentation – documentation of activities, digital marketing and others.

2) Government and Local Community Commitment

High commitment is owned by Sleman Regency in supporting empowerment for tourism villages. This commitment is manifested in the budget allocation used for the development of tourism villages, providing or facilitating tourism villages ranging from pioneering, developing, advancing and independent to conduct training in order to support capabilities, as well as decreasing direct decrees (SK) for Tourism Villages that have entered the pilot category. Then, the proposal submission used by the tourism village will be quickly approved by the Regional Apparatus Organization (OPD) in relation to the development of the tourism village. Especially for the development of existing infrastructure in Pulewulung Tourism Village such as road signs and for the construction of pavilions.
In addition, the commitment of the local community of Pulewulung Tourism Village also cannot be ruled out. (Komariah et al., 2018) which states that tourism activities are community-based activities, meaning that the resources and uniqueness of local communities are the main driving elements. In this case, even though it is constrained by limited Human Resources (HR), it can still be overcome by the local community of Pulewulung Tourism Village, so that the empowerment process can still be carried out properly. This can be seen from the rapid development of Pulewulung Tourism Village starting from the stub category to the current advanced category. It proves that the local community of Pulewulung Tourism Village has a strong commitment in the development of tourism villages.

3) Collaboration with external parties

According to Anindita in (Masitah, 2019) Tourism village development must be based on sustainability, which must create job opportunities for all parties to be involved through a healthy and competitive system. Pulewukung Tourism Village collaborates to meet the needs and requests of visitors. The collaboration carried out by the local community of Pulewulung Tourism Village includes Tosca Organizer, LPPM Universitas Mahakarya Asia and Omah Workshop Ma'e Etty (CV Mitha Az-Zahra), Grand Tjokro Hotel Yogyakarta, DPPM UII Yogyakarta, and involves Surrounding Tourism Villages such as Pancoh Tourism Village, Kelor Tourism Village, and Sangurejo Tourism Village. Each collaboration has different involvement but has the same goal, which is to learn from each other and benefit from the collaboration.

Conclusion

1. Local Community Empowerment Process

2. Awareness

The empowerment of local communities at the awareness stage in Pulewulung Tourism Village was done well. The local community of Pulewulung Tourism Village is able to recognize the potential of tourism villages that can be used as tourist attractions. The local community of Pulewulung Tourism Village has a high synergy and responsibility in the tourism village.

3. Captivation

The process of capacity of local communities in Pulewulung Tourism Village has not been good. Capacity is carried out in the form of training and coaching to develop skills needed by local communities.

4. Empowerment

The process of empowering the local community of Pulewulung Tourism Village is carried out quite well, independently able to develop on its own without having to be forced.

2. Inhibiting and Supporting Factors for Local Community Empowerment

1. Inhibiting Factors

The inhibiting factor for the empowerment of the local community of Pulewulung tourism village is the limited number of Human Resources (HR). The existing empowerment is not followed by local communities according to their fields. If the existing empowerment is not followed by local communities who have competence in their fields. Most of the local communities of Pulewulung tourism village have main jobs so that it interferes with the empowerment of local communities, if the empowerment schedule collides with the schedule at the main job. In addition, it also disrupts the focus of the local community while attending training.

2. Supporting Factors

The existing infrastructure in Pulewulung Tourism Village includes facilities and infrastructure such as access roads that have been paved smoothly from entering Pulewulung Village to tourist sites, lodging facilities, and road signs have also been installed. Sleman Regency has a high commitment in supporting empowerment for tourism villages. This is shown through training, proposal approval and lowering of the Decree (SK) for tourism villages as an effort to protect the law. In addition, the commitment of the local community of Pulewulung Tourism Village also cannot be ruled out. This can be seen from the rapid development of Pulewulung Tourism Village starting from the pilot to the current advance. Pulewulung Tourism Village collaborates by involving various parties. Such collaboration can expand relationships, increase resources and get support in empowerment. Pulewulung Tourism Village collaborates to meet the needs and requests of visitors.

Acknowledgment

1. Mrs. Dr. Warsiti, S.Kep., M.Kep., Sp. Mat as the Rector of Universitas 'Aisyiyah Yogyakarta who has given permission in the preparation of this thesis.
2. Mrs. Anisa Warastri, S.Psi.M.Psi., Psychologist as Dean of the Faculty of Economics, Social Sciences and Humanities, Universitas 'Aisyiyah Yogyakarta who has given permission in the preparation of this thesis.
3. Mr. Gerry Katon Mahendra S.IP., M.I.P as the Head of the Public Administration Study Program, Faculty of Economics, Social Sciences and Humanities, Universitas 'Aisyiyah Yogyakarta who has given permission in the preparation of this thesis.
4. Mrs. Nur Faidati, S.IP., M.A as an Academic Supervisor who has guided me from semester 1 to the time I did my thesis.
5. Mrs. Erni Saharrudin, S.Sos., MPA. As a Supervisor who provides support and guidance during thesis preparation.
6. Mrs. Dewi Amanatun Suryani, S.IP., MPA as the Examining Lecturer who has provided a lot of input and of course guided the preparation of the thesis
7. To all lecturers of Public Administration Universitas Aisyiyah Yogyakarta who are always diligent in teaching and guiding writers passionately.
8. Countless thanks to Mr. Fathurohman and Mrs. Hibarwati as parents who the author loves and who are always proud of the author, thank you for your prayers, encouragement, and support that have become everything for life.
9. Thanks to Alm. Mbah Kakung Giwono and Mbah Putri Sugimah as grandparents who never stop giving prayers to the writer.
10. To Asraf Niam Muzaka and Adnan Mifzal Muhib as younger brothers who became the spirit for the author to complete his thesis on time.
11. Pak Agung, Pak Muhari, Ibu Wulan, Pak Dayat, and Pak Aris who are in the Sleman Regency Tourism Office and Pulewulung Tourism Village who have provided support and assistance to the author in completing the thesis.
12. Thank you to Yayah Asriyah Suparman, Ella Apriyani, and Vio Tahtania who always accompany the author in joys and sorrows, share stories and encourage each other in completing the thesis.
13. Thank you to your comrades in arms of Public Administration Unisa Yogyakarta class of 2020 for being extraordinary partners inside and outside lectures.

References

[1] N. Komariah, E. Saepudin, & P.M. Yusup, *Pengembangan Desa Wisata Berbasis Kearifan Lokal.* Jurnal Pariwisata Pesona *3*(2), 2018 https://doi.org/10.26905/jpp.v3i2.2340

[2] Masitah, *Pengembangan Desa Wisata Oleh Pemerintah Desa Babakan Kecamatan Pangandaran Kabupaten Pangandaran*. Dinamika: Jurnal Ilmiah Ilmu Administrasi Negara, 6 Nomor 3, 2018.

[3] D. P. O. Prasiasa, & D. A. D. Widari, *Desa Wisata Berbasis Pemberdayaan, Kemitraan, dan Penguatan Kelembagaan Di Desa Terunyan, Bali*, 2019.

[4] Supriatna, *Strategi Pemberdayaan Masyarakat Melalui Pengembangan Desa Wisata Di Desa Rawabogo Kecamatan Ciwidey Kabupaten Bandung Provinsi Jawa Barat,* 2020.
[5] D. Syarifuddin, *Model Pengembangan Desa Wisata Melalui Pemberdayaan Masyarakat Di Desa Ciburial.* Jurnal Ilmiah MEA (Manajemen, Ekonomi, Dan Akuntansi), *6*(3). 2022.
[6] D. Wahyuni, *Strategi Pemberdayaan Masyarakat dalam Pengembangan Desa Wisata Nglanggeran, Kabupaten Gunung Kidul.* Jurnal Aspirasi, *9*, 2018, 1–16. https://doi.org/10.22212/aspirasi.v7i1.1084
[7] Y. P. Wibhisana, *Pemberdayaan Masyarakat dan Komunitas dalam Program Desa Wisata Jogoboyo Purworejo.* Aspirasi: Jurnal Masalah-Masalah Sosial, 12(1), 2021. 31–45. https://doi.org/10.46807/aspirasi.v12i1.1741
[8] R. R. Wrihatnolo, & R. N. Dwidjowijoto, *Manajemen Pemberdayaan: Sebuah Pengantar dan Panduan untuk Pemberdayaan Masyarakat* (R. R. Wrihatnolo & R. N. Dwidjowijoto, Eds.). Elex Media Computindo. 2007.
[9] F. Zakaria, & R. D. Suprihardjo, *Konsep Pengembangan Kawasan Desa Wisata di Desa Bandungan Kecamatan Pakong Kabupaten Pemekasan*. JURNAL TEKNIK POMITS, *3*, 2014.

Mother's Parenting Style and Self-Identity of Teenagers in Rural Family in Jember

Abdul Aziz Azari[1*], Dwi Indah Lestari[2], Ishana Balaputra[3*], Superzeki Zaidatul Fadilah[4]
[1,2,3,4]Bachelor of Nursing Study Program, Bhakti Al-Qodiri College of Health Sciences

*Email: aryafgand@gmail.com

Abstract
Purpose: The formation of a teenager's self-identity cannot be separated from the parenting style of their parents. Success in establishing an identity as an individual teenager will be beneficial in determining the appropriate role in their life. This research aims to determine the relationship between maternal parenting patterns and adolescent self-identity in rural families in the city of Jember.
Method: This research uses quantitative research with a cross-sectional approach, which aims to determine the relationship between maternal parenting patterns and self-identity. Respondents in this study were teenagers aged 16-19 who had mothers and lived with their mothers in rural Jember. Thirty respondents were randomly selected.
Results: Most teenagers have a democratic parenting style, with 15 respondents (50.0%). Most teenagers have Identity Achievement, as many as 17 respondents (56.6%). P value 0.048 < 0.05, so it can be concluded that there is a relationship between the mother's parenting style and adolescent self-identity.
Keywords: Mother's Parenting Style, Self-identity, Teenagers, Rural Family.

Introduction
Adolescents are an age group that is at risk of experiencing disorders, both related to growth and development and psychological disorders [1]. This can affect the behavior and developmental tasks of adolescents, for example, promiscuous sexual behavior, juvenile delinquency, use of illegal drugs, early marriage, abortion, fighting with peers, and other behaviors that can cause problems for adolescents [2]. The number of abortions carried out by teenagers in Indonesia reaches 700-800 thousand out of a total teenage population of around 2.4 million. Meanwhile, the estimated number of people infected with HIV/AIDS has reached 52,000 [3]. According to data from the National Narcotics Agency (BNN), in 2011, around 3.6 million teenagers were involved in drug abuse, with this figure estimated to increase every year [4].
Erikson's theory emphasizes the importance of adolescence in identity formation. During this period, individuals face uncertainty, begin to understand their strengths and weaknesses, and develop confidence in their unique characteristics [5]. To thrive, teens need to experience a crisis in which they answer fundamental questions about their values, life goals, careers, and sexual identity [6]. Through reflection and self-understanding, adolescents achieve a consistent and solid understanding of identity that continues to develop over time [7].
When teenagers experience physical, emotional, cognitive, and social changes, they can experience an identity crisis if they cannot meet the expectations and encouragement of themselves and their social environment. This can make them confused about who they really are. This confusion can result in two things: first, teenagers can withdraw, staying away from peers and family, or second, they can conform too much to their peer

environment and lose their own identity. A protracted identity crisis during adolescence can make teenagers feel lost. As a result, they may tend to adopt behavior that is not in accordance with applicable social norms, such as committing criminal acts or closing themselves off from society, because adolescent identity crises are often associated with deviant behavior and destructive actions [8].

The formation of a teenager's self-identity cannot be separated from the parenting style of their parents [7]. Success in establishing an identity as an individual teenager will be beneficial in determining the appropriate role in their life. The process of identity formation during adolescence can guide behavior and attitudes toward the environment, influence goal achievement, and help in facing and choosing alternatives that arise in life. At this time, parents have the responsibility to provide guidance or direction to their children in introducing them to social life and the norms that apply in the surrounding community [9]. How parents educate children also influences the formation of their character [10]. The influence of parenting patterns from parents on the formation and development of children's personalities is very significant because the family is the first social environment where children can interact, learn, and express themselves as individuals in society [4].

This research aims to determine the relationship between maternal parenting patterns and adolescent self-identity in rural families in the city of Jember.

Methods

This research uses quantitative research with a cross-sectional approach, which aims to determine the relationship between maternal parenting patterns and self-identity. The respondents in this study were teenagers aged 16-19 years who had mothers and lived with their mothers in rural Jember, 30 respondents who were randomly selected. Primary data was collected using a parenting style questionnaire and self-identity questionnaire, while secondary data was based on articles, books, and several other literature. The mother's parenting pattern variable focuses on democratic, permissive, and authoritarian parenting patterns. Meanwhile, the self-identity variable focuses on Confused Identity (Identity Diffusion), Closed Identity (Identity Foreclosure), Delayed Identity (Identity Moratorium), and Achieved Identity (Identity Achievement). Data analysis used the chi-square test [11][12].

Results

Based on the results of research conducted by researchers, the following results were obtained:

Table 1.1 Frequency Distribution of Mother's Parenting Patterns in Adolescents

No	Mother's Parenting Style	Frequency	Percentage
1	Democratic	15	50.0%
2	Authoritarian	5	16.7%
3	Permissive	10	33.3%
Total		**30**	**100%**

Based on the table above, it can be seen that the majority of teenagers have a democratic parenting style, with 15 respondents (50.0%).

Table 1.2 Frequency Distribution of Self-Identification in Adolescents

No	Personal identity	Frequency	Percentage
1	Identity Diffusion	3	10%
2	Identity Foreclosure	5	16.7%
3	Identity Moratorium	5	16.7%
4	Identity Achievement	17	56.6%
Total		**30**	**100%**

The table above shows that the majority of teenagers have Identity Achievement: 17 respondents (56.6%).

Table 1.3 The Relationship between Mother's Parenting Patterns and Adolescents' Self-Identity

Data analysis	P Value
Chi-Square	0,048

Based on the table above, it can be seen that the p-value is 0.048 < 0.05, so it can be concluded that there is a relationship between maternal parenting patterns and adolescent self-identity.

Discussion

The research results showed that the majority of teenagers had a democratic parenting style, with 15 respondents (50.0%). This is in line with research conducted by Devita (2020) her research states that parents generally prefer a democratic parenting style to educate their children. However, some use an authoritarian or permissive parenting style. Analysis shows that as many as 19.9% of parents use authoritarian parenting, with an average score of 27.31. Meanwhile, 63.5% chose democratic parenting, with an average score of 30.30. Permissive parenting is used by 16.5% of parents, with an average score of 29.05 [13]

Parents who implement democratic parenting encourage teenagers to see the world from various points of view, involve them in the decision-making process, and recognize that sometimes teenagers have broader knowledge than parents [14]. Characteristics of children raised with a democratic parenting style include having self-confidence, a friendly attitude, the ability to control themselves, a polite attitude, cooperation, a high interest in knowledge, clear life goals, and a focus on achievement [15]. All of this has a significant impact on healthy identity formation in adolescents [4].

Apart from that, based on self-identity, the research results show that the majority of teenagers have Identity Achievement as many as 17 respondents (56.6%). Research conducted by Ira et al. (2021) in their research stated that the majority of teenagers in Kampung Gunung Putri RW 10 (64%) had good self-identity [6].

Teenagers who achieve identity (identity achievement) have the urge to seek information about various options for the future, actively ask questions, and find out about jobs, careers, and gender roles that are suitable for them. Adolescents who experience identity moratorium are still in a search process, where they try to gather information and undertake various activities that will guide their lives in the desired direction, including matters related to career aspirations, gender roles, and ideology. However, individuals in

this stage have yet to make a definitive commitment or choice based on the information they have received [4] [16].

There is a correlation between maternal parenting style and adolescent self-identity. The relationship between parents and adolescents has a significant impact on the formation of adolescent identity. When there is good communication between teenagers and parents, as well as emotional support and freedom for teenagers to explore their environment, this can help teenagers grow and gain a healthy understanding of themselves [17]. The closeness between adolescents and parents, providing space for adolescents to voice their opinions, support, and affection from parents, as well as creating open communication between parents and adolescents, will all influence the formation of adolescent identity [4].

Parents have an essential role in forming teenagers' self-identity. Therefore, parents are advised always to provide sound guidance and parenting patterns that are appropriate to the growth and development of adolescents so that the formation of self-identity goes well. Apart from parents, of course, many other things influence the formation of self-identity, especially the environment, so future researchers are expected to pay more attention to the influence of adolescents' environment on the formation of their self-identity.

Conclusion

Most teenagers have a democratic parenting style, with 15 respondents (50.0%). Most teenagers have Identity Achievement, as many as 17 respondents (56.6%). P value 0.048 < 0.05, so it can be concluded that there is a relationship between the mother's parenting style and adolescent self-identity.

Acknowledgment

I want to express my deepest gratitude to Stikes Bhakti Al-Qodiri, who has provided assistance and support during this research study. All the support provided by Stikes Bhakti Al-Qodiri has dramatically helped us complete this research.

References

[1] K. W. Gintari, D. M. A. D. Jayanti, I. G. A. P. S. Laksmi, and S. N. N. Sintari, "Kesehatan Mental Pada Remaja," *J. Nurs. Res. Publ. Media*, vol. 2, no. 3, pp. 167–183, Oct. 2023, doi: 10.55887/NRPM.V2I3.49.

[2] W. Reza *et al.*, "FAKTOR-FAKTOR YANG MEMPENGARUHI KESEHATAN MENTAL REMAJA DI KOTA BATAM," *J. SINTAK*, vol. 1, no. 1, pp. 1–7, Sep. 2022, Accessed: Jul. 16, 2024. [Online]. Available: https://journal.iteba.ac.id/index.php/jurnalsintak/article/view/21.

[3] Stefanicia Stefanicia and Ivana Devitasari, "Hubungan Tingkat Pengetahuan, Usia, Jenis Kelamin, dan Kesehatan Mental dengan Perilaku Berisiko Terkena Infeksi Menular Seksual pada Remaja di Wilayah Kerja Puskesmas Menteng Palangka Raya," *J. Surya Med.*, vol. 8, no. 2, pp. 291–295, Aug. 2022, doi: 10.33084/JSM.V8I2.3911.

[4] Afrilyanti, Herlina, and Siti Rahmalia, "Hubungan Pola Asuh Orangtua dengan Status Identitas Diri Remaja," *J. Online Mhs. Progr. Stud. Ilmu Keperawatan Univ. Riau*, vol. 2, no. 2, pp. 899–907, 2016, Accessed: Apr. 24, 2024. [Online]. Available: https://www.neliti.com/publications/183470/.

[5] Y. A. Appulembang and A. Agustina, "STUDI KOMPARATIF: PERBEDAAN

STATUS IDENTITAS DIRI REMAJA DITINJAU DARI POLA ASUH ORANGTUA DI UNIVERSITAS X DI JAKARTA," *J. Bimbing. DAN KONSELING AR-RAHMAN*, vol. 5, no. 1, pp. 17–23, Apr. 2019, Accessed: Apr. 24, 2024. [Online]. Available: https://ojs.uniska-bjm.ac.id/index.php/BKA/article/view/1767.

[6] I. O. Siagian, M. A. Tumbol, and S. Melia, "HUBUNGAN IDENTITAS DIRI DENGAN MOTIVASI BELAJAR REMAJA DI KAMPUNG GUNUNG PUTRI RW 10 DESA JAYAGIRI, KECAMATAN LEMBANG, KABUPATEN BANDUNG BARAT," *J. Sahabat Keperawatan*, vol. 3, no. 02, pp. 22–28, Aug. 2021, doi: 10.32938/JSK.V3I02.1380.

[7] C. Ari Ramdhanu and Y. Sunarya, "Faktor – Faktor yang Mempengaruhi Identitas Diri," *J. Innov. Couns. Theory, Pract. Res.*, vol. 3, no. 01, pp. 7–17, Jan. 2019, Accessed: Apr. 24, 2024. [Online]. Available: http://www.journal.umtas.ac.id/index.php/innovative_counseling/article/view/380.

[8] John W. Santrock, *Adolescence perkembangan remaja*, 6th ed. Jakarta: Erlangga, 2003.

[9] L. H. Martono and S. Joewana, *16 Modul Latihan Pemulihan Pecandu Narkoba Berbasis Masyarakat : Untuk Pembimbing dan Pecandu Narkoba // Lydia Harlina Martono, Satya Joewana | Dinas Perpustakaan dan Arsip Daerah DIY*, 1st ed. Jakarta: Balai Pustaka, 2005.

[10] H. Makwana, K. K. Vaghia, V. Solanki, V. Desai, and R. Maheshwari, "Impact of Parenting Styles and Socioeconomic Status on the Mental Health of Children," *Cureus*, vol. 15, no. 8, Aug. 2023, doi: 10.7759/CUREUS.43988.

[11] A. A. Azari, *Cara Mudah Menyusun Metode Penelitian Keperawatan dan Kebidanan*. Jakarta: Penerbit Trans Info Media (TIM), 2022.

[12] A. A. Azari, *Analisis Data Penelitian Kesehatan: Memahami dan Menggunakan SPSS Untuk Pemula*, I. Yogyakarta: Gosyen Publishing, 2024.

[13] Yeni Devita, "Hubungan Pola Asuh Orang Tua Dengan Masalah Mental Emosional Remaja," *J. Ilm. Univ. Batanghari Jambi*, vol. 20, no. 2, pp. 503–513, Jul. 2020, doi: 10.33087/jiubj.v20i2.967.

[14] M. Stracke *et al.*, "Mental Health Is a Family Affair—Systematic Review and Meta-Analysis on the Associations between Mental Health Problems in Parents and Children during the COVID-19 Pandemic," *Int. J. Environ. Res. Public Health*, vol. 20, no. 5, Mar. 2023, doi: 10.3390/IJERPH20054485/S1.

[15] U. N. A. Putri, Makmuroh Sri Rahayu, and Andhita Nurul, "Pengaruh Mindful Parenting terhadap Stres Pengasuhan pada Guru Wanita yang Memiliki Anak Sekolah Dasar," *J. Ris. Psikol.*, vol. 1, no. 1, pp. 69–75, 2021, doi: 10.29313/jrp.v1i1.227.

[16] A. A. Azari, *Asuhan Keperawatan Kesehatan Psikososial (Berbasis 3S)*. Bandung: Yrama Widya, 2023.

[17] F. M. Lubis and D. Mahendika, "Hubungan Parenting Style, Peer Pressure, Self-Esteem, dan Kesehatan Mental pada Remaja Indonesia di Jawa Barat," *J. Psikol. dan Konseling West Sci.*, vol. 1, no. 02, pp. 90–104, Mar. 2023, doi: 10.58812/JPKWS.V1I02.262.

Testing The Effectiveness Of Entamopathogenic Fungi Beauveria Bassiana To Overcome Peach Peater Pest(*Myzus Persicae* Sulz) On Chili Plants

Heny Munawaroh[1*], Rizka Rohmawati[2], Sharfina Mutia Syarifah[1], Ika Afiffah Nugraheni[1]

[1]Departement of Biotechnology, Faculty of Sains and Technology, Universitas 'Aisyiyah Yogyakarta[2]Research and Development, PT.Biotek Cipta Kreasi, Sleman, Yogyakarta

*Email: Heny190602@gmail.com

Abstract

Purpose: This research aims to determine alternative media that are suitable for the entamopathogenic fungus *Beauveria bassiana* and the effectiveness of the entamopathogenic fungus *Beauveria bassiana* in dealing with *Myzus persicae* S. onchili plants. This research was carried out in September-December 2023 in the PT laboratory. Biotek Cipta Kreasi Yogyakarta province.

Method: This research used a completely randomized design (CRD) method consisting of 3 treatments, namely (Beauveria with a density of 10 8, 10 7, 10 6) with different application times (1 day, 2 days, 3 days). The parameters observed were mortality and symptoms of peach aphids *Myzus persicae* which were calculated manually using the mortality calculation formula.

Result: Based on the results of research using the *Beauveria bassiana*fungus, it was concluded that this fungus is effective in dealing with peach aphid pest populations. As well as the alternative media used for cilembu tubers which issuitable for the growth of the *Beauveria bassiana* fungus.

Key words: *Beuveria bassiana,* Chili, *Myzus persicae* Sulz

Introduction

Chili (Capsicum annuum, L.) is one of the important vegetable commodities and has high economic value in Indonesia. Chili plants are developed both in the lowlands and highlands[1]. Chili fruit is widely used by people as a spice and cooking seasoning. Along with rapid population growth and the development of the food industry, the need for chilies in Indonesia has also increased[2]. Agriculture is a major activity, with chili (*Capsicum annuum* L.) being a significant crop due to its high economic value and widespread use in cooking and industry. Chili contains essential nutrients such as protein, fat, carbohydrates, calcium, phosphorus, iron, and vitamins C, A, and E, as well as beneficial alkaloids like capsaicin[3].The demand for chilies is growing due to population growth and the food industry's expansion [2]. However, continuous planting without regard for environmental factors has led to declining production, caused by low soil fertility, high evaporation rates, and pest attacks [4].

OPT attacks are one of the factors that hinder the smooth cultivation of chilies. One of the pests that attacks chili plants is peach aphids (Myzus persicae Sulz). This pest is a type of pest that attacks all types of cultivated plants (polyphages), especially those belonging to the Solanaceae family. This pest is often found on the underside of young chili leaves [5]. This pest can be a vector for more than 100 types of viruses, losses due to attacks by peach aphids range between 10-30% and during the dry season the losses incurred can be even greater, namely up to 40% if no control measures are taken [6]. Due to the high number of peach aphid attacks, farmers can experience quite high crop failures, so farmers make efforts to overcome them, one of which is by using pesticides to eradicate these pests. The use of pesticides and insecticides with active chemicals that

are difficult to decompose causes various negative impacts on the environment such as loss of biodiversity, decreasing the population of organisms around plants which are useful as natural enemies, and has dangerous impacts on health when used. in contact with the body[7].

To reduce the impact caused by insecticides, pest control techniques such as the use of entamopathogenic fungi are needed. The use of entamopathogenic fungi in controlling plant pests is quite effective because they have high pathogenicity against target pests and can suppress pest populations in the long term, are relatively cheap, and are environmentally friendly compared to using chemical pesticides. Entamopathogenic fungi are heterotrophic fungi. Because of their heterotrophic nature, entamopathogenic fungi live as parasites on insects [8]. The use of entamopathogenic fungi to control insects has the advantage of high production capacity, a relatively short cycle of entamopathogenic fungi and the ability to form spores that are resistant to adverse environmental conditions. Beauveria bassiana is a fungus that has great potential as a biological control agent because Beauveria bassiana causes white muscardine disease in pests. Beauveria bassiana has white mycelium and conidia or spores[9].
Beauveria bassiana is a type of entomopathogenic fungus which has been widely developed as a biological agent to control various types of pests and diseases[10]. The success of biological control using this fungus is able to kill all stages of insects up to 96% and has a fairly wide host range including the orders Homoptera, Hemiptera, Ortoptera, Coleoptera, Lepidoptera, Diptera, Isoptera and Hymenoptera and does not cause resistance. on target insects [11]. Apart from that, this fungus also produces secondary metabolites which are effective in reducing the intensity of disease caused by soil-borne pathogens by up to 99%[12].

Methods

This research employs an experimental method. This research was carried out in the research and development division at PT. Biotek Cipta Kreasi whose address is Kyai Samiyoredjo street, Jetis, Donolayan, Donoharjo, Ngaglik Subdistrict, Sleman Regency, Special Region of Yogyakarta.

Materi and tools

The tools used are digital scales, laminar air flow (LAF), hot plate, vortex, petridish, autoclave, Erlenmeyer, shaker, test tube, bunsen, pipette, microscope, hemocytometer, measuring cup, scissors, brush number 00, micropipette, camera , cotton wool, glass jar, tissue paper, tweezers, label paper, object glass, deck glass, ose needle, aluminum foil,

spray bottle, rubber nipple, knife, ruler, and stationery and other tools that support this research. The material used is Beauveria bassiana fungus isolate collected from PT. BCK, PDA (Potato Dextrose Agar) and PDB (Potato Dextrose Broth) media, sterile Reverse Osmosis (RO) water, peach aphids (Myzus persicae S), young leaves of chili plants and leaves of chili plants infected with peach aphids taken from Green house PT. Biotech Cipta Kreasi. This research used a completely randomized design (RAl) method with 9 treatment doses of B. bassiana mushrooms. The treatments were carried out without repetition so that 9 experimental units were obtained. The experiment was carried out in a jar with a height of 10 cm, then each unit had 1 young chili leaf with a sample of 20 peach aphids.

Creation of media and alternative media for growth

Making media begins by making PDA media so that it tilts the test tube and petri tube. Each tube contains 6 ml of media while each petri tube contains 10 ml of media. In making PDA media as much as 39 gr/L media. Then on a hot plate and stir using a magnetic stirrer. After boiling and mixing, it is then sterilized using an autoclave for 15 minutes [13].

Making alternative media from cilembu tubers. 600 grams of Cilembu sweet potatoes are peeled and cut into cubes, then washed until clean and boiled for 30 minutes using a pan with 2 liters of sterile RO water. After that, the essence or boiled water from the Cilembu sweet potatoes is filtered using a cloth filter. And put 600 ml into 2 Erlenmeyer flasks, then add 30 grams of agar powder and 20 grams of dextrose and 20 grams of dextrose then put on a hotplate until homogeneous. Then sterilized in an autoclave for 1 hour at a temperature of 121℃ and a pressure of 1 atm, then cooled. Next, the sweet potato media with the addition of agar powder and dextrose was divided into 2 (300 ml) with 1 Erlenmeyer's jar given ciprofloxacin (1ml/1L) and 1 Erlenmeyer's jar with nothing added [14].

Inoculation of the Beauveria bassiana fungus into the media

After making agar media (PDA) and making alternative agar media (cilembu tuber media), inoculation is carried out by preparing tools and materials, preparing LAF by sterilizing it using 70% alcohol and using UV. Then after lighting the Bunsen, sterilize the LAF using 70% alcohol. Then burn the tip of the tube needle and the lip of the test tube and the lip of the petridish on Bunsen before use, then take 1 tube of isolate and put it directly on the Petridish agar medium, the tip of the petridish is closed and burned with Bunsen then wrapped in cling wrap and given a label containing the name and date of inoculation. After that, it is incubated at room temperature for approximately 3-5 days and growth is observed. inoculation from agar media to liquid media (harvesting), harvesting is done by pouring 5ml of sterile RO on the agar media petridish then scratching the fungus and pouring it into the prepared liquid media then vortexing until homogeneous and incubating for 1 week, transfer is carried out aseptically inside the LAF [13].

Spore density calculation

Calculations of spore density in the Beauveria bassiana fungus were carried out starting on the 7th day of incubation, growth was observed and then spore density was calculated with the help of a Haemocytometer. The calculation was carried out by taking 0.5 µl of the solution with the help of a micropipette, after which it was placed in the hemocytometer, 1 drop for the bottom column and 1 drop for the top column. Calculation of spore density using the calculation formula:[15]

$$C = \frac{t}{n \times 0{,}25} \times 10^6$$

Ket C = kerapatan spora per ml larutan,

t = jumlah total spora dalam kotak sampel yang diamati

n = jumlah kotak sampel

0,25 = faktor koreksi penggunaan kotak sampel skala kecil pada haemocytometer.

Creation of the experimental arena and sampling

The chili leaves used in this research were taken from the chili plant greenhouse at PT. Biotech Cipta Kreasi. The chili leaves used are young chili leaves because peach aphid attacks generally start from young leaves, young stems, lower leaf surfaces, plant shoots, flower buds and young stems [13]. The chili leaves that had been taken were then placed in the experimental arena. The experimental arena used was using a jar containing cotton which had previously been moistened with water to prevent aphids from leaving and to maintain a constant temperature, then the jar was covered with tissue paper and tied using a rubber nipple. The peach aphids used were caught in the green house area of PT's chili plants. Biotech Cipta Kreasi. The peach aphids used in this experiment were 20 individuals/jar. The peach aphids are then placed on the chili leaves in the jar using a 00 size brush and a magnifying glass.

Treatment and treatment applications

P 1 (1): Beauveria bassiana fungus with a density of 10^6, 1 spray, every day

P 2 (1): Beauveria bassiana fungus with a density of 10^6, 1 spray, every 2 days

P 3 (1): Beauveria bassiana fungus with a density of 10^6, 1 spray, once every 3 days

P 1 (2): Beauveria bassiana fungus with a density of 10^7, 1 spray, every day

P 2 (2): Beauveria bassiana fungus with a density of 10^7, 1 spray, every 2 days

P 3 (2): Beauveria bassiana fungus with a density of 10^7, 1 spray, once every 3 days

P 1 (3): Beauveria bassiana fungus with a density of 10^8, 1 spray, every day

P 2 (3): Beauveria bassiana fungus with a density of 10^8, 1 spray, every 2 days

P 3 (3): Beauveria bassiana fungus with a density of 10^8, 1 spray, every 3 days

Pest observation population

Population observations were carried out in each jar on all plants. Pest observations were carried out every day for a week. Observations of symptoms of aphids were observed every day for a week and recorded.
Observation of symptoms of peach aphids infected with entomopathogenic fungi. Observations are made every day. Peach aphids infected by the fungus will experience loss of appetite and the Beauveria bassiana fungus will grow on their bodies. Peach aphids were then inoculated on agar media to identify the fungus attached to their bodies.
Observation of peach aphid mortality. The mortality percentage of peach aphids is calculated using the following formula[15]:

$$P = \frac{n}{N} X\ 100\%$$

Ket :

P = Mortalitas (%)

n = Jumlah imago yang mati

N = Jumlah seluruh imago

Results

Tabel 1. Aphid pest mortality data

No	Treatment	Mortality
1	P1(1)	61,9%
2	P2(1)	60%
3	P3(1)	45%
4	P1(2)	50%
5	P2(2)	52%
6	P3(2)	43,4%
7	P1(3)	91%
8	P2(3)	86%
9	P3(3)	87,5%

The research results showed that Beauveria bassiana was able to kill peach aphids above 10 individuals/treatment within 5 days and had an effect on the death of aphids. The highest death rate for aphids due to the influence of Beauveria bassiana was in treatment P1(3) with a density of 10^8 and a daily application interval (Tabel 1), which caused approximately 91% death of peach aphids and the lowest death rate for peach aphids due to the influence of Beauveria bassiana was treatment P3(2) with a density of 10^7 and an application interval of every 2 days, which causes around 43.4% death of peach aphids.

(A) (B)

Figure 1. Peach aphid. A) peach aphid before applying Beauveria bassiana. B) peach aphid after application of Beauveria Bassiana

Discussion

Beauveria bassiana fungus is known to produce many secondary metabolites such as beauvericin, beauverolides, bassianolides, oosporein, cyclosporin A, and oxalic acid with antibacterial, antifungal, cytotoxic and insecticidal activities.The results of mortality data from the Beauveria bassiana fungus show that the most effective treatment for killing aphids is treatment p1(3) using a spore density of $10^8$and with an application interval every day with one spray (0.6 ml) at a distance of 10 cm from the plant leaves. chilli. This research also shows that the Beauveria bassiana fungus tested on peach aphids had a significant effect on the mortality rate of peach aphids. Beauveria bassiana is able to kill more than 10 peach aphids/treatment in 5 days. The results of the study also showed that Beauveria bassiana had an influence on aphid mortality, the highest level of death of aphids due to the influence of Beauveria bassiana was the P1(3) treatment with a density of 10^8 and an application interval every day, which caused approximately 91% death of peach aphids and the death rate The lowest level of peach aphids due to the influence of Beauveria bassiana was treatment P3(2) with a density of 10^7 and an application interval of every 2 days, which caused approximately 43.4% death of peach aphids. High percentage of death mortality. Spraying is carried out in 3 intervals, namely spraying every day, spraying once every 2 days and spraying once every 3 days. Mechanism of infection. Beauveria bassiana fungus against insects, carried out directly by infecting the outer skin layer. The spores begin to germinate to form hyphae and continue to grow while producing chitinase and protease enzymes which destroy the cuticle. Due to damage to the cuticle, the hyphae will penetrate and develop inside the insect's body. The pest will die because the entire body is filled with Beauveria bassiana mycelium. At an advanced level, the hyphae will penetrate and grow on the outside of the insect's body, and produce conidia which will be spread into the environment and infect other insects[13]. The death of aphids due to the influence of Beauveria bassiana occurs gradually. Based on observations of peach aphids infected with the Beauveria bassiana fungus (figure 1), they generally show the same initial symptoms, namely lack of appetite, slowed movements, stiff body, hardening, and drying out like a mummy (mummification)[6]. The process of attack by entomopathogenic fungi causing the host to die is as follows: the conidia contact the insect's integument, then attach and germinate and penetrate by forming a sprout tube (appressorium)[16]. After entering the hemocoel, the fungus forms blastospores which circulate in the hemolymph and form secondary

hyphae to attack other tissues such as the nervous system, trachea and digestive tract. The occurrence of nutritional deficiencies and the presence of toxins produced by fungi, as well as tissue damage in the insect's body will cause paralysis and death of the insect. Peach aphids infected with Beauveria bassiana die and are blackish brown in color. Fungal infections on peach aphids began to occur 3 days after application. The bodies of dead aphids infected with the Beauveria bassiana fungus appear dry and hard, this happens because all the fluids in the aphids' bodies are used for growth by the Beauveria bassiana fungus. In accordance with the statement of jauharlina and Hendrival (2003) in [17] states that in general all networks and the insect's body fluids are used up by the entomopathogenic fungus for its growth and development, as a result the insect dies with its body hardening like a mummy. If conditions are favorable, the fungus will penetrate outside the insect's body, especially at the articulation of the body appendage and mouthparts. Behavioral changes that occurred in the larvae 5 days after application showed that movements began to slow down, feeding activity began to decrease. Changes in pests infected with the toxin were rupture and blackening of the tissue in the abdomen, the pests shrank, turned pale yellow then changed again to blackish brown, shape the pest's body shrinks, stiffens and hardens. This is in accordance with research by Boucias and Pandland (1998)[8] stating that the black color change that occurs on the insect's body is caused by the melanization process which is a form of defense of the insect's body against pathogens. Mycelium initially appears between the segments of the pest's body on the abdomen.

that due to the enzymatic and chemical mechanism of insect infection, it will cause an increase in blood pH, blood clots and cessation of blood circulation in insects, which will cause death and dead pests will turn wrinkled and black[12]. .Each entomopathogenic fungus produces metabolite compounds that act as toxins or cuticle degrading compounds, this greatly influences the effectiveness of entomopathogenic fungi in infecting host insects [17].

Conclusion

The conclusion obtained from the results of research using the Beauveria bassiana fungus is that this fungus is effective for the peach aphid pest population. The body of dead aphids infected with the Beauveria bassiana fungus looks dry and hard, because all the fluid in the aphid's body is used for growth by the Beauveria bassiana fungus. As a result, the insect dies with its body hardened like a mummy. If conditions are favorable, the fungus will penetrate outside the insect's body, especially at the articulation of the body appendage and mouthparts. As well as the alternative media used for cilembu tubers which is suitable for the growth of the Beauveria bassiana fungus.Summarize the main findings and contributions of the research.

Acknowledgment

This research is part of an internship activity which is a program of the Ministry of Education, Culture, Research and Technology which is carried out at PT. Biotek Cipta Kreasi supported by the Biotechnology study program at Aisyiyah University, Yogyakarta in 2023.

References

[1] M. Syukur and R. Yunianti, "Pemanfaatan Sumber Daya Genetik Lokal dalam Perakitan Varietas Unggul Cabai (Capsicum annuum) Tahan Terhadap Penyakit Antraknosa yang Disebabkan oleh Colletotrichum sp (Local Genetic Resources Utilization in Assembling Superior Chili Varieties (Capsic," *J. Ilmu Pertan.*, vol. 18, no. 2, pp. 67–72, 2013.

[2] V. Soelaiman and A. Ernawati, "Pertumbuhan dan Perkembangan Cabai Keriting (Capsicum annuum L.) secara In Vitro pada beberapa Konsentrasi BAP dan IAA," *Bul. Agrohorti*, vol. 1, no. 1, p. 62, 2013, doi: 10.29244/agrob.1.1.62-66.

[3] R. Zuhra, "EFEKTIVITAS BAKTERI ENDOFIT SEBAGAI PUPUK HAYATI TERHADAP PERTUMBUHAN DAN PRODUKSI CABAI (Capsicum annuum, L.)," *J. Pertan. Trop.*, vol. 4, no. 1, pp. 65–74, 2017, doi: 10.32734/jpt.v4i1.3071.

[4] M. G. M. Polii, T. D. Sondakh, J. S. M. Raintung, B. Doodoh, and T. Titah, "Kajian Teknik Budidaya Tanaman Cabai (Capsicum annuum L .) Kabupaten Minahasa Tenggara," *Eugenia*, vol. 25, no. 3, pp. 73–77, 2019.

[5] Trizelia, E. Sulyanti, and R. Saputra, "Kemampuan Kolonisasi Cendawan Endofit Trichoderma sp dan Beauveria bassiana Pada Tanaman Cabai dan Pengaruhnya Terhadap Populasi Kutu Daun Myzus persicae," *Pros. Semin. Nas.*, pp. 188–198, 2020.

M. M. Nasution, M. Sayuthi, H. Hasnah, J. P. Tanaman, and F. Pertanian, "Patogenisitas Cendawan Entomopatogen Beauveria bassiana terhadap Serangga Nezara viridula (L.) pada Stadia yang Berbeda (Pathogenicity of Entomopathogenic Fungus Beauveria bassiana to Insect Nezara viridula (L.) at Different Stages)," *J. Ilm. Mhs. Pertan.*, vol. 8, no. 1, p. 2023, 2023, [Online]. Available: www.jim.usk.ac.id/JFP

[6] R. Rustam, J. H. Laoh, J. Agroteknologi, F. Pertanian, and U. Riau, "Riyanto Tamba 1".

[7] M. A. Permadi, R. A. Lubis, and I. Kinarang, "Studi Keragaman Cendawan Entomopatogen Dari Berbagai Rizosfer Tanaman Hortikultura Di Kota Padangsidimpuan," *EKSAKTA J. Penelit. dan Pembelajaran MIPA*, vol. 4, no. 1, p. 1, 2019, doi: 10.31604/eksakta.v4i1.1-9.

[8] A. Rosmiati, C. Hidayat, E. Firmansyah, and Y. Setiati, "Potensi Beauveria bassiana sebagai Agens Hayati Spodoptera litura Fabr. pada Tanaman Kedelai," *Agrikultura*, vol. 29, no. 1, p. 43, 2018, doi: 10.24198/agrikultura.v29i1.16925.

[9] T. Ramakuwela *et al.*, "Establishment of Beauveria bassiana as a fungal endophyte in pecan (Carya illinoinensis) seedlings and its virulence against pecan insect pests," *Biol. Control*, vol. 140, no. September 2019, 2020, doi: 10.1016/j.biocontrol.2019.104102.

[10] G. M. Mascarin and S. T. Jaronski, "The production and uses of Beauveria bassiana as a microbial insecticide," *World J. Microbiol. Biotechnol.*, vol. 32, no. 11, 2016, doi: 10.1007/s11274-016-2131-3.

[11] M. S. Y. I. Bayu, Y. Prayogo, and S. W. Indiati, "Beauveria bassiana: Biopestisida Ramah Lingkungan dan Efektif untuk Mengendalikan Hama dan Penyakit Tanaman," *Bul. Palawija*, vol. 19, no. 1, p. 41, 2021, doi: 10.21082/bulpa.v19n1.2021.p41-63.

[12] Y. Harun, A. K. Parawansa, and A. Haris, "KAJIAN PATOGENISITAS Beauveria bassiana dan Metarhizium sp TERHADAP LARVA ULAT GRAYAK (Spodoptera frugiperda) PADA TANAMAN JAGUNG," *AGROTEK J. Ilm. Ilmu*

Pertan., vol. 6, no. 2, pp. 81–93, 2022, doi: 10.33096/agrotek.v6i2.238.

[13] I. F. N. Kholifah and L. Y. Romli, "Ubi Jalar (Ipomoea batatas L.) Cilembu Sebagai Media Alternatif Untuk Diagnostik Pertumbuhan Candida Albicans," *STIKes ICME JOMBANG*, 2021, [Online]. Available: https://scholar.google.com/citations?view_op=view_citation&hl=en&user=lNOniTUAAAAJ&pagesize=100&citation_for_view=lNOniTUAAAAJ:ldfaerwXgEUC"Muhammad Ihsan_2.pdf."

[14] R. Hasibuan, D. Retnosari, N. Yasin, P. Purnomo, and L. Wibowo, "Pengaruh Beberapa Teknik Pengendalian Terhadap Populasi Wereng Jagung Di Kecamatan Natar Kabupaten Lampung Selatan," *J. Agrotek Trop.*, vol. 9, no. 1, p. 61, 2021, doi: 10.23960/jat.v9i1.4799.

[15] H. N. Wildan, E. Firmansyah, and S. Nurhidayah, "Keefektifan Lecanicillium lecanii Mengendalikan Crocidolomia pavonana Pada Skala Laboratorium," *Agro Wiralodra*, vol. 5, no. 1, pp. 15–19, 2022, doi: 10.31943/agrowiralodra.v5i1.63.

Testing The Effectiveness Of Entamopathogenic Fungi Beauveria Bassiana To Overcome Peach Peater Pest(*Myzus Persicae* Sulz) On Chili Plants

Heny Munawaroh[1*], Rizka Rohmawati[2], Sharfina Mutia Syarifah[1], Ika Afiffah Nugraheni[1]

[1]Departement of Biotechnology, Faculty of Sains and Technology, Universitas 'Aisyiyah Yogyakarta[2]Research and Development, PT.Biotek Cipta Kreasi, Sleman, Yogyakarta

*Email: Heny190602@gmail.com

Abstract

Purpose: This research aims to determine alternative media that are suitable for the entamopathogenic fungus *Beauveria bassiana* and the effectiveness of the entamopathogenic fungus *Beauveria bassiana* in dealing with *Myzus persicae* S. onchili plants. This research was carried out in September-December 2023 in the PT laboratory. Biotek Cipta Kreasi Yogyakarta province.

Method: This research used a completely randomized design (CRD) method consisting of 3 treatments, namely (Beauveria with a density of 10 8, 10 7, 10 6) with different application times (1 day, 2 days, 3 days). The parameters observed were mortality and symptoms of peach aphids *Myzus persicae* which were calculated manually using the mortality calculation formula.

Result: Based on the results of research using the *Beauveria bassiana*fungus, it was concluded that this fungus is effective in dealing with peach aphid pest populations. As well as the alternative media used for cilembu tubers which issuitable for the growth of the *Beauveria bassiana* fungus.

Key words: *Beuveria bassiana,* Chili, *Myzus persicae* Sulz

Introduction

Chili (Capsicum annuum, L.) is one of the important vegetable commodities and has high economic value in Indonesia. Chili plants are developed both in the lowlands and highlands[1]. Chili fruit is widely used by people as a spice and cooking seasoning. Along with rapid population growth and the development of the food industry, the need for chilies in Indonesia has also increased[2]. Agriculture is a major activity, with chili (*Capsicum annuum* L.) being a significant crop due to its high economic value and widespread use in cooking and industry. Chili contains essential nutrients such as protein, fat, carbohydrates, calcium, phosphorus, iron, and vitamins C, A, and E, as well as beneficial alkaloids like capsaicin[3].The demand for chilies is growing due to population growth and the food industry's expansion [2]. However, continuous planting without regard for environmental factors has led to declining production, caused by low soil fertility, high evaporation rates, and pest attacks [4].

OPT attacks are one of the factors that hinder the smooth cultivation of chilies. One of the pests that attacks chili plants is peach aphids (Myzus persicae Sulz). This pest is a type of pest that attacks all types of cultivated plants (polyphages), especially those belonging to the Solanaceae family. This pest is often found on the underside of young chili leaves [5]. This pest can be a vector for more than 100 types of viruses, losses due to attacks by peach aphids range between 10-30% and during the dry season the losses incurred can be even greater, namely up to 40% if no control measures are taken [6]. Due to the high number of peach aphid attacks, farmers can experience quite high crop failures, so farmers make efforts to overcome them, one of which is by using pesticides to eradicate these pests. The use of pesticides and insecticides with active chemicals that

are difficult to decompose causes various negative impacts on the environment such as loss of biodiversity, decreasing the population of organisms around plants which are useful as natural enemies, and has dangerous impacts on health when used. in contact with the body[7].

To reduce the impact caused by insecticides, pest control techniques such as the use of entamopathogenic fungi are needed. The use of entamopathogenic fungi in controlling plant pests is quite effective because they have high pathogenicity against target pests and can suppress pest populations in the long term, are relatively cheap, and are environmentally friendly compared to using chemical pesticides. Entamopathogenic fungi are heterotrophic fungi. Because of their heterotrophic nature, entamopathogenic fungi live as parasites on insects [8]. The use of entamopathogenic fungi to control insects has the advantage of high production capacity, a relatively short cycle of entamopathogenic fungi and the ability to form spores that are resistant to adverse environmental conditions. Beauveria bassiana is a fungus that has great potential as a biological control agent because Beauveria bassiana causes white muscardine disease in pests. Beauveria bassiana has white mycelium and conidia or spores[9].
Beauveria bassiana is a type of entomopathogenic fungus which has been widely developed as a biological agent to control various types of pests and diseases[10]. The success of biological control using this fungus is able to kill all stages of insects up to 96% and has a fairly wide host range including the orders Homoptera, Hemiptera, Ortoptera, Coleoptera, Lepidoptera, Diptera, Isoptera and Hymenoptera and does not cause resistance. on target insects [11]. Apart from that, this fungus also produces secondary metabolites which are effective in reducing the intensity of disease caused by soil-borne pathogens by up to 99%[12].

Methods

This research employs an experimental method. This research was carried out in the research and development division at PT. Biotek Cipta Kreasi whose address is Kyai Samiyoredjo street, Jetis, Donolayan, Donoharjo, Ngaglik Subdistrict, Sleman Regency, Special Region of Yogyakarta.

Materi and tools

The tools used are digital scales, laminar air flow (LAF), hot plate, vortex, petridish, autoclave, Erlenmeyer, shaker, test tube, bunsen, pipette, microscope, hemocytometer, measuring cup, scissors, brush number 00, micropipette, camera , cotton wool, glass jar, tissue paper, tweezers, label paper, object glass, deck glass, ose needle, aluminum foil,

spray bottle, rubber nipple, knife, ruler, and stationery and other tools that support this research. The material used is Beauveria bassiana fungus isolate collected from PT. BCK, PDA (Potato Dextrose Agar) and PDB (Potato Dextrose Broth) media, sterile Reverse Osmosis (RO) water, peach aphids (Myzus persicae S), young leaves of chili plants and leaves of chili plants infected with peach aphids taken from Green house PT. Biotech Cipta Kreasi. This research used a completely randomized design (RAl) method with 9 treatment doses of B. bassiana mushrooms. The treatments were carried out without repetition so that 9 experimental units were obtained. The experiment was carried out in a jar with a height of 10 cm, then each unit had 1 young chili leaf with a sample of 20 peach aphids.

Creation of media and alternative media for growth

Making media begins by making PDA media so that it tilts the test tube and petri tube. Each tube contains 6 ml of media while each petri tube contains 10 ml of media. In making PDA media as much as 39 gr/L media. Then on a hot plate and stir using a magnetic stirrer. After boiling and mixing, it is then sterilized using an autoclave for 15 minutes [13].

Making alternative media from cilembu tubers. 600 grams of Cilembu sweet potatoes are peeled and cut into cubes, then washed until clean and boiled for 30 minutes using a pan with 2 liters of sterile RO water. After that, the essence or boiled water from the Cilembu sweet potatoes is filtered using a cloth filter. And put 600 ml into 2 Erlenmeyer flasks, then add 30 grams of agar powder and 20 grams of dextrose and 20 grams of dextrose then put on a hotplate until homogeneous. Then sterilized in an autoclave for 1 hour at a temperature of 121℃ and a pressure of 1 atm, then cooled. Next, the sweet potato media with the addition of agar powder and dextrose was divided into 2 (300 ml) with 1 Erlenmeyer's jar given ciprofloxacin (1ml/1L) and 1 Erlenmeyer's jar with nothing added [14].

Inoculation of the Beauveria bassiana fungus into the media

After making agar media (PDA) and making alternative agar media (cilembu tuber media), inoculation is carried out by preparing tools and materials, preparing LAF by sterilizing it using 70% alcohol and using UV. Then after lighting the Bunsen, sterilize the LAF using 70% alcohol. Then burn the tip of the tube needle and the lip of the test tube and the lip of the petridish on Bunsen before use, then take 1 tube of isolate and put it directly on the Petridish agar medium, the tip of the petridish is closed and burned with Bunsen then wrapped in cling wrap and given a label containing the name and date of inoculation. After that, it is incubated at room temperature for approximately 3-5 days and growth is observed. inoculation from agar media to liquid media (harvesting), harvesting is done by pouring 5ml of sterile RO on the agar media petridish then scratching the fungus and pouring it into the prepared liquid media then vortexing until homogeneous and incubating for 1 week, transfer is carried out aseptically inside the LAF [13].

Spore density calculation

Calculations of spore density in the Beauveria bassiana fungus were carried out starting on the 7th day of incubation, growth was observed and then spore density was calculated with the help of a Haemocytometer. The calculation was carried out by taking 0.5 µl of the solution with the help of a micropipette, after which it was placed in the hemocytometer, 1 drop for the bottom column and 1 drop for the top column. Calculation of spore density using the calculation formula:[15]

$$C = \frac{t}{n \times 0{,}25} \times 10^6$$

Ket C = kerapatan spora per ml larutan,

t = jumlah total spora dalam kotak sampel yang diamati

n = jumlah kotak sampel

0,25 = faktor koreksi penggunaan kotak sampel skala kecil pada haemocytometer.

Creation of the experimental arena and sampling

The chili leaves used in this research were taken from the chili plant greenhouse at PT. Biotech Cipta Kreasi. The chili leaves used are young chili leaves because peach aphid attacks generally start from young leaves, young stems, lower leaf surfaces, plant shoots, flower buds and young stems [13]. The chili leaves that had been taken were then placed in the experimental arena. The experimental arena used was using a jar containing cotton which had previously been moistened with water to prevent aphids from leaving and to maintain a constant temperature, then the jar was covered with tissue paper and tied using a rubber nipple. The peach aphids used were caught in the green house area of PT's chili plants. Biotech Cipta Kreasi. The peach aphids used in this experiment were 20 individuals/jar. The peach aphids are then placed on the chili leaves in the jar using a 00 size brush and a magnifying glass.

Treatment and treatment applications

P 1 (1): Beauveria bassiana fungus with a density of 10^6, 1 spray, every day

P 2 (1): Beauveria bassiana fungus with a density of 10^6, 1 spray, every 2 days

P 3 (1): Beauveria bassiana fungus with a density of 10^6, 1 spray, once every 3 days

P 1 (2): Beauveria bassiana fungus with a density of 10^7, 1 spray, every day

P 2 (2): Beauveria bassiana fungus with a density of 10^7, 1 spray, every 2 days

P 3 (2): Beauveria bassiana fungus with a density of 10^7, 1 spray, once every 3 days

P 1 (3): Beauveria bassiana fungus with a density of 10^8, 1 spray, every day

P 2 (3): Beauveria bassiana fungus with a density of 10^8, 1 spray, every 2 days

P 3 (3): Beauveria bassiana fungus with a density of 10^8, 1 spray, every 3 days

Pest observation population

Population observations were carried out in each jar on all plants. Pest observations were carried out every day for a week. Observations of symptoms of aphids were observed every day for a week and recorded.
Observation of symptoms of peach aphids infected with entomopathogenic fungi. Observations are made every day. Peach aphids infected by the fungus will experience loss of appetite and the Beauveria bassiana fungus will grow on their bodies. Peach aphids were then inoculated on agar media to identify the fungus attached to their bodies.
Observation of peach aphid mortality. The mortality percentage of peach aphids is calculated using the following formula[15]:

$$P = \frac{n}{N} X\ 100\%$$

Ket :

P = Mortalitas (%)

n = Jumlah imago yang mati

N = Jumlah seluruh imago

Results

Tabel 1. Aphid pest mortality data

No	Treatment	Mortality
1	P1(1)	61,9%
2	P2(1)	60%
3	P3(1)	45%
4	P1(2)	50%
5	P2(2)	52%
6	P3(2)	43,4%
7	P1(3)	91%
8	P2(3)	86%
9	P3(3)	87,5%

The research results showed that Beauveria bassiana was able to kill peach aphids above 10 individuals/treatment within 5 days and had an effect on the death of aphids. The highest death rate for aphids due to the influence of Beauveria bassiana was in treatment P1(3) with a density of 10^8 and a daily application interval (Tabel 1), which caused approximately 91% death of peach aphids and the lowest death rate for peach aphids due to the influence of Beauveria bassiana was treatment P3(2) with a density of 10^7 and an application interval of every 2 days, which causes around 43.4% death of peach aphids.

(A) (B)

Figure 1. Peach aphid. A) peach aphid before applying Beauveria bassiana. B) peach aphid after application of Beauveria Bassiana

Discussion

Beauveria bassiana fungus is known to produce many secondary metabolites such as beauvericin, beauverolides, bassianolides, oosporein, cyclosporin A, and oxalic acid with antibacterial, antifungal, cytotoxic and insecticidal activities.The results of mortality data from the Beauveria bassiana fungus show that the most effective treatment for killing aphids is treatment p1(3) using a spore density of $10^8$and with an application interval every day with one spray (0.6 ml) at a distance of 10 cm from the plant leaves. chilli. This research also shows that the Beauveria bassiana fungus tested on peach aphids had a significant effect on the mortality rate of peach aphids. Beauveria bassiana is able to kill more than 10 peach aphids/treatment in 5 days. The results of the study also showed that Beauveria bassiana had an influence on aphid mortality, the highest level of death of aphids due to the influence of Beauveria bassiana was the P1(3) treatment with a density of 10^8 and an application interval every day, which caused approximately 91% death of peach aphids and the death rate The lowest level of peach aphids due to the influence of Beauveria bassiana was treatment P3(2) with a density of 10^7 and an application interval of every 2 days, which caused approximately 43.4% death of peach aphids. High percentage of death mortality. Spraying is carried out in 3 intervals, namely spraying every day, spraying once every 2 days and spraying once every 3 days. Mechanism of infection. Beauveria bassiana fungus against insects, carried out directly by infecting the outer skin layer. The spores begin to germinate to form hyphae and continue to grow while producing chitinase and protease enzymes which destroy the cuticle. Due to damage to the cuticle, the hyphae will penetrate and develop inside the insect's body. The pest will die because the entire body is filled with Beauveria bassiana mycelium. At an advanced level, the hyphae will penetrate and grow on the outside of the insect's body, and produce conidia which will be spread into the environment and infect other insects[13]. The death of aphids due to the influence of Beauveria bassiana occurs gradually. Based on observations of peach aphids infected with the Beauveria bassiana fungus (figure 1), they generally show the same initial symptoms, namely lack of appetite, slowed movements, stiff body, hardening, and drying out like a mummy (mummification)[6]. The process of attack by entomopathogenic fungi causing the host to die is as follows: the conidia contact the insect's integument, then attach and germinate and penetrate by forming a sprout tube (appressorium)[16]. After entering the hemocoel, the fungus forms blastospores which circulate in the hemolymph and form secondary

hyphae to attack other tissues such as the nervous system, trachea and digestive tract. The occurrence of nutritional deficiencies and the presence of toxins produced by fungi, as well as tissue damage in the insect's body will cause paralysis and death of the insect. Peach aphids infected with Beauveria bassiana die and are blackish brown in color. Fungal infections on peach aphids began to occur 3 days after application. The bodies of dead aphids infected with the Beauveria bassiana fungus appear dry and hard, this happens because all the fluids in the aphids' bodies are used for growth by the Beauveria bassiana fungus. In accordance with the statement of jauharlina and Hendrival (2003) in [17] states that in general all networks and the insect's body fluids are used up by the entomopathogenic fungus for its growth and development, as a result the insect dies with its body hardening like a mummy. If conditions are favorable, the fungus will penetrate outside the insect's body, especially at the articulation of the body appendage and mouthparts. Behavioral changes that occurred in the larvae 5 days after application showed that movements began to slow down, feeding activity began to decrease. Changes in pests infected with the toxin were rupture and blackening of the tissue in the abdomen, the pests shrank, turned pale yellow then changed again to blackish brown, shape the pest's body shrinks, stiffens and hardens. This is in accordance with research by Boucias and Pandland (1998)[8] stating that the black color change that occurs on the insect's body is caused by the melanization process which is a form of defense of the insect's body against pathogens. Mycelium initially appears between the segments of the pest's body on the abdomen.

that due to the enzymatic and chemical mechanism of insect infection, it will cause an increase in blood pH, blood clots and cessation of blood circulation in insects, which will cause death and dead pests will turn wrinkled and black[12]. .Each entomopathogenic fungus produces metabolite compounds that act as toxins or cuticle degrading compounds, this greatly influences the effectiveness of entomopathogenic fungi in infecting host insects [17].

Conclusion

The conclusion obtained from the results of research using the Beauveria bassiana fungus is that this fungus is effective for the peach aphid pest population. The body of dead aphids infected with the Beauveria bassiana fungus looks dry and hard, because all the fluid in the aphid's body is used for growth by the Beauveria bassiana fungus. As a result, the insect dies with its body hardened like a mummy. If conditions are favorable, the fungus will penetrate outside the insect's body, especially at the articulation of the body appendage and mouthparts. As well as the alternative media used for cilembu tubers which is suitable for the growth of the Beauveria bassiana fungus.Summarize the main findings and contributions of the research.

Acknowledgment

This research is part of an internship activity which is a program of the Ministry of Education, Culture, Research and Technology which is carried out at PT. Biotek Cipta Kreasi supported by the Biotechnology study program at Aisyiyah University, Yogyakarta in 2023.

References

[1] M. Syukur and R. Yunianti, "Pemanfaatan Sumber Daya Genetik Lokal dalam Perakitan Varietas Unggul Cabai (Capsicum annuum) Tahan Terhadap Penyakit Antraknosa yang Disebabkan oleh Colletotrichum sp (Local Genetic Resources Utilization in Assembling Superior Chili Varieties (Capsic," *J. Ilmu Pertan.*, vol. 18, no. 2, pp. 67–72, 2013.

[2] V. Soelaiman and A. Ernawati, "Pertumbuhan dan Perkembangan Cabai Keriting (Capsicum annuum L.) secara In Vitro pada beberapa Konsentrasi BAP dan IAA," *Bul. Agrohorti*, vol. 1, no. 1, p. 62, 2013, doi: 10.29244/agrob.1.1.62-66.

[3] R. Zuhra, "EFEKTIVITAS BAKTERI ENDOFIT SEBAGAI PUPUK HAYATI TERHADAP PERTUMBUHAN DAN PRODUKSI CABAI (Capsicum annuum, L.)," *J. Pertan. Trop.*, vol. 4, no. 1, pp. 65–74, 2017, doi: 10.32734/jpt.v4i1.3071.

[4] M. G. M. Polii, T. D. Sondakh, J. S. M. Raintung, B. Doodoh, and T. Titah, "Kajian Teknik Budidaya Tanaman Cabai (Capsicum annuum L .) Kabupaten Minahasa Tenggara," *Eugenia*, vol. 25, no. 3, pp. 73–77, 2019.

[5] Trizelia, E. Sulyanti, and R. Saputra, "Kemampuan Kolonisasi Cendawan Endofit Trichoderma sp dan Beauveria bassiana Pada Tanaman Cabai dan Pengaruhnya Terhadap Populasi Kutu Daun Myzus persicae," *Pros. Semin. Nas.*, pp. 188–198, 2020.

M. M. Nasution, M. Sayuthi, H. Hasnah, J. P. Tanaman, and F. Pertanian, "Patogenisitas Cendawan Entomopatogen Beauveria bassiana terhadap Serangga Nezara viridula (L.) pada Stadia yang Berbeda (Pathogenicity of Entomopathogenic Fungus Beauveria bassiana to Insect Nezara viridula (L.) at Different Stages)," *J. Ilm. Mhs. Pertan.*, vol. 8, no. 1, p. 2023, 2023, [Online]. Available: www.jim.usk.ac.id/JFP

[6] R. Rustam, J. H. Laoh, J. Agroteknologi, F. Pertanian, and U. Riau, "Riyanto Tamba 1".

[7] M. A. Permadi, R. A. Lubis, and I. Kinarang, "Studi Keragaman Cendawan Entomopatogen Dari Berbagai Rizosfer Tanaman Hortikultura Di Kota Padangsidimpuan," *EKSAKTA J. Penelit. dan Pembelajaran MIPA*, vol. 4, no. 1, p. 1, 2019, doi: 10.31604/eksakta.v4i1.1-9.

[8] A. Rosmiati, C. Hidayat, E. Firmansyah, and Y. Setiati, "Potensi Beauveria bassiana sebagai Agens Hayati Spodoptera litura Fabr. pada Tanaman Kedelai," *Agrikultura*, vol. 29, no. 1, p. 43, 2018, doi: 10.24198/agrikultura.v29i1.16925.

[9] T. Ramakuwela *et al.*, "Establishment of Beauveria bassiana as a fungal endophyte in pecan (Carya illinoinensis) seedlings and its virulence against pecan insect pests," *Biol. Control*, vol. 140, no. September 2019, 2020, doi: 10.1016/j.biocontrol.2019.104102.

[10] G. M. Mascarin and S. T. Jaronski, "The production and uses of Beauveria bassiana as a microbial insecticide," *World J. Microbiol. Biotechnol.*, vol. 32, no. 11, 2016, doi: 10.1007/s11274-016-2131-3.

[11] M. S. Y. I. Bayu, Y. Prayogo, and S. W. Indiati, "Beauveria bassiana: Biopestisida Ramah Lingkungan dan Efektif untuk Mengendalikan Hama dan Penyakit Tanaman," *Bul. Palawija*, vol. 19, no. 1, p. 41, 2021, doi: 10.21082/bulpa.v19n1.2021.p41-63.

[12] Y. Harun, A. K. Parawansa, and A. Haris, "KAJIAN PATOGENISITAS Beauveria bassiana dan Metarhizium sp TERHADAP LARVA ULAT GRAYAK (Spodoptera frugiperda) PADA TANAMAN JAGUNG," *AGROTEK J. Ilm. Ilmu*

Pertan., vol. 6, no. 2, pp. 81–93, 2022, doi: 10.33096/agrotek.v6i2.238.

[13] I. F. N. Kholifah and L. Y. Romli, "Ubi Jalar (Ipomoea batatas L.) Cilembu Sebagai Media Alternatif Untuk Diagnostik Pertumbuhan Candida Albicans," *STIKes ICME JOMBANG*, 2021, [Online]. Available: https://scholar.google.com/citations?view_op=view_citation&hl=en&user=lNOniTUAAAAJ&pagesize=100&citation_for_view=lNOniTUAAAAJ:ldfaerwXgEUC"Muhammad Ihsan_2.pdf."

[14] R. Hasibuan, D. Retnosari, N. Yasin, P. Purnomo, and L. Wibowo, "Pengaruh Beberapa Teknik Pengendalian Terhadap Populasi Wereng Jagung Di Kecamatan Natar Kabupaten Lampung Selatan," *J. Agrotek Trop.*, vol. 9, no. 1, p. 61, 2021, doi: 10.23960/jat.v9i1.4799.

[15] H. N. Wildan, E. Firmansyah, and S. Nurhidayah, "Keefektifan Lecanicillium lecanii Mengendalikan Crocidolomia pavonana Pada Skala Laboratorium," *Agro Wiralodra*, vol. 5, no. 1, pp. 15–19, 2022, doi: 10.31943/agrowiralodra.v5i1.63.

The Relationship of Hemodialysis Duration with Fluid Restrictions Compliance Among Chronic Kidney Disease Patient

L . Syahrul Robiul Azim[1], Estriana Murni Setiawati[1*]
[1]Nursing Departement, Faculty of Health Sciences, 'Aisyiyah Yogyakarta University

*Email: **estriana.ms@unisayogya.ac.id**

Abstract

Purpose: Chronic Kidney Disease is a condition of decreased kidney function, which occurs when the kidneys are unable to transport the body's metabolic waste or carry out their regular functions. This disease is characterized by irreversible and progressive worsening of kidney function.To identify the relationship between the length of time undergoing hemodialysis and compliance with fluid intake restrictions in patients undergoing hemodialysis

Method: Quantitative research type with analytical observational research design with a cross sectional approach. The population in this study was 254 hemodialysis patients with a purposive sampling technique, namely 72 hemodialysis patients. Data analysis used the Kendall Tau statistical test.

Results: Characteristics of respondents based on age, the majority of the elderly aged 56-65 years (33.3%), based on gender, the majority male (56.9%), based on education level, the majority high school/high school (38.9%), based on occupation the majority did not work (67.7%), based on the length of time undergoing hemodialysis, the majority in the old category was (54.2%), and the majority in the less compliant category had compliance with fluid intake restrictions (86.1%). There is a relationship between the length of time undergoing hemodialysis and compliance with fluid intake restrictions in chronic kidney failure patients with a value of p=0.003 (p value<0.01).

Keywords **:** Duration of Hemodialysis, Compliance with Fluid Restrictions, Chronic Kidney Disease

Introduction

Chronic Kidney Disease (CKD) is a condition of decreased kidney function, which occurs when the kidneys are unable to transport the body's metabolic waste or carry out their regular functions. A substance that is usually eliminated in urine accumulates in body fluids due to impaired renal excretion and causes disruption of endocrine and metabolic functions, fluids, electrolytes and acid bases [1]. This disease is characterized by irreversible and progressive worsening of kidney function. Chronic kidney disease will occur if *the Glomerular Filtrate Rate* (GFR) is <60 ml/minute/1.73 for three months or more, and is said to be in the final stage if the GFR reaches <15 ml/minute/1.73 with dialysis or not [2].

According to *the World Health Organization* (WHO) (2019), the incidence of chronic kidney disease worldwide reaches 10% of the population, while those undergoing hemodialysis reach 1.5 million people worldwide. Data in Indonesia, the incidence of chronic kidney disease is 0.38% or 3.8 per 1000 Indonesian population [3]. Chronic kidney disease sufferers are aged around 50 years and are of productive age. Data from *the Indonesian renal registry* (IRR) in 2018 who underwent hemodialysis were 66,433 patients, while active patients In 2018 there were 132,142 hemodialysis patients. According to Basic Health Research (RIKESDAS, 2018) in Yogyakarta

Special Region there are disease prevalence chronic kidney disease was 0.43%. The number of chronic kidney disease sufferers is more common among men (0.4%) than women (0.3%).

The results of a preliminary study in the hemodialysis room at the PKU Muhammadiyah Hospital in Yogyakarta on November 25 2023 showed that there were 254 routine hemodialysis patient data in a month. As an initial observation, there were 10 patients undergoing hemodialysis therapy in the hemodialysis room at PKU Muhammadiyah Hospital, Yogyakarta, with the patients experiencing thirst due to restrictions on fluid intake. There were 7 patients who said they were still unable to limit their fluid intake so they often experienced edema and shortness of breath due to the excess fluid volume, and 3 others were still able to comply with limiting their fluid intake by eating sweets to prevent the feeling of thirst a little. Of the 10 hemodialysis patients, the average length of time they underwent hemodialysis was 5 years.

In patients with chronic kidney disease, the inability of the body's organ function to maintain fluid and electrolyte balance can cause clinical manifestations such as uremia and decreased ability to concentrate urine which results in edema. Apart from edema, other impacts include anemia as a result of a decrease in the amount of erythropoietin production due to the age of red blood cells being less than optimal, the emergence of nutritional disorders, and the appearance of bleeding caused by the client's uremic condition [4]. Excess fluid in this case is a risk factor that can increase the morbidity and mortality rates of chronic kidney disease patients undergoing hemodialysis therapy . If this condition is allowed to continue, it will cause heart failure and can even lead to death [5].

One of the treatments for chronic kidney disease is hemodialysis which aims to improve kidney function and improve quality of life. Hemodialysis is a kidney replacement therapy carried out 2-3 times a week for 4-5 hours, which aims to remove the remains of protein metabolism and correct fluid and electrolyte balance disorders [6]. Therefore, chronic kidney disease patients must undergo hemodialysis regularly and implement good self-management [7].

Self-management in hemodialysis patients includes compliance with hemodialysis, medication, diet fluid and sodium. Restricting fluids and sodium in hemodialysis patients can reduce the consequences of increasing body fluid volume, reduce blood pressure and *Interdialytic Weight Gain (IDWG)* [8]. Interdialytic Weight Gain (IDWG) is an increase in the amount of fluid that causes weight gain as a basis for determining the amount of fluid received during the interdialytic period (Novia et al., 2020).

Based on previous research, the duration of hemodialysis has a significant correlation with compliance with fluid intake limits (P 0.014) with a negative correlation (r -0.0375), meaning that the longer undergoing hemodialysis, the lower the compliance with fluid restrictions [9]. Meanwhile, other research with the results of *Kendall's tau* analysis shows a calculated value (p) of 0.681. A calculated value above 0.005 indicates that the length of hemodialysis and compliance with fluid intake is not significant, the longer the patient undergoing hemodialysis is less compliant with limiting fluid intake because the patient has reached the acceptance stage [10]. Therefore, researchers are interested in conducting research on "the relationship between length of time undergoing hemodialysis and compliance with fluid intake restrictions in patients undergoing hemodialysis at PKU Muhammadiyah Hospital Yogyakarta".

Methods

The type of research used is quantitative research, with an analytical observational research design with a *cross sectional approach* , namely the measurement of the independent variable and the dependent variable is carried out simultaneously and only once for each respondent [11]. In this study, researchers used medical records to examine the relationship between length of time undergoing hemodialysis and questionnaires regarding compliance with fluid intake restrictions in patients undergoing hemodialysis at PKU Muhammadiyah Hospital Yogyakarta .

The population in this study was all people undergoing hemodialysis without distinguishing between gender, totaling 254 people. The sampling method was carried out using a *purposive sampling* method , The sample in this research is with criteria respondents who are over 18 years old, patients who undergo routine hemodialysis, patients who can have their weight weighed and can stand, undergo hemodialysis twice a week, undergo outpatient treatment, can communicate verbally, and are willing to be respondents at the PKU Muhammadiyah Hospital in Yogyakarta.

Data analysis uses *Kendall Tau* to determine the relationship between the independent variable and the dependent variable (Duarsa, 2021). In this study, the independent variable is the relationship between length of time undergoing hemodialysis and the dependent variable is compliance with fluid intake restrictions.

Results

This chapter will describe the research results which include data collection, data analysis and discussion of research results. The results of this research will be presented in table form. The research was carried out from February 15 to February 16 2024 in the Hemodialysis room at PKU Muhmadiyah Hospital Yogyakarta through interviews using questionnaires and observations regarding the relationship between the length of undergoing hemodialysis and compliance with fluid intake restrictions in patients with chronic kidney disease.

Data collection was carried out for 2 days, namely February 15 to February 16 2024 with a total of 72 respondents.

1. Respondent demographic data consisting of age, gender, education and occupation.

Table 4. 1Frequency Distribution of Respondent Characteristics at PKU Muhammadiyah Hospital Yogyakarta

No	Characteristics Respondent	Frequency n (72)	Percentage (%)
1	**Age**		
	17-25 (Teenagers End)	2	2.8
	26-35 (Adult Beginning)	5	6.9
	36-45 (Adult End)	13	18.1
	46-55 (Elderly Beginning)	19	26.4
	56-65 (Elderly End)	24	33.3
	≥65 (Seniors)	9	12.5
2	**Type Sex**		
	Man	41	56.9
	Woman	31	43.1
3	**Education**		
	elementary school	11	15.3

	JUNIOR HIGH SCHOOL	17	23.6
	high school/high school	28	38.9
	vocational school	1	1.4
	Bachelor	7	9.7
	Diploma	5	6.9
	No school	3	4.2
4	**Work**		
	Work	24	33.3
	No Work	48	66.7
	Total	**72**	**100**

Based on table 4.1 regarding the frequency distribution of characteristics of respondents at the PKU Muhammadiyah Hospital in Yogyakarta, it shows that the characteristics of respondents based on age are mostly elderly people aged 56-65 years as many as 24 people (33.3%). Characteristics of respondents based on gender showed that the majority of respondents were male, 41 people (56.9%). Characteristics of respondents based on level of education showed that the highest level of education of respondents was SMA/SLTA, 28 people (38.9%). Based on job characteristics, the largest number of respondents were not working, 48 people (67.7%).

2. Duration of Hemodialysis in Chronic Kidney Disease Patients

Table 4. 2Frequency Distribution of Respondents' Time Undergoing Hemodialysis at PKU Muhammadiyah Hospital Yogyakarta

No	Duration of Hemodialysis	Frequency	Percentage (%)
1	New (<12 months)	19	26.4
2	Medium (12-24 months)	14	19.4
3	Long (>24 months)	39	54.2
	Total	**72**	**100**

Based on table 4.2 regarding the frequency distribution of the length of time undergoing hemodialysis in chronic kidney disease patients with hemodialysis therapy at PKU Muhammadiyah Hospital Yogyakarta, it shows that the length of time undergoing hemodialysis in the old category was 39 people (54.2%), while it was 14 people (19.4%).) and only 19 people (26.4%).

3. Compliance with Fluid Intake Restrictions in Chronic Kidney Disease Patients

Table 4.3 Frequency Distribution of Compliance with Respondents' Fluid Intake Restrictions at PKU Muhammadiyah Hospital Yogyakarta

No	Obedience Restrictions Intake Fluid	Frequency	Percentage (%)
1	Not enough Obedient	62	86.1
2	Obedient	10	13.9
	Total	**72**	**100**

Based on table 4.3 regarding the frequency distribution of compliance with restrictions on fluid intake of respondents, it shows that compliance with restrictions on fluid intake in patients with chronic kidney disease in the less compliant category was 62 people (86.1%), in the compliant category was 10 people (13.9%).

4. Relationship between duration of undergoing hemodialysis and compliance with fluid intake restrictions in chronic kidney disease patients

Table 4. 5 Distribution Frequency Long Lasting Relationship Hemodialysis with Obedience Restrictions Intake Fluid Respondents at the PKU Muhammadiyah Hospital in Yogyakarta

Long serving Hemodialysis	**Obedience Restrictions Intake Fluid**		**Total**	**Correlation coefficient**	**Sign.**
	Not enough Compliant F (%)	Compliant F (%)	F (%)	-0.331	0.003
New	12 (16.7)	7 (9.7)	19 (26.4)		
Currently	13 (18.0)	1 (1.4)	14 (19.4)		
Long	37 (51.4)	2 (2.8)	39 (54.2)		
Total	**62 (86.1)**	**10 (13.9)**	**72 (100)**		

Based on table 4.5, it shows that the percentage of time undergoing hemodialysis in the new category with compliance with fluid intake restrictions in the non-compliant category was 12 people (16.7%), the length of time undergoing hemodialysis in the new category with compliance with fluid intake restrictions in the compliant category was 7 people (9, 7%), length of time undergoing hemodialysis in the moderate category with compliance with fluid intake restrictions in the less compliant category was 13 people (18.0%), length of time undergoing hemodialysis in the moderate category with compliance with fluid intake restrictions in the compliant category was 1 person (1.4 %), length of time undergoing hemodialysis in the old category with compliance with fluid intake restrictions in the less compliant category was 37 people (51.4%), length of time undergoing hemodialysis in the long category with compliance with fluid intake restrictions in the compliant category was 2 people (2.8%). The contingency result value is -0.331, which means the correlation between the two variables for the length of undergoing hemodialysis and compliance with limiting fluid intake with sufficient correlation. The results of the SPSS test with a p value *of* (0.003) (<0.01) which means that Ha is accepted, that is, there is a relationship between the length of undergoing hemodialysis and compliance with limiting fluid intake in patients with chronic kidney disease.

Discussion

1. Duration of Hemodialysis in Chronic Kidney Disease Patients

The results of this study show that the length of time undergoing hemodialysis for chronic kidney disease patients at PKU Muhammadiyah Hospital Yogyakarta is included in the long category, namely 39 people (54.2%). According to similar research conducted by [12], the majority of patients undergoing hemodialysis are in the old category, where hemodialysis is a therapy used to treat chronic kidney disease, namely a condition where the kidneys cannot function properly. Chronic kidney disease is a progressive condition that cannot be cured. Patients with chronic kidney disease need to undergo regular hemodialysis to help control blood urea, creatinine and electrolyte levels. The length of time a patient undergoes hemodialysis depends on the severity and overall health condition of the patient.

Patients who are non-compliant with hemodialysis, such as not following the hemodialysis schedule or not limiting fluid intake, may need to undergo hemodialysis for a long time [13].

Long-term treatment will have effects on sufferers, such as psychological pressure for sufferers without complaints or symptoms of illness when they are declared sick and have to undergo long treatment. [14] states that respondents who have undergone hemodialysis therapy for a long time tend to have lower levels of anxiety compared to respondents who have just undergone hemodialysis, this is because the longer a person undergoes hemodialysis, the person will be more adaptive to dialysis procedures. Patients who have been undergoing hemodialysis therapy for a long time may already be in the acceptance phase. Patients first diagnosed with chronic kidney disease must undergo long-term dialysis.

Long treatment is a burden in terms of the costs involved, the injections that take so long to receive are felt to be quite boring. The side effects of the drug, even though they are mild, will still make the sufferer feel uncomfortable. It is difficult to convince sufferers to continue treatment for a long period of time. The length of treatment requires tenacity and perseverance on the part of the sufferer himself [15].

2. Compliance with Fluid Intake Restrictions in Chronic Kidney Disease Patients

Based on the research results, it shows that compliance with limiting fluid intake in patients with chronic kidney disease at PKU Muhammadiyah Hospital Yogyakarta was highest in the non-compliant category at 62 people (86.1%).

Based on the research results, it is known that the majority of respondents undergoing hemodialysis therapy were aged 56-65 years, 24 people (33.3%) who were less compliant with limiting fluid intake. Because as age increases, the level of compliance with limiting a person's fluid intake decreases. The aging process can affect changes in kidney function [16]. This is in accordance with the opinion which states that the age of a person who has entered the age of 40 years and above has much better health behavior compared to those aged below or above, because at that age they have given maturity in thinking about behaving better for their health [17]. Elderly chronic kidney disease patients are less compliant with limiting fluid intake, which can be because the patient experiences memory loss. Elderly patients experience cognitive impairment so they forget the amount of fluid they have consumed.

Based on gender, the majority were men, 41 people (56.9%) who were less compliant with limiting fluid intake. Men get thirstier more easily so they are less compliant with fluid restrictions because men have more activity outside so they consume more fluids. This is in accordance with the opinion which states that the body composition of men and women is different, men tend to have more muscle tissue while women have more fat content in their bodies, so that women have less body fluids than men. resulting in women's thirst threshold being lower than men [18].

Based on education, the majority were high school/high school graduates, 28 (38.9%) were less compliant with limiting fluid intake. In line with research conducted by [19] that education is an important factor in being able to understand and regulate oneself in limiting eating and drinking. Research conducted by [20] states that there is a significant relationship between education of 60.4% and diet and fluid compliance in patients with chronic kidney disease, so that the greater the level

of education, the greater the level of understanding of diet compliance and fluid management. chronic kidney disease patient in the Hemodialysis room at Koja Regional Hospital, North Jakarta.

Based on work, the majority did not work as many as 48 people (67.7%) were less compliant with limiting fluid intake, due to lack of family support in controlling fluid intake. In line with research by [21], family support is also needed to ensure that patients remain consistent in controlling fluids because they interact directly with patients at all times at home. Good fluid intake regulation can prevent excessive IDWG. According to the research results, it was found that 64.9% of respondents received support from their families to undergo hemodialysis therapy and control fluid intake. The family functions as a starting point for behavior and provides a basic definition of health and illness. So the family also plays a role in influencing individual perceptions.

3. Relationship between duration of undergoing hemodialysis and compliance with fluid intake restrictions in chronic kidney disease patients

Table 4.5 shows that the highest percentage was undergoing hemodialysis for a long time in the long category with compliance with fluid restrictions in the less compliant category, namely 37 people (51.4%). Based on this research, in terms of age, the majority are 56-65 years old, where older people are less compliant with fluid restrictions, which could be because patients experience memory loss. Elderly patients experience cognitive impairment so they forget the amount of fluid they have consumed [17]. Based on gender, the majority are men, where men have more activity outside, causing them to consume more fluids so they are less compliant with fluid restrictions compared to women [18]. Based on the majority of high school/high school education, patients who have a high level of education make it easier to receive information so that a good perception regarding fluid restrictions is formed [22]. Based on occupation, the majority do not work, where people who do not work are less compliant with limiting fluid intake than people who work, because working people have a more regular schedule, which can help them to be more disciplined in following fluid intake restrictions [23].

Kendall Tau test produces an Ƭ value of -0.331 and a significant value (p) of 0.003, which is smaller than 0.01, so there is a relationship between the length of undergoing hemodialysis and compliance with limiting fluid intake in patients with chronic kidney disease at PKU Muhammadiyah Hospital, Yogyakarta. The coefficient value is negative, meaning that the longer you undergo hemodialysis, the lower the compliance with fluid restrictions and vice versa, the more recently you undergo hemodialysis, the higher the compliance with fluid restrictions.

The results were similar to previous researchers in that patients who had been ill for less than one year were more compliant with fluid restrictions. The longer the illness, the higher the risk of decreased compliance because the patient has reached the acceptance stage [24]. Similar results in a study in South Africa showed that non-compliance with fluid restrictions was 10-74%, non-compliance with compliance medication ranged from 3 to 80%, and non-compliance with diet was 2-39% [25].

The buildup of fluids in the body causes the function of the heart and lungs to become unstable or heavy, which results in the patient's physical response becoming quickly tired and tense, physical activity is also disturbed both when carrying out light and moderate activities.

Restricting fluid intake will change the lifestyle of patients who are considered to have an abnormality. And the recommended eating pattern is not liked by most sufferers so they often ignore their eating pattern [26].

Education is an important factor for hemodialysis patients to be able to understand and regulate themselves in limiting eating and drinking. This proves that education has an influence on compliance with limiting fluid intake in hemodialysis patients. It is hoped that the higher the patient's education, the more compliant the patient will be in limiting fluid intake [19].

Hemodialysis is a kidney replacement therapy carried out by patients with chronic kidney disease, a disease that will last a lifetime. The duration of hemodialysis affects compliance with fluid intake restrictions. Each patient requires a different level of compliance with fluid intake restrictions. The longer the patient undergoes hemodialysis, the more it is hoped that the patient will be more compliant and can control fluid intake restrictions properly, but this is inversely proportional to what is expected in limiting fluid intake. The longer patients undergoing hemodialysis therapy are less compliant in limiting fluid intake because the patient has reached the acceptance stage [27].

Limitations of this research include the researchers cannot see significantly the discipline, organization and effort in limiting fluid intake in patients with chronic kidney disease which can cause an increase in interdialytic weight gain if the patient is not compliant with limiting fluid intake, researchers do not know the significant factors that can cause an increase in interdialytic weight gain, for example efforts and how to control the patient's intake and output before undergoing hemodialysis therapy, and the results of measuring body weight are only seen from medical records and are not carried out directly when the patient is undergoing hemodialysis.

Suggestions for future researchers are that many patients undergoing hemodialysis are still in the category of less compliant with fluid intake restrictions, besides that the patient's family and health workers play an important role in increasing information regarding fluid intake restrictions so that it is hoped that patients with chronic kidney disease will always comply with the fluid restrictions they undergo so that complications such as edema, shortness of breath and fatigue did not occur.

Conclusion

Characteristics of respondents based on age, the majority of elderly people aged 56-65 years were 33.3%. Characteristics of respondents based on gender were mostly male at 56.9%. Respondent characteristics based on education level were mostly SMA/SLTA as much as 38.9%. Characteristics of respondents based on occupation, the majority were not working, 67.7%. Respondents undergoing hemodialysis were in the old category as much as 54.2%. Compliance with fluid intake restrictions in patients with chronic kidney disease on hemodialysis therapy was in the less compliant category at 86.1%. There is a relationship between the length of time undergoing hemodialysis and compliance with fluid intake restrictions in chronic kidney failure patients with a *p value* = 0.003, the correlation is -0.331, which is in the sufficient category, and the direction of the correlation is negative.

Acknowledgment

I would like to express my sincere gratitude to my supervisor, Estriana Murni Setiawati, MNS who has been wholeheartedly patient in guiding. I also would like to express my gratitude to Edy Suprayitno, M. Kep as a thesis examiner who has provided input and suggestions to improve the results. Lastly, I would like to thank all the respondent for their invaluable support in completing this research project.

References

[1] Harmilah, "Asuhan Keperawatan pada Pasien dengan Gangguan Sistem Perkemihan," *PT Pustaka Bru Press*, 2020.

[2] Rosliana, "Adaptasi Pasien Penyakit Ginjal Kronik pada Efektor Konsep Diri," *J. EDUNursing*, 2019.

[3] Kemenkes RI, "Laporan Nasional Riskesdas," *Badan Penelit. dan Pengemb. Kesehat.*, 2018, [Online]. Available: Jakarta

[4] P. Wijaya, A. K., & Padila, "Hubungan Dukungan Keluarga, Tingkat Pendidikan Dan Usia Dengan Kepatuhan Dalam Pembatasan Asupan Cairan Pada Klien Esrd Yang Menjalani Terapi Hemodialisa," *J. Keperawatan Silampari*, vol. 3(1), pp. 323–404, 2019.

[5] M. T. D. Suparmo, S., & Hasibuan, "Hubungan Kepatuhan Pembatasan Cairan Terhadap Terjadinya Edema Post Hemodialisa Pada Pasien Gagal Ginjal Kronik Di Rumah Sakit Aminah Kota Tangerang.," *Indones. Trust Heal. J.*, vol. 4(2), pp. 522–528, 2021.

[6] A. Putri, E. Indrawati, I. Alini, "Hubungan Dukungan Keluarga dan Kebutuhan Spiritual dengan Tingkat Kecemasan Pasien Gagal Ginjal Kronik dalam menjalani Terapi Hemodialisis di RSUD Bangkinang," *J. Ners*, vol. 4 (2), pp. 47–55, 2020.

[7] D. . Pratiwi, D.T. Tamtomo, "Deteminants of the Quality of Life for Hemodialysis Patients," *Indones. J. Med.*, vol. 4 (2), pp. 145–154, 2019, doi: https://doi.org/10.26911/theijmed.2019.04.02.08.

[8] A. F. Anggraini, F. & Putri, "Pemantauan Intake Output Cairan pada Pasien Gagal Ginjal Kronik dapat Mencegah Overload Cairan," *J. Keperawatan Indones.*, vol. 19 (3), pp. 152–160, 2016.

[9] C. Anita and D. Novitasari, "'Kepatuhan Pembatasan Asupan Cairan Terhadap Lama Menjalani Hemodialisa,'" *J. Kesehat. Masy*, vol. 1(1), pp. 104–112, 2017.

[10] John and W. & Sons, "(Ed. Thomas, Keperawatan Ginjal: Perawatan dan Penatalaksanaan Penderita Penyakit Ginjal," 2019.

[11] I. Nurhaedah, *Buku Ajar Kesehatan Lingkungan: Metodologi Penelitian*. Kementerian Kesehatan Republik Indonesia, 2017.

[12] S. Nurchayati, "nalisis Faktor-Faktor yang Berhubungan dengan Kualitas Hidup Pasien Penyakit Ginjal Kronik yang Menjalani Hemodialisis. 26 April 2015.," 2019, doi: http://repository.usu.ac.id/bitstream/123456789/27561/7/Cover.pdf.

[13] Melianna, "'Hubungan Kepatuhan Pembatasan Cairan Terhadap Terjadinya Overload pada Pasien Gagal Ginjal Kronik Post Hemodialisa di Rumah Sakit Umum Pusat Fatmawati,'" *J. Ilmu Keperawatan Orthop.*, vol. 2(1), 2019.

[14] Sulistini. R., "Hubungan Tekanan Darah Pre Hemodialisis dan Lama Menjalani Hemodialisis Dengan Penambahan Berat Badan Interdialitik Di Ruang Hemodialisis RS.MOH. Hoesin Palembang.," 2023.

[15] Sudoyo., *Buku Ajar Ilmu Penyakit Dalam. Jakarta: Balai Penerbit FKUI*. 2021.
[16] W. M. Schoolwerth, A, C., Engelgau, M, M., Hostetter, T, H., Rufo, K, H., McClelan, "Chronic Kidney Disease a Public Health Problem that Needs a Public Health Action Plan. Prevention Chronic Disease," vol. Vol (3)., 2019.
[17] Marniati, "Pemberdayaan Kesehatan Masyarakat. Jakarta: Rajagrafindo," 2021.
[18] Isrofah & Angkasa, "'The Efffect Of Sipping Ice To Reducethirsty Feel In Chronic Kidney Disease Patients Who Have Hemodialysis In Rsud Bendan Pekalongan City,' Faculty of Health Science , Pekalongan University," 2019.
[19] L. Y. Lindbreg, "Fibrosis Ginjal: Wawasan Baru Tentang Patogenesis DanTerapi.," Ginjal Int.," 2020.
[20] M. E. Naryati, N., & Nugrahandari, "Faktor-faktor yang Berhubungan dengan Kepatuhan Diet Pada Pasien Gagal Ginjal Kronik Melalui Terapi Hemodialisis," *J. Ilm. Keperawatan (Scientific J. Nursing)*, vol. 7(2), pp. 256–265, 2021, doi: https://doi.org/10.33023/jikep.v7i2.799.
[21] Yuni Permata, "Hubungan Antara Masukan Cairan Dengan Interdialytik Wieght Gains (IDWG) Pada Pasien Chronic Kidney Diseases di Unit Hemodialisis RS PKU Muhammadiyah Yogyakarta.," 2021.
[22] Aditya, "'Faktor-Faktor yang Berhubungan dengan Kepatuhan Pembatasan Cairan pada Pasien CKD Ruang Rawat Inap Rumah Sakit Sentra Medika Cibinong Kabupaten Bogor,' Universitas Medika Suherman.," 2023, doi: https://repository.medikasuherman.ac.id/xmlui/handle/123456789/2936.
[23] Fidayanti, ""Kepatuhan Pembatasan Cairan pada Klien Gagal Ginjal Kronis yang Menjalani Hemodialisa di RSI Jemursari Surabaya," *J. Keperawatan*, vol. 11(2), 2018.
[24] & E. L.Kammerer. J., Garry, G., Hartigan, M., Carter, B., "Kepatuhan Pada Pasien Pada Dialsys: Strategi Untuk Sukses," *Nephrol. Perawat. Jurnalkeperawatan J.*, vol. 34, t, p. hal.479– 487, 2021.
[25] dan A. M. CG Geldine, B. Bhengu, "Kepatuhan pasien Penyakit Ginjal Kronis dewasa sehubungan dengan dialisis, pengobatan, diet dan pembatasan cairan," *Res. J. Sembuh. Sains*, vol. jilid. 5, p. hal. 3, 2020, doi: doi: 10.4314/rejhs.v5i1.2.
[26] W. Riyanto, "Hubungan antara Penambahan Berat Badan di antara Dua Waktu Hemodialisis (Interdialysis Weight Gain = IDWG) terhadap Kualitas Hidup Pasien Penyakit Ginjal Kronik yang Menjalani Terapi Hemodialisis, Tesis. Jakarta: Universitas Indonesia," 2023.
[27] S. Nurchayati, "Analisis Faktor-Faktor yang Berhubungan dengan Kualitas Hidup Pasien Penyakit Ginjal Kronik Menjalani Hemodialisis," 2020, doi: http:// repository.usu.ac.id/ bitstream/ 123456789/27561/7/, 2020.

Knowledge And Foot Care Behavior Among Diabetic Patient

Novia Putri Widya Astuti[1], Estriana Murni Setiawati[2*]
[1-2]Department Nursing, Faculty of Health Sciences, 'Aisyiyah University Yogyakarta

*Email: estriana.ms@unisayogya.ac.id

Abstract

Purpose: Diabetic foot ulcers can significantly impact the physical and psychosocial aspects of a patient's life, leading to a reduced quality of life and an increased risk of death. To prevent complications from diabetic foot wounds, it is essential to have good knowledge and good foot care behaviors.To identify the knowledge and foot care behavior of patients with diabetes mellitus.
Methods: The study employed a descriptive research design with a cross-sectional approach. The research focused on 48 respondents who were type 2 diabetes mellitus patients who had visited the Internal Medicine Clinic in the last month. The total sampling technique was used to select the respondents. The instruments used in the study were The Foot Care Knowledge Questionnaire and the Nottingham Assessment of Functional Footcare.
Results: The results showed that the majority of respondents were elderly aged 56-65 years (37.5%), female (60.4%), housewives (29.2%), married (87.5%), higher education (33.3%), income >2,500,000, had diabetes <10 years (62.5%), had complications (56.3%) with hypertension type (59.3%), never received education about foot care behavior (83.3%), knowledge of foot care behavior was good (75.0%), and diabetic foot care behavior was good (75.0%).
Keywords: Knowledge, Diabetes Mellitus, Foot Care Behavior

Introduction

Diabetes mellitus (DM) is one of the chronic diseases that has significant implications for public health globally. In low-middle-income countries, the prevalence of diabetes mellitus is increasing at a faster rate than in other countries [1]. Based on data indicates that there has been a 10.5% increase in the number of adults (aged 20-79 years) diagnosed with diabetes. Of these individuals, half were unaware of their condition. In addition, the prevalence of diabetes in Indonesia has increased in the last ten years. This figure is projected to reach 28.57 million by 2045, representing a 47% increase from the 19.47 million in 2021 [2]. Based on Basic Health Research data in 2018 indicates that Yogyakarta Province has the third highest incidence of diabetes mellitus among all provinces in Indonesia [3]. The prevalence of diabetes mellitus in the Special Region of Yogyakarta reached 4.5%, while Yogyakarta City alone has a prevalence rate of 4.9%, which is higher than the other four districts. In 2022, the number of individuals who have diabetes in Yogyakarta City reached 28,420 people, which is equivalent to 86.6% of the total population. This represents an increase from the previous year when the number of cases reached 26,720 [4].

Long-term (chronic) diabetes mellitus is often associated with complications [5]. Diabetes complications consist of macrovascular and microvascular problems. The most prevalent complication is a pathological alteration of the lower extremities, which is medically designated as diabetic foot [6]. Diabetic foot is a severe impact of diabetes

mellitus, manifesting as open skin wounds (ulceration), infection, and tissue damage that can result in amputation. This condition affects 6% of individuals with diabetes mellitus [Mishra & Schaper in 7]. Diabetic foot ulcers account for approximately 85% of all amputations in patients who are not due to traumatic injury but rather caused by the spread of infection and gangrene [Ahmeti & Jain in 8]. Diabetic foot ulcers have the potential to affect the physical and psychosocial aspects of a person's life, which can result in a decreased quality of life and increased risk of death [Pereira & Rice JB in 9]. To prevent diabetic foot ulcers, it is essential for diabetic patients to have knowledge about foot care and to exhibit proper foot care behavior.

The Ministry of Health of the Republic of Indonesia has provided guidelines for foot care for people with diabetes. These guidelines include daily cleaning of feet using water and soap, applying moisturizers to dry feet, and avoiding moisture between the toes to prevent fungal infections. Additionally, it is recommended to cut toenails straight, not too close to the skin, and to wear properly fitting footwear such as shoes or sandals to protect the feet from injuries. Before wearing, it is advisable to check shoes for pebbles or sharp objects. Minor wounds should be treated and covered with a clean cloth or gauze. Regular checks for signs of inflammation in the feet are necessary, and if wounds are present, it is essential to consult a doctor immediately [10].

The results of the research conducted by [9] Shows that the knowledge factor about foot care significantly affects predictors of foot care behavior in Indonesia. The study's mean foot care knowledge score was 5.33 ± 2.2, indicating a poor overall level of foot care knowledge. The mean standard score regarding foot care behavior was 47.4, indicating poor overall foot care behavior. Research findings by [11] 84.8% of participants needed better knowledge, and only 8.8% followed good care practices. Previous research results showed that 72.8% of people living with diabetes had poor foot care behavior [12]. In contrast to the findings of [13], which indicated that 38% had good knowledge about diabetic foot care, and 22% were known to follow good diabetic foot care practices.

In light of the above description, which was obtained from the results of previous studies, the inconsistencies that arise in this study have attracted the attention of researchers, who have sought to examine the knowledge and foot care behavior of patients with diabetes mellitus at PKU Muhammadiyah Yogyakarta Hospital.

Methods

This study employed a descriptive cross-sectional design and was conducted at the PKU Muhammadiyah Yogyakarta Hospital between October 2023 and March 2024. The study sample consisted of 48 patients with type 2 diabetes mellitus who underwent an outpatient examination at the Internal Medicine Clinic of PKU Muhammadiyah Yogyakarta Hospital during the last month. The non-probability sampling method with a total sampling technique was employed to obtain the samples.

The research variables were knowledge of foot care behavior as the independent variable and foot care behavior as the dependent variable. The research instrument is a questionnaire, namely the Foot Care Knowledge Questionnaire, which consists of 11 items. This questionnaire was developed by [14] in English and has been backward translated into Indonesian. It has also carried out a validity test using the Content Validity Index (CVI), which shows the results of 0.91 and acceptable test-retest reliability with r = 0.67-1, Kurden-Richardson 20 (KR-20) analysis was also carried out with the results of

the KR-20 coefficient of 0.37 by [15]. Subsequently, the diabetic foot care behavior questionnaire, developed by [16] and modified for Indonesian using the back translation method, was tested for reliability using Cronbach's alpha. The resulting Cronbach's alpha was 0.53, and the reliability coefficient was 0.83 (r> r-table = 0.532) by [17].

The data were collected through direct interviews with respondents. Before the interview, the researcher informed the prospective respondents of the research procedures, objectives, and benefits. This was done to obtain informed consent. Once the respondents had been told and agreed to participate, the researcher requested that they sign the consent form, thereby becoming research respondents. The data were analyzed using SPSS 27 with descriptive frequency statistics. This study has obtained ethical approval from the Research Ethics Committee of the Training Secretariat of PKU Yogyakarta Hospital, with certificate number 00011/KT.7.4/I/2024.

Results

According to Table 1, the majority of participants in this study are in the 56-65 age group (37.5%), female (60.4%), housewives (29.2%), married (87.5%), have higher education (33.3%), with an income >2,500,000, have had diabetes for less than ten years (62.5%), have complications (56.3%) with type of hypertension (59.3%), have never received education about foot care behavior (83.3%), and have good knowledge of foot care behavior (75.0%). Additionally, 75.0% of the participants showed good diabetic foot care behavior.

Table 1
Sociodemographic Characteristics, Knowledge of Foot Care Behavior, and Foot Care Behavior of People with T2DM (n=48, n=27)

Characteristics/ Study Variables	Frequency	Percentage
Age		
Late Teens (17-25)	1	2.1%
Early Adulthood (26-35)	1	2.1%
Late Adults (36-45)	2	4.2%
Early Elderly (46-55)	12	25.0%
Late Elderly (56-65)	18	37.5%
Elderly (>65)	14	29.2%
Gender		
Male	19	39.6%
Female	29	60.4%
Education Level		
Primary Education (Elementary and Junior High School)	16	33.3%
Secondary Education (Senior and Vocational High School)	14	29.2%
Higher Education (College)	16	33.3%
Not In School	2	4.2%
Employment Status		
Not Working	4	8.3%
Laborer	4	8.3%
Self-employed / Entrepreneur	8	16.7%
Private Employee	7	14.6%
Civil Servant	1	2.1%
Housewife	14	29.2%
Retired	10	20.8%
Marital Status		
Married	42	87.5%

Unmarried	2	4.2%
Widower	2	4.2%
Widowed	2	4.2%
Income Level		
<2.500.000	14	29.2%
2.500.000	5	10.4%
>2.500.000	17	35.4%
No Income	12	25.0%
Length of Time with Diabetes		
< 10 Years	30	62.5%
≥ 10 Years	18	37.5%
Complications		
Has Complications	27	56.3%
No Complications	18	37.5%
Had Complications, but Recovered	3	6.3%
Diabetic Foot Care Behavior Education		
Ever	8	16.7%
Never	40	83.3%
Knowledge of Foot Care Behavior		
Good	36	75.0%
Satisfactory	11	22.9%
Poor	1	2.1%
Diabetes Foot Care Behavior		
Good	36	75.0%
Less Good	12	25,0%
Total	48	100,0%
Types of Complications		
Heart	2	7.4%
Hypertension	16	59.3%
Diabetic Retinopathy	1	3.7%
Multiple Complications	8	29.6%
Total	27	100,0%

Source: Primary Data (2024)

Discussion

1. Knowledge of Foot Care Behavior

In this study, most respondents had good knowledge of foot care behavior. One researcher assumes that this is caused by doctor advice, the custom of washing feet before prayer, and health education via television, radio, and the internet [13]. Increasing patient foot care knowledge and understanding of foot-related risks and consequences will result in better diabetes foot care behavior [15], [18], [19]. This research shows that knowledge of good foot care behavior may be caused by factors influencing it.

In this study, although respondents had good knowledge categories, their lack of education in the practical aspects of daily foot care could hinder their foot care behavior [20], caused by a lack of appropriate education [21]. Two studies discovered that the absence of patient education in foot care resulted from nurses and physicians prioritizing other aspects, such as blood glucose and diet management, over foot care education during diabetes education. Patients only received foot care advice after the onset of diabetic foot disease [21], [22]. In this study, 83.3% of respondents had never received education regarding foot care behavior.

Regarding age, most respondents were late elderly (56-65 years). Elderly respondents can also perform good foot care because of their more significant experience and skills. Younger age is associated with the ability to access information. However, increasing age will be followed by increasing knowledge and skills [23]. Most respondents have a high level of education. A high level of education was assumed, with adequate knowledge of disease management [12], [24]. Highly educated people are expected to be more likely to read and receive information about diseases, care for their feet, and understand the information provided by medical staff in healthcare settings [11].

2. Foot Care Behavior

This study found that most respondents engaged in good foot care behavior. This study's results are consistent with previous research stating that most diabetes mellitus sufferers engage in good foot care [15]. However, this study's results do not match previous research, which stated that most diabetes mellitus sufferers had poor foot care behavior [12]. The difference between this study's results and those of previous studies could be due to factors that influenced it.

Most of the respondents were late elderly (56-65 years). Age is a determining factor in diabetes foot care practices, with older patients having better diabetes foot care behaviors than younger patients [9], [24]. Elderly respondents can carry out good foot care because they have more experience and skills so they are, making them wiser in carrying it out [23]. The majority of respondents were women. Gender influences diabetes foot care behavior, with women appearing to be better at foot care than men [11], [25], [26]. Men seem to pay less attention to foot care because social habits and daily life require them to work [27].

In terms of marital status, the majority of respondents are married. Patients who have a partner and family support show better foot care behavior [27], [28]. Powered by [21] who reported that lack of family support compromised diabetic foot care behavior. Furthermore, the majority of respondents earned more than the district minimum wage. Patients with higher incomes and better access to health services showed increased diabetic foot care behavior [15], [18], [29], [30]. A high income can also increase self-efficacy in diabetes mellitus sufferers by increasing the growth of positive perceptions of their disease [15].

The limitations of this study include the influence of the crowded polyclinic environment and the risk of disturbing the comfort and focus of respondents in filling out the questionnaire. In polyclinics, respondents frequently encounter crowded or crowded conditions, particularly when awaiting a physician's consultation or procuring pharmaceuticals from the pharmacy. The completion of the questionnaire may be disrupted by the necessity of patients being called to be examined by a doctor. In such instances, the patient must resume the questionnaire in the exact location (in front of the clinic) or in a different location (at the pharmacy), where the atmosphere may also be crowded and distracting. This may result in a lack of focus or optimal understanding of the questions in the questionnaire. The following research limitation lies in the type of complication in the study. Researchers have not conducted more profound research on the complications of diabetic foot ulcers.

Suggestions for future researchers It is hoped that this can be used as evaluation material for better research on foot care behavior in patients with diabetes mellitus and to examine more deeply the types of diabetic foot ulcer complications experienced by

patients. In collecting data, it is hoped that future researchers will use other methods, such as interviews and observations. Future researchers can also conduct research with a larger sample to better understand the relationship between the variables studied. Include other variables that can explore more information related to factors that influence foot care behavior in patients with diabetes mellitus.

Conclusion

This study shows that most diabetes mellitus sufferers have good foot care knowledge and behavior. It is essential to pay attention to the level of knowledge and foot care behavior in diabetes mellitus sufferers to prevent complications from diabetic foot ulcers. Educating and counseling programs about the importance of foot care for diabetes mellitus patients by involving the patient's family can reduce the risk of diabetic foot ulcers.

Acknowledgment

I would like to express my sincere gratitude to my supervisor for the guidance and mentorship. I would also like to extend my heartfelt appreciation to all the individuals who contributed to the successful completion of this study.

Author Contributions

First author: Designing the research design together with guidance from the second author, collecting data through preliminary studies, interviews, and questionnaires by the designed methodology, analyzing data using appropriate statistical techniques, preparing the initial draft of the article based on the research results, contributing to the revision of the manuscript with input from the supervisor.

Second Author: Guided planning and conducting the research, provided direction in data analysis and interpreting the results, assisted in writing the manuscript by giving academic insights and research experience, played a role in validating the findings and ensuring the accuracy of data interpretation, provided feedback and made revisions to the manuscript to improve quality and conformity to academic standards.

References

[1] World Health Organization, "Diabetes," *World Health Organization*, 2023. https://www.who.int/news-room/fact-sheets/detail/diabetes (accessed Oct. 01, 2023).

[2] International Diabetes Federation, "IDF Diabetes Altas 10th Edition 2021," *International Diabetes Federation*, 2021. https://diabetesatlas.org/data/en/ (accessed Sep. 28, 2023).

[3] Kementerian Kesehatan Republik Indonesia dan Badan Penelitian dan Pengembangan Kesehatan, "Hasil Riset Kesehatan Dasar Tahun 2018" *Kementerian Kesehatan Rebublik Indonesia*, 2018. https://kesmas.kemkes.go.id/assets/upload/dir_519d41d8cd98f00/files/Hasil-riskesdas-2018_1274.pdf (accessed Sep. 28, 2023).

[4] Pemerintah Kota Yogyakarta, "Penderita Penyakit Tidak Menular di Yogyakarta di Atas Nasional," *Portal Berita Pemerintah Kota Yogyakarta*, Yogyakarta, Aug. 31, 2023. Accessed: Sep. 28, 2023. [Online]. Available: https://warta.jogjakota.go.id/detail/index/28934

[5] N. S. Jasmine, S. Wahyuningsih, and M. S. Thadeus, "Analisis Faktor Tingkat Kepatuhan Minum Obat Pasien Diabetes Melitus di Puskesmas Pancoran Mas Periode Maret – April 2019," *J. Manaj. Kesehat. Indones.*, vol. 8, no. 1, pp. 61–66, 2020, [Online]. Available:

https://ejournal.undip.ac.id/index.php/jmki/article/view/24742

[6] M. Mulyaningsih and S. Handayani, "Deteksi Ulkus Diabetik dan Pemeriksaan Kadar Gula Darah Pada Penderita Diabetes Mellitus di Surakarta," *GEMASSIKA J. Pengabdi. Kpd. Masy.*, vol. 5, no. 2, p. 148, 2021, doi: 10.30787/gemassika.v5i2.758.

[7] L. Alshammari, P. O'Halloran, O. McSorley, J. Doherty, and H. Noble, "The Effectiveness of Foot Care Educational Interventions For People Living With Diabetes Mellitus: An Umbrella Review," *J. Tissue Viability*, vol. 32, no. 3, pp. 406–416, 2023, doi: 10.1016/j.jtv.2023.06.001.

[8] D. Syauta *et al.*, "Risk Factors Affecting The Degree of Diabetic Foot Ulcers According to Wagner Classification in Diabetic Foot Patients," *Med. Clin. Pract.*, vol. 4, p. 100231, 2021, doi: 10.1016/j.mcpsp.2021.100231.

[9] Y. Sari *et al.*, "Foot Self-Care Behavior and Its Predictors in Diabetic Patients in Indonesia," *BMC Res. Notes*, vol. 13, no. 1, pp. 4–9, 2020, doi: 10.1186/s13104-020-4903-y.

[10] Kementerian Kesehatan Republik Indonesia, "Cara Perawatan Kaki Diabetes," *p2ptm.kemkes.go.id*, 2019. https://p2ptm.kemkes.go.id/infographic-p2ptm/penyakit-diabetes-melitus/cara-perawatan-kaki-diabetes (accessed Nov. 24, 2023).

[11] A. Pourkazemi *et al.*, "Diabetic Foot Care: Knowledge and Practice," *BMC Endocr. Disord.*, vol. 20, no. 1, pp. 1–8, 2020, doi: 10.1186/s12902-020-0512-y.

[12] F. Syed, M. A. Arif, M. Afzal, R. Niazi, A. Ramzan, and U. E. L. Hashmi, "Foot-Care Behaviour Amongst Diabetic Patients Attending a Federal Care Hospital in Pakistan," *J. Pak. Med. Assoc.*, vol. 69, no. 1, pp. 58–63, 2019.

[13] F. Gaows and A. Zahrani, "Knowledge and Practice of Foot Care Among Diabetic Patients Attending Diabetic Care Center in Jeddah City," *Int. J. Med. Rev. Case Reports*, vol. 3, no. 0, p. 1, 2019, doi: 10.5455/ijmrcr.knowledge-and-practice-diabetes.

[14] R. D. Pollock, N. C. Unwin, and V. Connolly, "Knowledge and Practice of Foot Care in People With Diabetes," *Diabetes Res. Clin. Pract.*, vol. 64, no. 2, pp. 117–122, 2003, doi: 10.1016/j.diabres.2003.10.014.

[15] S. Indrayana, S. E. Guo, C. L. Lin, and S. Y. Fang, "Illness Perception as a Predictor of Foot Care Behavior Among People With Type 2 Diabetes Mellitus in Indonesia," *J. Transcult. Nurs.*, vol. 30, no. 1, pp. 17–25, 2019, doi: 10.1177/1043659618772347.

[16] N. B. Lincoln, W. J. Jeffcoate, P. Ince, M. Smith, and K. A. Radford, "Validation of a new measure of protective footcare behaviour: The Nottingham Assessment of Functional Footcare (NAFF)," *Pract. Diabetes Int.*, vol. 24, no. 4, pp. 207–211, 2007, doi: 10.1002/pdi.1099.

[17] N. N. Windasari, "Pendidikan Kesehatan Dalam Meningkatkan Kepatuhan Merawat Kaki pada Pasien Diabetes Melitus Tipe II," *Indones. J. Nurs. Pract.*, vol. 2, no. 1, pp. 61–67, 2015, doi: https://doi.org/10.18196/ijnp.v2i1.670.

[18] L. Khan, A. Al-Nami, H. Al-Gaseer, and I. Al-Neami, "Foot Self-Care Knowledge and Practice Evaluation Among Patients With Diabetes," *J. Diabetol.*, vol. 11, no. 3, p. 169, 2020, doi: 10.4103/jod.jod_30_19.

[19] E. Lael-Monfared, H. Tehrani, Z. E. Moghaddam, G. A. Ferns, M. Tatari, and A. Jafari, "Health Literacy, Knowledge and Self-Care Behaviors to Take Care of Diabetic Foot in Low-Income Individuals: Application of Extended Parallel Process Model," *Diabetes Metab. Syndr. Clin. Res. Rev.*, vol. 13, no. 2, pp. 1535–1541, 2019, doi: 10.1016/j.dsx.2019.03.008.

[20] X. Zhu, M. Lee, E. A. L. Chew, L. J. Goh, L. Dong, and B. Bartlam, "'When Nothing Happens, Nobody is Afraid!' Beliefs and Perceptions Around Self-Care and Health-Seeking Behaviours: Voices of Patients Living with Diabetic Lower Extremity Amputation in Primary Care," *Int. Wound J.*, vol. 18, no. 6, pp. 850–861, 2021, doi: 10.1111/iwj.13587.

[21] Y. Sari, S. Yusuf, H. Haryanto, A. Sumeru, and S. Saryono, "The Barriers and Facilitators

of Foot Care Practices in Diabetic Patients in Indonesia: A Qualitative Study," *Nurs. Open*, vol. 9, no. 6, pp. 2867–2877, 2021, doi: 10.1002/nop2.993.

[22] M. Fayfman *et al.*, "Barriers to diabetic foot care in a disadvantaged population: A qualitative assessment," *J. Diabetes Complications*, vol. 34, no. 12, 2020, doi: 10.1016/j.jdiacomp.2020.107688.

[23] Rondhianto, N. Widayati, and S. Qur'aini, "Foot Care Behavior Among People With Type 2 Diabetes Mellitus: Overview and Sociodemographic Factors Impact," *Nurs. Heal. Sci. J.*, vol. 3, no. 2, pp. 213–221, 2023, doi: 10.53713/nhsj.v3i2.257.

[24] S. A. Ahmed, S. Badi, H. Tahir, M. H. Ahmed, and A. O. Almobarak, "Knowledge and Practice of Diabetic Foot Care in Sudan: A Cross Sectional Survey," *Diabetes Metab. Syndr. Clin. Res. Rev.*, vol. 13, no. 4, pp. 2431–2435, 2019, doi: 10.1016/j.dsx.2019.06.016.

[25] A. Tuha, A. G. Faris, A. Andualem, and S. A. Mohammed, "Knowledge and Practice on Diabetic Foot Self-Care and Associated Factors Among Diabetic Patients at Dessie Referral Hospital, Northeast Ethiopia: Mixed Method," *Diabetes, Metab. Syndr. Obes.*, vol. 14, pp. 1203–1214, 2021, doi: 10.2147/DMSO.S300275.

[26] Y. Y. Usta, Y. Dikmen, S. Yorgun, and I. Berdo, "Predictors of Foot Care Behaviours in Patients With Diabetes in Turkey," *PeerJ*, vol. 2019, no. 2, pp. 1–12, 2019, doi: 10.7717/peerj.6416.

[27] S. A. Domingos, C. N. França, I. Tuleta, M. P. da C. R. Barbosa, A. L. L. Bachi, and L. M. Neves, "Self-Care in Type 2 Diabetes Patients With Urgency Lower Limb Amputation: The Influence of Sex, Marital Status and Previous Amputations," *Patient Prefer. Adherence*, vol. 15, pp. 1083–1090, 2021, doi: 10.2147/PPA.S298537.

[28] E. J. Kim and K. S. Han, "Factors Related to Self-Care Behaviours Among Patients with Diabetic Foot Ulcers," *J. Clin. Nurs.*, vol. 29, no. 9–10, pp. 1712–1722, 2020, doi: 10.1111/jocn.15215.

[29] I. H. Khaliq *et al.*, "Self-care Practices of Type 2 Diabetes Patients by Socio-Demographic and Clinical Factors: An Ordered Probit Model," *Sudan J. Med. Sci.*, vol. 14, no. 4, pp. 210–224, 2019, doi: 10.18502/sjms.v14i4.5901.

[30] T. W. Tan *et al.*, "Association Between Race/Ethnicity and The Risk of Amputation of Lower Extremities Among Medicare Beneficiaries with Diabetic Foot Ulcers and Diabetic Foot Infections," *BMJ Open Diabetes Res. Care*, vol. 8, no. 1, pp. 1–9, 2020, doi: 10.1136/bmjdrc-2020-001328.

Correlation Between Age and Waist Functional Ability in Batik Workers Community

Arif Pristianto[1], Azizah Shalsa Billa[1], Samiyem[1], Adnan Faris Naufal[1], Mahendra Wahyu Dewangga[1]
[1]Physiotherapy Department/Health Sciences Faculty, University Muhammadiyah of Surakarta, Indonesia

*Email: arif.pristianto@ums.ac.id

Abstract

Purpose: Functional ability used to explain something that's seen from a functional perspective, for example the functional ability of the waist or lower back. The functions as a load support when the body moves, supports body weight, and is one of the supporting structures for the body and head. Changes in the functional ability of the waist can be caused by many factors, an example is age can affect muscle strength and bone structure. This can certainly hinder activities and reduce the quality of life, especially for workers in unergonomic positions for long periods, one of which is batik making. This study aims to determine whether there is a relationship between age and changes in waist functional ability in batik makers in the Surakarta area, especially in Kampung Batik Laweyan and Kauman.
Methods: This research uses an observational research method with a cross sectional study approach and a sample size of 60 people with inclusion criteria being >30 years old. The measurement instrument used was a modification Indonesian version of the Owestry Disability Index (ODI) questionnaire.
Result: From statistical tests it was found that there was no relationship between age and waist functional ability in the batik worker community in Laweyan and Kauman batik villages with a p *value* of 0.342. It can be concluded based on the results of the study, there is no correlation between age and waist functional ability in the batik worker community.
Keywords: age, batik, functional ability, ODI, lower back complaints.

Introduction

Batik has been recognized as one of the values of cultural heritage and wealth, as well as the identity of the Indonesian Nation by UNESCO. Surakarta is known as one of the largest batik-producing cities in Indonesia. It is known as a historical and cultural city with the title "Spirit of Java". The Laweyan and Kauman areas are the largest batik industry villages in the city of Surakarta, as many as 80% of Laweyan people have almost the same business, namely as batik craftsmen. So that Laweyan village is the driving force of the local economy. Kauman is a village known as one of the cultural and assets of the Surakarta palace, because batik craftsmen there are specialized in making batik for the Surakarta palace family [3].

In the manufacturing process, batik is grouped into two, namely printed batik and written batik. Written batik workers will spend more time in a sitting position which makes the loading on the vertebrae three times greater, while printed batik workers will experience more standing, bending, and repetition which will cause physical workload. This results in batik workers during their activities not being in a normal position of the body, and away from the center of motion which will pose a risk of muscle complaints or

muscle fatigue [24].

The position of batik makers who often sit for a long time causes musculoskeletal problems, which can increase tension in the muscles of the back and hips and cause tension in the joints in a static position for a long time. The back muscles experience excessive contraction, then to hold and maintain a sitting position, the muscles become spasm or tightness so that they are at risk of functional impairment [7].

Problems with the waist are one of the most common muscle complaints and are most often found in all people, especially in workers, and are one of the largest contributors to global disability [21]. Complaints to the waist can cause limited worker activity and even result in work absence, complaints to the waist are not the cause of death but can interfere with a person's productivity in doing their job, so that it can cause an individual or family economic burden [14].

According to WHO 2023, back disorders affected 619 million people worldwide in 2020 and are expected to increase to 843 million cases by 2050, largely due to aging and population expansion. Lumbar complaints will increase at the peak of 35-55 years of age, because when a person is 30 years old, the body will begin to degenerate in the form of tissue replacement into scar tissue, fluid reduction, and destruction of some tissues. The degeneration that occurs can cause decreased stability in muscles and bones. As a person gets older, the higher the risk of reducing bone elasticity, which is a triggering factor for complaints at the waist to arise [1].

Complaints that will often be found in people with lumbar disorders are discomfort, pain, and even stiffness localized in the back to buttock area [14]. Complaints about the waist can also be caused by several factors, namely from individual factors (age, length of service, gender, smoking habits, increased Body Mass Index / BMI) and environmental factors (work activities, work attitudes, workplace facilities, repetition, body movement factors) [11]. Decreased lumbar flexibility, stiffness in the lumbar muscle area and decreased strength and endurance of the lumbar muscles are the main factors that can affect changes in the functional ability of the waist [1][6][19].

This decline can be in the form of degeneration changes in the lumbar joint. Changes that occur in old age include changes in synovial fluid in the joints, decreased bone mass and muscle mass. Loss of muscle size and strength can be related to metabolic, physiological, and functional disorders [18][8][20][12].

According to the description above, the researcher is interested in conducting research on the correlation of waist functional ability with age in batik makers. This is also because there are still many previous studies that discuss the relationship of low back pain to certain factors, so there is a lack of research that discusses changes in the functional ability of the waist in workers, especially to the age factor. This study also discusses the community of batik workers according to the types of stamp, write, and differentiated in the batik work division. The purpose of this study is to determine whether there is a correlation between changes in waist functional ability and age in the batik worker community in Kampung Batik Laweyan and Kauman.

Methods

This type of research is quantitative observational with a cross sectional study survey approach. The total research subjects were 60 people consisting of a group of printed and written batik workers in the lorod, coloring, nyolet, ngiseni, and mola work divisions with waist complaints aged >30 years, in Kauman and Laweyan Batik Villages in Surakarta. The samples were taken using purposive sampling technique, with the inclusion criteria

of batik workers willing to fill out informed consent, willing to fill out research questionnaires, aged> 30 years, and batik workers experiencing low back complaints during their working period with exclusion criteria of batik workers having physical limitations or a history of trauma, and not cooperating during the study.

Data collection was carried out through direct observation and interviews with respondents using a modified Indonesian version of the Owestry Disability Index (ODI) questionnaire to measure impaired functional ability of the waist and included 10 validated points with a validity value of 0.722 and a reliability value of 0, 890 [22][25]. The study involved batik makers and workers of both printed and written batik. Filling in the questionnaire was carried out by the enumerator after informed consent, which had previously been explained to respondents about the purpose and benefits of the study. This research already has an Ethical Clearance permit or ethical feasibility with Number 870/EC/IV/2024 from research ethics committee of RST dr. Soedjono Magelang.

This study used ordinal scale data on the age variable and ratio scale data on the waist functional ability variable, so the bivariate analysis test used the Spearman Rho test, to see the significance, strength and direction of the relationship between variables. The data normality test used Kolmogorov Smirnov because the research sample amounted to 60 people, and for the ordinal data scale was normally distributed, while for the ratio data scale was not normally distributed.

Results

a) Characteristics of respondents

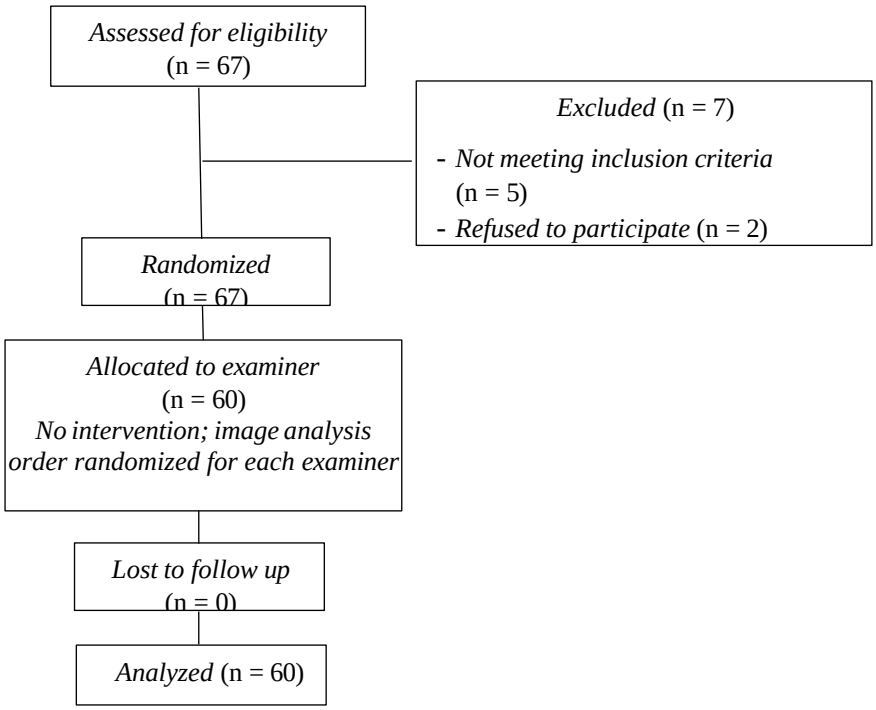


Figure 1. Observational study flowchart

The number of subjects participating in this study was 60 people consisting of 32 men (53.3%) and 28 women (46.7%) with a written batik group of 34 people (56.7%) and printed batik 26 people (43.3%). The age variable is categorized into 3 groups according to WHO, namely the adult group (30-44 years) as much as 36.7%, middle age (45-59

years) as much as 38.3%, and elderly (60-74 years) as much as 38.3%. elderly (60-74 years) as much as 25%, and it is known that 54 people (90%) fall into the mild disability category in the ODI score group.

Table.1 Univariate analysis of sample characteristics

Variable	n	Mean ± STDEV	Range	Median	Variant	Modus
Age	60	49.08 ± 12.152	43.00	50.00	147.671	50.00
ODI Score	60	11.50 ± 7.773	34.00	10.00	60.424	8.00
Age Group	60	1.88 ± 0.783	2.00	2.00	0.613	2.00
Score Group ODI	60	1.10 ± 0.303	1.00	1.00	0.092	1.00
	Characteristics			***f***		**%**
Age	*Adult*			22		36,7%
	Middle Age			23		38,3%
	Elderly			15		25%
	Total (n)			**60**		**100%**
Gender	Man			32		53,3%
	Woman			28		46,7%
	Total (n)			**60**		**100%**
Type of Batik Makers	Stamp			26		43,3%
	Write			34		56,7%
	Total (n)			**60**		**100%**
Job description **Batik Makers**						
Stamp	Ngiseni			18		30%
	Mola			0		0%
	Nyolet			0		0%
	Pewarnaan			6		10%
	Lorod			2		3,3%
	Total (n)			**26**		**43,3%**
Write	Ngiseni			28		46,7%
	Mola			1		1,7%
	Nyolet			3		5%
	Pewarnaan			1		1,7%
	Lorod			1		1,7%
	Total (n)			**34**		**56,7%**
Group Score ODI	Mild Disability			54		90%
	Medium Disability			6		10%
	Total (n)			**60**		**100%**

Source: Primary Data

b) Correlation of Waist Functional Ability with Age in the Batik Worker Community

In the data normality test using Kolmogorov Smirnov, the results of the age variable with a sig value. 0.2 (>0.05) means that the data is normally distributed, and the waist functional ability variable (ODI score) with a sig value. <0.01 (<0.05) means that the data is not normally distributed.

Table 2. Data normality test

Kolmogorov-Smirnov	**Statistic**	**df**	**Sig.**
Age	0.093	60	0.200
ODI Score	0.177	60	0.000

Source: Primary Data

From the Spearman test, the p value is 0.342 (p> 0.05) so it can be said that Ho is accepted and Ha is rejected. This shows that there is no relationship between age and waist functional ability among batik makers in Kauman and Laweyan Batik Villages. The level of correlation strength is 0.125, meaning that the correlation is very weak and the direction of the relationship is positive (unidirectional).

Table 3. Bivariate Analysis of Age Group Variables with ODI Category

			Age	**ODI Score**
Spearman's rho	**Age**	*Correlation*	1.000	0.125
		Sig. (2-tailed)	.	0.342
		N	60	60
	ODI Score	*Correlation*	0.125	1.000
		Sig. (2-tailed)	0.342	.
		N	60	60

Source: Primary Data

Discussion

The absence of a relationship can be indicated because this study only focuses on one of the causal factors, namely age. Without paying attention to other causal factors that can affect changes in waist functional ability such as good physical activity, length of service, duration of work, and working position of the batik maker.

This study is in line with research conducted by Riningrum & Widowati (2016), which states that there is no relationship between age and low back complaints in workers with a p value of 0.554 (p> 0.05), while the study states that there is a relationship between ergonomic factors and low back complaints with a p value of 0.002 and 0.040 (p < 0.05).

Increasing age in a person can indeed cause a decrease in stability and strength of the waist muscles, but when the batik is in an ergonomic position during work, has sufficient rest time, endurance and has good nutritional intake and physical activity, fatigue in the waist muscles can be minimized [24][10]. Aging is a natural process that cannot be avoided, according to Sari *et al*. (2017) the decrease in muscle strength in a person will look more significant at the age of 60 years, with an average decrease of up to 20% which will trigger the onset of low back complaints.

Factors that affect the aging process in each individual are not the same, resulting in a person's health status being different from one another (Ekasari *et al*., 2018). This statement is supported by research conducted by Rohmah *et al*. (2012) on the elderly at Panti Werdha Hargo Dedali, which states that the quality of life of the elderly can be influenced by physical, psychological, social, and environmental factors.

Increasing age is not the only factor causing changes in a person's waist functional ability. According to research conducted by Chaidir *et al*. (2017) states that the physiological health of the elderly is also one of the factors that can affect their physical functional abilities, the better the physiological health, the better the functional abilities in the elderly, and vice versa (Chaidir *et al*., 2017). To achieve good physiological health, one of them is obtained from good physical activity as well, because it can increase the flexibility of muscle tone in the elderly, so that the level of complaints in the muscles will decrease [4].

Based on the explanation above, the probability of changes in waist functional ability can decrease, so the majority of batik makers in this study for ODI values are in the low category. In batik makers with mild disability category, it means that batik makers can still do most of their life activities, without any indication of drug consumption, and are more focused on being given education related to how to sit or lift things correctly so as not to aggravate the level of disability.

However, the researcher realizes that this research is still not perfect, there are several limitations in the course of this research. One of them is an interview when filling out the questionnaire, so that the data can be subjective. We recommend that during the ODI questionnaire filling, the research sample fills in the questions independently to avoid the risk of subjective data.

Conclusion

Based on the results of statistical tests and the presentation of the material above, it can be concluded that age is not related to the cause of changes in waist functional ability, with p value = 0.342. The next research is expected to discuss more about other factors that influence changes in the functional ability of the waist in workers, and conduct generalization tests based on the batik work division.

Acknowledgment

Thank you to the enumerators who were willing to assist in data collection, the respondents who were willing to be interviewed, and to the heads of the development forums of the two batik villages (Laweyan and Kauman) in Surakarta who helped in the continuity of this research.

Author Contributions

Arif Pristianto: research and data collection.
Azizah Shalsa Billa: data collection and article writing.
Samiyem: article writing and translation.
Adnan Faris Naufal: data collection.
Mahendra Wahyu Dewangga: Data analysis.

References

[1] Andini, F. (2015). Risk Factors of Low Back Pain in Workers. *Medical Journal of Lampung University*, *4*, 12.

https://juke.kedokteran.unila.ac.id/index.php/majority/article/view/495.

[2] Andri, J., Karmila, R., Padila, P., Harsismanto, J., & Sartika, A. (2019). Terapi Aktivitas Aenam Ergonomis terhadap Peningkatan Kemampuan Fungsional Lansia. *Journal of Telenursing*, *1*(2), 304–313. https://doi.org/https://doi.org/10.31539/joting.v1i2.933.

[3] Anisah, S. S., & Tohjiwa, A. D. (2016). Pusat Batik Surakarta Hadiningrat di Laweyan, Surakarta. *Jurnal Ilmiah Desain & Konstruksi*, *15*(1), 60–68. https://ejournal.gunadarma.ac.id/index.php/dekons/article/view/1587.

[4] Arwinno, L. D. (2018). Keluhan Nyeri Punggung Bawah pada Penjahit Garmen. *Higeia Journal of Public Health Research And Development*, *2*(3), 406–416.

[5] Chaidir, R., Amelia, D., & Syafril, E. (2017). Hubungan Faktor-Faktor Dengan Kemampuan Fungsional Fisik Lansia Wanita. *Jurnal Ilmu Kesehatan 'Afiyah, 4(2).* https://ejournal.umnyarsi.ac.id/index.php/JAV1N1/article/view/108. Ekasari, M. F., Riasmini, N. M., & Hartini. T. (2018). *Meningkatkan kualitas hidup lansia konsep dan berbagai intervensi.* Malang: Wineka Media.

[6] Hasmar, W., & Faridah. (2022). E-Book Core Stability Exercise on Myogenic Low Back Pain. *Indonesian Journal of Sport Management and Physical Education*, *1*(1), 1–10. https://doi.org/10.55927/ijsmpe.v1i1.2113

[7] Junita, R. G., Pristianto, A., Supriyadi, A., & Susilo, T. E. (2021). Hubungan Aktivitas Duduk Lama Dengan Keluhan Musculoskeletal Pada Punggung Bawah: Critical Review. *FISIO MU: Physiotherapy Evidences*, *2*(3), 150–161. https://doi.org/10.23917/fisiomu.v2i3.15199

[8] Lintin, G. B., & Miranti. (2019). Hubungan Penurunan Kekuatan Otot dan Massa Otot dengan Proses Penuaan pada Individu. *Jurnal Kesehatan Tadulako*, *5*(1), 1–62. http://jurnal.untad.ac.id/jurnal/index.php/HealthyTadulako/article/view/12618

[9] Nugroho, A. J. (2021). Tinjauan Produktivitas dari Sudut Pandang Ergonomi. Sumatera Barat: PACE.

[10] Pandjukang, A. P., Hutasoit, R. M., & Damanik, E. M. B. (2020). Hubungan Usia Dan Jenis Kelamin Pada Penderita Nyeri Punggung Bawah (Low Back Pain) Dengan Komorbid Diabetes Melitus Di Rsud. *Cendana Medical Journal*, *19*(1), 9–15. https://ejurnal.undana.ac.id/CMJ/article/view/3332.

[11] Mardatillah, S., Putra, E. P., & Nova, R. (2022). Gambaran Radiografi Vertebrae Lumbal pada Pasien Lansia dengan Low Back Pain di Rumah Sakit dr. Reksodiwiryo Padang Tahun 2021. *Scientific Journal*, *1*(6), 434–445. https://doi.org/10.56260/sciena.v1i6.76.

[12] Pristianto, A., Ramadhan, K. K., & Widodo, A. (2022). *Jurnal Kesehatan*, *15*(1), 93–100. https://doi.org/10.23917/jk.v15i1.17603.

[13] Pristianto, A., Wijianto, W., Susilo, T. E., Naufal, A. F., Rahman, F., & Addiningsih, Y. (2021). Edukasi Program Aquatic Exercise dalam Mengurangi Keluhan serta Meningkatkan Kemampuan Fungsional Pasien Nyeri Pinggang Kronik. *Jurnal Pengabdian Masyarakat Multidisiplin*, *4*(3), 190–193. https://doi.org/10.36341/jpm.v4i3.1880.

[14] Riningrum, H., & Widowati, E. (2016). Pengaruh Sikap Kerja, Usia, dan Masa Kerja Terhadap Keluhan Low Back Pain. *Jurnal Pena Medika, 6(2), 91-102.* https://jurnal.unikal.ac.id/index.php/medika/article/view/394/352.

[15] Rohmah, A. I. N., Purwaningsih., & Bariyah, K. (2012). Kualitas Hidup Lanjut

Usia. *Jurnal Keperawatan, 3(2), 120-132.* https://doi.org/10.22219/jk.v3i2.2589

[16] Saputra, A. (2020). Sikap Kerja, Masa Kerja, dan Usia terhadap Keluhan Low Back Pain pada Pengrajin Batik. *Higeia Journal of Public Health Research and Development*, *1*(3), 625–634. http://journal.unnes.ac.id/sju/index.php/higeia.

[17] Scanlon, T. C., Fragala, M. S., Stout, J. R., Emerson, N. S., Beyer, K. S., Oliveira, L. P., & Hoffman, J. R. (2014). Muscle Architecture and Strength: Adaptations to Short Term Resistance Training. *Muscle & Nerve*, *49*(4), 1–34. https://doi.org/10.1002/mus.23969.

[18] Setiorini, A. (2021). Kekuatan otot pada lansia. *JK Unila*, *5*(3), 69–74. https://doi.org/https://doi.org/10.23960/jkunila5169-74.

[19] Tamtomo, D. G. (2016). Perubahan anatomik organ tubuh pada penuaan. Diakses dari *https://library. uns. ac. id/perubahan-anatomik-organ-tubuh-pada-penuaan*.

[20] Triwulandari, N., & Zaidah, L. (2019). Hubungan Usia Dan Durasi Lama Duduk Dengan Keluhan Nyeri Punggung Bawah Pada Pembatik Di Kampung Batik Giriliyo. *Ilmiah Fisioterapi*, *2*(2), 81–92. http://jurnal.univrab.ac.id/index.php/jif/article/view/990.

[21] Wahyuddin, Hanun, A., & Ivanali, K. (2016). Abstrak Adaptasi Lintas Budaya Modifikasi Kuesioner Disabilitas Untuk Nyeri Punggung Bawah (Modified Oswestry Low Back Pain Disability Questionnaire / Odi) Versi Indonesia. *Fisioterapi*.https://digilib.esaunggul.ac.id/public/UEU-Research-7825-WAHYUDDIN_Sst.Ft_M.Sc.pdf.

[22] World Health Organization. (2023). *Low Back Pain*. Diakses pada 9 September 2023, dari https://www-whoint.translate.goog/news room/fact-sheets/detail/low-backpain?_x_tr_sl=en&_x_tr_tl=id&_x_tr_hl=id&_x_tr_pto=tc.

[23] Wulan, M., Hilal, S., & Entianopa. (2020). Perbandingan Keluhan Low Back Pain pada Pekerja Batik Tulis dan Cap di Kecamatan Danau Teluk Kota Jambi Tahun 2020. *Indonesian Journal of Health Community*, *1*(1), 1–5. https://e-journal.ivet.ac.id/index.php/ijheco/article/view/1391.

[24] Yates, M., & Shastri-Hurst, N. (2017). The oswestry disability index. *Occupational Medicine*, *67*(3), 241–242. https://doi.org/10.1093/occmed/kqw051.

The Role Of Stakeholders In The Development Of Grogol Tourism Village (Case Study: Grogol Tourism Village, Seyegan, Sleman District , DI Yogyakarta)

Ananda Amalia1, Erni Saharuddin S.Sos., MPA2*
Public Administration/Faculty of Economics, Social Sciences and Humanities,
'Aisyiyah University, Yogyakarta

*Email: ernisaharuddin@unisayogya.ac.id *

Abstract

Purpose: The Special Region of Yogyakarta (DIY) was determined by the Ministry of Tourism and Creative Economy in 2023 to have the highest number of tourist villages at number 9, namely 168 tourist villages which of course have a lot of interesting tourist attractions and are almost never empty of tourists. One of the tourist villages that continues to develop every year in DI Yogyakarta, especially Sleman Regency, is the Grogol tourist village. In the process of developing the Grogol tourist village, there needs to be a role for stakeholders involved so that the development can run well. The aim of this research is to determine the role of stakeholders in the development of the Grogol tourist village and the factors that influence stakeholders in the development of the Grogol tourist village which is analyzed using the Mathis stakeholder role model.
Methods: This research uses descriptive qualitative methods with data collection techniques through observation, interviews and documentation.
Result: The results of this research show the role of the government as a regulator which issues two laws and regulations regarding tourist villages; planning using a local characteristics approach and USP in each area; training and communication forums are already underway; lack of effective supervision; Providing infrastructure by providing physical and non-physical assistance. Then the role of the private sector in planning and implementing has been running well even though there is no official involvement with the private company. Furthermore, the role of the community, especially managers or administrators, at each stage of planning and implementation has been running well and significantly, but is often hampered by a lack of human resources; supervision is carried out after each activity and at monthly meetings; and utilization of the proceeds from increased financial resources provides direct benefits to surrounding communities. The advice that can be given is to consider the dynamics of collaboration and conflict in it to support the development of the Grogol tourist village effectively and progressively.
Keywords :*Stakeholders*, Development, Tourism Village

Introduction

Tourist villages are a form of tourism that emphasizes the natural beauty of a village. This is widely used in a number of countries, including Indonesia, to attract tourists who want to visit their region. Indonesia continues to strive to increase local wisdom tourism. This is proven by the increase in the number of tourist villages in Indonesia. According to (Risanti, 2023) It is written that in 2023 there will be 4,674 tourist villages in Indonesia. This number increased by 36.7% compared to the previous year's 3,419 tourist villages. Yogyakarta Special Region (DIY) is the least visited by tourists on the island of Java, because it is influenced by several factors. According to the Central Statistics Agency (BPS), it records Special RegionsYogyakarta(DIY) is the poorest province on the island

of Java as of September 2022. Yogyakarta City Government data also records the average value of expenditure spenttravelerin Yogyakarta City, almost IDR 1.9 million per tourist. However, BPS reported that the percentage of poor people in DIY in September reached 11.49 percent(Ninis Chairunnisa, 2023). Therefore, DIY must continue to develop tourist areas. Because of course it will have a significant impact on the economic growth of society.

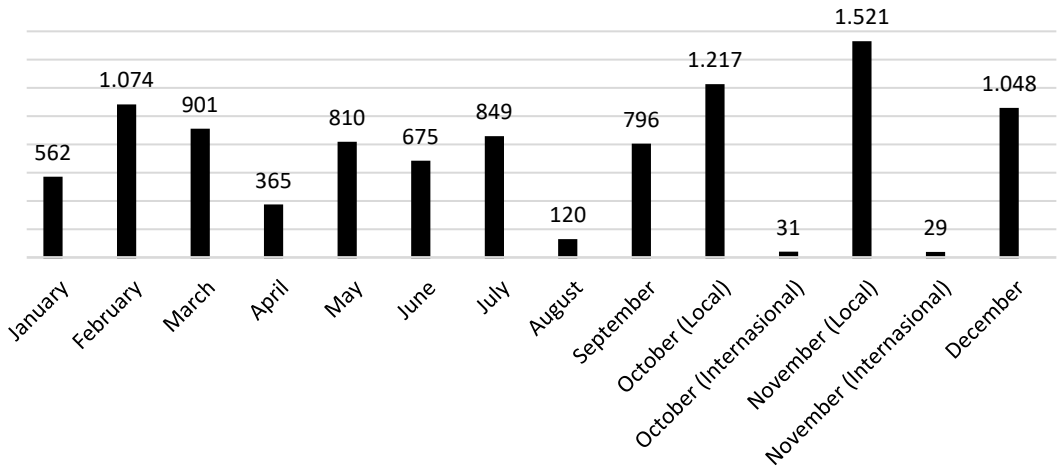
Table 1 Number of Regency/City Tourism Villages in DI Yogyakarta in 2022

The Special Region of Yogyakarta (DIY) has five districts/cities spread out and of course has a variety of interesting tourist attractions. The following are the number of tourist attractions in DIY Regency/City:

Regency/City	Number of Tours
Sleman	**41 Tourism**
Bantul	38 Tourism
Gunung Kidul	42 Tourism
Kulon Progo	44 Tourism
Yogyakarta City	26 Tourism

(Source: Solopos Jogja(Ridha Rosliana, 2023)

According to the recap of the classification of tourist villages, the Sleman Regency Tourism Office is currently carrying out an update which, as is known, has 80 tourist villages. Consisting of 12 independent tourism villages, 17 developed tourism villages, 18 developing tourism villages and 33 pioneer tourism villages(Sleman, 2022). One of the tourist villages that continues to develop every year in Sleman Regency is the Grogol Tourism Village. With all the available resources, this tourist village continues to take advantage of these advantages to be able to continue developing the tourist village it manages. For the last 11 years, the Grogol tourist village has emphasized the introduction and preservation of activities based on Javanese culture, such as the many artists who come from the village, jathilan, wayang orang, there are several dance studios, etc. Grogol Tourism has won quite a lot of awards at both district and national levels, as evidenced by the many awards received to date. And it can be said that Grogol tourism is a successful tourist village because it won one of the categories "Best DIY Tourism Village in 2023". The following is graphic data on the number of visitors to the Grogol tourist village in 2023:



(Source: Grogol Tourism Village Manager, Bu Esthi)

Graph 1 Number of Visitors to Grogol Tourism Village in 2023

The survival of the Grogol tourist village to this day cannot be separated from the role of stakeholders involved in developing the tourist village. Grogol tourism is managed by three actors who play an important role in its management, namely the government, the private sector and the local community. However, there are several community roles that are less than optimal, due to the lack of youth's role in developing the Grogol tourist village. Most of the people involved in developing the Grogol tourist village are older people, because the youth are still focused on education. The role of youth is very important as the next generation of nation development, youth must participate in supporting changes in the community environment, playing an important role in development and positive change. Positive changes in the community environment require their commitment, hard work, enthusiasm, energy and creativity. Youth can be strong agents of change in creating a better and more sustainable society, both nationally and regionally.

The Grogol tourist village was founded in 2012 supported by the Sleman Regency Tourism Office and began accepting guests in 2014 with the initiative of the local community because it has abundant springs and there is land that cannot be planted with rice. Therefore, recreational tourism with a cultural and natural concept was formed with assistance from the private sector, such as providing transportation or local tours to support the experience of tourists visiting from abroad by providing a positive experience. However, in the development process, the government and the private sector often face a number of obstacles. Especially for travel buses which find it difficult to access tourist villages because the roads are difficult to pass for large vehicles. Meanwhile, the Sleman Regency Tourism Office faces limited human resources and is difficult to monitor due to the emergence of many tourist villages in Sleman Regency.

Grogol Tourism is a tourist village with the title of independent which involves parties other than the government as official actors in its management. The Sleman Regency Tourism Office plays a very important role in supporting non-physical activities, such as

by introducing various forums to share opinions, consult, and meet with various experienced experts which ultimately have a good impact and become administratively complete, such as having written SOPs and mechanisms for receiving guests. In the end, the Grogol tourist village received the title of being a professional organization. And the development of the Grogol tourist village cannot be separated from the role of digitalization, for example by carrying out indirect promotions through social media.

Method

Research conducted inGrogol Tourism Village, Seyegan, Sleman Regency, DI Yogyakarta. This research uses a qualitative-descriptive approach, according toSidiq & Miftachul(Yuni Umrah Imawati, 2023)Descriptive qualitative research, namely research proposed to describe and analyze phenomena, events, social activities, attitudes, beliefs, perceptions and human thoughts both individually and in groups which are presented in the form of data on speech, writing and behavior of people being observed. This research observation is related to the role of stakeholders in the development of the Grogol Tourism Village. Apart from that, interviews were carried out by gathering information directly from the Head of Sub-Coordinator for Human Resources Development of the Sleman Regency Tourism Office, Kaur Danarta (Head of Financial Affairs) of the Margodadi District Government, the Manager or Management of the Grogol Tourism Village, the Owner of the Travel Agent (Traveling). D'SA Trans Tour & Travel) and Event Organizer. This research documentation includes activities carried out by stakeholders in developing the Grogol Tourism Village. Data analysis was carried out using an interactive model according to Miles and Huberman(Yuni Umrah Imawati, 2023)namely data collection, data reduction, data presentation, conclusions and verification.

Results

The Role of Stakeholders in the Development of the Grogol Tourism Village

Ecotourism-based tourism management activities require active involvement of the three actors. Therefore, it is not only the private sector or government that has a big role, but local communities must also participate(Manalu, Benmart E, Siti Latifah, 2020). The roles of the 3 actors in developing the Grogol tourist village are as follows:

A. Role of Government

The roles played by the government can be measured through the following indicators (1) Regulator, (2) Planner, (3) Facilitator, (4) Supervisor, (5) Infrastructure Provider. The results of the study of these indicators are as follows:

Table 2 Indicators of the Government's Role in Development Grogol Tourism Village

<table>
<tr><th>Role of Government</th><th>Explanation</th></tr>
<tr><td>Regulators</td><td>One of the criteria for policy formation is to form regulations, which is an important and often necessary step. At the provincial level, these regulations have been formed in the form of Governor's Regulation No. 40 of 2020 concerning Tourism Awareness Groups and Tourism Villages and Homestays. Then following up at the provincial level, the Regional Government issued Regional Regulation No. 9 of 2022 concerning Tourism Villages.</td></tr>
<tr><td>Planner</td><td>
2024 Activity Agenda
<table>
<tr><th>No</th><th>Activity</th><th colspan="2">Amount</th></tr>
<tr><td>1</td><td>PUPM/Pokir</td><td>35</td><td>Activity</td></tr>
<tr><td>2</td><td>Tourism Awareness Campaign</td><td>8</td><td>Activity</td></tr>
<tr><td>3</td><td>Non-Physical Dak</td><td>6</td><td>Activity</td></tr>
<tr><td>4</td><td>Study Of Tourist Village Classification 2024</td><td>1</td><td>Activity</td></tr>
<tr><td>5</td><td>Tourist Village Safari</td><td>16</td><td>Activity</td></tr>
<tr><td>6</td><td>Coaching For Traders</td><td>1</td><td>Activity</td></tr>
<tr><td>7</td><td>Tourist Village Communication Forum</td><td>3</td><td>Activity</td></tr>
<tr><td>8</td><td>Tourism Awareness Group Communication Forum</td><td>2</td><td>Activity</td></tr>
<tr><td>9</td><td>Increasing The Capacity Of The Tourist Village Communication Forum (DANAIS)</td><td>1</td><td>Activity</td></tr>
</table>
</td></tr>
<tr><td>Facilitator</td><td>The role of the Sleman Regency Tourism Office in facilitating the development of tourist villages is by providing training, communication forums, and collaboration with PUPM (Community Empowerment Team) and MUSRENBANG (Development Planning Conference). The benefit is that it can help build capacity and coordination between stakeholders, but also ensure community participation in the decision-making process.

Moreover, with the support and involvement of the Margodadi District Head who is responsible for finances, this strengthens trust and transparency in the management of funds allocated for training programs and tourism village development.</td></tr>
<tr><td>Supervisor</td><td>One of the supervision or monitoring carried out is direct visits by government officials such as the Regent of Sleman and the Sleman Regency Tourism Office to the location of the Grogol tourist village, which is a very important step in monitoring and supporting tourism development at the local or village level.</td></tr>
</table>

Infrastructure Provider	• **Physique** Yogyakarta Special Fund. The Yogyakarta Special Fund or Dana Is is a budget allocation given to the Sleman Regency Tourism Office by the Yogyakarta Special Region Government (DIY). These funds are managed by the Sleman Regency Tourism Office to support tourism development, especially in the Grogol tourist village, such as promoting tourist destinations, developing tourism infrastructure, training for local tourism actors, as well as various other programs aimed at increasing tourist visits and regional income from the tourism sector. • **Non physical** The Sleman Regency Tourism Office has arranged several mechanisms for submitting non-physical budgets, which include several types of assistance such as plant assistance, MSME training, and prime village development programs. Involvement with the Margodadi Village in providing infrastructure also plays a very important role. Such as providing assistance in the form of providing land for activities, which is an important step to support the development of tourism infrastructure. The local government also provides support related to the licensing process and other needs required by the Grogol tourist village.

B. The Role of the Private Sector

The roles played by the private sector can be measured through the following indicators (1) Planner and (2) Implementer. The results of the study of these indicators are as follows:

Table 3 Indicators of the Role of the Private Sector inDevelopmentGrogol Tourism Village

Private Role	Explanation
Planner	 The role of the Event Organizer is to carry out planning by adapting the event concept to the characteristics of the guests who come. By

	adjusting the event concept, EO will work with related parties such as tourism destination managers and local communities to understand the characteristics of the guests who come, such as age, interests and special needs. When the visiting guests are elementary school children, of course as an EO you have to create an event concept that suits the age and interests of the guests. Such as using recycled materials from used bottles to make pencil or pen holders which is a good example of an environmentally friendly approach. This not only creates awareness about the importance of recycling, but also helps reduce plastic waste.
Executor	Direct interaction between private parties, such as Event Organizers (EO) and Travel Bureaus (Traveling D'SA TRANS Tour & Travel) with tourist village managers is an important step in implementing cooperation. One of them is by planning and carrying out a welcoming event using Udeng (Head Iket) as a symbol when visiting the Grogol tourist village, this is an important aspect of the collaboration between EO and the management of the Grogol tourist village. With implementation that runs smoothly and successfully, it provides a memorable experience for guests and raises the name of the Grogol destination as wellprovides various facilities and services needed for travel, including travel bus accommodation.

C. Community Role

The roles played by the community can be measured through the following indicators (1) Planner, (2) Implementer, (3) Supervisor, and (4) Utilization of Results. The results of the study of these indicators are as follows:

Table 4 Indicators of Community Role inDevelopmentGrogol Tourism Village

Community Role	Explanation
Planner	The manager or manager of the Grogol tourist village plays a key role in every planning stage in developing this tourism destination. Before visiting with the LAZNAS Yakesma extended family, the Grogol tourist village manager is responsible for planning activities that suit the visitors' goals and needs. During the visit, the Grogol tourist village manager acted as host and facilitated activities in wayang making, such as providing the space, equipment and materials needed for the workshop as well as providing an explanation of the history of wayang and its significance in local culture.
Executor	Maintaining continuity and improving the tourist experience in the Grogol tourist village, implementation of scouting, site maintenance and preparing the location are also very important. Such as ensuring the guide has good communication skills and can provide visitors with a pleasant and memorable tourism experience, then involving local communities in site maintenance

	activities and cleaning the tourist area as a form of shared responsibility, of course also providing clear information regarding accessibility, facilities and activities available at the tourist location. Through good implementation, the Grogol tourist village can create a satisfying tourism experience for visitors and help improve the image and reputation of the tourist village as a well-managed and environmentally friendly destination.
Supervisor	Evaluations are carried out at every event or visit, as well as at monthly meetings to check performance and evaluate progress and overcome obstacles that arise. In addition to monthly meetings, emergency meetings are held when urgent situations or events that require immediate action occur. These meetings help in dealing with emerging problems effectively and immediately, as well as developing strategies to prevent similar things from happening in the future. By carrying out regular and comprehensive evaluations, the Grogol tourist village can improve its performance, improve service quality, and provide a better tourism experience for visitors or tourists.
Utilization of Results	The role of the community, especially managers or administrators, in utilizing the results from the development of the Grogol tourist village can provide economic, social and environmental prosperity around the Grogol tourist village. The direct influence on the local economy is one of the main factors that drives the sustainability and success of the development of the Grogol tourist village. The impact is felt when tourist visits reach a high level, even exceeding the Regional Minimum Wage (UMR). This is clear evidence of how the development of the Grogol tourist village is able to provide direct benefits to the local community, by providing real economic opportunities and improving the community's standard of living.

D. Factors that Influence Stakeholders in the Development of the Grogol Tourism Village

There are several factors that can influence stakeholders in developing the Grogol tourist village. Here are some examples of these factors:

Table 5. Factors that Influence Stakeholders in the Development of the Grogol Tourism Village

Supporting factors	Obstacle factor
Professional Workforce	Lack of Human Resources (HR)
Financial Resources	Lack of Partnership
	Application of Rules to Foreign Tourists
	Lack of Effective Oversight

Discussion

A. Role of Government

1. Regulators

According to Pongtuluran (1995), policies are seen as: (1) guidelines for action, (2) behavior constraints, and (3) assistance for decision makers.(Rozak, 2021). Apart from that, it is important for tourist villages to comply with and implement policies implemented by the provincial and regional governments because this can provide clear direction and framework, one of which is for developing economic businesses in the village. By creating government regulations that support this initiative, tourist villages can more easily access the resources and support needed to develop existing potentials.

2. Planner

In the process of developing a tourist village, planning is certainly needed. By carrying out careful and coordinated planning, especially in the Grogol tourist village, we can optimize its potential to improve the welfare of local communities and promote sustainability and local culture. Sleman Regency is an area that is rich in tourism destinations, especially in the form of tourist villages. The concept of developing tourist villages has been well received by the community, which is proven by the growth in the number of tourist villages every year. In 2018, Sleman Regency had 47 tourist villages. However, in the following two years, this number increased significantly. In 2020 the number of tourist villages increased to 61 and then in 2022 it reached 80 tourist villages.

This data reflects the success of efforts to socialize and develop tourist villages carried out by the local government. An approach that takes into account local characteristics and the Unique Selling Point (USP) of each region has been successfully implemented. This creates a unique and attractive brand positioning for every tourist village in Sleman Regency. With many tourist villages/villages appearing in Sleman Regency, the Tourism Office has carried out or formed a classification which is divided into four, namely pioneering, developing, advanced and independent. It can be seen that in 2022 the Grogol tourist village will receive the status of an independent tourist village, which is an extraordinary achievement. This shows that Grogol has

succeeded in developing tourism infrastructure, improving services and facilities, and has excellent management and promotion capabilities.

3. **Facilitator**

   Regarding the government's role as a facilitator, namely creating conducive conditions for the implementation of development or bridging interests as parties in optimizing regional development(Anggraini, 2019). The role of the Sleman Regency Tourism Office in facilitating the development of tourist villages is by providing training, communication forums, and collaboration with PUPM (Community Empowerment Team) and MUSRENBANG (Development Planning Conference). The benefit is that it can help build capacity and coordination between stakeholders, but also ensure community participation in the decision-making process.

   Regarding the tourism village training program, it has started very well, with 35 activities spread across all sub-districts. This shows a strong commitment to advancing local tourism in various regions, not only in the tourist village of Grogol. Concrete examples include training held in the Margodadi Village which still focuses on conflict management and developing tour packages. The involvement of local tourism activists and observers will provide broad insight into the development of the tourism sector in DIY.

   In addition, it is important to note that these training initiatives emerged based on suggestions from the local community, both at the sub-district and sub-district/kapanewon levels. This shows that there is active participation from various parties in advancing tourism in the village. For example, regarding the training held by Seyegan District, with participants coming from Margodadi District, this shows positive inter-regional collaboration in an effort to improve skills and knowledge in the tourism industry.

4. **Supervisor**

   Supervision (toezicht) is a very important element in the framework of a decentralized unitary state. A unitary state will survive if the central government is strong and able to supervise the behavior of regional heads and/or autonomous regions(Elcaputera, 2021). One of the supervision or monitoring carried out is direct visits by government officials such as the Regent of Selman and the Sleman Regency Tourism Office to the location of the Grogol tourist village, which is a very important step in monitoring and supporting tourism development at the local or village level. However, there are several problems, especially the Sleman Regency Tourism Office regarding the lack of budget and the large number of activities, while the available resources are limited, this is a situation that is difficult to overcome. Due to these problems, the Sleman Regency Tourism Office made changes to the program it carried out, namely by creating a tourist safari program which aims to monitor and visit tourist villages and record important matters related to various problems that need to be addressed.

5. **Infrastructure Provider**

   According to Sumarto (2003), the implication is that the role of government as a developer and provider of infrastructure will shift to become a driving body for the creation of an environment that is able to facilitate other parties for the community.(Armela Shintani, 2021). Providing physical and non-physical assistance in providing infrastructure by the Sleman Regency Tourism Office is an important

step in supporting local tourism development. The role of government as an infrastructure provider, according toMinistry of Public Works Strategic Plan (2010) Infrastructure development is part of national development, which aims to support economic activities in making human life easier and also forming regional spatial structures(Pramono & Yulianto, 2020).

The gift given is in physical form, namely the Yogyakarta Special Fund. The Yogyakarta Special Fund or Dana Is is a budget allocation given to the Sleman Regency Tourism Office by the Yogyakarta Special Region Government (DIY). These funds are managed by the Sleman Regency Tourism Office to support tourism development, especially in the Grogol tourist village, such as promoting tourist destinations, developing tourism infrastructure, training for local tourism actors, as well as various other programs aimed at increasing tourist visits and regional income from the tourism sector. The Grogol tourist village received Yogyakarta Special Funds through the Mandiri Budaya Village. By providing these funds, it is hoped that the Grogol tourist village can continue to develop and provide significant benefits to the local community. Involvement with the Margodadi Village in providing infrastructure also plays a very important role. Good collaboration between the Grogol tourist village and the local government in supporting the development and smooth running of activities in the area. Such as providing assistance in the form of providing land for activities, which is an important step to support the development of tourism infrastructure. The local government also provides support related to the licensing process and other needs required by the Grogol tourist village.

B. Private Role

1. Planner

The role of the Event Organizer is to carry out planning by adapting the event concept to the characteristics of the guests who come.According to Suseno (2013), an event organizer is an institution that manages and organizes an event held at the client's request(Wulanda et al., 2019).The existence of an Event Organizer (EO) in tourism activities brings a number of benefits to various parties involved, including the private sector, tourist destinations and local communities.

2. Executor

The involvement of the private sector in planning a tour is not only limited to hosting guests or promotions, but also involves the implementation of various activities or events. Direct interaction between private parties, such as Event Organizers (EO) and Travel Bureaus (Traveling D'SA TRANS Tour & Travel) with tourist village managers is an important step in implementing cooperation. The involvement of the private sector in the marketing sector not only increases tourist traffic, but also brings other benefits such as increasing the quality of the tourist experience which has a significant impact on the development of the Grogol tourist village. Just like seeing EO directly providing services to guests or tourists, of course tourist village managers can also improve their own service standards. Such as by learning to serve guests, adapting facilities and services according to tourist needs, and improving the overall tourist experience.

C. Community Role

1. Planner

The role of the community means actions carried out by a group of people that reflect the same behavior as a social unit related to a certain social structure and its relationship to the tourist village. Of course the community has ownership of the history of the village, so that the community is much more aware of the weaknesses and potential of the village compared to other parties. outside, so that in the process of developing tourist villages, experience and knowledge contribute
community in tourism development is very much needed(Herdiana, 2019).

The manager or manager of the Grogol tourist village plays a key role in every planning stage in developing this tourism destination. Before visiting with the LAZNAS Yakesma extended family, the Grogol tourist village manager is responsible for planning activities that suit the visitors' goals and needs. During the visit, the Grogol tourist village manager acted as host and facilitated activities in wayang making, such as providing the space, equipment and materials needed for the workshop as well as providing an explanation of the history of wayang and its significance in local culture.

2. Executor

In tourism activities, the community must be involved at least in implementing tourism development programs in their area(Marlina, 2019). To maintain continuity and improve the tourist experience in the Grogol tourist village, implementing scouting, site maintenance and preparing the location is also very important. Such as ensuring the guide has good communication skills and can provide visitors with a pleasant and memorable tourism experience, then involving local communities in site maintenance activities and cleaning the tourist area as a form of shared responsibility, of course also providing clear information regarding accessibility, facilities and activities available at the tourist location. Through good implementation, the Grogol tourist village can create a satisfying tourism experience for visitors and help improve the image and reputation of the tourist village as a well-managed and environmentally friendly destination.

3. Supervisor

According to Cohen and Uphoff quoted by Soetomo 2008, the role of the community in evaluation is realized in the form of community participation in assessing and monitoring development activities and their results. This assessment is carried out directly, for example by participating in monitoring and assessing or indirectly, for example providing suggestions, criticism or process(Dea Deviyanti, 2019). By carrying out regular and comprehensive evaluations, the Grogol tourist village can improve its performance, improve the quality of services, and provide a better tourism experience for visitors or tourists.

Evaluations are carried out at every event or visit, as well as at monthly meetings to check performance and evaluate progress and overcome obstacles that arise. In addition to monthly meetings, emergency meetings are held when urgent situations or events that require immediate action occur. These meetings help in dealing with emerging problems effectively and immediately, as well as developing strategies to prevent similar things from happening in the future.

4. **Utilization of Results**

By utilizing the results achieved, of course there are steps that must be taken as in the current digital era, following trends, innovating, and maintaining a commitment to quality are important keys in developing the Grogol tourist village. First, following trends is a must. Understanding the latest trends in the tourism industry helps the Grogol tourist village remain relevant and attractive to visitors. Next, innovate, innovation is the foundation for continuing to develop and differentiate the Grogol tourist village from other destinations. This innovation can occur in various aspects, starting from the development of new products and services to creative marketing approaches. Furthermore, promotion also has an important role in introducing the Grogol tourist village to potential visitors. In today's digital era, visitor ratings, reviews and testimonials have a huge impact. By following trends, innovating continuously and providing extraordinary experiences to visitors, the Grogol tourist village can continue to develop and become a destination that is in demand by tourists both from within the country and abroad.

D. Inhibiting Factors That Influence Stakeholders in the Development of the Grogol Tourism Village

1. **Lack of Human Resources (HR)**

The Sleman Regency Tourism Office is very aware of the importance of quality Human Resources (HR) in developing the Grogol tourist village. However, the obstacle currently faced is the lack of personnel who have a background or experience in the tourism sector. In developing the Grogol tourist village, the government realizes that success is not only determined by infrastructure and promotions, but also by the ability and knowledge of the people responsible for managing it. Without personnel who understand the dynamics of the tourism industry, the Sleman Regency Tourism Office feels limited in carrying out the various development initiatives carried out.

2. **Lack of Partnership**

Efforts to involve the private sector with the Travel Bureau (Traveling D'SA TRANS Tour & Travel) have been made, although this process has not gone smoothly. Various inhibiting factors influence cooperation between private parties and the development of tourist villages. The Travel Bureau revealed that there are no private companies officially tied to the Grogol tourist village. However, there is cooperation, especially in terms of promotion, and of course without an attachment or MOU, it is clearly difficult for both parties to reach an adequate agreement regarding their goals, responsibilities and expectations in this collaboration. Therefore, it is important to draft the MOU carefully to avoid misunderstandings and conflicts in the future.

3. **Application of Rules to Foreign Tourists**

Managing tourists, especially foreign tourists, is a challenging task. Therefore, it is important to have an effective system for providing information to tourists about the rules and their consequences and enforcing the rules firmly but fairly for those who break them. Clear communication and education to tourists can also help reduce rule violations, especially in the Grogol tourist village.

4. **Lack of Effective Oversight**

Not only that, the local government, namely Margodadi Village, in developing the Grogol tourist village has faced several problems that need to be overcome. One of the main problems faced is the lack of effective supervision of the progress of the development of the tourist village. So far, there has been no clear relationship or correlation between tourist villages and sub-districts in terms of supervision. However, the Margodadi Subdistrict has made significant progress in formulating a solution to this problem. One of the steps taken was to establish BUMKal (Kalurahan-Owned Business Entity) which was previously known as BUMDes. Through BUMKal, the local government is determined to improve supervision and management of the development of the Grogol tourist village. Not only that, BUMKal will be fully responsible for the supervision, progress and management of all aspects related to tourist villages such as infrastructure maintenance and so on.

E. Supporting Factors That Influence Stakeholders in the Development of the Grogol Tourism Village

1. **Professional Workforce**

By having professional experts, the Margodadi District feels fortunate to have a competent and expert team of management or administrators who are able to explain the operations of the tourist village well. Yang then felt that the existence of the Grogol tourist village had a positive impact on the good name of Margodadi Village as a whole, becoming more famous in the eyes of the wider community.

2. **Financial Resources**

With the presence of the private sector in developing the Grogol tourist village, there are great opportunities for the growth and progress of this tourist destination. One of the supporting factors with the presence of the private sector is the contribution of financial resources provided. Having access to financial resources is important to support various aspects of developing the Grogol tourist village. Such as helping to build the necessary infrastructure, namely roads, public facilities and adequate buildings. This will directly increase the quality and attractiveness of the Grogol tourist village for tourists. Apart from that, with large income, the Grogol tourist village can invest funds to create new tourist attractions. This new tourist attraction will increase the attractiveness of the tourist village for tourists and expand the variety of experiences that visitors can enjoy. The increased income can also be used to improve accommodation facilities in the Grogol tourist village. Like a homestay, comfortable and quality facilities will make visitors feel more satisfied and possibly extend their visit

Conclusion

1. **Role of Government**

The importance of regulations in the formation of tourism policy by the Sleman Regional Government can be seen from Governor Regulation no. 40 of 2020 concerning Tourism Awareness Groups and Tourism Villages and Homestays, as well as Regional Regulation No. 9 of 2022 concerning Tourism Villages. Tourist villages are developed with planning

based on local characteristics and USP of each area. Regional and local governments play an important role in organizing training and communication forums. Supervision of tourism development at the village level is carried out through direct visits by government officials. The Sleman Tourism Office supports local tourism development by providing infrastructure and physical and non-physical assistance.

2. The Role of the Private Sector

The private sector, including Event Organizers and Travel Bureaus (Traveling D'SA Trans Tour & Travel), plays a key role in developing the Grogol tourist village. EO and Travel Bureau are responsible for planning and implementing events as well as providing facilities and services including travel accommodation. Both of them not only promote, but are also actively involved in activities in the village.

3. Community Role

Managers or administrators have an important role in developing the Grogol tourist village. They must plan and execute activities carefully before the arrival of guests. In addition, they are also responsible for site maintenance, site preparation, and supervision after each activity as well as at monthly meetings. Performance evaluation is carried out to improve obstacles and plan future strategies. Then the results of the development of the Grogol tourist village are very influential in improving economic and social welfare, and providing real economic opportunities and increasing the community's living standards.

4. Factors that Influence Stakeholders in the Development of the Grogol Tourism Village

The Sleman Regency Tourism Office faces the constraints of inexperienced human resources and a lack of formal engagement with private companies in developing the Grogol tourist village. The implementation of regulations on foreign tourists and the lack of effective supervision are also obstacles. However, the presence of the Grogol tourist village with its professional workforce has increased the popularity of Margodadi Village. The contribution of the private sector in infrastructure development such as roads, public facilities, supporting buildings which improves the quality and attractiveness of the Grogol tourist village.

Confession

1. Mrs. Dr. Warsiti, S.Kp., M.Kep., Sp. Mat as Chancellor of 'Aisyiyah University Yogyakarta.
2. Mrs. Annisa Warastri, S.Psi., M.Psi as Dean of the Faculty of Economics, Social Sciences and Humanities, Yogyakarta Aisiyah University.
3. Mr. Gerry Katon Mahendra, S.IP., MIP as Head of the Public Administration Undergraduate Study Program, Faculty of Economics, Social Sciences and Humanities, Yogyakarta 'Aisyiyah University.
4. Mrs. Erni Saharuddin S.Sos., MPA as Supervisor, was very patient and willing to provide energy, time, thoughts, suggestions and support to the author so that it could be completed well.

5. Mr. and Mrs. Lecturers of the Bachelor of Public Administration Study Program, Faculty of Economics, Social Sciences and Humanities, Yogyakarta 'Aisyiyah University who have educated and provided knowledge while studying at 'Aisyiyah Yogyakarta University.
6. Thank you to Mrs. Esthi as secretary of the Grogol Tourism Village for her support and assistance to the author in completing this research.
7. Thank you to all the sources who I cannot mention one by one who have helped the author in completing this research.
8. Mr. Gunawan and Mrs. Sri as the author's parents who never tire of providing support and prayers for the author's success in all matters, as well as for the entire extended family who also always provide support and help.
9. My friends Anggie Angelita and Dian Purwanti, thank you for accompanying the author and being willing to process together through the joys and sorrows all this time. May Allah SWT always give us ease.
10. Friends who the researcher cannot mention one by one have helped in the preparation of this thesis.
11. And finally, thank you to myself or Ananda Amalia who have tried and struggled to get to this stage so that I can complete my studies to completion. Hopefully in the future it can be even better and always try Aminnn.

Reference

[1] Anggraini, D. (2019). Analysis of Teaching System Supervision at the Edu Smart Learning Center Medan. Ilman Journal: Journal of Management Science, 7(1), 19–27. https://doi.org/10.35126/ilman.v7i1.80
[2] Armela Shintani. (2021). Relations between Regional Government and the Private Sector in Managing Tourist Destinations in Sei Gohong Village. Journal of Social Sciences, Politics and Government, 9(2), 28–37. https://doi.org/10.37304/jispar.v9i2.1517
[3] Dea Deviyanti. (2019). Study of Community Participation in Development in Karangjati Village, Central Balikpapan District. EJournal of State Administration, 1(2), 27. https://ejournal.ap.fisip-unmul.ac.id/site/wp-content/uploads/2013/05/JURNAL DEA (05-24-13-09- 02-30).pdf
[4] Elcaputera, A. (2021). The Provincial Government's Supervisory Authority on the Implementation of Regency/City Government Based on Law Number 23 of 2014 concerning Regional Government. AL-IMARAH: Journal of Islamic Government and Politics, 6(1), 22–38.
[5] Herdiana, D. (2019). The Role of the Community in Community-Based Tourism Village Development. Journal of the Master of Tourism (JUMPA), July, 63. https://doi.org/10.24843/jumpa.2019.v06.i01.p04
[6] Manalu, Benmart E, Siti Latifah, and PP (2020). (PUBLIC PERCEPTION OF ECOTOURISM DEVELOPMENT IN HUTA GINJANG VILLAGE, SIANJUR This research aimed to examine the potential of ecotourism and public perception of ecotourism development in the village of Huta Ginjang, District Sianjur Early, Samosir Re. 2, 54–64.

[7] Marlina, N. (2019). Independence of tourist village communities from a community based tourism perspective: Case study of Ketengger Village, Banyumas Regency. Scientific Journal of Government Science, 4(1), 17. https://doi.org/10.14710/jiip.v4i1.4735
[8] Ninis Chairunnisa. (2023). High Tourist Visits, Why is Yogyakarta the Poorest Province in Java? Tempo.Co. https://travel.tempo.co/read/1681654/kunjungan-wisata-tinggi-mengapa-yogyakarta-jadi-provinsi-termiskin-di-jawa
[9] Pramono, SA, & Yulianto, P. (2020). Infrastructure Development with Environmental Insights Infrastructure Development with Environmental Insights. Theodolite, 21(1), 89–98.
[10] Ridha Rosliana. (2023). Not Sleman, this is the area that has the most tourist attractions in DIY. Jogja.Solopos.Com. https://jogja.solopos.com/bukan-sleman-ini-region-yang-cepat-cepat-wisata-paling-besar-di-diy-1672510
[11] Risanti, S. (2023). Number of Tourist Villages in Indonesia 2023, Latest! Fortune Indonesia. https://www.fortuneidn.com/news/surti/nomor-desa-wisata-di-indonesia?page=all
[12] Rozak, A. (2021). EDUCATION POLICY IN INDONESIA. 3(25), 6.
[13] Sleman, DPK (2022). Jepara to Study Tourism Management in Sleman. Sleman Regency Tourism Office. https://pariwisata.slemankab.go.id/2022/11/30/jepara-belajar-pengelolaan-pariwisata-ke-sleman/
[14] Wulanda, N., Wahab, Z., & Widad, A. (2019). The Influence of Price, Word of Mouth and Brand Image on Purchasing Decisions in Choosing an Event Organizer (Case Study in Un Production). Journal of Management and Business Review, 16(1), 43–70. https://doi.org/10.34149/jmbr.v16i1.139
[15] YUNI UMROH IMAWATI. (2023). OBSTACLES OF STUDENTS IN WORKING ON THESIS AS WELL AS EFFORTS TO IMPROVE THE QUALITY OF WORSHIP DURING THE THESIS PERIOD FOR STUDENTS OF DARUSSALAM KARTASURA SUKOHARJO Islamic Boarding School STUDENTS IN 2023 THESIS. 31–41.

Knowledge Of Pregnant Women In The Third Trimester About The Initiation Of Early Breastfeeding (Iebf)

Farida Kartini[1,2*], Hikmah[1]
[1]Faculty of Health Sciences, Universitas 'Aisyiyah Yogyakarta
[2]Center for Women, Family, and Disaster Studies Universitas 'Aisyiyah Yogyakarta

*Email: faridakartini@unisayogya.ac.id

Abstract

Purpose: The success of IEBF is an early signal of the success of exclusive breastfeeding. This is very important considering the low achievement of exclusive breastfeeding of 32.4%. IEBF is done as soon as the baby is born. Therefore, in order for IEBF to run well, it is necessary to have a good understanding of pregnant women about IEBF. To determine the level of knowledge of pregnant women in the third trimester about IEBF.

Methods: This research is a descriptive research. The population of this study is pregnant women in the third trimester who visit the Ngampilan Health Center, Wirobrajan Health Center, Mergangsan Health Center, Tegalrejo Health Center and Jetis Health Center. In the sampling period, namely in October 2013. Pregnant women who were willing to become research respondents at the Ngampilan Health Center were 17 pregnant women, Wirobrajan Health Center as many as 15 pregnant women, Mergangsan Health Center as many as 25 pregnant women, Tegalrejo Health Center as many as 26 pregnant women and Jetis Health Center as many as 37 pregnant women. The sampling technique is a quota sample. Thus, the number of samples in this study is 121 pregnant women in the third trimester.
Data analysis uses univariate analysis.
Results: The characteristics of the respondents showed that pregnant women were mostly at a healthy reproductive age. The most education is high school. Most mothers have already received information about IEBF. These maternal characteristics are not yet supportive at the level of maternal knowledge, because there are still many pregnant women in the third trimester who have a low level of knowledge about IEBF.
Suggestion: There needs to be research on the evaluation of the implementation of health promotion carried out by Puskesmas.
Keywords: IEBF, postpartum, knowledge, initiation, breast

Introduction

The current health development goals are directed at achieving the *Millennium Development Goals* (MDGs). In the MDGs, there are 2 goals that are closely related to midwifery, namely reducing mortality rates and improving maternal welfare. One of the efforts to achieve this goal is to provide exclusive breastfeeding. Many factors affect the success of exclusive breastfeeding, one of which is doing Early Breastfeeding Initiation (IEBF) as soon as the baby is born. IEBF is a government policy that has been

established since 2007 [6].

Nationally, the achievement of exclusive breastfeeding has only reached 32.4%. This achievement is still very far from the exclusive breastfeeding achievement target of 80%. The proportion of babies who get breast milk in the first 1 hour after birth only reaches 43.9% [12]. In the Special Region of Yogyakarta, the achievement of exclusive breastfeeding was only around 34.71% in 2010 [3].

This situation makes it a concern considering that breast milk is a baby food that is always ready to be available and almost all mothers can give it. Most of the deliveries are without problems in both the mother and the baby, so it is very possible to breastfeed immediately after birth. Most importantly, with breast milk, mothers do not need to spend money, time to prepare breast milk and the baby will get very good nutrients and immune substances and are needed by the baby for his growth and development in the future. Therefore, in the Qur'an, Surah Al-Baqarah verse 233 Allah says:

وَالْوَالِدَاتُ يُرْضِعْنَ أَوْلَادَهُنَّ حَوْلَيْنِ كَامِلَيْنِ ۖ لِمَنْ أَرَادَ أَنْ يُتِمَّ الرَّضَاعَةَ ۚ وَعَلَى الْمَوْلُودِ لَهُ رِزْقُهُنَّ وَكِسْوَتُهُنَّ بِالْمَعْرُوفِ ۚ لَا تُكَلَّفُ نَفْسٌ إِلَّا وُسْعَهَا ۚ لَا تُضَارَّ وَالِدَةٌ بِوَلَدِهَا وَلَا مَوْلُودٌ لَهُ بِوَلَدِهِ ۚ وَعَلَى الْوَارِثِ مِثْلُ ذَٰلِكَ ۗ فَإِنْ أَرَادَا فِصَالًا عَنْ تَرَاضٍ مِنْهُمَا وَتَشَاوُرٍ فَلَا جُنَاحَ عَلَيْهِمَا ۗ وَإِنْ أَرَدْتُمْ أَنْ تَسْتَرْضِعُوا أَوْلَادَكُمْ فَلَا جُنَاحَ عَلَيْكُمْ إِذَا سَلَّمْتُمْ مَا آتَيْتُمْ بِالْمَعْرُوفِ ۗ وَاتَّقُوا اللَّهَ وَاعْلَمُوا أَنَّ اللَّهَ بِمَا تَعْمَلُونَ بَصِيرٌ ﴿٢٣٣﴾

"Mothers should breastfeed their children for two full years, that is, for those who want to perfect breastfeeding. And the obligation of the father to feed and dress the mothers by means of ma'ruf. A person is not burdened but according to his level of ability. Let not a mother suffer misery for her child and a father for her child, and the heirs are obliged to do so. If both of them want to wean (before two years) by their own volition and consultation, then there is no sin against them. And if you want your child to be breastfed by someone else, then there is no sin for you if you give the payment you deserve. Fear Allah and know that Allah is Seeing what you are doing."

In the word of Allah, it is very clear that the best for baby food is breast milk, not formula milk, because it is clearly said that if the mother does not want to breastfeed her baby, then the baby can be breastfed to someone else instead of being given milk other than breast milk. Breast milk is milk produced by a mother after giving birth. Breast milk consists of colostrum that is released on the first day after childbirth until about day 3, transitional breast milk on days 4 to 14 and after that (day 15 onwards) permanent breast milk. Colostrum contains a lot of proteins and antibodies that are needed by babies [11]. The amount of colostrum is not as much as transitional breast milk and permanent breast milk and the time is very short so it is very good if given to the baby immediately. Therefore, the policy of immediately carrying out IEBF on newborns is very appropriate.

The absorption of colostrum by babies has an impact on the formation of the baby's body immunity properly so that it can reduce the incidence of morbidity and mortality of babies. Edmond et al. (2006) found that babies who underwent IEBF in the first hour of birth reduced the risk of neonatal death by 22%. On the other hand, if the baby at 1 o'clock of birth is not IEBF, it can increase the infant's mortality by 2-4 times. However, the implementation of IEBF requires the readiness of mothers and families of babies. This has an effect on the success of IEBF itself. Research conducted at St. Carolus Hospital in 2008 found that of the 276 babies who underwent IEBF successfully, only 75% succeeded in doing so [14].

Judging from the success rate of IEBF, it is necessary to have strong motivation and encouragement from mothers and families to do IEBF as best as possible. This motivation and encouragement will arise well if supported by good knowledge about IEBF in his mother and family. Good knowledge will greatly affect a person's behavior in action. From the results of the research conducted by Apriani (2012), it was found that there was a positive relationship between the level of knowledge and the behavior of postpartum mothers about the correct way to breastfeed.

Based on the existing phenomenon, it is necessary to research the knowledge of pregnant women, especially in the third trimester of pregnancy about IEBF. This is important considering that if the mother knows and understands what and how IEBF, the mother will be motivated and encouraged to do IEBF during childbirth. This study aims to determine the level of knowledge of pregnant women in the third trimester about IEBF. The results of this study are expected to provide input for health practitioners to prepare mothers in the third trimester to want to carry out IEBF properly.

Methods

a. Research Design

This study uses a quantitative method with a descriptive research design. This design was chosen because the researcher wanted to get an overview of the level of knowledge of pregnant women in the third trimester about IEBF.

b. Population and Sample

The population of this study is pregnant women in the third trimester who visit the Ngampilan Health Center, Wirobrajan Health Center, Mergangsan Health Center, Tegalrejo Health Center and Jetis Health Center. In the sampling period, namely in October 2013, the number of pregnant women with K4 visits (third trimester) of each health center was: Ngampilan Health Center as many as 18 pregnant women, Wirobrajan Health Center as many as 16 pregnant women, Mergangsan Health Center as many as 28 pregnant women, Tegalrejo Health Center as many as 28 pregnant women and Jetis Health Center as many as 38 pregnant women. Pregnant women who are willing to be respondents at the Ngampilan Health Center are 17 pregnant women, Wirobrajan Health Center is 15 pregnant women, Mergangsan Health Center is 25 pregnant women, Tegalrejo Health Center is 26 pregnant women and Jetis Health Center is 37 pregnant women. The sampling technique is a quota sample. Thus, the number of samples in this study is 121 pregnant women in the third trimester.

c. Operational Definition

The level of knowledge of pregnant women about Early Breastfeeding Initiation is the understanding of pregnant women about breastfeeding for the first time immediately after the baby is born who starts to breastfeed is a baby, not from the mother. Data on the level of mothers' knowledge about IEBF is known from the correct answers given by mothers based on the questionnaire given. The data scale used is ordinal with good criteria if the answer is correct >75-100%, while if the answer is correct 50-75% and less if the answer is correct 1-50% and bad if there is no correct answer.

d. Data Inference Tools and Techniques

The instrument used to collect data is a questionnaire. This questionnaire contains

questions that include the meaning of IEBF, the benefits of IEBF for mothers and babies, the time to implement IEBF and the methods/steps of IEBF. The type of instrument used in this study is a questionnaire with open-ended questions. The selection of this questionnaire is intended to obtain the most valid information possible from the respondents without giving the respondents the opportunity to answer randomly or approximately.

Data collection was carried out with the help of 7 research assistants taken from students. Before data collection is carried out, a perception equation with the research assistant is carried out. At the time of data collection, before the respondents fill out the questionnaire, they first explain and ask for their approval to become a respondent. After the respondent agrees to it, a questionnaire is given and then waited until the respondent completes the questionnaire, then the questionnaire is taken again.

e. Data Analytics

The data analysis to be used is univariate analysis, namely with percentages. This analysis will be carried out by computerization.

Results and Discussion

a. RESULTS

This research was conducted in 5 health centers consisting of 2 outpatient health centers, namely the Ngampilan Health Center and the Wirobrajan Health Center. Three inpatient health centers are the Mergangsan Health Center, Jetis Health Center and Tegalrejo Health Center. The five health centers all provide pregnancy care services/Ante Natal Care (ANC). The implementation of this service is carried out 1-2 times a week depending on the existing schedule. in each health center.

One of the activities in ANC services is Communication, Education and Information (CIE). This CIE is carried out by midwives. One of the discussions on CIE is about IEBF, especially in the third trimester. However, the CIE carried out by the Midwife in the KIA room of the Puskesmas is very limited considering that the time to serve the mother is very short even though the mother who does ANC visits is quite a lot starting from the first to the third trimester, so the midwife cannot give the CIE in depth. Therefore, the Pregnant Women Class was held. In addition, for pregnant women in the third trimester, lactation counseling is also carried out by lactation counselors, but because this activity takes time, not all pregnant women are willing to participate in this activity on the grounds that there are other activities or needs. For pregnant women who experience nutritional problems, a referral is made for nutrition consultation in the nutrition section. In this section, the CIE material provided also mentions IEBF and breast milk.

Pregnant women classes are a means to learn together about health for pregnant women, in the form of face-to-face in groups that aim to improve the knowledge and skills of mothers regarding pregnancy, pregnancy care, childbirth, postpartum care, newborn care, myths, infectious diseases and birth certificates.

The implementation of this Mother's class in each Health Center is not the same. Some are once every 1 month, once every 3 months or more depending on the program that has been prepared by the Health Center. The Mother's Class, which is held once a month, involves Independent Practice Midwives in the work area of the Puskesmas and local Health Cadres. This pregnant woman class can be followed by every pregnant

woman who is willing and willing, so there is no obligation to participate.

In this study, pregnant women who were used as respondents were those in the third trimester of pregnancy and visited to check their pregnancy at the KIA Puskesmas section. During this data collection, there were a total of 128 respondents. Seven people were not willing to be respondents, so there were 121 pregnant women in the third trimester who were willing to become respondents.

Characteristics Responden

Table 1 shows that most of the respondents are in a healthy reproductive age, which is 79.3% (96 people). The least is respondents with the age of <20 years as many as 8.3% (10 people). Most of the respondents had a high school education, which was 66.9% (81 people). The least is respondents with elementary education as much as 2.5% (3 people). The most respondents with a gestational age of 37-40 weeks were 41% (42 people). The least were respondents with a gestational age of 28-32 weeks as many as 31.4% (38 people). Most of the respondents 49.6% did not have children or this pregnancy was their first pregnancy. Most respondents had heard of IEBF, namely 96.4% (84 people). Respondents who received CIE from midwives were 39 mothers (32.3%) and from nutrition workers 12 mothers (9.9%).

Table 1. Characteristics of Respondents n= 121

Question	Frequency	%
Age:		
<20 years	10	8,3
20-34 years	96	79,3
≥ 35 years	15	12,4
Education:		
Not finishing elementary school	4	3,3
Elementary school	3	2,5
Junior high school	11	9,1
Senior high School	81	66,9
College/Universities	22	18,2
Gestational age:		
28-32 weeks	38	31,4
33-36 weeks	42	34,7
37-42 weeks	41	33,9
Number of children:		
0	60	49,6
1	44	36,4
2	13	10,7
3	3	2,5
4	1	0,8

CIE:		
Didn't get a CIE	70	57,9
CIE by Midwife	39	32,2
CIE by Health Workers	12	9,9

Table 2 shows that most of the respondents (62.8%) do not know the meaning of IEBF. This ignorance also dominated the answer to the question about when to do IEBF, which was 38.8%. Most of the respondents 92.6% did not know how long the IEBF was carried out. Most of the respondents (53.7%) had sufficient knowledge about the benefits of IEBF. The level of knowledge of respondents about IEBF is at most 48.8% in the category of poor.

Table 2. Respondents' Knowledge Level About IEBF

Question	Frequency	%
Definition of IEBF:		
Do not know	76	62,8
Enough to Know	25	20,7
Know	20	16,5
IEBF implementation time:		
Do not know	47	38,8
Enough to Know	29	24
Know	45	37,2
IEBF Implementation Period:		
Do not know	112	92,6
Enough to Know	6	5
Know	3	2,5
Benefits of IEBF:		
Do not know	51	42,1
Enough to Know	65	53,7
Know	5	4,1
Respondents' Knowledge Level About IEBF:		
Bad	36	29,8
Less	59	48,8
Keep	23	19
Good	3	2,5

Table 3. Cross-Age Tabulation with Respondents' Education Levels

Level / Education Mother's Age	Not finishing elementary school (%)	Elementary school (%)	Junior high school (%)	Senior high School (%)	College/Universities (%)	Total (%)
<20 years	3 (2,5)	1 (0,8)	3 (2,5)	3 (2,5)	0 (0)	10 (8,3)
20-34 years	0 (0)	2 (1,7)	6 (5)	71 (58,7)	17 (14)	96 (79,3)
≥35 years	1 (0,8)	0 (0)	2 (1,7)	7 (5,8)	5 (4,1)	15 (12,4)
Total	4 (3,3)	3 (2,5)	11 (9,1)	81 (66,9)	22 (18,2)	121 (100)

Table 3 shows that respondents who are in the most healthy reproductive age 79.3% have a high school education level of 58.7%.

Table 4. Cross-tabulation of Puskesmas Status with CIE IEBF Status

Community Health Center Status	Status with CIE IEBF			Total (%)
	No CIE	CIE Midwife	CIE Nutritionist	
Outpatient	13 (10,7)	14 (11,6)	5 (4,1)	32 (26,4)
Hospitalization	57 (47,1)	25 (20,7)	7 (5,8)	89 (73,6)
Total	70 (57,9)	39 (32,2)	12 (9,9)	121 (100)

Table 4 shows that pregnant women who do ANC at inpatient health centers, most of 47.1% do not get a CIE about IEBF. In outpatient health centers, most of 11.6% have received a CIE about IEBF from midwives.

Table 5. Cross-tabulation of Mother's Level of Knowledge about IEBF with Respondent's Age

Age of Pregnant Women / Level of Knowledge	<20 years (%)	20-34 years (%)	≥ 35 years (%)	Total (%)
Bad	4 (3,3)	28 (23,1)	4 (3,3)	36 (29,7)
Less	6 (5)	49 (40,5)	4 (3,3)	59 (48,8)
keep	0 (0)	17 (14)	6 (5)	23 (19)
Good	0 (0)	2 (1,7)	1 (0,8)	3 (2,5)
Total	10 (8,3)	96 (79,3)	15 (12,4)	121 (100)

Table 5 shows that pregnant women with a healthy reproductive age of 79.3% have a level of knowledge about IEBF in the category of less than 40.5%.

Table 6. Cross-tabulation of Mother's Level of Knowledge about IEBF with Education Level

Education Level / Level of Knowledge	Not finishing elementary school (%)	Elementary school (%)	Junior high school (%)	Senior high School (%)	College/ Universities (%)	Total (%)
Bad	2 (1,7)	1 (0,8)	5 (4,1)	24 (19,8)	4 (3,3)	36 (29,7)
Less	2 (1,7)	2 (1,7)	6 (5)	40 (33)	9 (7,4)	59 (48,8)
keep	0 (0)	0 (0)	0 (0)	14 (11,6)	9 (7,4)	23 (19)
Good	0 (0)	0 (0)	0 (0)	3 (2,5)	0 (0)	3 (2,5)
Total	4 (3,3)	3 (2,5)	11 (9)	81 (67)	22 (18,2)	121 (100)

Table 6 shows that the level of knowledge of mothers about IEBF is the highest with the category of less than 48.8%, dominated by respondents with high school education (33%).

Table 7. Cross-tabulation of Mother's Knowledge Level about IEBF with Gestational Age

Gestational Age / Level of Knowledge	28-32 weeks (%)	33-36 weeks (%)	37-42 weeks (%)	Total (%)
Bad	15 (12,4)	10 (8,3)	11 (9)	36 (29,7)
Less	14 (11,6)	25 (20,7)	20 (16,5)	59 (48,8)
Keep	7 (5,8)	7 (5,8)	9 (7,4)	23 (19)
Good	2 (1,70	0 (0)	1 (0,8)	3 (2,5)
Total	38 (31,4)	42 (34,7)	41 (33,9)	121 (100)

Table 7 shows that the most level of knowledge of mothers about IEBF is less than 48.8%, dominated by mothers with a gestational age of 33-36 weeks.

Table 8. Cross-tabulation of Mother's Knowledge Level about IEBF with CIE Status from Health Workers

CIE status of health workers / Level of Knowledge	No CIE (%)	CIE Midwife (%)	CIE Nutritionist (%)	Total (%)
Bad	31 (25,6)	5 (4,1)	0 (0)	36 (29,8)
Less	29 (24)	23 (19)	7 (5,8)	59 (48,8)
Keep	10 (8,3)	8 (6,6)	5 (4,1)	23 (19)
Good	0 (0)	3 (2,5)	0 (0)	3 (2,5)
Total	70 (57,9)	39 (32,2)	12 (9,9)	121 (100)

From table 8, it can be seen that the level of knowledge of mothers about IEBF is the most categorized as less than 48.8%, of which 24% do not get CIE.

b. Discussion

Respondents in this study were 79.3% in the age range of 20-35 years. This age is a period of healthy reproduction. The healthy reproductive period is a very good time to give birth where the possibility of risks due to pregnancy and childbirth for mothers and babies is low [1]. As many as 49.6% of the respondents of this pregnancy are the first pregnancy. In the first pregnancy, mothers generally pay more attention to pregnancy. This is also the first experience for mothers.

Judging from the level of education of the respondents, most of the respondents

have a high school education. The education of the respondent/mother is related to the level of knowledge. A person who has a high level of education is assumed to also have a high level of knowledge as well. A person who has a high level of education will easily capture and understand what is conveyed as a form of communication. Changes will not occurs when the message conveyed is not understood and remembered by someone [9].

Respondents mostly 57.9% never received information about IEBF. Only 42.1% of mothers received information/CIE about IEBF. Of this number, 32.2% of mothers get CIE about IEBF from midwives. In accordance with the role and function of Midwives, one of which is as an educator, in this case educating pregnant women to know and understand about maternal and fetal health. This education is provided through CIE to mothers during visits to midwives [5].

The CIE regarding IEBF should have been obtained by the mother when examining pregnant women. Similarly, it is assumed that mothers who have their pregnancies checked at health centers, both outpatient health centers and inpatient health centers. The CIE guide on IEBF is also found in the mother's KIA book. This KIA book is a must-have for every pregnant woman.

More mothers who check their pregnancy at the Puskesmas have never received information about IEBF. The data obtained also showed that mothers who carried out pregnancy checks at outpatient health centers tended to get more CIE about IEBF than those who checked for health at inpatient health centers. This is very interesting considering that the inpatient health center should have service synergy between each unit. should be able to carry out the function as a mother who checks her pregnancy at the Outpatient Health Center. This should not happen considering the possibility that the mother will give birth at the inpatient health center has a great chance. If the mother does not understand IEBF, it is likely that she will refuse to do IEBF.

The lack of optimal CIE activities in inpatient health centers may be due to the large number (about 2 times) of the number of mothers who check their pregnancies there compared to mothers who check their pregnancies at outpatient health centers.

Actually, to overcome this, each Health Center has an activity called the Mother Class. It's just that the activity This is not so optimal because the number of pregnant women who can participate in these activities is limited considering the limited funds. Besides that, not all mothers can participate in these activities because of the possibility of being busy so they are not willing to be participants. In addition, this Mother's class activity is not routinely carried out because it depends on the program and existing funds.

When viewed as a whole, most of the respondents had received information about IEBF, but the level of knowledge of mothers/respondents was the most in the category of less. Even though a person's level of knowledge about something greatly affects their opinions/attitudes and behaviors towards it. Mother's knowledge of IEBF will greatly affect the implementation of IEBF itself. A good understanding of the IEBF from pregnant women allows the mother to do the IEBF at the time of delivery. The research of Susanti & Hartini (2007) obtained the results that the knowledge of postpartum mothers about umbilical cord care is related to their behavior in caring for the umbilical cord.

This level of lack of knowledge can be influenced, among others, by the

characteristics of the respondents. Judging from the age factor, respondents with the age of <20 years have a tendency to have a poor and lacking level of knowledge. This is possible because he has not had too much experience and a low level of education. Respondents with the age of ≥35 years are likely to easily forget the information they have obtained. However, the low level of knowledge about IEBF is dominated by mothers with a healthy reproductive age, namely 20-34 years old. Judging from the level of education, most of the mothers who graduated from high school and PT. In fact, the purpose of education is to change behavior [9]. How will good behavior happen if mothers do not have knowledge about it.

In mothers with a gestational age of 37-42 weeks, there are still many who have a poor level of knowledge and lack of knowledge about IEBF. This is concerning considering that mothers are waiting for birth in a matter of days or hours. If the mother does not understand IEBF, it is possible that the success of the implementation of IEBF is not optimal, which ultimately has an impact on exclusive breastfeeding. This is due to the Initiation Early Breastfeeding (IEBF) as soon as the baby is born. IEBF carried out in the first 30 minutes of the baby's birth is one of the 10 steps towards breastfeeding success based on the *Baby Friendly Hospital Initiative* in 1992 [15].

If the level of maternal knowledge is associated with CIE status, then the level of maternal knowledge is less in mothers who are CIE by midwives. It is ironic because the midwife should be able to provide the CIE well so that the mother can understand what is conveyed by the midwife to be implemented. If the understanding and memory of information is lacking, there will be no change. If the instructions are effective and the explanation is good, then it will be difficult for the mother not to follow what is conveyed [9].

The CIE given by Midwives is less effective, perhaps due to the many tasks that must be done by Midwives, while the existing Midwives are only a few, around 3-4 people. Ideally, a pregnant woman should at least get comprehensive services by a midwife taking at least half an hour. By that time, it is estimated that midwives can give CIE to mothers quite deeply. The reality that exists in the Puskesmas with so many patients when compared to the available time plus the number of Midwives is slightly reduced because there are Midwives whose outside duties increasingly make the services provided by Midwives ineffective. Consultation with Nutrition Officers is carried out only for mothers who have nutritional problems.

In addition, it is possible that the mother herself is no longer too concerned about what the midwife said. Mom is tired of waiting in line for checkups, plus maybe she has other needs after checking her pregnancy, so it seems that she is in a hurry to go home immediately.

This lack of knowledge is based on mothers' answers to questions about the definition, implementation time and duration of IEBF which most mothers answered did not know. The question of IEBF benefits is mostly quite knowledgeable. Most mothers only know what IEBF stands for, namely Early Breastfeeding Initiation and do not know the definition of IEBF itself.

The implementation of IEBF takes enough time. This needs to be known by the mother and her family so that they are ready to carry out IEBF. Without the support and readiness of mothers and families, it is likely that IEBF will not succeed properly.

The steps in IEBF are the first skin contact between mother and baby at least the

first 1 hour after birth. The baby is lying on the mother's chest and stomach with the head tilted. The position of the baby's head between the mother's breasts and under the nipples. Cover the mother and baby to prevent hypothermia. Both babies will use their instincts to do IEBF and the mother can assess her baby when it is ready to breastfeed. Wait until the baby starts crawling and searching for the nipple until he finds it and sucks it. Third, postpone all procedures to be carried out on newborns until the IEBF is completed [6]. Research conducted at St. Carolus Hospital in 2008 found that of the 276 babies who were carried out IEBF, only 75% succeeded in doing so. Of this number, 82% are babies born spontaneously [15].

The implementation of IEBF is carried out as early as 1 hour after delivery to 2 hours. Not many mothers know this. This ignorance is feared to have an impact on the mother's unpreparedness to do IEBF because perhaps the mother still feels tired due to the delivery process.

Maybe it is necessary for CIE to do this IEBF clearly and deeply and must be repeated at every subsequent meeting, it is not enough just once. Actually, you can read information about this IEBF in your KIA book. Storing long-term memories requires a more effective effort to learn through repetition and associating them with other thoughts [9].

In general, during CIE, there is not only one topic that midwives convey to mothers in a very short time, so it is likely that the information provided by midwives is not in-depth and clear. In fact, to store one piece of information in memory, it takes a break of 10-15 minutes after the information is conveyed. If other information is immediately given, the previous information will be hampered [9].

Conclusion

The characteristics of the respondents showed that most pregnant women were at a healthy reproductive age. The most education is high school. Most mothers have already received information about IEBF. These maternal characteristics are not yet supportive at the level of maternal knowledge, because there are still many pregnant women in the third trimester who have a low level of knowledge about IEBF.

Reference

[1] Affandi, B. ed. (2012) *Buku Panduan Praktis Pelayanan Kontrasepsi*. PT. BPSP. Jakarta.

[2] Apriani. (2012) Hubungan Tingkat Pengetahuan Dengan Perilaku Tentang Cara Menyusui Yang Benar Pada Ibu Post Partum Di Puskesmas Mergangsan Yogyakarta Tahun 2011 [Internet], http://skripsistikes.wordpress.com [akses 26 Februari 2013].

[3] Dinkes DIY (2012) *Laporan Dinkes Subdinyankes.* Yogyakarta.

[4] Edmond dkk. (2006) Delayed Breastfeeding Initiation Increases Risk of Neonatal Mortality[Internet]http://pediatrics.aappublications.org/content/117/3/e380.full

[5] Hani, U., dkk. (2010) A*suhan Kebidanan Pada Kehamilan Fisiolois* . Salemba Medika. Jakarta.

[6] JNPK-KR, Depkes RI. (2008) *Asuhan Persalinan Normal.* Jakarta.

[7] Kementrian Agama RI. (2010) *Al Qur'anulkarim Miracle The Reference.* PT. Sygma Examedia Arkanleema. Jakarta.

[8] Machfoedz, I. (2008) *Pendidikan Kesehatan Bagian Dari promosi Kesehatan*. Fitramaya. Yogyakarta.
[9] Maramis,W.F. (2006) *Ilmu Perilaku Dalam Pelayanan Kesehatan.* Airlangga University Press. Surabaya.
[10] Notoadmojo. (2007) *Promosi Kesehatan & Ilmu Perilaku*. Pt. Rineka Cipta.Jakarta.
[11] Saifuddin Ed. (2008) *Ilmu Kebidanan. BP-SP.* Jakarta
[12] Sari, L., (2013) *Faktor Penyebab Ibu Tidak Memberikan ASI Secara Ekslusif.* KaryaIlmiah. STIKES 'Aisyiyah Yogyakarta.
[13] Susanti, L. & Hartini (2007) Hubungan Tingkat Pengetahuan dengan Perilaku Perawatan Tali Pusat Bayi pada Ibu Nifas di BPS Romdhati Jetis Semin Gunungkidul [Internet] e-journal respati.ac.id/node/120 (Jurnal Medika Respati, Juli 2007, No.3, No.3 diunggah Selasa, 25-6-2013, 05:08)
[14] Yohmi, E. & Purnawati, J. (2010) *The Rate of Early Initiation of Breastfeeding at Sint Carolus Health Service.* Dipresentasikan pada PIT IDAI Maret 2010.
[15] Yohmi, E. (2010) Inisiasi Menyusu Dini. In:Suradi, R., Hegar, B., Pratiwi, I. G. A. N., Marzuki, A. N. S., Ananta, Y. ed. Indonesia Menyusui: Jakarata: Badan Penerbit IDAI, pp. 45-57.