

PROCEEDING

ISBN : 978-602-53540-8-3

3rd International Conference on Health Research and
Science Expanding Innovation in Health Higher Education
and Health Services in Handling the Covid-19 Pandemic



Virtually from Health Polytechnic of Jakarta III,
Ministry of Health, Indonesia
Wednesday-Thursday, April 14-15, 2021

Published by :



POLTEKKES
KEMENKES
JAKARTA III

Support by :





POLTEKKES KEMENKES JAKARTA III

Jl Arteri JORR Jatiwarna, Pondok Melati, Bekasi 17145

Telp 021-84978693, Fax 021-84978696

Website : <http://www.poltekkesjakarta3.ac.id>

ISBN 978-602-53540-8-3



PROCEEDING

3rd International Conference on Health Research and Science
**Expanding Innovation in Health Higher Education
and Health Services in Handling the Covid-19 Pandemic.**

Virtually from Health Polytechnic of Jakarta III,
Ministry of Health, Indonesia
Wednesday-Thursday, April 14-15, 2021



Published By:
Health Polytechnique of Jakarta III

PROCEEDING

3rd International Conference on Health Research and Science:
Expanding Innovation in Health Higher Education
and Health Services in Handling the Covid-19 Pandemic.

ISBN: 978-602-53540-8-3

THE COMMITTEE OF THE 3rd INTERNATIONAL CONFERENCE OF JAKARTA III HEALTH POLYTECHNIC, April 2021

Advisory Steering	: Director of Health Polytechnique of Jakarta III
Referrer	: Vice Dir I of Health Polytechnique of Jakarta III
Person in charge	: Vice Dir II dan Vice Dir III of Health Polytechnique of Jakarta III
Organizing Committee:	
Chairman	: Dr. Yudhia Fratidina, M.Kes
Vice Chairman	: Ns. Paula Krisanty, S.Kep, MA
General Secretary	: Dewi Astuti, S.Si.,M.Biomed
Secretarial	1. Willa Follona, SST, M.Keb (Coord) 2. Rizanna Fajrunnimah, M.Biomed 3. Maya Guningsih 4. Fitri Rizki Danisa, SST 5. Puji Lestari, SH
Treasurer	6. Sri Sukamti, SKp, MKM (Coord) 7. Nina Primasari, M.Keb 8. Aldine Harahap, M.Kes
Scientific division	9. Dr. Eviana S. Tambunan, SKp, MKM (Coord) 10. Erika, Y.I., SST, MKeb (Coord) 11. Dita Sulistiowati, M.Kep 12. Dr. Sri Djuwitaningsih 13. Rita Ismail, MTD (HE), PhD 14. Dr. Pramita Iriana, M.Biomed 15. Dr. Heru Setiawan, SKM, M.Biomed 16. Roikhatul Jannah, MPH
Event division	17. Nessi Meilan, SST.,MKeb (Coord) 18. Ni Luh Putu Ekarini, M.Kep, Sp.KMB 19. Nurdahlia, MKM 20. Eva Ayu Maharani, S.Si, M.Biomed 21. Husjain Djajaningrat, SKM., MKes

Consumption division	22. Dra. Jomima Batlajery, M.Kes (Coord) 23. Eros Siti Suryati, S.Pd, MKM
Public Relations Division	24. Winancy Gunawan, SST., MKeb 25. Jathu Dwi Wahyuni, MKep
Publications Section, Registration and Documentation	26. Yandri Irawan, S.Kom (Coord) 27. Sulistyo Asmoro Bangun, S.Kom, MKM 28. Erna Sariana, SKM., M.kes. 29. Riky Aldrias, S.Kom 30. Muhamad Fitrah, S.Kom 31. Depri Pahla Kurnia, Amd
Section Exhibition & Sponsorship	32. Debbiyantina, S.ST, M.Keb (Coord) 33. Ni Putu Aryadnyani, M.Biomed 34. Ahmad Syakib. SKM., S.Ft., MKM
Equipment Committee	35. Rozy Efendi, AMAK (Coord) 36. Priyanti Edi Kurnia, S.Kom 37. Taufik Nasor, S.Kom

Editors:

Dr. Eviana S. Tambunan, SKp, MKM
Dr. Pramita Iriana, M.Biomed
Dr. Heru Setiawan, SKM, M.Biomed
Rita Ismail, MTD (HE), PhD
Dita Sulistiowati, M.Kep

Reviewer:

Associate Prof. Dr. Ritthikorn Siriprasertchok
Erljhon C. Gomez, MAN, RN
Dr. Miswar Fattah
Dr. Johan Arief Budiman
Dr. Sri Juwitaningsih, M.Kep, Sp.Mat
Willa Follona, SST, M.Keb
Ns.Valen Fridolin Simak,,M.Kep., Sp.Kom
Ns. Megawati, M.Kep.,Sp.Kep.M.B
Ns. Kurniawati, S.Kep.,M.Kep
Ns. Putri Mahardika, M.Kep., Sp.Mat

Design & Lay Out:

Yandri Irawan, S.Kom, M.Pd

Published by

Health Polytechnic of Jakarta III

Office :

Jl. Arteri JORR Jatiwarna, Kec. Pondok Melati, Kota Bekasi

Jawa Barat, Indonesia

Telp. 021 84978693. Fax. 021 84978696

All rights reserved

Reproduction of this paper in any form is prohibited without written permission from the publisher

ACKNOWLEDGEMENT

Thank God, We pray to God Almighty for abundant blessings and mercy, on the 3rd International Conference on Health Research and Science “Expanding Innovation in Health Higher Education and Health Services in Handling the Covid-19 Pandemic”.

This proceeding contains the results of health researches which are carried out most by the lectures. Those have been reviewed by the experts, met the scientific requirements were defined, published through oral and poster presentations at the International Conference in which held by Jakarta 3 Health Polytechnic.

This proceeding was the journal of scientific conference. In a scientific climate, persons were not only creating a research but also had to make the publication of their works in the form of scientific media including in a form of proceeding. Writing a research report in the proceeding in a form of responsibility and accountability to work of researcher. This proceeding was expected to be a reference for the development of health sciences.

This proceeding could be issued because the entire processes of the international conference, oral and poster presentations had been conducted well due the good cooperation of the conference committee and support from various parties. On this occasion, we deliver our thanks and appreciations to the Director of Jakarta 3 Health Polytechnic, all Vice Director (1, 2 and 3) as well as their staffs, all health professional organizations: Patelki (Medical Laboratory Technology Expert Association), IFI (Indonesian Physiotherapist Association), IBI (Indonesian Midwives Association), and PPNI (Indonesian National Nurses Association). All universities which are involved: Osaka University Japan, St. Paul University Philippines, Nanyang Technological University, all participants particularly participants of oral and poster presentations, and also the whole committee members.

We still expect the critics and suggestions from all readers for the developing and quality of the scientific conference proceeding in the future.

The International Conference Committee 2021

WELCOME SPEECH DIRECTOR

The Third Jakarta III Health Polytechnic International Conference on Health Research and Science

Her excellency dr. Kirana Pritasari, MQIH: Acting Head of Board Development and Empowerment Human Resources of Health, Ministry of Health, Republic of Indonesia
In which today is represented by dr. Trisa Wahjuni Putri, M.Kes: Secretary of Head of Board Development and Empowerment Human Resources of Health, Ministry of Health, Republic of Indonesia.

Honorable speakers:

- Masayo Matsuzaki, PH. D: Professor, Osaka University Japan
- Dr. Bryan Chua: Director of Nanyang Polytechnic School of Health and Social Sciences, Singapore
- Czarina Estonactoc-Cruel, MAM-MT: Saint Paul University Manila Philippines
- Dr. Mizwar Fatah: The Indonesian Association of Health Laboratory Technologist (PATELKI Indonesia)
- Roikhatul Jannah, MPH: Jakarta III Health Polytechnic

Honorable reviewers:

- Associate Prof. Dr. Ritthikorn Siriprasertchok: Burapha University, Thailand
- Erljohn C. Gomez, PhD: Centro Escolar University, Philippines

Honorable guests, the representative of our partners:

- Sandy Sanchez-Montano, PhD: Chairperson Philippine Commission on Women & President of CHEERS Philippines.
- Sister Ma. Evangeline Anastacio, SPC: President of Academic Services, St. Paul University Manila Philippines.
- Dr. Elvira L. Urgel: Dean of School of Nursing, Centro Escolar University Philippines.
- Dr. Lina Tio, MBA: Director of Marketing Research & Internationalization, Lincoln University Malaysia.
- Prof. Hiroko Watanabe, PhD: Head of Department of Children and Women's Health, Division of Health Science, Osaka University Graduate School of Medicine, Japan.
- Dr. Tuomo Rautakivi: Honorary Consulate of Finland.

Honorable sponsors:

- Bank Negara Indonesia
- Enseval Medika Prima
- Bank Syariah Indonesia
- PT. Yakult Indonesia
- PT. Intergastra Nusantara

Eminent scholars, colleagues, ladies and gentlemen.

Ass. Wr. Wb., Good morning, Om Swasti Astu, Namo Budaya, Salam Kebajikan,

I am pleased to welcome you to the third Jakarta III Health Polytechnic International Conference on Health Research and Science. This year we bring the theme: **Expanding Innovation in Health Higher Education and Health Services in Handling the Covid-19 Pandemic.**

I would like to make report to her excellency Ibu Trisa that in this conference are followed by 17 foreign participants (USA, Pakistan, Thailand, Malaysia, Singapore, Japan and Phillipines) and 1,008 Indonesian participants in which oral presentant: 30 persons, poster presentant: 14 persons. So total participant: 1,025 persons.

Ladies and Gentlemen,

As you are only too aware, we are in the midst of a crisis like no other. The pandemic has sent shockwaves through the global economy. People are worried about their lives and livelihoods. Many businesses are either closed or waiting for customers to return. Governments are stretching their spending capacity. And the stability of financial systems is threatened. Policymakers all over the world are looking for ways to contain the spread of the virus while limiting the economic fallout. And this is a truly global crisis. The Covid-19 virus does not stop at borders. For this reason, coordinated, international strategies to fight the virus and its all sectors impact are more effective than going it alone.

Even different countries or even regions within the same country can require different approaches in defining essential health services and in reorienting elements of the health system to maintain these services. Decision makers must balance the benefits of certain activities and the risk of spreading the virus that these activities pose. The risk-benefit analysis for any activity will depend on the disease burden and local social context, the scenario of Covid-19 transmission, and local capacity to provide services, both basic capacity and capacity as the pandemic progresses.

This certainly encourages each country to have different policies for public health and social measures that are implemented to limit the transmission of Covid-19, and the approach to loosening these measures also varies. Policies that restrict movement to contain transmission can create barriers to access to health services and will influence the roadmap for returning health services to their original state.

Ladies and Gentlemen,

The Covid-19 pandemic not only affects health service factors, but also education. Education and students are required to be able to adapt and take advantage of the 4.0 Revolution era education due to the conditions of the Covid-19 Pandemic, due to restrictions on movement and mobility to deal directly with the application of the internet of things (IoT). This condition can encourage the development of creativity and innovation through joint assignments (collaboration), individual assignments and certain projects that are useful during this epidemic situation. The collaboration shown by educational innovation should have bridged this.

In the conditions of the Covid-19 pandemic, innovation in the field of education is needed, namely reforms in the education sector carried out to solve educational problems. Educational innovation is an idea, item, method that is perceived or observed as new to a person or group of people (society) either in the form of an invention (new) or discovery (changing an old one) that is used to achieve educational goals or solve educational problems.

Ladies and Gentlemen,

Conferences such as this provide a valuable opportunity for research scientists, health provider specialists and decision-makers to share experiences.

I am grateful to the many experts who have come to share their knowledge today. I also welcome the many representatives of governments, health provider associations and scholars who have joined us. I am sure you will have fruitful and rewarding exchanges in the next two days. I wish you every success with this important conference and I look forward to learning about the outcome.

Thank you.

Wass. Wr. Wb, Good Morning, Om Shanti Shanti Om, Namo Budaya, Salam Kebajikan.

CONTENT

Committee	iii
Acknowledgement	vi
Welcome Speech of Director	vii
Content	x

ORAL PRESENTATION

1	EFFECT OF PENETRATION ENHANCER DIMETHYL SULFOXIDE (DMSO) ON PENETRATION ANCHOVIES (<i>STOLEPHORUS SP</i>) PROTEIN CONCENTRATE GEL ON <i>IN VIVO</i> STUDY Arlan K Imran, Gunawan P. Widodo, Anita Sukmawati, Zulfiayu, ^{Vyani} Kamba	1
2	FORMULATION AND EVALUATION OF CLOFENACED NATRIUM EMULGELS WITH CARBPHOL 940 CONCENTRATION VARIATIONS AS <i>GELLING AGENT</i> Sri Andriyani A Nusi, Prisca Wicita, Zulfiayu	11
3	KNOWLEDGE OF RDT AND RT-PCR FOR COVID-19 DETECTION AMONG MEDICAL LABORATORY TECHNICIAN AND MEDICAL LABORATORY TECHNOLOGIST Muhammad Rizki Kurniawan, Wulan Fitriani Safari, Roro Enggar Sandra Wilujeng, Restiyani	19
4	PERFORMANCE ANALYSIS OF LECTURERS & EDUCATION LABORATORY INSTRUCTORS IN THE LEARNING PROCESS BEFORE AND DURING THE COVID-19 PANDEMIC Hartati, Nangsih Sulastri Slamet, Fihrina Mohamad, Vyani Kamba	27
5	FOOD HABITS AND WASHING HANDS BEHAVIOR AMONG ADULT AND TEENAGERS DURING PANDEMIC Didit Damayanti, Ratih Puspitaningtyas Purbaningrum, Leni Purbasari, Iskari Ngadiarti	40
6	THE ANALYSIS OF SERVICE QUALITY ON CUSTOMER SATISFACTION AT GORONTALO MEDIKA PHARMACY DURING THE COVID-19 PANDEMIC Prisca Safriani Wicita, Zulfiayu, Vyani Kamba, Insyira Fadliana Basri	49
7	EFFECTIVENESS OF COMMUNICATION, INFORMATION AND EDUCATION IN COMPLIANCE THE USE OF ANTIBIOTICS IN PANGKALPINANG CITY Rachmawati Felani Djuria, Syamsul Rizal Sinulingga	62
8	FORMULATION AND EVALUATION OF ANTIOXIDANT CREAM AVAILABILITY TELANG FLOWER SARI (<i>Clitoria ternatea L</i>) WITH VCO CONCENTRATION COMPARISON Muh.Ikhsan Umar, Prisca S Wicita, Zulfiayu	71
9	FORMULATION AND EVALUATION OF ORAL SUSPENSION PROVISION OF CHLORAMPHENICOL WITH NA CMC CONCENTRATION COMPARISON Titi Nurul Huda K. Puluwulawa, Prisca S. Wicita, Zulfiayu	80
10	ORAL SUSPENSION AVAILABILITY FORMULATION CHLORAMPHENICOL Siti Nurkhalisa Akuba, Nur'ainun Panigoro, Prisca S Wicita, Zulfiayu	90
11	THE EFFECT OF HEALTH EDUCATION USING BOOKLETS ON COMPLIANCE WITH TAKING MEDICINES OF LEPROSY PATIENTS Hosiana L. Sombuk, Yayuk Nuryanti, Ivonne J Fabanjo	100
12	DESCRIPTIVE STUDY OF PREECLAMPSIA SCREENING IN THIRD TRIMESTER PREGNANT WOMEN (USING MAP (<i>MEAN ARTERIAL PRESSURE</i>), ROT (<i>ROLL OVER TEST</i>), BMI (<i>BODY MASS INDEX</i>), AGE DAN HISTORY OF PREECLAMPSIA) Ade Nurul Ashifa, Triana Sri Hardjanti, Elisa Ulfiana	109

POSTER PRESENTATION

- | | | |
|---|--|-----|
| 1 | PRENATAL YOGA REDUCES UNCOMFORTABILITY IN PREGNANCY
Nina Primasari, Jehanara, Mohammad Ali | 120 |
| 2 | SIGNIFICANCE OF THE ROLE OF HUSBANDS IN SUPPORTING EXCLUSIVE
BREASTFEEDING IN THE WORKING AREA OF PUSKESMAS KELURAHAN
BARU KECAMATAN PASAR REBO JAKARTA TIMUR
Heriza Syam, Elly Dwi Wahyuni, Siti Masitoh | 131 |
| 3 | RELATIONSHIP OF ASSESSMENT OF CHILDREN'S GROWTH AND
DEVELOPMENT WITH KADER'S SKILLS IN DETECTING EARLY STUNTING
Theresia Eugenie, Dewi Nirmala Sari, Niken Purbowati. | 137 |

PUBLISHED IN JOURNAL

Jurnal Ilmu dan Teknologi Kesehatan (JITek)

- | | |
|---|--|
| 1 | IN SILICO APPROACH FOR VACCINE DESIGN FROM MEMBRANE (M)
PROTEIN OF SARS-COV-2
Ysrafil, Vyani Kamba, Arlan K Imran, Prisca S Wicita, Fihrina Mohamad, Riska Puji
Astuti Daud, Zulfiayu Sapiun, Fadli Husain, Hartati, Nangsih Sulastris Slamet |
| 2 | THE CHARACTERISTICS OF PREMARITAL COUPLE RELATED TO
PREPARATION FOR HEALTHY PREGNANCY
Juli Oktalia, Ira Budi Pratiwi, Herlyssa, Indra Supradewi, Ani Kusumastuti |
| 3 | PEER GROUP INFLUENCE AND POSITIVE AFFIRMATIONS ON PHYSICAL
CHANGES AND PSYCHOLOGICAL CONSEQUENCES OF MENOPAUSE
Siti Masitoh, Yudhia Fratidina, Rus Martini, Heriza Syam |
| 4 | EMPOWERING CADRES AND PARENTS TO OPTIMIZE GROWTH AND
DEVELOPMENT IN TODDLERS DURING THE COVID-19 PANDEMIC
Niken Purbowati, Safrudin |

JKEP (Jurnal Keperawatan)

- | | |
|---|---|
| 1 | PERSPECTIVES OF ADOLESCENT GIRLS IN MAINTAINING THEIR
REPRODUCTIVE HEALTH IN BOGOR RURAL AREA, WEST JAVA,
INDONESIA: A QUALITATIVE STUDY
Sri Juwitaningsih |
| 2 | FACTORS ASSOCIATED WITH THE INCIDENCE OF LEUCORRHOEA IN
YOUNG WOMEN
Kartika Witrianti, Sri Djuwitaningsih, Syafdewiyani |

EFFECT OF PENETRATION ENHANCER DIMETHYL SULFOXIDE (DMSO) ON PENETRATION ANCHOVIES (*STOLEPHORUS SP*) PROTEIN CONCENTRATE GEL ON *IN VIVO* STUDY

Arlan K Imran*¹, Gunawan P. Widodo², Anita Sukmawati³, Zulfiayu¹, Vyani Kamba¹

¹National Health of Polytechnic of Gorontalo, ²Setia Budi University Surakarta,

³Muhammadiyah University Surakarta

Email: arlan_imran@poltekkesgorontalo.ac.id

Abstract

Anchovies has contain proteins that are useful in the process of cell regeneration, so it can be developed into topical pharmaceutical dosage forms gel for wound healing, on the other hand the protein has a very large size which makes it difficult to penetration into the skin that is composed of several layers of fat the stratum corneum as the main barrier. One of technical formulations are often used to improve the penetration of active ingredients through the skin by adding penetration enhancer in pharmaceutical preparations . Penetration enhancer that is often used because of its ability to penetrate the skin is Dimethyl Sulfoxide (DMSO). This study aims to determine the effect of the penetration enhancer dimethyl sulfoxide (DMSO) to *IN VIVO* penetration anchovies protein concentrate gel . This research was conducted by formulating the anchovy (*Stolephorus sp*) protein concentrate into a gel dosage formula with various DMSO concentrations, respectively F1 0%, F2 2%, F3 5%, F4 7% and F5 10%. The penetration test for anchovy protein concentrate gel used Franz diffusion cells and white mouse skin as diffusion membranes. The results were obtained cumulative amount of gel formulation penetrated anchovy protein concentrate F1-F5 through the skin of white rats respectively 0.47 g/cm², 0.48 g/cm², 0.60 g/cm², 0.63 g/cm², 0.72 g/cm², and the rate of protein concentrate gel preparation penetrated anchovy F1-F5 respectively 0.0022 µg/cm²/minute, 0.0024 µg/cm²/minute, 0.0027 µg/cm²/minute, 0.0029 µg/cm²/minute, 0.0031 µg/cm²/minute. Study showed that F5 gel formulation containing 10% DMSO is the best formula to help penetration protein concentrate anchovy pass through the skin , because it has a cumulative amount and rate of the highest penetrated compared to another formula with DMSO concentrations below it. Statistical analysis using One Way ANOVA (Analysis of Variance) showed there was a significant effect ($p < 0.05$) of the DMSO concentration on the *IN VIVO* cumulative amount and concentration rate of anchovies protein concentrate gel.

Keywords: Protein Concentrate, Anchovy, Franz Diffusion Cell, Penetration, DMSO

INTRODUCTION

Anchovies (*Solephorus sp*) is one of the many fish consumed by people of Indonesia. Anchovies (*Stolephorus sp*) besides contains essential amino acids such as isoleucine, leucine and lysine, anchovies (*Stolephorus so*) also contain non-essential amino acid such as methionine and glutamate acid which plays a role in the healing of burns on hemostasis phases and phases of proliferation, through its mechanism of action as an antioxidant and forming the

structure of collagen. These are the considerations to formulate protein concentrate anchovies (*Stolephorus sp*) into topical gel dosage forms (Wirakusumah, 2008; Sankar et al, 2013; Anggo et al, 2015; Katili, 2009; Mackay & Miller, 2003; Mohanty et al 2014; Lachman, 1994).

Gel is a topical preparation that sticks to the skin for a long time but is easily washed off with water and does not clog pores . One of the things that must be considered in formulating topical gel preparations is the ability to penetrate the active ingredients to penetrate the main protective layer of the skin. One of the things that determines an active ingredient can penetrate the skin layer is physical and chemical properties of the active ingredient (Sinha VR & Kaur MP, 2000; Lachman, 1994).

Protein concentrate anchovies (*Stolephorus sp*) have the large size and molecular weight between 20-120 kDa. Protein fish is also hydrophilic, because amino acids that are dominant in the anchovy protein concentrate is a water-soluble amino acid. The stratum corneum can provide 1000 times resistance to active ingredients that are large molecular weight and hydrophilic, this is because the stratum corneum consists of a thick layer of fat. Anchovy (*Stolephorus sp*) protein concentrate can be effective if it is able to penetrate the stratum corneum and reach the basal layer . Therefore, in formulating an anchovy protein concentrate to gel dosage form preparation, with penetration enhancing agent needed to help increase the penetration of anchovy protein concentrate through the stratum corneum (Sapiun et al 2020; Riviere & Papich, 2001). *Penetrant enhancers* are materials used to increase the permeability of the stratum corneum by interacting with the components of the stratum corneum, commonly wide used penetration enhancer is dimethyl sulfoxide (DMSO) (Williams & Barry, 2004).

DMSO may alter the stratum corneum keratin conformation of α -helical conformation into β -sheet conformation . DMSO can increase drug flux by interacting with lipids in the stratum corneum, changing the structure of the protein, which causes changes in the value of its partition coefficient. Therefore, these changes which form the basis of DMSO can act as an increase in the penetration of active substances in the skin membrane through the diffusion process (Trommer & Neubert, 2006; Shembale et al, 2010).

Based on the description above, this study aims to determine the effect of DMSO on the *IN VIVO* penetration of anchovies protein concentrate gel, in order to obtain a well-penetrated topical pharmaceutical preparation with anchovy protein concentrate as the active ingredient.

METHOD

Types of research

This research is an experimental research laboratory to test the speed and penetrated the cumulative amount of gel preparation of anchovy (*Solephorus sp*) protein concentrat using a *Franz* diffusion cell apparatus.

Research Place.

The research was conducted at the Formulation Technology Laboratory of the Muhammadiyah University of Surakarta and the Pharmacology Laboratory of the Indonusa Polytechnic of Surakarta.

Material

The materials used in this study were: anchovy protein concentrates, small white mice, carbopol (CV Chem-Mix), tetanolamine (CV Chem-Mix), dimethyl sulfoxide (CV Chem-Mix), propylenglycol (CV Chem. -Mix), citric acid (CV Chem-Mix) , sodium citrate (CV Chem-Mix) , aquadest (CV Chem-Mix) . The tools used in this study were: *Franz* diffusion cell (Prima Medica), magnetic stirrer (Schcolab), UV VIS spectrophotometry (Genesis), cuvette (Purschee), measuring cup (Iwaki), beaker (Iwaki), analytical scales (Durascale).), 1 mL ringe syringe, scalpel and surgical board

Producing Concentrated Protein Anchovy Procedure

The manufacture of anchovy protein concentrate follows the work procedure that has been carried out by Imran, AK, 2019.

Producing Anchovy Protein Concentrate Gel Procedure.

Anchovy (*stolephorus sp*) protein concentrate gel anchovy made in the five formula with a variation of DMSO as shown in Table 1. The gel preparation material of each formula is weighed as needed, carbopol dispersed into warm water from stock water, left for 15 minutes then stirred with a stirrer at a speed of 346 RPM for 10 minutes, added TEA, citric acid, sodium citrate and DMSO respectively. Variated concentrations of F1-F5 , sufficient with water according to the amount needed for each formula, while homogenized for 5 minutes.

Table 1. Anchovy Protein Concentrate Gel Formulation

Material	Concentration (% w/w)				
	F1	F2	F3	F4	F5
Concentrate	0.8	0.8	0.8	0.8	0.8
DMSO	0	2	5	7	10
Carbopol	1.5	1.5	1.5	1.5	1.5
TEA	1	1	1	1	1
Citric Acid	0.1	0.1	0.1	0.1	0.1
Na. sitrat	0.3	0.3	0.3	0.3	0.3
Propilenglikol	15	15	15	15	15
Aquadest	81.3	79.3	76.3	74.3	71.3

The formulation of anchovies protein concentrate gel F1-F5 that was formed was continued in the penetration test using the *Franz* diffusion cell device.

Penetration Test of Anchovy Protein Concentrate

Albumin Raw Curve

Bovine Serum Albumin (BSA) solution in a concentration series of 0.015625 ppm, 0.03125 ppm, 0.0625 ppm, 0.125 ppm, 0.25 ppm, 0.5 ppm and 1 ppm in a phosphate buffer pH 7.4 as much as 10 mL, the absorption is measured at wavelength (λ) 595 nm with a UV-VIS spectrophotometer. Then the calibration curve and regression equation are made

Determination of Validation Method (Percent Recovery)

1 g of the gel preparation was added to the active ingredient Bovine Serum Albumin (BSA) with a known amount of 0.4 mg, then the levels were determined using a UV-VIS spectrophotometer at a wavelength of 595 nm, the quantitative data obtained by means were included in the equation:

$$\text{Recovery} = \frac{\text{Concentration}}{\text{Unknown Concentration}} \times 100 \%$$

White Rat (*Rattus novergicus*) Skin Preparation

The mice were sedated with chloroform until they died, then the rats were carefully shaved off. The skin of the rats was sliced on the stomach (abdomen) and immersed in a phosphate buffer pH 7.4 for 30 minutes (Fatmawaty *et al.*, 2012; Damayanti & Yuwono, 2015).

Diffusion Test

The penetration test was carried out using Franz diffusion cells. The receptor compartment was filled with phosphate buffer pH 7.4 and maintained at $37 \pm 1^\circ \text{C}$, and stirred with a constant speed stirrer. Then the mouse skin was placed between the donor compartment and the receptor compartment with the stratum corneum facing up. Samples of 1 g of protein concentrate gel of each formula F1-F5 were applied to the skin surface. Then, at minutes 0, 5, 10, 15, 30, 60, 90, 120, 150 and 180 a sample of 1 ml was taken from the receptor compartment using a syringe and immediately replaced with a phosphate buffer pH 7.4 of the same volume. The absorbance of the sample was measured at a wavelength of 595 nm with a UV-VIS spectrophotometer. The data obtained were entered in equation 1 and equation 2 to determine the cumulative amount and penetration rate of each anchovy protein concentrate gel preparation with various concentrations of DMSO F1-F5 (Jatav *et al.*, 2012; Damayanti & Yuwono, 2013; Lucida & Heryian, 2008; Lachman 1994).

Equation 1. Cumulative Penetration Value

$$Q = \frac{[C_n \cdot V + \sum_{i=1}^{n-1} C_i \cdot S]}{A}$$

Description:

- Q = Cumulative Penetration Value ($\mu\text{g}/\text{cm}^2$)
C_n = Protein Concentration ($\mu\text{g}/\text{ml}$)
V = Franz Diffusion Cell Volume (ml)
 $\sum_{i=1}^{n-1} C_i$ = Total Concentration Before ($\mu\text{g}/\text{ml}$)
S = Sampling Volume (ml)
A = Area of the Membrane (cm^2)

Equation 2. Penetration Rate

$$J = \frac{dM}{S \cdot dt}$$

Description:

- J = Penetration Rate ($\mu\text{g cm}^{-2} \text{jam}^{-1}$)
M = Cumulative amount of Drug obat (μg)
S = Area of Diffusion (cm^2)
T = Time (hour/minute).

Data analysis

The data obtained, namely the cumulative amount and penetration rate of anchovies protein concentrate gel preparation DMSO F1-F5 were analyzed by *one way ANOVA* (*Analysis of Variance*) method using SPSS , for normally distributed and homogeneous data followed by

LSD post hoc test and data collected. normally distributed and heterogeneous followed by post hoc test, Games-Howell test (Harmita, 2004).

RESULTS AND DISCUSSION

Bovin Serum Albumin (BSA) Raw Curve

The standard BSA curve obtained then regressed the relationship between concentration and absorbance as shown in Figure 1.

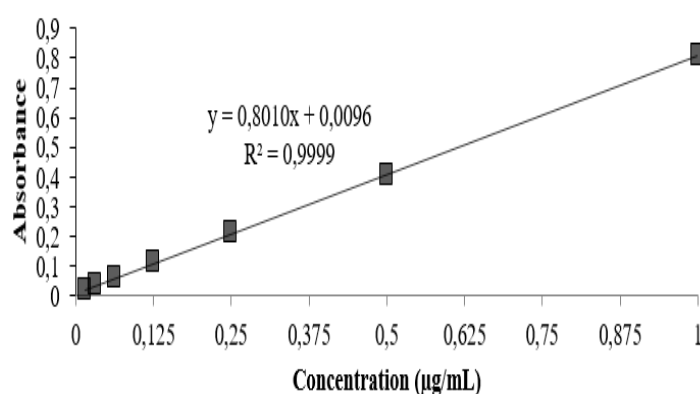


Figure 1. BSA Standard Curve Graph

The standard curve is used to calculate the levels of protein compounds in testing the cumulative amount and penetration rate of the DMSO optimization gel preparations through the *IN VIVO* test using the *franz diffusion cell* tool. The results of measuring the absorbance of the standard BSA in phosphate buffer pH 7.4 at a wavelength of 595 nm, the regression value is $y = 0.8010x + 0.0096$, with a correlation coefficient of $r = 0.9999$. A method is said to have good linearity if the value of r is close to 1, the results obtained show that the method used has good linearity requirements (Harmita, 2004)

Validation Method (Percent Recovery)

In conducting an analytical test, it is necessary to assess that the test method used is appropriate and meets the terms of use. So it is necessary to validate the analytical method. One of the analysis parameters that must be considered in the validation of the method is the percent recovery (Harmita, 2004)

The accuracy test through the % *recovery* test is intended to observe the accuracy of the method used, whether the concentration method used can describe the actual amount of the active ingredient concentration of penetrated anchovy protein concentrate. The percent recovery test used a predetermined gel preparation and it is expected that the added content can be obtained

completely using the assay method using UV-VIS spectrophotometry . The percent recovery value for each formula F1-F5 gel preparation with the pure active ingredient BSA is as shown in Table 3.

Table 3. Percentage Value of Recovery

	F1 (%)	F2 (%)	F3 (%)	F4 (%)	F5 (%)
BSA Levels in Gel Dosage Form	97.77	97.22	97.07	97.53	97.70

The results showed that the % recovery formula for gel preparation F1-F5. Optimization of DMSO using pure active ingredients of BSA met the requirements . This is because the percent recovery value is in the required percent range of 90-107%, so it can be said that the method used has good accuracy and can be used to determine the concentration of anchovy protein (Harmita, 2004)

Diffusion Test

The diffusion test parameters in this study were the cumulative value penetrated (Q) and rate of penetration flux (J). The cumulative amount and rate penetrated gel preparation of fish protein concentrate anchovy variations (*Stolephorus sp*) in the concentration of DMSO F1, F2, F3, F4 and F5 are shown respectively in figure 2 and figure 3 . The curve can be observed cumulative amount of fish protein concentrate penetrated directly proportional to the time, the longer the time cumulative amount of anchovy protein concentrate that is penetrated is greater

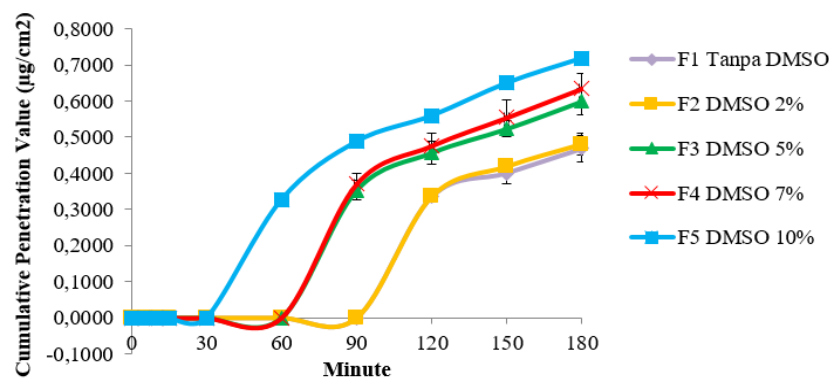


Figure 2. Profiles of Cumulative Amounts Anchovy Concentrat Protein Penetration

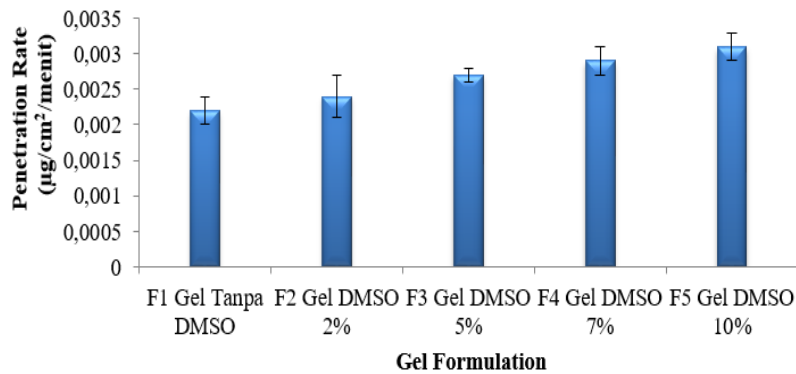


Figure 3. Profiles Penetration Rate of Anchovy Concentrate Protein

DMSO has a mechanism that is able to dissolve the fat to form a water channels in the stratum corneum which will 'm Enhancing permeability . Apart from fluidizing lipids, DMSO can also interact with keratin in the corneocytes and cause damage in the corneocytes so that the diffusion coefficient increases and permeability also increases. Where DMSO works by changing the stratum corneum keratin conformation of α -helical conformation into β -sheet co nformation . DMSO molecules also modify peptides or proteins in the lipid bilayer domain thereby increasing their permeability . This is proven in research that the higher the DMSO concentration used, the more effective DMSO is in increasing the penetration of substances (Jatav et al, 2012; Damayanti & Yuwono 2013; Trommer & Neubert, 2006)

The effect of DMSO *penetrant enhancer* on the increase in the cumulative value and penetration rate of anchovy protein concentrate obtained at the last minute of 180 minutes testing , was seen by its effect in *one way ANOVA* statistical test with LSD post hoc test. as indicated by an asterisk (*) in Table 4 and Table 5 .

Table 4. Cumulative Value Penetration Anchovy Protein Concentrate in Minute 180.

Time (Minute)	Cumulative Value Penetration (µg/cm ²)				
	F1 Gel without DMSO	F2 Gel with DMSO 2%	F3 Gel with DMSO 5%	F4 Gel with DMSO 7%	F5 Gel with DMSO 10%
180	0,47	0,48	0,60*	0,63*	0,72*

Description : * Significant Difference With F1

Table 4. Penetration Rate of Anchovy Protein Concentrate in Minute 180

Time (Minute)	Penetration Rate ($\mu\text{g}/\text{cm}^2/\text{menit}$)				
	F1 Gel without DMSO	F2 Gel with DMSO 2%	F3 Gel with DMSO 5%	F4 Gel with DMSO 7%	F5 Gel with DMSO 10%
180	0.0022	0.0024	0.0027*	0.0029*	0.0031*

Description : * Significant Difference with F1

The effect of the DMSO *enhancer penetrant* on the increase in the cumulative amount obtained was seen by its effect in the *one way ANOVA* statistical test with the LSD post hoc test. as indicated by an asterisk (*) in Table 4 .

The test results showed that the increase in the cumulative number of 180 minutes of F2 gel preparation was not significantly different from the F1 gel preparation without DMSO, this means that the 2% DMSO concentration has not been able to significantly increase the cumulative amount of anchovies protein concentrate gel preparation, but the F3 gel preparation up to F5 has a significant difference to the F1 gel preparation without DMSO, this means that an increase in the DMSO concentration of 5%, 7% and 10% can significantly increase the cumulative amount penetrated by anchovies protein concentrate gel in penetrating the skin layer .

CONCLUSION

Based on the research that has been done, the following conclusions can be drawn:

- 1) There is an effect of the addition of Dimethyl Sulfoxide (DMSO) on the penetration of anchovies protein concentrate gel using *IN VIVO*. Where the higher the DMSO concentration, the greater the anchovy protein concentrate (*Stolephorus* sp) which penetrated through the mouse skin membrane.
- 2) Gel preparation F5 with DMSO 10% is the best preparation because it has a higher cumulative amount and penetration rate than other formulas, respectively, the cumulative amount and penetration rate data are $0.72 \mu\text{g}/\text{cm}^2$ and $0.0031 \mu\text{g}/\text{cm}^2/\text{min}$.

FUTURE WORK

In the future, direct research will be carried out on humans who have burns, to see the immediate effect on humans

REFERENCE

- Anggo AD, Ma'ruf WF, Swastawati F, Rianingsih L. 2015. Changes of amino and fatty acids in anchovy (*Stolephorus sp*) fermented fish paste with different fermentation periods. *Procedia Environmental Sciences* 23:58-63.
- Damayanti RA, Yuwono T. 2013. Dimetilsulfoksid Sebagai *Enhancer* Transpor Transdermal Teofilin Sediaan Gel. *Jurnal Ilmiah Kefarmasian* 3(1): 61-69.
- Harmita. 2004. Petunjuk Pelaksanaan Validasi Metode dan Cara Perhitungannya. *Majalah Ilmu Kefarmasian*. 1(3): 117-135.
- Imran, AK. 2019. Optimasi Volume Perbandingan Kitosan : Tpp terhadap Penetrasi Sediaan Gel Konsentrat Protein Ikan Teri (*Stolephorus sp*) secara EX VIVO [Tesis]: Universitas Setia Budi Surakarta.
- Jatav VS *et al.* 2012. Effect Of Dimethyl Sulphoxides As Permeation Enhancer On Transdermal Patch Of Nebivolol Hydrochloride. *Pharmacoaphore* 3 (6): 307- 313.
- Katili AS. 2009. Struktur dan fungsi protein kolagen. *Jurnal pelangi ilmu* 2(5):19-29.
- Lachman, L *et al.* 1994. *Teori dan Praktek Farmasi Industri Edisi Ketiga*, penerjemah; Suyatmi S. Jakarta: UI Press. Terjemahan dari: *Theory and Practice of Industrial Pharmacy 3th Edition*.
- Lachman, L *et al.* 1994. *Teori dan Praktek Farmasi, Edisi Pertama*. Penerjemah; Suyatmi S. Jakarta: UI Press. Terjemahan dari: *Theory and Practice of Industrial Pharmacy 1st Edition*.
- Lucida H, Salman, Hervian MS. 2008. Uji daya peningkat penetrasi virgin coconut oil (Vco) dalam basis krim. *Jurnal Sains dan Tekhnologi Farmasi* 13(1): 23-30.
- Mackay D, Miller AL. 2003. Nutritional support for wound healing. *Journal of clinical therapeutic* 8(4): 359-377.
- Mohanty B *et al.* 2014. Amino acid composition of 27 food fishes and their importance in clinical nutrition. *Journal of Amino Acids* 5:1-7.
- Riviere. J.E., dan Papich, M.G. 2001. Potential and Problems of Developing Transdermal Patches for Veterinary Applications. *Advanced Drug Delivery Reviews*. 50: 175-203.
- Sankar TV *et al.* 2013. Chemical composition and nutritional value of Anchovy (*Stolephorus commersonii*) caught from Kerala coast, India. *European Journal Experimental Biology* 3(1): 85-89..
- Sapiun, Z. *et al.* (2020). Preparation And Characterization Of Anchovy (*Stolephorus Sp*) Protein Concentrate Nanoparticle Using Ionic Gelation Method. *International Journal of Applied Pharmaceutics* 12 (2) : 109-111
- Shembale, Borole, Lohiya, R.T. 2010. *Useful Permeation Enhancers for Transdermal Drug Delivery: A Review*. Int. J. Pharm. Research & Developments
- Sinha, V.R dan Kaur, M.P. 2000. Permeation Enhancer for Transdermal Drug Delivery. *Drug Dev Ind Pharm.*, 26, 1131-1140.
- Trommer, H., dan Neubert, R.H.H. 2006. Overcoming The Stratum Corneum: The Modulation of Skin Penetration. *Skin Pharmacology and Physiology*. 19: 106-121.
- Williams, A.C dan Barry, B.W. 2004. *Penetration Enhancers, Advanced Drug Delivery Reviews*, 56, 603-618
- Wirakusumah S E. 2008. *Mencegah Osteoporosis*. Jakarta : Penebar Plus

FORMULATION AND EVALUATION OF CLOFENACED SODIUM EMULGELS WITH CARBOPOL 940 CONCENTRATION VARIATIONS AS GELLING AGENT

Sri Andriyani A Nusi, Prisca Wicita, Zulfiayu
Department of Pharmacy, Health Politechnic of Gorontalo, Gorontalo, Indonesia

Abstract

Emulsion is a liquid preparation consisting of two liquid phases in a liquid phase dispersion system and one is very finely dispersed, while gel is a mixture of two phases, namely solid and liquid and the appearance of the gel is supple. So an emulgel is a semisolid dosage form which is made by combining an emulsion and a gel. Emulgel has also emerged as a good hydrophobic drug delivery system, and is best used when applied to the skin for local purposes. This study determined an emulgel base with a formula of gelling agent (Carbopol 940), active substance (Sodium Diclofenac), emulgator (VCO, Tween 80, Span 80), base (cetyl alcohol), emulsifier (TEA), penetration (PEG), preservative. (Nipagin, Nipasol), Co-solvent (Propylene Glycol) and antioxidants (Sodium Metabisulfite). In the emulgel formulation there is one component, namely the gelling agent, its effect has been studied in a drug release rate. Emulgel has beneficial properties such as good consistency, longer contact time, moisture absorption, easy removal and water solubility. Emulgel has the advantage that hydrophobic drugs can be mixed into the gel using an oil-in-water type emulsion, good stability, good loading capacity, and easy to produce and low cost, and controlled release. In this study using carbopol 9, the Emulgel preparation aims to determine what concentration of carbopol 940 can be used in emulgel preparations and fulfill the evaluation requirements made with different concentrations. Carbopol with a concentration of 1%, 2% and 3%.

Keywords: Diclofenac Sodium; Carbopol 940; Emulgel

INTRODUCTION

Inflammation is the body's defense due to a tissue response to damaging influences, both local and intrusive into the body, inflammation is also called a reaction to tissue healing. Inflammation is local and systematic, and can be relieved by anti-inflammatory drugs (Mutschler, 1986).

Anti-inflammatory drugs are pain relievers. One of the substances that has anti-inflammatory properties is diclofenac sodium. Diclofenac sodium is a commonly used non-steroidal anti-inflammatory drug (NSAID) agent and is very effective as an analgesic. Non-steroidal anti-inflammatory drugs are the most widely used drugs for pain relief. Diclofenac sodium is used for acute conditions of pain in musculoskeletal disorders and arthritis. Oral administration of diclofenac sodium shows pharmacokinetic data for absorption of diclofenac 100%. Diclofenac

can irritate the stomach and undergoes first pass metabolism so that only 50% of the drug reaches the systemic circulation when given orally. Diclofenac sodium is better formulated into a topical preparation and for transdermal use. Diclofenac sodium is used in topical form with a concentration of 1% to relieve symptoms of pain and inflammation (Ermawati, 2012; Katzung, 2011; Sweetman, 2007).

Diclofenac sodium has low permeability through the skin so that carrier modifications are needed to penetrate the transdermal layer. This is a problem on the skin surface that can be overcome with penetration enhancers, one of the carriers of transdermal preparations is Emulgel. Emulgel is an oil-in-water or water-in-oil type emulsion preparation which is gelatinized by the addition of a gelling agent and is a double disperse system consisting of emulsion and gel. Emulgel is also a topical dosage form when emulsion and gel are combined. Emulsion preparations, whether the type of oil in water (M / A) are used to deliver hydrophobic drugs, while water in oil (A / M) is used to deliver hydrophilic drugs. Emulgel preparations have the advantage of being a hydrophobic material carrier that does not join directly in the gel base. Emulgel combines the hydrophobic active ingredients in the oil phase, then the oil globules are dispersed in the water phase and mixed on a gel base. The use of gelling agents that will play a role in this formula will improve the consistency of the emulgel preparation (Aisyah, 2018; Ajazudin et al, 2013; Vikas et al, 2012).

The best gelling agent side panel is carbophol 940. Carbopol 940 is non-toxic and non-irritating and there is no evidence of a hypersensitivity reaction when used topically. Topical delivery using carbopol 940 as a gelling agent and Tween 80 / Span 80 as an emulgator and results in physical stability and release with a carbopol concentration of 1% (Das et al, 2013; Baibhav et al., 2012).

Based on this, the researchers conducted research on the formulation and evaluation of emulgel preparations using the active substance Diclofenac sodium by looking at the effect of using carbophol 940 with different concentrations in several formulas. Effect of Carbopol as a gelling agent.

METHOD

Tool

The tools used in this research are glass tools (measuring cups, beakers, porcelain cups, micro pipettes, stirring rods, watch glasses) mixers, horn spoons, hot plates.

Material

The materials used in this study were Diclofenac Sodium, VCO, Cetyl Alcohol, Carbopol, TEA, PEG, Tween 80, Span 80, Nipagin, Nipazol, Propylene Glycol, Natrium Metabisulfite and Aquadest.

Work procedures

Table.1 Formulation

Material	F1 (%)	F2 (%)	F3
Diclofenac Sodium	1	1	1
VCO	10	10	10
Alcoholic	2	2	2
Carbopol	1	2	3
TEA	q.s	q.s	q.s
PEG	25	25	25
Tween 80	1,35	0,084	0,084
Span 80	1,65	2,916	2,916
Nipagin	0,18	0,18	0,18
Nipazol	0,02	0,02	0,02
Propylene Glycol	10	10	10
Sodium Metabisulfite	0,1	0,1	0,1
Aquadest	Ad 100	Ad 100	Ad 100

Making Emulgel Preparations

Emulgel preparation begins with the separation of the ingredients for the emulsion and gel. Stage I: Emulsion is made by separating the oil phase and the water phase. The oil phase (Cetyl Alcohol, Virgin Coconut Oil (VCO), nipazol, span 80) is put in Z on the hot plate at a temperature of 70-750C. The water phase (Tween 80, nipagin, propylene glycol, and aquadest) is put in a beaker glass, stirring until the temperature is 70-750C. Then the melted oil phase is mixed into the water phase little by little, After the oil phase is mixed in the water phase, gradually stir it to form an emulsion period. Mix the oil phase and the water phase, put it in a beaker containing the gel in the mixer until it is completely hydrated. Stage II: Gelling is done by heating with distilled water at a temperature of $\pm 700\text{C}$ then adding carbopol 940 and stirring while adding 5 drops of TEA to form a gel mass. Stage III: Making the emulgel is done by mixing the emulsion mass into the gel mass gradually in a mixer until an emulgel is formed.

Evaluation of Emulgel Preparations

Organoleptic tests for emulgel preparations were carried out by visually observing them in terms of color, smell and shape (Khullar et al, 2012). The pH test for emulgel preparations was

carried out using a PH meter (Tranggono, 2007). The spreadability test of the emulgel preparation was carefully placed on a glass coated chart, left for 10 seconds (Voight, 1994 in Swastini). Homogeneity test of emulgel preparations was carried out by smearing the sample on a piece of glass, this preparation showed a homogeneous arrangement and did not show any coarse grains (Shovyana, 2013).

RESULTS AND DISCUSSION

Emulgel is one of the preparations that is widely used by the wider community, because of its cheap price and practical use by applying it to the skin. Emulgel is also a good preparation of water and oil type emulsion or oil in water mixed with a gelling agent. Emulgel has two phases, namely the oil phase and the water phase. The oil phase used in the emulgel serves as a good carrier and provides a large charge in the formula. The water phases that are commonly used are water, alcohol and others (Purushottam, 2013; Mengesha, 2015; Vikas et al, 2012).

In this practicum we make emulgel, where the active ingredient is Diclofenac sodium which is often used as the main ingredient of emulgel with anti-inflammatory and inflammatory properties, namely by relieving joint pain containing substances that are thought to relieve or relieve pain. This drug works by stopping the production of substances that cause pain.

The basic formulation in the manufacture of Diclofenac Sodium Emulgel with a concentration of Carbopol 940 has several ingredients. Carbopol 940 as a gelling agent has the advantage of being able to mix with many active substances, and has an attractive organoleptic appearance and high viscosity at low concentrations. Carbopol 940 serves to increase the viscosity of trapping water and will form a network so that it becomes important in the gel system and will strengthen the gel structure network and it causes an increase in gel, develops carbopol by dissolving carbopol in aquadest stirring until homogeneous and using Diclofenac sodium as the active substance. Diclofenac sodium is used as the active substance. Diclofenac sodium is a drug that provides analgesic, antipyretic, and anti-inflammatory effects and diclofenac is used to relieve pain and inflammation of skeletal muscle and joint diseases. Tween 80 is a polyoxyethylene sorbitan fatty acid ester in the form of a yellow oily liquid which has a characteristic slightly bitter odor and is used as an emulgator. Span 80 is a thick yellow sorbitan liquid that has a distinctive smell and taste and is used as an emulgator and Virgin Coconut Oil (VCO) is also used as an emulgator. This emulgator is used in the emulsification process and to control emulsion stability. Cetyl alcohol is used as a base which has white flakes or waxy

granules and has a distinctive smell and taste and is easily soluble in ethanol. 95% of its solubility increases with temperature, and is insoluble in water and is stable with light and air. TEA (Triethanolamine) is used as an ingredient emulsifier in the form of a viscous liquid that is clear and colorless to pale yellow in color and has an ammonia-like odor, tea has a melting point of 20-210C with a concentration of 2-4%. Nipagin and nipasol are used as preservatives, have the advantage of being active at pH 4 to 8 although they are generally active in acidic solutions, but have both acidic and alkaline antimicrobial activity. Propylene glycol is used as a cosolvent used in topical preparations, where the concentration of propylene glycol which is commonly used is 1-10% and aims to determine the effect of propylene glycol on the ability to penetrate hesperidin, it is used because propylene glycol compounds have hydrophilic and hydrophobic groups and are not greasy. Sodium Metabisulfite is used as an antioxidant, in the form of a powder, colorless, water soluble, slightly soluble in alcohol and has a distinctive odor and a salty taste. It is usually used in oral, parenteral, and other topical preparations, namely sodium metabisulfite. Polyethylene Glycol (PEG) is used as penetration. (Islam, Hornedo, Ciotti, Ackermann, 2004; Sweetman, 2007; Rowe et al, 2009; Mohammed Haneefa, et al, 2013; Reynold, 1972; Sri Mulyana, 2009).

To find out whether the emulgel preparation can meet the physical evaluation requirements, namely by conducting tests, among others, the organoleptic test, the PH test, the homogeneity test, and the spreadability test. Organoleptic testing was carried out directly by observing color, smell and shape without separating the emulgel preparations made. Based on this observation, the three emulgel formulations showed almost the same appearance. Organoleptically Formulas 1 and 3 looked thick and the same color and for Formula 2 they looked thick too but the emulgel preparations had an excess of color.

Table.2 Emulgel Organoleptic Test with Carbopol 940 variations

Test Parameters	Formulation 1	Formulation 2	Formulation 3
Color	3	4	3
Smell	3	3	3
Form	3	3	4
Average	3	4	4

Note: 1. all bad categories; 2. all categories are rather bad; 3. all categories are good; 4. all categories are rather good; 5. all categories are very good.

Based on table 2. The results obtained from the organoleptic test of formula 2 emulgel formulation with carbopol 940 variations showed a rather good category in terms of color and

this emulgel preparation met the standards for aesthetics. PH evaluation is carried out to determine the pH stability of the emulgel base, each formula is done by taking a little and then testing it using a PH meter.

Table 3 Emulgel PH test with Carbopol 940 variation

Test Parameters	Formulation 1	Formulation 2	Formulation 3
PH with Universal Indicator	6	7	6

Note: 1. (0-6) Acid; 2. (7) Neutral; 3. (8-14) Bases

Based on the results of the PH test, Formula 1 and Formula 3 meet the requirements because they have acidic values, if they are acidic it can cause irritation to the skin, if the PH is more than 7 then it is alkaline and will make the skin dry and cracked. Meanwhile, Formula 2 in the test results has a neutral PH value. This test aims to determine the homogeneity of the active ingredients and other additional ingredients. Homogeneity test is a parameter that indicates the quality of the preparation because it will affect the therapeutic effect of the preparation. We weigh 0.1 gram of emulgel and then apply it to the transparent glass evenly and thinly. Homogeneity of a preparation if no coarse grains are seen. Homogeneity testing is carried out by smearing the emulgel sample on a piece of glass and the preparation must show a homogeneous arrangement with no visible coarse grains (Yenti et al., 2014).

Table 4 Emulgel Homogeneity Test with Carbopol 940 variations

Test Parameters	Formulation 1	Formulation 2	Formulation 3
Homogeneity	Homogeneous	Homogeneous	Homogeneous Not

Note: 1. Homogeneous: if the preparation is not granular / evenly colored / there is no separation / ingredients are well mixed; 2. Not Homogeneous: if the preparation is grainy / uneven color / separation occurs / ingredients do not mix well.

From the results above, the homogeneity test shows that the emulgel preparation for Formula 1 and Formula 2 produces a homogeneous preparation due to the absence of coarse particles in the preparation. Homogeneous preparations will increase the acceptability of consumers. For Formula 3 it is not homogeneous because coarse grains are visible on the glass and it causes the preparation not to be homogeneous. The spreadability test aims to determine the dispersibility that can be taken by the emulgel preparation made. The good spreadability will provide easy application to the skin surface to ensure the ability and evenness of the emulgel

when applied or applied to the skin. If a preparation has a high spreadability, it means that the area of distribution will be greater so that the active substances contained will be distributed evenly and are more effective in producing a therapeutic effect.

Table 5. Emulgel Spreadability Test with Carbopol 940 variations

Test Parameters	Load (g)	Formulation 1	Formulation 2	Formulation 3
Distribution of preparations	0	5,625	5,275	4,375
	50	6,475	6,45	4,575
	100	6,925	6,925	4,8
	150	7,1	7,225	4,925
	200	7,4	7,575	4,925
	250	7,875	8	5,1
Average		6	7	5

The results of the Spreadability Test at different uses of the load obtained the results of the spreading power which caused the spread to be wider and had different values at the addition of the load starting at 0 gr, 50 gr, 100 gr, 150 gr, 200 gr, and 250 gr.

CONCLUSION

A good emulgel formulation so that the sodium diclofenac emulgel preparation with a quality variation of carbopol 940 and must meet the aspects including stable, easy to use / applied and homogeneous.

REFERENCES

- Andriany, V. H. (2018). Optimization of Emulgel Zinc Oxide Nanoparticles with Carbopol 940 as gelling agent and propylene glycol as humectant and in vitro solar activity tests. Surakarta: Muhammadiyah University of Surakarta.
- Citra Dewi, A. S. (2018). Evaluation of the snail (*Achatina fulica*) slime emulgel formula and test for its antibacterial activity against the staphylococcus epidermis bacteria that causes acne. Journal of Mandala Pharmacon Indonesia, Vol 4, No 2 December.
- Indrayani, K. E. (2020). Topical Anti-Inflammatory Effects of Telang Flower Extract (*Clitoria ternatea* L). Yogyakarta: Sanata Dharma University.
- Karlina Amir Tahir, S. N. (2017). Effect of base concentration variation of hpmc 4000 on the physical stability of diclofenac sodium microemulsion gel. Makassar: Allauddin State Islamic University Makassar.
- Khasanah, N. (2016). Effect of carbopol 940 polymer concentration as a gelling agent on the physical properties of the gamma-oryzano emulgel. Jakarta: Faculty of Medicine and Health Sciences, Pharmacy Study Program.

- Lusi Nurdianti, D. r. (2018). Evaluation of tea tree (*melaleuca alternifolia*) oil anti-acne emulgel using hpmc as a gelling agent. *Journal of pharmacopolium*, Volume 1, No. 1, April 2018, 23-31.
- Merry Handayani, N. M. (2015). Formulation and optimization of carbopol 940 emulgel base and triethanolamy with various concentrations. Samarinda: Faculty of Pharmacy, Mulawarman University, Samarinda.
- rastianto, B. A. (2016). Optimization of gelling agent carbopol 940 and humectant sorbitol in the formulation of binahong leaf ethanol extract gel. Yogyakarta: Faculty of Pharmacy, Sanata Dharma University.
- Rina Wahyuni, H. R. (2020). Formulation and evaluation of emulgel preparations from red dragon fruit peel extract (*hylocereus lemairei* (hook) Britton and Rose) with a combination of gelling agents. *The Journal of Hygiene Pharmacy*, vol 12, no 1.
- Ulik Alta, B. I. (2020). Optimization of gelling agent carbopol 940 and HPMC in the essential oil gel formulation of cinnamon bark using the factorial design method. Palembang: Bachelor of Pharmacy study program, Stikes, Aisyiah.
- vitro, F. e. (2016). Tri Nofi Yani, Effionora Anwar, Fadlina Chany Saputri. Depok: Herbal Masters Program, Faculty of Pharmacy, University of Indonesia, Depok, Indonesia.
- Yulia Anggraeni, E. H. (2012). The characteristics of the preparation and release of diclofenac sodium in a niosome system based on carbomer 940 gel. Surabaya: Department of Pharmacy, Faculty of Pharmacy, Airlangga University jln. Dharmawangsa in, Surabaya.

KNOWLEDGE OF RDT AND RT-PCR FOR COVID-19 DETECTION AMONG MEDICAL LABORATORY TECHNICIAN AND MEDICAL LABORATORY TECHNOLOGIST

Muhammad Rizki Kurniawan, Wulan Fitriani Safari, Roro Enggar Sandra Wilujeng,
Restiyani

Program Studi Teknologi Laboratorium Medis, Fakultas Sains dan Teknologi,
Universitas Binawan, Jakarta

Email : riezkeey03@gmail.com and kurniawan@binawan.ac.id

Abstract

Coronavirus disease 2019 (COVID-19) is caused by a novel coronavirus, named Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2). WHO declared COVID-19 as pandemic On March 11. RDT dan RT PCR was used for SARS-CoV-2 detection. Medical laboratory technicians and medical laboratory technologists play a vital role to provide the clinical support for the diagnosis of Covid-19. They must have good knowledge of the diagnosis methods to avoid the inaccurate or missed results. This study investigated the level of knowledge of them RDT and RT-PCR. The research design used was descriptive with a cross-sectional approach used questionnaire, with a sample of 102 people. Statistical analysis that is used in descriptive is a way of analysis. The results showed that respondents had adequate level of knowledge about 77.5%, the respondents had poor knowledge of RDT 12.7%. As many as 9.8%, respondents had good knowledge of RDT. The respondents had adequate level of knowledge about RT-PCR 39.2%, the respondents had poor knowledge of RT-PCR about 57.8%. As many as 2.9% of participants had good knowledge of RT-PCR. The researchers concluded that most of the respondents were well knowledgeable about RDT and were less knowledgeable about RT-PCR for COVID-19 detection.

Keywords: COVID-19, SARS-CoV-2, Medical, Technician, Technologist

INTRODUCTION

The novel virus that causes pneumonia emerged in Wuhan City, Hubei Province, Central China in Late December 2019. It was temporally named 2019 novel coronavirus, 2019-nCoV. International Committee on Taxonomy of Viruses termed it SARS-Cov-2, due to the similarity of its symptoms to those induced by the *Severe Acute Respiratory Syndrome* (SARS) (Gorbalenya, *et al*, 2020). The SARS-CoV-2 is a betacoronavirus similar to SARS-CoV and MERS-CoV. The data of sequencing show that the SARS-CoV-2 is most closely related to coronaviruses found in bats. The virus has a 79% nucleotide identity to SARS-CoV and about 50% to MERS-CoV(Zhu N, *et al.*,2020), (Lu .R, *et al.*, 2020). On February 11, World Health Organization (WHO) announced that the disease caused by this new virus as a "COVID-19", which is the acronym of "Coronavirus disease 2019" and declared this disease as pandemic On March 11. To date, COVID-19 has spread rapidly in 216 countries(WHO, 2020).

SARS-CoV-2 is the seventh member of the family of CoVs that infect humans. This virus is a single-stranded, positive-sense RNA virus, having a diameter of 60-140 nm with a round or elliptic shape (Lu .R, *et al.*, 2020). SARS-CoV has four structural proteins, spike (S) surface glycoprotein, the membrane (M) protein, the envelope (E) protein ,and the nucleocapsid (N) protein, which is essential for SARS-CoV-2 assembly and infection(Yuan.Y, *et al.*, 2017). The SARS-CoV-2 can be transmitted between humans via respiratory droplets. SARS-CoV-2 can be transmitted through direct or indirect contact with mucous membranes in the eyes, mouth ,or nose (Lu. CW, *et al.*, 2020). The mean incubation period of SARS-CoV-2 is estimated to be 3–7 days (range, 2–14 days) (Backer JA, *et al.*, 2020) (Lauer. SA, *et al.*, 2020). The main manifestations of COVID-19 are fatigue, fever, dry cough, myalgia and dyspnoea, with less common symptoms being nasal congestion, headache, runny nose, sore throat, vomiting ,and diarrhea. Severe patients often have dyspnoea and/or hypoxemia 1 week after onset, after which septic shock, ARDS, difficult-to-correct metabolic acidosis, and coagulation dysfunction develop rapidly. Of note, severe and critical patients can also only present with a low fever, or even no obvious fever, and mild patients show only low fever, mild fatigue ,and no pneumonia. These asymptomatic or mild cases can also spread SARS-CoV-2 between humans (Wang D, *et al.*, 2020) (Huang C, *et al.*, 2020).

Rapid and accurate detection of SARS-CoV-2 is essential to control the outbreak of Covid-19. In Indonesia, Rapid Diagnostic Test (RDT) and Reverse Transcription Polymerase Chain Reaction (RT-PCR) used to detection of SARS-CoV-2. A Common type of RDT marketed for COVID-19; a test that detects the presence of antibodies in the blood of people believed to have been infected with COVID-19. Antibodies are produced over days to weeks after infection with the virus. The strength of antibody response depends on several factors, including age, nutritional status, the severity of the disease, and certain medications or infections like HIV that suppress the immune system (Liu Y, *et al.*, 2020) (Li Z, *et al.*,2020) (Zhao J, *et al.*, 2020). RT-PCR assay was the standard and recommended methods for detecting. SARS-CoV-2 RT-PCR is a molecular biological diagnosis technology based on nucleic acid sequences. The complete SARS-CoV2 genome sequences are available in GenBank. Thus, the nucleic acid of SARS-CoV-2 can be detected by RT-qPCR or by viral gene sequencing of nasopharyngeal and oropharyngeal swabs, stool, sputum or blood samples (Corman VM, *et al.*, 2020) (Chu DKW, *et al.*, 2020).

During the COVID-19 pandemic, the world has turned its eye towards medical laboratory technicians and medical laboratory technologists. They play a vital role in provides the clinical support for the diagnosis of COVID-19. Inaccurate or missed results can lead to a missed diagnosis. Patients rely on clinicians to provide answers and manage healthcare concerns, and clinicians rely on medical laboratory technicians and medical laboratory technologists to provide accurate and reliable results to help make the best clinical decisions. That positive or negative result impacts patient response in our communities and the isolation protocols to minimize the spread of the virus. There are very strict rules and policies that must be followed in the lab to ensure the right result is reported out on the right patient. These tests are not just loaded on machines that do the work. They must also be the gatekeeper for the quality of all laboratory testing. They must completely understand every specimen collection and transport requirement, principle ,and the procedure of the test.

The objective of this research to investigate the level of knowledge of RTD and RT-PCT for COVID-19 detection among medical laboratory technicians and medical laboratory technologists. The result of this research can be used to performance improvement of medical laboratory technicians and medical laboratory technologists and health policymaking,

METHOD

The research was carried out at Binawan University, Jakarta, Indonesia, from April to Mei 2020. This study design used was descriptive with a cross-sectional approach, with a sample of 102 people. Independent variables included gender, education, workplace, and work duration, while the dependent variable was the level of knowledge of RDT and RT-PCR.

Data were obtained using a self-administered questionnaire. The questionnaire included 12 items assessing the level of respondents's knowledge of RDT and RT-PCR, including its sample (items 1 and 2), principle (items 3–7), and time (item 8). The questionnaire was found to be valid and reliable with a Cronbach's alpha of 0.705. Data were analyzed using Statistical Package for the Social Sciences (SPSS) version 25 IBM, and demographic data and level of knowledge of RDT and RT-PCR are presented using descriptive statistics.

RESULTS AND DISCUSSION

A total of 102 medical laboratory technicians and medical laboratory technologists from various hospitals and clinics participated in this study. The majority of the respondents were

female 71.6% and male 28.4% with various work duration in hospitals or other public health agencies (Table 1).

Table 1. Characteristics of Respondents

Gender	Frequency	Percent	Valid Percent	Cumulative Percent
Male	29	28.4	28.4	28.4
Female	73	71.6	71.6	100
Total	102	100	100	
Work Duration	Frequency	Percent	Valid Percent	Cumulative Percent
< 1 Year	9	8.8	8.8	8.8
1 -5 Years	52	51	51	59.8
6 - 10 Years	19	18.6	18.6	78.4
11 - 15 Years	5	4.9	4.9	83.3
16 - 20 Years	11	10.8	10.8	94.1
> 20 Years	6	5.9	5.9	100
Total	102	100	100	

Table 2 shows that respondents have various education, more than half were SMK Analis Kesehatan about 57.8%, Diploma-III Analis Kesehatan 29.4%, Diploma-IV Teknologi Laboratorium Medis 7.8%, and Others 4.9%.

Table 2. Education of Respondents

Education	Frequency	Percent	Valid Percent	Cumulative Percent
SMK Health Analyst	59	57.8	57.8	57.8
Diploma-III Health Analyst	30	29.4	29.4	87.3
Diploma-IV Medical Laboratory Technology	8	7.8	7.8	96.1
Others	5	4.9	4.9	

Table 3 shows the respondents' knowledge level about RDT for COVID-19 detection.

The results showed that respondents had adequate level of knowledge about 77.5%, the participants had poor knowledge of RDT 12.7%. As many as 9.8%, participants had good knowledge of RDT.

Table 3. Level knowledge of RDT

Level Knowledge	Frequency	Percent	Valid Percent	Cumulative Percent
Poor	13	12.7	12.7	12.7
Adequate	79	77.5	77.5	90.2
Good	10	9.8	9.8	100
Total	102	100	100	

Table 5 shows the respondents's knowledge level about RT-PCR for COVID-19 detection. The respondents had adequate level of knowledge about RT-PCR 39.2%, the participants had poor knowledge of RT-PCR about 57.8%. As many as 2.9% participants had good knowledge of RT-PCR.

Table 5. Level knowledge of RT-PCR

Level Knowledge	Frequency	Percent	Valid Percent	Cumulative Percent
Poor	59	57.8	57.8	57.8
Adequate	40	39.2	39.2	97.1
Good	3	2.9	2.9	100
Total	102	100	100	

DISCUSSION

The respondents of this study were medical laboratory technicians and medical laboratory technologists as many as 102 people from hospitals and clinics around Indonesia (Jakarta, Depok, Bekasi, Tangerang, Jawa Barat, Jawa Timur, Jawa Tengah, Cilegon, Palembang). According to Peraturan Menteri Kesehatan Republik Indonesia (Permenkes RI) No 24 Tahun 2015, Medical laboratory technologist is everyone who has graduated from a medical laboratory technology education or health analyst or medical analyst (Diploma-III and Diploma-IV) and has the competence to conduct analyze body fluids and tissues to get information about the health of individuals and the community. Medical laboratory technologists must have Registration letter to conduct their job (Permenkes RI No 24, 2015). Everyone who not graduated from a medical laboratory technology education or health analyst or medical analyst (Diploma-III and Diploma-IV) and has the competence to analyze body fluids and tissues cannot be called Medical laboratory technologist so in this study we called them as "Medical laboratory technicians" who assist and support medical laboratory technologist.

Medical laboratory technicians and medical laboratory technologists play a vital role in provides the clinical support for the diagnosis of COVID-19. In Indonesia, the large hurdle to

help our patients is the lack of COVID-19 tests and pre-analytical (extraction reagents, etc.) supplies. But the biggest hurdle of all is the lack of medical laboratory professionals who conduct those tests. They must completely understand every specimen collection and transport requirement, principle and the procedure of the test to provide accurate diagnosis results.

Table 4 and 5 show that majority of the medical laboratory technicians and medical laboratory technologists had an adequate level of knowledge about RDT (77.5%) for COVID-19. But the majority of the respondents surveyed had poor knowledge of RT-PCR (57.8%). The poor knowledge of RT-PCR determined in this research may be attributed to the fact that RT-PCR has rarely used as a detection method for infectious diseases in hospitals and clinics and even 85.3% of respondents have never done RT-PCR testing. This result may be also affected by the education of respondents. More than half of respondents is medical laboratory technicians who not graduated from a medical laboratory technology education or health analyst or medical analyst (Diploma-III and Diploma-IV). They may not study molecular diagnostics. The Medical curriculum is important to provide medical students with the knowledge, skills, and attitudes required for their practice (Al-Elq. AH, 2017). Medical technicians and medical laboratory technologists should be encouraged to gain information on RT-PCR and prepare themselves with the knowledge that can help them provide the clinical support for the diagnosis of COVID-19. Due to the critical nature of what they do, labs are highly regulated and require medical technologists and technicians to obtain education qualifications, certifications, and continued training.

The viral pandemic, COVID-19 /SARS-CoV-2, has had a widespread impact on all aspects of daily life. The laboratory has to prepare against it. The result of this study shows that Hospitals and Public Health Agencies in Indonesia not well prepared against COVID-19 pandemic. The researchers recommend of COVID-19 detection:

1. The researchers recommend that Laboratory leadership must ensure personnel are provided training on knowledge and skill of COVID-19 detection methods and documented policies and procedures are read and, if possible, signed by all laboratory personnel
2. The researchers recommend that laboratories train staff from different clinical labs to perform each other's' functions. This will allow for coverage if staff numbers become reduced, train as many staff as possible.

3. The researchers recommend that both manufacturers and laboratories are working to meet the clinical demands imposed by this pandemic like implement additional procedures and staff training.

CONCLUSION

In conclusion, medical laboratory analysts have adequate level of knowledge about RTD for COVID-19 detection and have poor knowledge regarding RT-PCR. Training recommended improving the current level of knowledge of RT-PCR.

REFERENCES

- Al-Elq, A. H. (2007). Medicine and clinical skills laboratories. *Journal of family & community medicine*, 14(2), 59.
- Backer, J. A., Klinkenberg, D., & Wallinga, J. (2020). Incubation period of 2019 novel coronavirus (2019-nCoV) infections among travellers from Wuhan, China, 20–28 January 2020. *Eurosurveillance*, 25(5), 2000062.
- Chu, D. K., Pan, Y., Cheng, S. M., Hui, K. P., Krishnan, P., Liu, Y., ... & Poon, L. L. (2020). Molecular diagnosis of a novel coronavirus (2019-nCoV) causing an outbreak of pneumonia. *Clinical chemistry*, 66(4), 549-555.
- Corman, V. M., Landt, O., Kaiser, M., Molenkamp, R., Meijer, A., Chu, D. K., ... & Drosten, C. (2020). Detection of 2019 novel coronavirus (2019-nCoV) by real-time RT-PCR. *Eurosurveillance*, 25(3), 2000045.
- Gorbalenya, A. E., Baker, S. C., Baric, R., Groot, R. J. D., Drosten, C., Gulyaeva, A. A., ... & Ziebuhr, J. (2020). Severe acute respiratory syndrome-related coronavirus: The species and its viruses—a statement of the Coronavirus Study Group.
- Huang, C., Wang, Y., Li, X., Ren, L., Zhao, J., Hu, Y., ... & Cao, B. (2020). Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. *The lancet*, 395(10223), 497-506.
- Liu, Y., Liu, Y., Diao, B., Ren, F., Wang, Y., Ding, J., & Huang, Q. (2020). Diagnostic indexes of a rapid IgG/IgM combined antibody test for SARS-CoV-2. *MedRxiv*.
- Li, Z., Yi, Y., Luo, X., Xiong, N., Liu, Y., Li, S., ... & Ye, F. (2020). Development and clinical application of a rapid IgM-IgG combined antibody test for SARS-CoV-2 infection diagnosis. *Journal of medical virology*, 92(9), 1518-1524.
- Lu, R., Zhao, X., Li, J., Niu, P., Yang, B., Wu, H., ... & Tan, W. (2020). Genomic characterisation and epidemiology of 2019 novel coronavirus: implications for virus origins and receptor binding. *The lancet*, 395(10224), 565-574.
- Lauer, S. A., Grantz, K. H., Bi, Q., Jones, F. K., Zheng, Q., Meredith, H. R., ... & Lessler, J. (2020). The incubation period of coronavirus disease 2019 (COVID-19) from publicly reported confirmed cases: estimation and application. *Annals of internal medicine*, 172(9), 577-582.
- Lu, C. W., Liu, X. F., & Jia, Z. F. (2020). 2019-nCoV transmission through the ocular surface must not be ignored. *Lancet (London, England)*, 395(10224), e39.

Peraturan Menteri Kesehatan Republik Indonesia (Permenkes RI) No 24 Tahun 2015

Wang, D., Hu, B., Hu, C., Zhu, F., Liu, X., Zhang, J., ... & Peng, Z. (2020). Clinical characteristics of 138 hospitalized patients with 2019 novel coronavirus–infected pneumonia in Wuhan, China. *Jama*, 323(11), 1061-1069.

World Health Organization (WHO). World Health Organization Coronavirus Disease (COVID-19). 2020.

Yuan, Y., Cao, D., Zhang, Y., Ma, J., Qi, J., Wang, Q., ... & Gao, G. F. (2017). Cryo-EM structures of MERS-CoV and SARS-CoV spike glycoproteins reveal the dynamic receptor binding domains. *Nature communications*, 8(1), 1-9.

Zhao, J., Yuan, Q., Wang, H., Liu, W., Liao, X., Su, Y., ... & Zhang, Z. (2020). Antibody responses to SARS-CoV-2 in patients with novel coronavirus disease 2019. *Clinical infectious diseases*, 71(16), 2027-2034.

Zhu, N., Zhang, D., Wang, W., Li, X., Yang, B., Song, J., ... & Tan, W. (2020). A novel coronavirus from patients with pneumonia in China, 2019. *New England journal of medicine*

PERFORMANCE ANALYSIS OF LECTURERS & EDUCATION LABORATORY INSTRUCTORS IN THE LEARNING PROCESS BEFORE AND DURING THE COVID-19 PANDEMIC

Hartati, Nangsih Sulastris Slamet, Fihrina Mohamad, Vyani Kamba
Department of Pharmacy, Health Polytechnic of Gorontalo, Indonesia

Email: hartati.apr24@gmail.com

Abstract

Learning from home during a pandemic has affected education systems around the world in a significant way. Responding to this change, countries have implemented various methods to deal with changes in the learning system which incidentally shifted to online learning. The various impacts of the transition of learning from face-to-face to online have been studied in various countries. Research related to the performance of lecturers and educational laboratory instructors at the Pharmacy Department of Health Polytechnic of Gorontalo was conducted to analyze using a paired sample T test with SPSS 16.0 to know whether or not there were differences in the performance of lecturers and educational laboratory instructors before the Covid-19 pandemic compared to during the Covid-19 pandemic based on student perceptions. The analysis was carried out on 17 lecturers and educational laboratory instructors who regularly teach courses in 1st semester and 3rd semester in the 2019 academic year and 2020 academic year. The results showed that there were not differences of the pedagogic aspects, but professional and personality aspects of the educators experienced significant changes, where there was a decrease in the average assessment in a row, from 3.47 in 2019, to 3.41 in 2020 and 3.55 in 2019, to 3.47 in 2020. However, the scores is still included in the Good / High / Frequent category based on the scoring on the Likert scale.

Keywords: Lecturers and Educational Laboratory Instructors; Performance; Learning Process; The Covid-19 Pandemic; Pharmacy Students Perceptions

INTRODUCTION

The ongoing COVID-19 pandemic has an impact on all aspects of life, including health and education. In Indonesia, policies related to the implementation of education during the COVID-19 pandemic are contained in The Letter of the Minister of Education and Culture Number 4 of 2020, Number 3 of 2020 concerning Prevention of COVID-19 in the Education Unit, and Number 36962 / MPK.A / HK / 2020 concerning Online Learning and Working from Home in the Context of Preventing the Spread of Corona Virus Disease (COVID-19). According to the letter, educators in educational institutions use various online learning media with different platforms to fulfill students' cognitive, affective and social needs (Ferdiana, 2020).

The transfer of learning from conventional face-to-face learning methods is reported to have several impacts, including: affecting the economy of students, so that some students feel worried about not being able to pay for their studies after the pandemic is over. In addition, while at home, some lecturers and students are busy taking care of their children, parents, or siblings who also live at home or study online (Rajab et al., 2020).

Challenges in the online learning process, including time management, use of technology tools, easy internet access, lack of communication due to indirect interactions, and technophobia, both among students and educators. Research conducted by Kusnayat, et al (2020) even found that around 60% of students from a total of 59.5% who objected to assignments given by lecturers in online learning, experienced increased stress (Kusnayat et al., 2020; Rajab et al., 2020).

Various methods and models of learning are more varied by educators as a strategy to make students more interested in teaching materials, including by creating creative video content that has never been done by educators before. The use of various online learning platforms, such as Google Classroom, Edlink, Edmodo, Slack, Asana, Email, WhatsApp, Line, Skype, Youtube or Zoom is also optimized. The use of information technology in terms of learning evaluation is carried out by presenting a lively and exciting educational game or quiz in the classroom, based on learning platforms, including applications such as kahoot, socrative, quizizz, jamboard, padlet or mentimeter (Daryanes & Ririen, 2020; Puspitorini, 2020).

Research on the effectiveness of online learning has been conducted all over the world. Abbasi et al. (2020) who examined the perceptions of students at the Liaquat College of Medicine and Dentistry regarding online learning found that around 77% of students had negative perceptions of e-learning. Different research results were stated by Shawaqfeh et al. (2020) who found that 42.9% of pharmacy students at King Saud Bin Abdulaziz University for Health Sciences showed a positive attitude towards online learning provided.

Pharmaceutical education that relies on teaching methods involving lectures, seminars, training and laboratory practices also faces the same impact. Lectures and seminars can be carried out both face-to-face and online, but training activities and laboratory practices require physical contact and social interaction between instructors and students and between students so that the expected quality of learning can be achieved. During a pandemic, educators are required to

adapt quickly to the transitional learning process that relies entirely on online platforms for all types of learning activities (Shawaqfeh et al., 2020).

Health Polytechnic of Gorontalo as one of the Technical Implementing Units that holds health vocational education under the auspices of the Health Human Resources Development and Empowerment Agency of the Ministry of Health of the Republic of Indonesia, has also experienced the impact of the transition to online learning. The research was conducted with the aim of analyzing the performance of the teaching staff, in this case the lecturers and educational laboratory instructors at the Pharmacy Department during the implementation of online learning activities which were compared with the performance before the pandemic based on student perceptions.

METHOD

Research design and settings

This study is a cross-sectional study that compares the performance of educators during the learning process before and during the Covid-19 pandemic based on student perceptions. The inclusion criteria of the respondents were students at 1st semester 1 and 3rd semester who were registered and active in Pharmacy Department of Health Polytechnic of Gorontalo which numbered 116 people. The exclusion criteria were students who did not reach the minimum 75% attendance limit in the learning process. The number of samples obtained based on the Slovin formula with a standard deviation of 5% was 90 students.

The analysis was carried out on 17 lecturers who regularly teach courses in 1st semester 1 and 3rd semester of the 2019/2020 Academic Year and 2020/2021 Academic Year. The attributes used in the questionnaire refer to pedagogic, professional and personality aspects as stated in article 69 of Law Number 14 of the Year 2005 concerning Teachers and Lecturers.

Questionnaire design

The questionnaire contains the identity of the respondent, the name of the educator and the courses to be assessed. The assessment is based on a Likert scale with a total of 22 attributes spread over 3 aspects of assessment, namely pedagogical aspects, professional aspects and personality. There are 9 attributes for pedagogic aspects, 7 attributes for professional aspects and 6 attributes for personality aspects. Each attribute is given points 1 = Very Bad / Very Low

/ Never, 2 = Not Good / Low / Rarely, 3 = Good / High / Often, and 4 = Very Good / Very High / Always.

Questionnaire analysis

SPSS Version 16.0 was used to analyze the validity and reliability of each attribute in the questionnaire used. The validity test with $r_{table} = 0.312$ is smaller than the calculated r (tables 1, 2 and 3) respectively on each attribute of the pedagogic, professional and personality aspects, so that all attributes are declared valid (Sujarweni, 2019).

Table 1. Item Total Statistics of Pedagogic Aspects

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item- Total Correlation	Cronbach's Alpha if Item Deleted
Readiness to give lectures and / or practice / practicum	28.57	15.978	.897	.979
Order and order in the administration of lectures	28.53	15.913	.932	.977
The ability to liven up the classroom atmosphere	28.63	15.689	.836	.981
Clarity of material delivery and answers to questions in class	28.57	15.771	.955	.977
Utilization of media and learning technology	28.60	15.903	.906	.978
Diversity of ways of measuring learning outcomes	28.60	15.214	.961	.976
Giving feedback on tasks	28.63	15.344	.922	.978
The suitability of the test material and / or assignments with the course objectives	28.60	15.214	.961	.976
The suitability of the value given to learning outcomes	28.60	16.110	.849	.980

Table 2. Item Total Statistics of Professional Aspects

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item- Total Correlation	Cronbach's Alpha if Item Deleted
Ability to explain the subject / topic appropriately	21.53	8.395	.893	.967

Ability to provide relevant examples of the concepts being taught	21.50	8.259	.967	.962
The ability to explain the relationship between the fields / topics being taught	21.50	8.259	.967	.962
Mastership of the latest issues in the field being taught	21.57	8.323	.910	.966
Use of research results to improve the quality of lectures	21.53	8.671	.785	.974
Involving students in research, study and or development	21.60	8.041	.881	.968
Ability to use a variety of communication technologies	21.57	8.047	.885	.968

The Cronbachs' Alpha values sequentially on the attributes of the pedagogic, professional and personality aspects are 0.980, 0.971 and 0.978, which are greater than 0.60, so that all attributes are declared reliable (Sujarweni, 2019).

Table 3. Item Total Statistics of Personality Aspects

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item- Total Correlation	Cronbach's Alpha if Item Deleted
Authority as a lecturer person	18.07	5.513	.939	.972
Wisdom in decision making	18.13	5.499	.903	.976
Be an example in attitude and behavior	18.13	5.430	.938	.972
Words are accompanied by actions	18.13	5.430	.938	.972
Ability to control him/herself in various situations and conditions	18.10	5.610	.864	.979
Fair in treating students	18.10	5.403	.972	.969

RESULTS AND DISCUSSION

Learning from home during a pandemic has affected education systems around the world in a significant way. Responding to this change, countries have implemented various methods to deal with changes in the learning system which incidentally shifted to online learning (Wijoyo, et al., 2021).

The transfer of the learning process in online form was also carried out by the Health Polytechnic of Gorontalo in accordance with the Decree of the Director of the Health Polytechnic of Gorontalo Number HK.02.03 / 1.1 / 11493 / 2020 concerning Online Learning Guidelines during the Covid-19 Pandemic Period at Health Polytechnic of Gorontalo. In response to this, the Pharmacy Department as one of the departments in the Health Polytechnic of Gorontalo is conducting hybrid learning. Theory learning is carried out online, but practice in the laboratory is carried out face-to-face in order to achieve the expected learning targets.

The various impacts of the transition of learning from face-to-face to online have been studied in various countries, one of which is research conducted by Arifiati et al. (2020) who argues that students experience various benefits of online learning, including that they can take part in the learning process anywhere and anytime. However, there are several negative impacts that are also felt by students due to learning carried out online, one of which is the unsynchronized lecturers and teaching materials.

Research related to the performance of lecturers and educational laboratory instructors at the Pharmacy Department of Health Polytechnic of Gorontalo was conducted to analyze whether or not there were differences in the performance of lecturers and educational laboratory instructors before the Covid-19 pandemic compared to during the Covid-19 pandemic based on student perceptions. The analysis was carried out on 17 lecturers and educational laboratory instructors who regularly teach courses in 1st semester and 3rd semester in the 2019 academic year and 2020 academic year. 1st semester and 3rd semester in 2019 were the closest semesters before online learning due to the Covid-19 pandemic was implemented.

Demographic data from 17 education personnel (lecturers and educational laboratory instructors) assessed based on gender are shown in Figure 1.

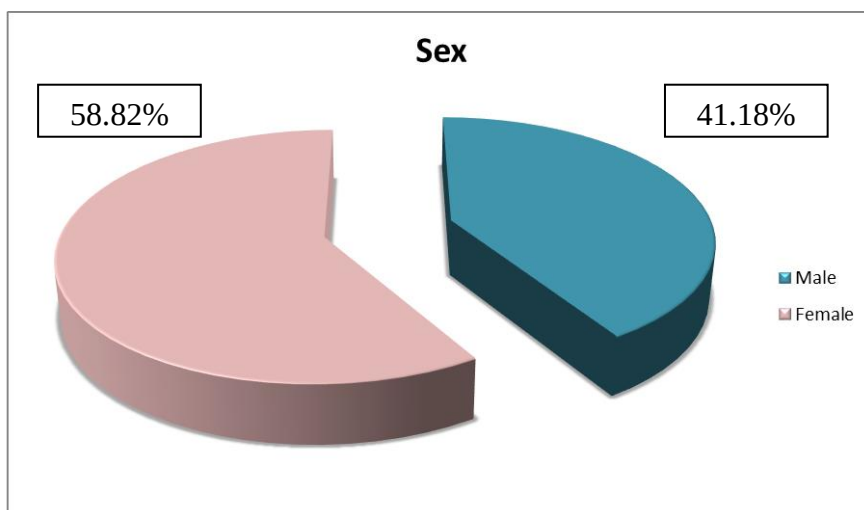


Figure 1. Demographic Data of Lecturers and Educational Laboratory Instructors in Pharmacy Department of Health Polytechnic of Gorontalo Based on Gender

As many as 7 male (41.18%) from 17 educational staff were lecturers, while 10 (58.82%) other educational staff were female, consisting of 8 lecturers and 2 educational laboratory instructors.

Whether or not differences in the performance of education personnel before and during the Covid-19 pandemic were analyzed using a paired sample T test. Testing of the questionnaire distribution results was carried out with SPSS Version 16.0. The decision making on the paired sample T test is based on the Sig. If Sig > 0.05, then Ho (there was no difference in the performance of education personnel before and during the Covid-19 pandemic) was accepted. Conversely, if Sig < 0.05, then Ho is rejected and Ha (there is a difference in the performance of education personnel before and during the Covid-19 pandemic) is accepted (Sujarweni, 2019).

Table 4. Paired Sample T Test of Pedagogic Aspects

		Paired Differences							
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference		t	df	Sig. (2-tailed)
					Lower	Upper			
Pair 1	Odd Semester 2019 – Odd Semester 2020	.06118	.12752	.03093	-.00439	.12674	1.978	16	.065

Table 5. Paired Sample T Test Professional Aspects

		Paired Differences							Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference		t	df	
					Lower	Upper			
Pair 1	Odd Semester 2019 – Odd Semester 2020	.06118	.11208	.02718	.00355	.11880	2.251	16	.039

Table 6. Paired Sample T Test Personality Aspects

		Paired Differences							Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference		t	df	
					Lower	Upper			
Pair 1	Odd Semester 2019 – Odd Semester 2020	.07882	.11693	.02836	.01870	.13895	2.779	16	.013

Based on the table, aspects that do not show significant changes, both before the Covid-19 pandemic and during the Covid-19 pandemic, are pedagogic aspects. The pedagogic aspect according to Article 12 paragraph 1 of the National Education Standards is the ability to manage student learning which includes understanding of students, designing and implementing learning, evaluating learning outcomes, and developing students to actualize their various potentials. Mastery of developmental theories and learning theories is absolutely in the hands of educators. Therefore, it is necessary to grow awareness that mastery of student development materials, learning theories, curriculum development, evaluation techniques, mastery of teaching models and methods, is necessary in addition to mastery of subjects and science and technology related to teaching (Nur, A., 2014).

Professional aspects according to Hasan (2017) is the ability to master broad and in-depth learning materials which include (a) concepts, structures, and scientific / technology / art methods that cover / are coherent with teaching materials; (b) teaching materials in the school curriculum; (c) the conceptual relationship between related subjects; (d) application of scientific concepts in everyday life; and (e) professional competition in a global context while preserving national values and culture. Based on the results of the paired sample T test, the

professional aspects of the education personnel in the Pharmacy Department of Health Polytechnic of Gorontalo underwent significant changes. Likewise with the personality aspect. According to Safitri et al. (2018), personality is the ability of the teaching staff to reflect a solid, stable, mature, wise and dignified personality, become an example of a student and have a noble character. Further elaboration regarding the results of the average assessment of lecturers and educational laboratory instructors performance from these three aspects based on student perceptions is listed in table 7.

Table 7. Average Performance of Lecturers and Educational Laboratory Instructors in Pharmacy Department of Health Polytechnic of Gorontalo Before and During Covid-19 Pandemic

Lecturer/Instructor Code	Assessment					
	Pedagogic		Professional		Personality	
	2019	2020	2019	2020	2019	2020
1	3.59	3.48	3.46	3.44	3.57	3.49
2	3.62	3.47	3.6	3.49	3.68	3.48
3	3.14	3.09	3.16	3.05	3.33	3.22
4	3.64	3.53	3.56	3.50	3.64	3.56
5	3.61	3.35	3.56	3.38	3.63	3.36
6	3.43	3.47	3.45	3.39	3.58	3.52
7	3.57	3.53	3.49	3.56	3.57	3.56
8	2.99	3.24	3.04	3.22	3.1	3.30
9	3.21	3.32	3.18	3.25	3.37	3.39
10	3.7	3.54	3.63	3.51	3.69	3.56
11	3.5	3.52	3.47	3.45	3.55	3.59
12	3.73	3.49	3.72	3.47	3.69	3.48
13	3.52	3.33	3.47	3.31	3.58	3.41
14	3.64	3.55	3.63	3.40	3.72	3.50
15	3.6	3.59	3.6	3.58	3.67	3.63
16	3.51	3.48	3.53	3.49	3.53	3.50
17	3.55	3.53	3.49	3.51	3.51	3.52
Average	3.50	3.44	3.47	3.41	3.55	3.47

The professional and personality aspects of the educators experienced significant changes, where there was a decrease in the average assessment in a row, from 3.47 in 2019, to 3.41 in 2020 and 3.55 in 2019, to 3.47 in 2020. However, the scores is still included in the Good / High / Frequent category based on the scoring on the Likert scale.

Table 8. Item Total Statistics of Online Learning Quality

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
The quality of the content / material presented in online learning is presented in communicative language, complete and there are links to sites to enrich the content	52.20	20.648	.879	.953
The quality of the various learning objects (text, images, videos, animations, simulations) that have been selected has been adjusted to the needs of learning outcomes	52.20	21.476	.820	.955
Availability of effective time to conduct online lecture material discussions between lecturers and students	52.20	20.786	.846	.954
The quality of giving feedback by lecturers to students on the results of assignments given online	52.27	20.892	.767	.956
The ability of lecturers to provide motivation in online learning	52.20	20.510	.912	.952
The quality of the presentation design given by the lecturer in online learning	52.13	21.430	.956	.953
The punctuality of starting online learning	52.20	21.338	.857	.954
The timeliness of ending online learning activities	52.27	19.926	.874	.953
Ease of accessing online learning services	52.17	21.316	.918	.953
An online service for giving scores to assignments that have been given by lecturers to students	52.13	21.430	.956	.953
In general, the quality of online learning has been implemented well	52.20	20.441	.811	.955
Do you agree if lectures in the following semester are carried out online?	52.47	22.120	.365	.973

The results of interviews with educators found that decrease in the performance of educators during the Covid-19 pandemic, especially in the professional aspect, was caused by increased stress levels due to the suggestion to stay at home which caused the work atmosphere to become

monotonous, concentration distracted by household chores and taking care of children, unstable internet network and lack of knowledge and skills to use online learning platforms.

The second stage of the questionnaire was distributed to 90 students to analyze the quality of online learning. Twelve statement items were submitted in this evaluation with points 1 = Not Good / Disagree, 2 = Poor / Disagreeable, 3 = Enough, and 4 = Good Agree, 5 = Very Good / Strongly Agree. The results of the validity and reliability tests showed that the 12 items were declared valid (table 8) and reliable with a Cronachs' Alpha value of $0.952 > 0.60$.

From the distribution of the questionnaires, about 83.94% of students felt that online learning had been carried out well. The description of each statement item on the questionnaire is shown in Figure 2.

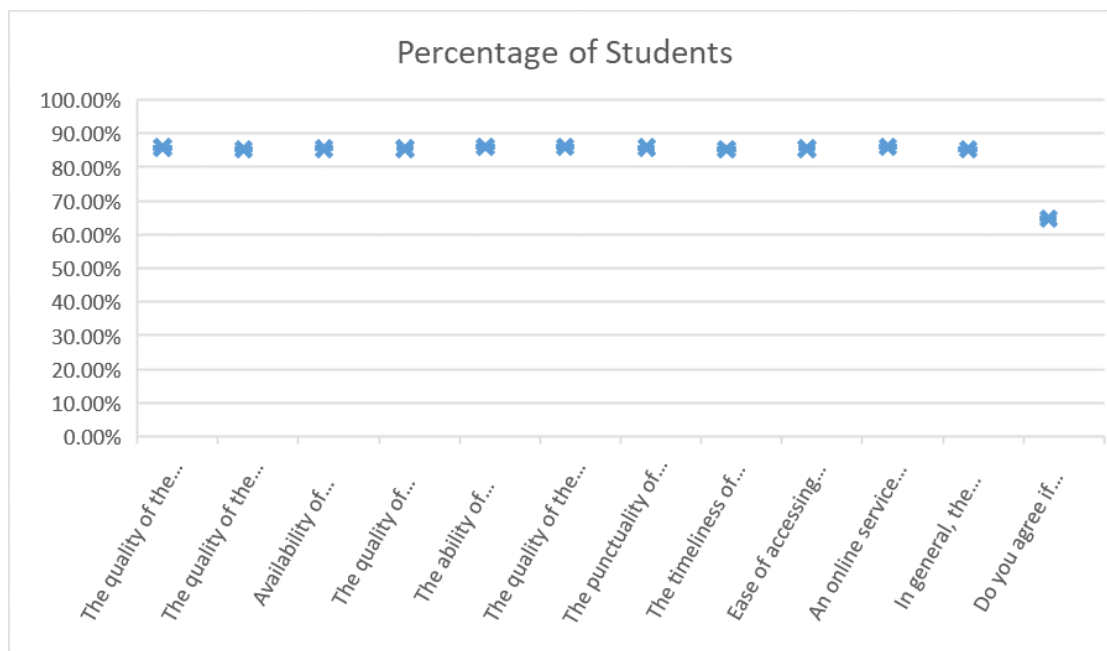


Figure 2. Percentage of Student Assessment of Online Learning Quality at Pharmacy Department of Health Polytechnic of Gorontalo

In the picture, it can be seen that the percentage of students who agree to do online learning in the following semester is only around 64.75%. Some students feel that direct interaction through face-to-face learning activities is more effective and gives students a sense of comfort compared to online learning.

CONCLUSION

The results of the analysis of the performance of lecturers and educational laboratory instructors at Pharmacy Department of Health Polytechnic of Gorontalo based on student perceptions showed a significant decrease in competence of the professional aspects as well as the personalities of lecturers and educational laboratory instructors, while for the pedagogic aspect there was no significant change.

REFERENCE

- Abbasi, S., Ayoob, T., Malik, A., & Memon, S. I. (2020). Perceptions of students regarding e-learning during covid-19 at a private medical college. *Pakistan Journal of Medical Sciences*, 36(COVID19-S4), S57–S61. <https://doi.org/10.12669/pjms.36.COVID19-S4.2766>
- Arifiati, N., Nurkhayati, E., Nurdiawati, E., Pamungkas, G., Adha, S., Purwanto, A., Julyanto, O., & Azizi, E. (2020). University Students Online Learning System During Covid-19 Pandemic: Advantages, Constraints and Solutions. *Systematic Reviews in Pharmacy*, 11(7), 570–576.
- Daryanes, F., & Ririen, D. (2020). Efektivitas Penggunaan Aplikasi Kahoot Sebagai Alat Evaluasi pada Mahasiswa. *Journal of Natural Science and Integration*, 3(2), 172. <https://doi.org/10.24014/jnsi.v3i2.9283>
- Ferdiana, S. (2020). Persepsi Mahasiswa tentang Penggunaan Media Daring pada Program Studi S1 Ilmu Gizi Sekolah Tinggi Ilmu Kesehatan Surabaya selama Masa Pandemi Corona Virus Disease (COVID-19). *Indonesian Journal of Science Learning*, 1(1), 5–12.
- Hasan, M. (2017). Pengaruh Kompetensi Profesional Guru Terhadap Kinerja Guru Ekonomi Sekolah Menengah Atas Negeri Di Kabupaten Gowa. *Jurnal Economix*, 5(2), 72–73.
- Kusnayat, A., Sumarni, N., Mansyur, A. S., Zaqiah, Q. Y., & Bandung, U. T. (2020). Pengaruh Teknologi Pembelajaran Kuliah Online Di Era Covid-19 Dan Dampaknya Terhadap Mental Mahasiswa. *EduTeach : Jurnal Edukasi Dan Teknologi Pembelajaran*, 1(2), 153–165.
- Nur, A., A. (2014). Meningkatkan kompetensi pedagogik guru di SD Yayasan Mutiara Gambut. *Jurnal Administrasi Pendidikan*, 2(1), 65–72. ejournal.unp.ac.id/index.php/bahana/article/viewFile/3735/2970
- Puspitorini, F. (2020). Strategi Pembelajaran Di Perguruan Tinggi Pada Masa Pandemi Covid-19. *Jurnal Kajian Ilmiah*, 1(1), 99–106. <https://doi.org/10.31599/jki.v1i1.274>
- Rajab, M. H., Gazal, A. M., & Alkattan, K. (2020). Challenges to Online Medical Education During the COVID-19 Pandemic. *Cureus*, 12(7). <https://doi.org/10.7759/cureus.8966>
- Safitri, N., Wisroni, W., & Solfema, S. (2018). Gambaran Kompetensi Kepribadian Instruktur Pada Pembelajaran Pelatihan Menjahit di Panti Sosial Bina Remaja Harapan Kota Padang Panjang. *Spektrum: Jurnal Pendidikan Luar Sekolah (PLS)*, 1(3). <https://doi.org/10.24036/spektrumpls.v1i3.100555>
- Shawaqfeh, M. S., Al Bekairy, A. M., Al-Azayzih, A., Alkatheri, A. A., Qandil, A. M., Obaidat, A. A., Al Harbi, S., & Muflih, S. M. (2020). Pharmacy Students Perceptions of Their Distance Online Learning Experience During the COVID-19 Pandemic: A Cross-

Sectional Survey Study. *Journal of Medical Education and Curricular Development*, 7, 238212052096303. <https://doi.org/10.1177/2382120520963039>

Sujarweni, V. W. (2019). SPSS untuk Penelitian. In Florent (Ed.), *SPSS untuk Penelitian*. Pustaka Baru Press.

Wijoyo, Hadion; dkk. (2021). *Efektivitas Proses Pembelajaran Di Masa Pandemi* (Hadion Wijoyo, D. Sunarsi, & I. Indrawan (eds.)). Insan Cendekia Mandiri.

FOOD HABITS AND WASHING HANDS BEHAVIOR AMONG ADULT AND TEENAGERS DURING PANDEMIC

Didit Damayanti, Ratih Puspitaningtyas Purbaningrum, Leni Purbasari, Iskari Ngadiarti
Health Polytechnic of Jakarta II

Email : diditdamayanti@yahoo.com

Abstract

The Covid-19 pandemic has hit the world, including Indonesia, so prevention is needed, including using masks, keeping distance and washing hands. In addition to maintaining individual hygiene, it is recommended to eat balanced nutrition by increasing the consumption of vegetables and fruit. This study aims to study changes in eating habits and hand washing before and during the Covid-19 pandemic in adults in Jakarta, Bogor, Depok, Tangerang and Bekasi (Jabodetabek). The research is an online survey using google form, WhatsApp and video call to 155 respondents. Data on characteristics, eating habits and hand washing were collected using a questionnaire and food recall. The data is processed by SPSS. The characteristics of the respondents are mostly women, aged 25 to 34 years, working in the private sector, civil servants, housewives and students. Vegetable consumption increased 2 times a day (46.5%) and 3 times a day (25.2%). Fruit consumption increased 2 times a day (29%) and 3 times a day (12.3%) and animal protein consumption increased 2 times a day (49%) and 3 times a day (38.1%). Meanwhile, the consumption of herbal medicine once a day increased to 31.6% and 2 times a day was 9%. Supplement consumption also increased by 51.6% 1 time a day and 4.5% 2 times a day as well as an increase in the implementation of hand washing behavior. There has been an increase in the consumption of vegetables, fruit, animal protein, herbs and supplements among adults in Jabodetabek during the pandemic.

Keywords: Food habits; eating habits; washing hand behaviour; Covid-19 pandemic

INTRODUCTION

At the end of 2019, people in Wuhan China had suffered of Covid-19 infection. In March 2020, World Health Organization (WHO) has set the Covid-19 infection as a global pandemic. In the same time, Indonesian government also had been declare as a country exposed to Covid-19 infection The cause of Covid-19 infection is the SARS Corona 2 virus which is transmit very fast from person to person (WHO, 2020b). In order to break the transmission of corona virus, WHO suggest public health measures include using the mask, social distancing and washing the hand regularly even limit mobilitation. These behaviors will prevent the crowd and reduce the risk of Covid-19 infection (WHO, 2020a).

The immune system exist to protect the host from patogens include Covid-19 virus. Immune system is always active and it will enhance when somebody infected. The higher activity of immune system need more energy and substrats that come from foods. The vitamins and trace

elements that have been demonstrated the role in supporting the immune system in human and reducing the risk of virus infection are vitamin A, B6, B12, folate, C, D and E. The mineral are zinc and selenium (Calder, 2020). The majority source of these vitamins and minerals are vegetables and fruits (Kemenkes RI, 2018b).

During pandemic, nutrition guidelines for Covid-19 still advise eat variety of food and in adequately amount, it include carbohydrate foods, protein foods, vegetables, fruits and water. The guidelines consider to eat more vegetables and fruits (Kemenkes RI, 2020). However, based on national research the proportion of individuals in Indonesia who consume enough amount of vegetables and fruit are low. Majority people in Indonesia eat less vegetables and fruits, the proportion increases from 93.5% in 2013 (Kemenkes RI, 2013) to 95.5% in 2018 (Kemenkes RI, 2018a).

During Covid-19 pandemic, the mortality rate of Covid-19 infection are remarkably high. Therefore, besides implementation the public health measures include using the mask, social distancing, washing hands regularly, it also suggest to eat follow nutrition guidelines and eat more vegetables and fruits. Based on background above, this study aim was to determine food consumption and washing hand behavior during Covid-19 pandemic among adult and teenager in Jakarta and other cities around Jakarta.

METHODS

The study was a part of student practicum of food survey course during pandemic. The study design was cross sectional and the research had been conducted in April 2020. The respondents were adults and teenagers who live in Jakarta, Depok, Bekasi, Tangerang and Bogor and willing to follow the study.

Foods consumption and washing hand behavior were collected through interview using questionnaires and conducted with respondents through online using google form, whatsapp and video conference. Method dietary recall was used to collect data of food consumption. Enumerators who collected food consumption using dietary recall had trained in Nutrition Department, Health Polytechnic Jakarta II before research. The data was descriptive analyzed using SPSS 22.

RESULT

Respondent characteristic

The study consisted 155 respondents. Table 1. showed majority of respondents was female (72,3%), age 25 to 34 years old (45,2%). Furthermore, majority respondents (58,7%) has high school as the highest education level and 48,4% were students but majority work in private sectors, government official, and housewives.

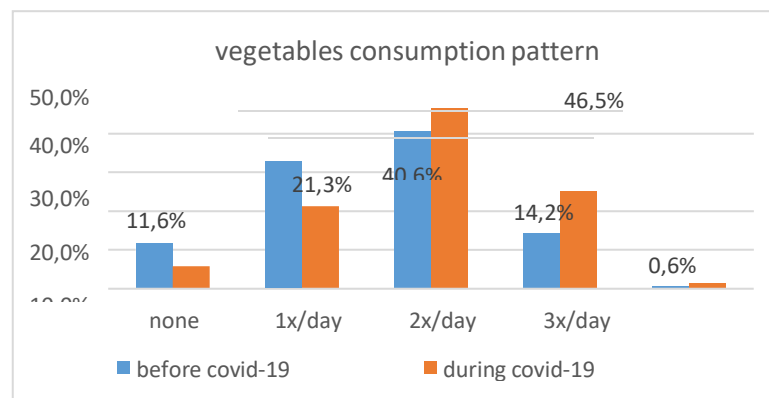
Table 1. Distribution of Characteristic Respondents (n=155)

	n	%
Sex		
Male	43	27.7
Female	112	72.3
Age (years)		
15 - 24	22	14.2
25 - 34	70	45.2
35 - 44	26	16.8
45 - 54	22	14.2
55 - 64	15	9.7
Education		
University	60	38.7
High school	91	58.7
Yunior High school	4	2.6
Occupation		
Students	75	48.4
Private sector	40	25.8
Government officer	7	4.5
Entrepreneur	5	3.2
Housewives	28	18.1

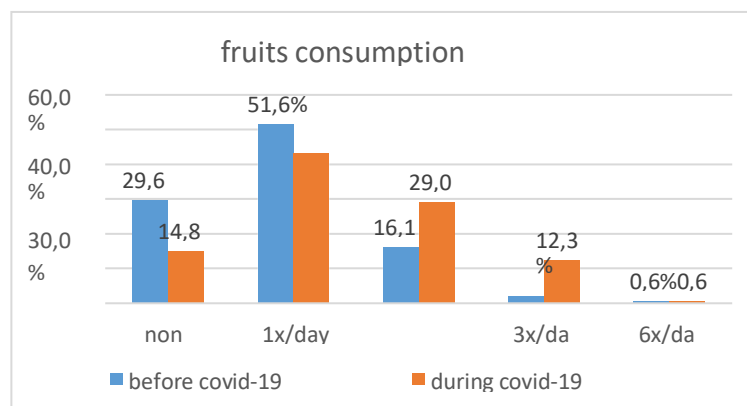
The present study showed the change of consumption pattern before and during covid-19 pandemic, such as vegetables and fruits. Before Covid-19 pandemic, 40.6% of respondents ate vegetables 2 times per day then increased to 46.5% during Covid-19 pandemic and also more respondent, from 14.2% to 25.2%, ate vegetables 3 times per day. It showed in Graph 1. Similar pattern happened in fruits and animal source protein consumption before and during Covid-19 pandemic. There were increased of 2 times consumption per day (16.1% to 29.0%) of fruits and (48.4% to 49.0%) of animal source protein. There were also increased frequency 3 times per day consumption of fruits (1.9% to 12.3%) and animal source protein (1.9% to 12.3%). It showed in grap 2 and 3.

The consumption of herbal drinks and supplements vitamin and mineral become more

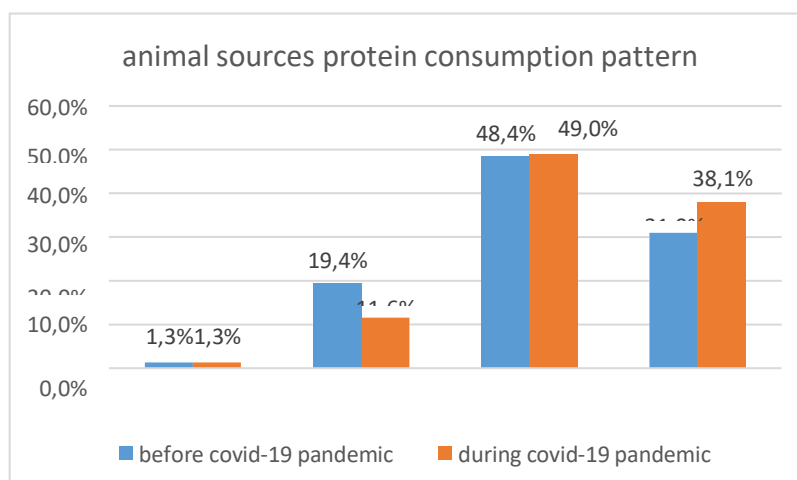
frequently during Covid-19 pandemic. Respondents consumed supplements at least once per day, also 2-3 times per day. It showed in graph 1 to 5.



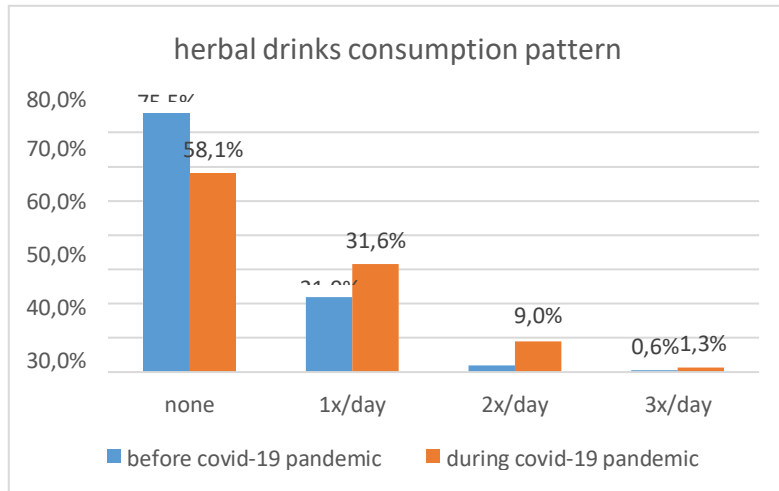
Graph 1. Frequency of Vegetables Consumption among Adult and Teenagers in Jabodetabek



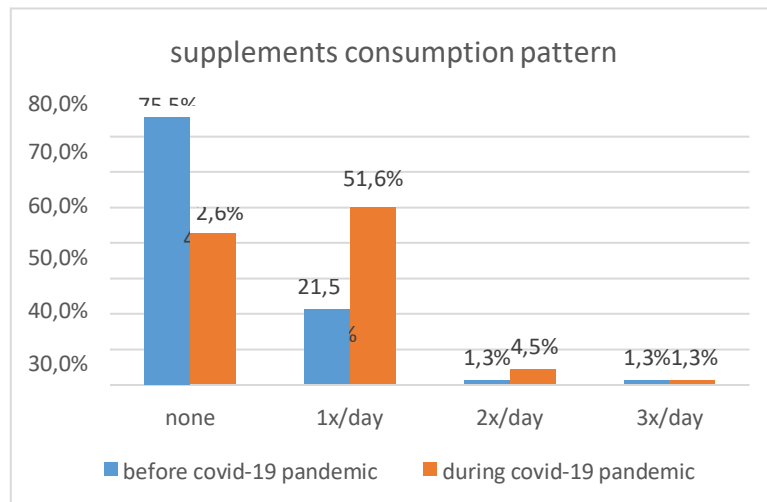
Graph 2. Frequency of Fruits Consumption among Adult and Teenagers in Jabodetabek



Graph 3. Frequency of Animal source Protein Foods Consumption among Adult and Teenagers in Jabodetabek

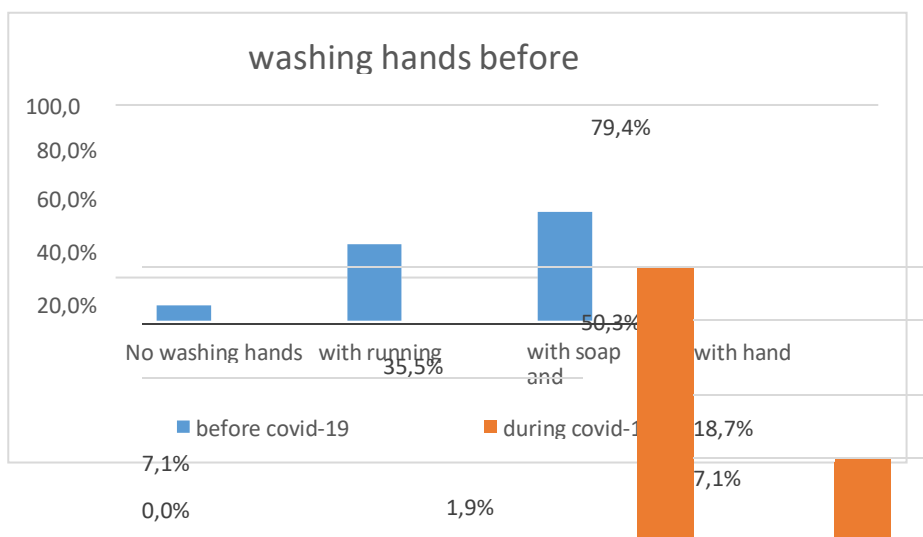


Graph 4. Frequency of Herbal Drinks Consumption among Adult and Teenagers in Jabodetabek

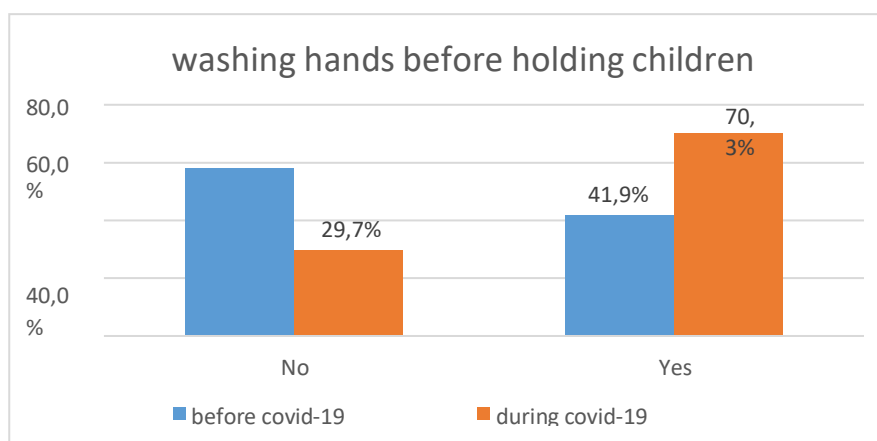


Graph 5. Frequency of Supplement Consumption among Adult and Teenagers in Jabodetabek

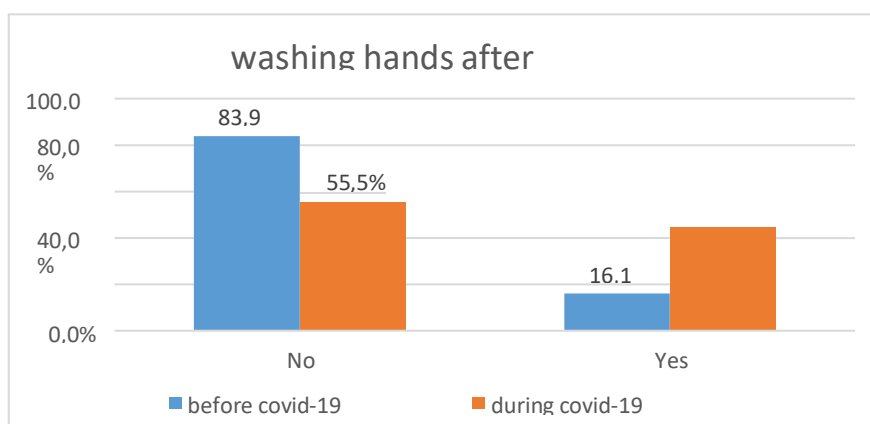
Besides study about food consumption, this research also explore about the implementation of washing hands behavior among respondents. The result showed Covid-19 pandemic changed respondents habits for washing their hands more frequently. In some activities, such as before eating 79,4% respondents washed their hands using running water and soap even 18,7% respondents using hand sanitizer. Majority of respondents (70,3%) washing hands before holding their children. Although there were changed in washing hands behavior after travelling however majority of respondent still did not wash their hands after travelling (55,5%). It showed in graph 6,7 and 8.



Graph 6. Frequency of Washing Hands before Eating among Adult and Teenagers in Jabodetabek



Graph 7. Frequency of Washing Hands before Holding Children among Adult and Teenagers in Jabodetabek



Graph 8. Frequency of Washing Hands before Travelling among Adult and Teenagers in Jabodetabek

DISCUSSION

The strength of this study, there was a few research conducted during Covid-19 pandemic, which there is a change in every day life of people in the world include in Indonesia. First, the change of food habits and washing hands behavior were capture by the finding of present study. Second, students and lecturers as researcher and enumerator have opportunity learned to conduct data collection through online system. However, the limitation of this present study was the method collecting data used interview through online using google form, whatsapp and video conferences while usually collecting data in Indonesia still use face to face or offline interview. Using this method may influence the result because the method not yet standardize.

The finding of present study showed there was a remarkable increase of vegetables, fruits and animal protein food sources consumption among respondents during pandemic, especially if compare with national survey that found 93,5 - 95,5 % of respondents eat less portion of vegetables than recommendation. However, the change of food frequency was not enough to meet the recommendation based on Indonesia nutrition guidelines. The consumption of vegetables increase 2 times per day (46,5%) and 3 times per day (25,2 %). If we assume each times respondent consume 1 portion, while the recommendation is 3 to 4 portion of vegetables per day, therefore vegetables consumption still lower than recommendation. It similar to consumption of fruits which was increased 2 times per day (29%) and 3 times per day (12,3%) and consumption of protein animal food source which increased 2 times per day 49% and 3 times per day 38,1%.

This changing of food habits in Indonesia similar to study result of Yılmaz et al., (2020) among students in Turkey. The study found increased of vegetable consumption 40,5%, fruits 49,5% and red meat, chicken, fish 32,1% and dairy products 41%. Meanwhile majority of respondents did not changed their food habits and nutritional supplement during pandemic. Huber et al. (2020) found an increase consumption of bread, meat, but no different of vegetables and fruits consumption. It has similar result of Ngadiarti et al. (2020) study, which found that fiber intake (vegetables and fruits) was very low.

Survey present study also showed an increase of supplement consumption one per day 51,6% and twice per day 4,5%. Respondents also reported an increase of herbal drink consumption 31,6% once per day and 9% twice per day. This finding may higher than Survey Diet Total (2014) that found mean consumption of herbal drink was 1,0 g per capita per day. However,

this finding different with study by Yılmaz et al. (2020) among students in Turkey that showed decrease of supplement consumption from 18,1% to 8,7%. The reason may be respondents of present study were adult while in Turkey were students who have differed social economy level.

The change of food habits may explained by Health Belief Model (Green et al., 2020), which person have change after have enough information and decide to implement a new behavior after weighing between benefit and consequence of implemented certain behavior. In this case eating more vegetables, fruits, vitamin, supplement and washing hands regularly compare to get suffer from corona virus even loss the life of their family. Besides formal source, the information how to improve immunity during pandemic also get from social media (Utama et al., 2020). Research by Litton and Beavers (2021) found the people who eat more vegetables and fruits are people which secure and people who eat less vegetables and fruits during pandemic were people which insecure. The reason of insecure include perception of afraid for food contamination, high price of foods and the availability of foods. This study recommend the need of adequate food assistant for program during Covid-19 pandemic to maintain and promote healthy eating.

CONCLUSION

This study result conclude that there was a good change of food habit and hand wash behavior among adult in Indonesia. All respondent should use soap and running water when washing their hands during Covid-19 pandemic.

RECOMENDATION

There is a need of adequate assistant from government and other sectors to maintain healthy eating and hands wash behavior. Further study also need to explore the change in a year of Covid-9 pandemic.

REFERENCES

- Calder, P. C. (2020). Nutrition, immunity and COVID-19. *BMJ Nutrition, Prevention & Health*, 3(1), 74–92. <https://doi.org/10.1136/bmjnp-2020-000085>
- Green, E. C., Murphy, E. M., & Gryboski, K. (2020). The Health Belief Model. *The Wiley Encyclopedia of Health Psychology*, 2, 211–214. <https://doi.org/10.1002/9781119057840.ch68>
- Huber, B. C., Steffen, J., Schlichtiger, J., & Brunner, S. (2020). Altered nutrition behavior during COVID-19 pandemic lockdown in young adults. *European Journal of Nutrition*.

<https://doi.org/10.1007/s00394-020-02435-6>

Kemenkes RI. (2013). *Riset Kesehatan Dasar*.
<https://doi.org/10.1126/science.127.3309.1275>
Kemenkes RI. (2014). *Studi Diet Total : Survei Konsumsi Makanan Individu Indonesia 2014*.

In Ministry of Health Republic of Indonesia.

Kemenkes RI. (2018a). *Riskesdas*. In *Badan Penelitian dan Pengembangan Kesehatan*.
http://labdata.litbang.kemkes.go.id/images/download/laporan/RKD/2018/Laporan_Nasional_RKD2018_FINAL.pdf

Kemenkes RI. (2018b). *Tabel Komposisi Pangan Indonesia 2017*. Direktorat Gizi Masyarakat.

Kemenkes RI. (2020). *Panduan Gizi Seimbang COVID-19.pdf*. Direktorat Gizi Masyarakat.

Litton, M. M., & Beavers, A. W. (2021). The relationship between food security status and fruit and vegetable intake during the covid-19 pandemic. *Nutrients*, 13(3), 1–14.
<https://doi.org/10.3390/nu13030712>

Ngadiarti, I., Damayanti, D., & Budiman, J. A. (2020). Obese School Children Assessment During COVID-19 Pandemic. *Dokkyo Journal of Medical Sciences*, 4.

Utama, L. J., Yunianto, A. E., Shagti, I., Sine, J. G. L., Adi, A. A. A. M., Loaloka, M. S., & Nur, A. (2020). Impact of the COVID-19 epidemic on eating habits and lifestyle : An east nusa tenggara survey. *European Journal of Molecular and Clinical Medicine*, 7(10), 162–171.

WHO. (2020a). Considerations for school-related public health measures in the context of COVID-19. *World Health Organisation*, 2020, 1–10. <https://www.who.int/publications-detail/risk->

WHO. (2020b). *Coronavirus Disease 2019 (COVID-19) World Health Situation Report - 1*.
Vol.2019, WHO Indonesia Report.

Yılmaz, H. Ö., Aslan, R., & Unal, C. (2020). Effect of the COVID-19 pandemic on eating habits and food purchasing behaviors of university students. *Kesmas*, 15(3), 154–159.
<https://doi.org/10.21109/KESMAS.V15I3.3897>

THE ANALYSIS OF SERVICE QUALITY ON CUSTOMER SATISFACTION AT GORONTALO MEDIKA PHARMACY DURING THE COVID-19 PANDEMIC

Prisca Safriani Wicita, Zulfiayu, Vyani Kamba, Insyira Fadliana Basri
Pharmacy Department, Health Polytechnic of Gorontalo, Indonesia

Email: prisca_wicita@poltekkesgorontalo.ac.id

Abstract

Pharmacy is a business entity engaged in health services to the public. The large number of pharmacies causes business competition between pharmacies to get tighter both in terms of services and facilities in order to get the maximum number of customers. The current big challenge related to pharmaceutical services at pharmacies is the Corona Virus which has caused a health and socio-economic crisis. Apart from the Covid-19 problem, the pharmacy business must continue to run well, one them is determined by the consumer satisfaction factor. Customer satisfaction is determined by the quality of service. The research objective was to determine the attributes of all dimensions of service quality and choose which ones would be prioritized to improve services at Gorontalo Medika pharmacy. This study used a cross sectional method with purposive sampling of 30 customers who bought prescriptions and self-medication at Gorontalo Medika pharmacy. The instrument used was a questionnaire with 25 questions using a Likert scale. The level of customer satisfaction was measured using the SERVQUAL (Service Quality) model on 5 dimensions of service quality : tangible, reliability, responsiveness, assurance and empathy. The dimension that has the highest level of satisfaction is the dimension empathy; The attribute that has the highest level of satisfaction is the employees being friendly in serving customers. The dimension that needs improvement the most is the dimension responsiveness, this dimension has the lowest level of conformity between expectations and reality compared to other dimensions. Of all the dimensions of the attributes which become the main priority that need to be improved is the dimension, assurance namely the price given does not exceed the HET. The attributes that are mapped on the most Cartesian diagram are in quadrant IV which shows the service quality of Gorontalo Medika Pharmacy in providing special services.

Keywords: Service Quality, Customer Satisfaction, Gorontalo Medika, Covid-19

INTRODUCTION

Pharmacy is a pharmaceutical service facility where pharmacists practice pharmacy. In the current era of globalization, pharmacy competition is getting tougher coupled with deregulation of the establishment of pharmacies, high consumer demand for drugs, increasingly complex health problems and the large number of pharmacists are also the triggering factors for the increasing number of pharmacies. The large number of pharmacies causes business competition between pharmacies to be tighter both in terms of services and facilities in order to get the maximum number of customers (Kemenkes RI, 2017; Narendra, Skarayadi,

Duda, & Direstuti, 2017; Putri & Kautsar, 2018; Yulia, Baga, & Djohar, 2016).

Pharmaceutical service is a direct and responsible service to patients related to pharmaceutical preparations with the aim of achieving definite results to improve the quality of life of the patient. Pharmacy services at the pharmacy must be done as well as possible in order to maintain and improve public health. This is directly related to the shift of pharmaceutical service orientation from *drug oriented* to *patient oriented* with reference to *pharmaceutical*. Service activities that initially only focused on managing drugs as a commodity have turned into comprehensive services with the aim of improving the quality of life of patients (Helni, 2015; Ihsan, Rezky, & Akib, 2014; Kemenkes RI, 2016; Pratiwi et al., 2020; Putri & Kautsar, 2018). The current big challenge related to pharmaceutical services at pharmacies is the Corona Virus which has caused a health and socio-economic crisis. Corona Virus (nCoV), which is a group of viruses that infect the respiratory system, in most cases of corona virus only causes mild to moderate respiratory infections, such as flu, however, this virus can also cause severe respiratory infections, such as pneumonia, MiddleEast Respiratory Syndrome (MERS) and Severe Acute Respiratory Syndrome (SARS) (Karyono, Rohadin, & Indriyani, 2020; Kementerian Kesehatan RI, 2020).

The disease from the first laboratory confirmed case of 2019-nCoV infection was December 1, 2019 in Wuhan, China. The spread of the Corona virus is very fast even across countries. The spread of the Corona virus has spread to various parts of the world and one of them has a serious impact on Indonesia's health. Based on the spread, WHO declared Covid-19 an International Pandemic. for this reason, every country is required to take policy steps to prevent the wider spread of Covid-19 (Kusumo et al., 2020; Susilowati, 2020). The disease is transmitted through tiny droplets produced when coughing, sneezing or speaking. The infection is acute without any career status. Symptoms usually begin with a nonspecific syndrome, including fever, dry cough, and fatigue. Several systems may be involved, including respiratory (cough, shortness of breath, sore throat, rhinorrhea, hemoptysis, and chest pain), gastrointestinal (diarrhea, nausea, and vomiting), musculoskeletal (muscle pain), and neurological (headache or confusion) (Kusumo et al., 2020; Meilina, Dewi, & Nadia, 2020). Transmission can occur through asymptomatic patients or patients with early symptoms, so prevention of transmission is important for all customers and patients who come to the pharmacy. The big risks faced by this should not make pharmaceutical services in pharmacies decrease, especially pharmacies are included in the first line of community interaction with

pharmaceutical officers.

According to the Indonesian Ministry of Health (2016), to ensure the quality of pharmaceutical services in pharmacies, an evaluation of the quality of pharmaceutical services must be carried out. One of the determinants of the pharmacy business is the consumer satisfaction factor. Customer satisfaction is determined by the quality of service. The measure of customer satisfaction can be assessed if what consumers feel about a service is equal to or greater than their expectations. Customer expectations are beliefs about service delivery that serve as a standard in assessing performance. In fact, customers compare it with perceptions when assessing service quality, knowing consumer expectations is very important for marketers. Customers usually perceive service based on service quality and how much the product satisfies their desires compared to their overall experience (Kotler & Keller, 2009; Parasuraman, Zeithaml, & Berry, 1994; Yulia et al., 2016).

One important aspect that needs to be considered to maintain consistency of pharmaceutical services is by maintaining the attributes of each dimension of the quality of service provided to customers. Satisfaction is the level of feelings of a person (customer) after comparing the performance. Satisfaction of customers are feeling happy or disappointed someone who emerged after comparing the results of the product are considered the performance of the resulting (Helni, 2015; Kotler, Philip, & Kevin, 2007; Narendra et al., 2017; Putri & Kautsar, 2018). Some The benefits that can be obtained by creating customer satisfaction include harmonious relationship between the company and customers, can encourage the creation of customer loyalty, provide a good basis for repeat purchases, form word of mouth recommendations, increase profits. The positive effects that occur due to increased service quality and customer satisfaction are the occurrence of repeated purchases, loyalty, and positive word-of-mouth (Narendra et al., 2017; Samad, 2014; Tjiptono & Fandy., 2003).

Assessment of consumer satisfaction with pharmaceutical services in pharmacies is based on pharmaceutical standards in terms of clinical pharmacy services that directly interact with the community. The concept of measuring customer satisfaction has several kinds, including overall customer satisfaction, dimensions of patient satisfaction, and confirmation of expectations (Umar, 2003). The "SERVQUAL" model (Service Quality) is a model that is widely used to measure customer satisfaction by making a comprehensive customer satisfaction assessment for services in the field of goods and services that prioritize service

aspects. There are five dimensions of service quality that need to be considered, namely Reliability). Responsiveness (responsiveness) Assurance (assurance) Empaty (empathy) and Tangibles (direct evidence) Customer satisfaction analysis is carried out on five dimensions of service quality, which is often abbreviated as RATER. Assessment can be done at a pharmacy to see the performance of pharmaceutical services in pharmacies, especially during a pandemic like this time (Kotler & Keller, 2009; Narendra et al., 2017; Parasuraman et al., 1994). Gorontalo Medika Pharmacy is one of the pharmacies that carry out pharmaceutical services. This pharmacy is located on Jalan Musa Kaluku, Luwoo Village, Telaga District, Gorontalo District, Gorontalo Province. The Gorontalo Medika Pharmacy during the Covid-19 pandemic was quite busy because it was a pharmacy that was strategically located on the border of Luwoo village and opened a doctor practice.

This study is intended to describe the level of customer satisfaction at Gorontalo Medika Pharmacy, especially for the attributes that need attention so that it can be improved so that it affects the level of customer satisfaction as a benchmark for improving service at the pharmacy.

METHOD

The research design used inferential descriptive statistical method with a single cross sectional study approach, in which respondents were given a questionnaire which contains 25 statement items that summarize the five dimensions of service quality along with the respondent's agreement scale in numerical value or Likert scale.

Populations and Samples

The population of this study were all customers who came to Gorontalo Medika Pharmacy. Samples or respondents were divided into inclusion criteria and exclusion criteria. The inclusion criteria are customers over 17 years of age, customers who have visited more than once to Gorontalo Medika pharmacy, and customers who redeem prescriptions at Gorontalo Medika. The exclusion criteria are customers who are under 17 years of age. Based on the Slovin formula to calculate the minimum sample size, the results obtained from 30 patients for the study for 2 days.

Data processing

This study used 2 parts of the questionnaire instrument consisting of a preliminary questionnaire containing statements about the characteristics of the respondents and a questionnaire regarding the expectations (expectations) and respondents' perceptions of the services received. The measuring instrument used is the SERVQUAL instrument in the form of a questionnaire on a Likert scale adopted from (Parasuraman et al., 1994).

Data Analysis

Questionnaire results are interpreted in a Cartesian diagram which is one of the methods used to measure customer satisfaction by comparing levels of expectation. with the performance perceived by the customer. The Cartesian diagram is divided into four quadrants, each quadrant occupies a priority level for updating, if ordered from the highest priority level to be updated, the order is quadrant I, quadrant III, quadrant IV, and quadrant II (quadrant I: need to be improved ;quadrant II: need to be maintained ;quadrant III: not a consideration for the customer ;quadrant IV: considered insignificant by the customer, however, get special service) (Caruana, 2002; Putri & Kautsar, 2018).

RESULTS

Based on the research that has been carried out, there are 30 customers of Gorontalo Medika Pharmacy who meet the inclusion criteria. The data in this study were obtained through filling out questionnaires by customers while waiting for prescription services and those who came self-medicated at Gorontalo Medika pharmacy. The score on each question in each dimension can then be analyzed using a Cartesian diagram so that there are quadrants IV, each of which shows the level of *urgency* for improvement.

Customer Demographics

Table 1. Customer Demographics

Demographics	Total	Percentage
Age		
17-25	8	27%
26-35	6	20%
36-45	10	33%
46-55	3	10%
56-65	3	10%
>65	0	0%
Gender		
Male	12	40%
Female	18	60%
Last Education		
No School	1	3%
Elementary School	0	0%
Junior High School	3	10%
Senior High School	7	23%
College	19	63%
Job		
Not Working	1	3%
Student	6	20%
Housewife	7	23%
Self-employed	5	17%
Private Employees	4	13%
Civil Servants	7	23%
Income		
< Rp. 1million	12	40%
Rp. 1-3 million	13	43%
> Rp. 3 million	5	17%
Reason for choosing Gorontalo Medika Pharmacy		
Close to Home	10	33%
Good Service	10	33%
Complete Medicine	5	17%
Friend's recommendation	3	10%
Medicine is not available at another pharmacy	2	7%
Appointed by an agency	0	0%
Distance		
< 1 KM	10	33%
1 - 2 KM	13	43%
2 - 5 KM	7	23%
> 5 KM	0	0%
Vehicle		
Private Car	4	13%
Motorcycle	16	53%
Walking	10	33%

Table 2. Recapitulation of Expectation and Reality Score Average

No	Pertanyaan	Expectations	Reality
<i>Responsiveness</i>			
1	Employees give <i>greetings</i> when customers arrive	4.18	4.12
2	Employees are fast in serving customers	4.25	4.04
3	Employees remind customers to wash their hands before entering the pharmacy	3.88	3.61
4	Employees remind to use masks	4.04	3.96
5	Employees quickly direct customers to the desired product	4.31	4.16
Average		4.13	3.98
<i>Assurance</i>			
6	The original drugs	4.55	4.37
7	The drugs given do not expire	4.53	4.37
8	The price given does not exceed the HET (highest retail price)	4.47	3.92
9	Drug information services are carried out by pharmacists	4.43	4.04
10	Pharmacists ensure that information about drugs is understood by customers	4.37	4.06
Average		4.47	4.15
<i>Tangible</i>			
11	Adequate parking area	3.98	3.67
12	Pharmacy has sufficient lighting	4.22	4.12
13	The layout of goods / medicines regularly	4.33	4.10
14	Employees wear neat clothes and masks	4.29	4.16
15	Pharmacy waiting rooms are clean and apply health protocols	4.31	4.00
Average		4.23	4.01
<i>Emphaty</i>			
16	Employees are friendly in serving customers	4.45	4.33
17	Employees say "thank you" when customers have finished getting service	4.18	4.27
18	Employees do not discriminate between customers in service	4.35	4.31
19	Employees always ask about complaints or symptoms that are suffered	4.35	4.10
20	Employees can provide solutions if drugs are not available	4.39	4.16
Average		4.35	4.24
<i>Reability</i>			
21	Employees provide drug choices to self-medicated customers (self-medication)	4.31	4.10
22	Pharmacists provide drug information in easy-to-understand language	4.27	4.04
23	Pharmacists answer all customer questions related to drugs given	4.20	4.14
24	Pharmacists provide explanationslifestyles for healthyto support treatment outcomes	4.12	3.78
25	Pharmacists provide solutions if there are complaints about the drugs given	4.29	4.00
Average		4.24	4.01

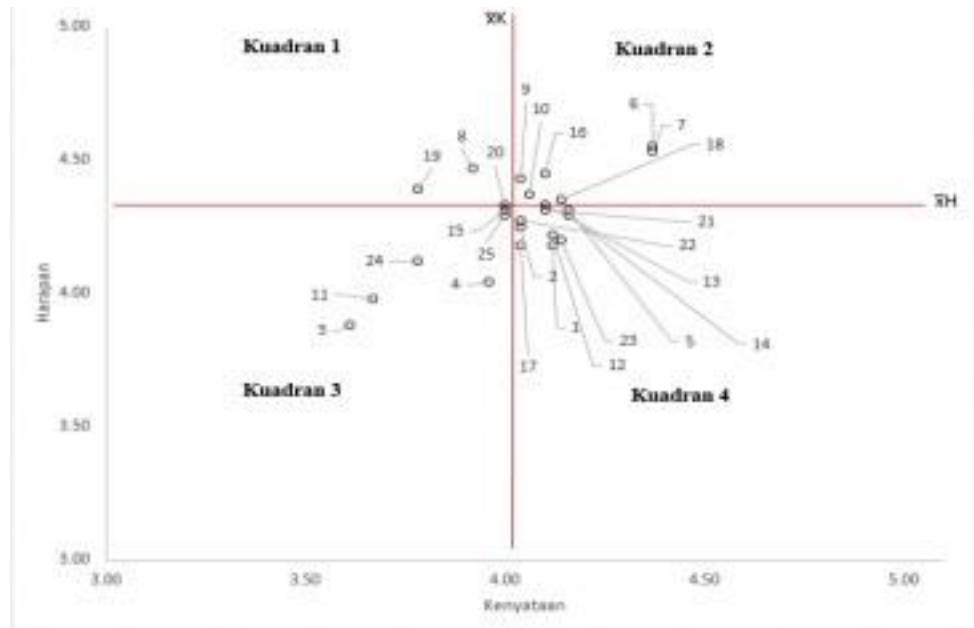


Figure 1. Cartesian Diagram for All Attributes

DISCUSSION

Based on the results of the demographic recapitulation of respondents, the characteristics of customers who are respondents can be seen in Table 1. Table 1 shows that most of the customers who visit the Gorontalo Medika Pharmacy are 36-45 years old with a percentage of 33% where some large female with a percentage of 60%. Based on the level of education, it is known that Gorontalo Medika pharmacy customers are mostly college graduates with a percentage of 63%, the average customer occupation is civil servants and housewives (IRT) with a percentage of 23%. Customer income per month is around Rp. 1,000,000 - Rp. 3,000,000. In the survey it was also known that the reason customers chose Gorontalo Medika pharmacy because it was close to home and had good service with a percentage of 33%. The distance between the customer from the Gorontalo Medika pharmacy is 1-2 KM (43%). Most of the customers included in this study used private motorbikes, namely as many as 16 customers (53%).

Based on the results of a survey with a questionnaire filled out by 30 customers of Gorontalo Medika pharmacy, the score of expectation and reality for each question attribute is obtained. Then from each score of expectations and the reality of each attribute, the average is calculated as a whole and in each dimension. The average expectation for all dimensions is 4.28 and the average reality for all dimensions is 4.03. Furthermore, the calculation of the average

expectations and reality for each dimension is carried out. In the dimension *responsiveness*, the average expectation is 4.13 and the reality is 3.98, the dimension is *assurance* 4.47 and the reality is 4.15, the average expectation is 4.23 and the reality is 4.01, *empathy* is the average expectation of 4.35 and the reality is 4.24, and for the dimension *reliability*, the average expectation is 4.24 and 4.01. The results of the recap of the scores per attribute for each dimension can be seen in table 2.

After obtaining the average of all dimensions, the analysis is carried out using a Cartesian diagram. In the Cartesian diagram there are 4 quadrants where the four quadrants are divided based on the average of overall expectations and reality. Quadrant I show that these attributes have a high priority for improvement. In quadrant I, the attributes included in it are numbers 8, 19, and 20. Quadrant II shows that these attributes need to be maintained. In quadrant II the attributes included in it are numbers 6, 7, 9, 10, 16, and 18. Quadrant III shows that these attributes have a low priority for improvement. In quadrant III, the attributes included in it are numbers 3, 4, 11, 15, 24, and 25. Meanwhile, quadrant IV shows that these attributes are overestimated. In quadrant IV, the attributes included in it are numbers 1, 2, 5, 12, 13, 14, 17, 21, 22, and 23. So that based on the analysis obtained, the attributes that have priority to be improved are the price given does not exceed the HET (highest retail price) (the dimension *assurance*), employees always ask about complaints or symptoms suffered (dimension *empathy*), and employees can provide solutions if the drug is not available (dimension *empathy*). After obtaining the analysis for each attribute as a whole dimension, re- analysis is carried out using a Cartesian diagram for each dimension.

In the dimension, *responsiveness* there are no attributes that occupy quadrant I, quadrant II is occupied by attributes number 1, 2, and 5, quadrant III is occupied by attributes number 3 and 4, and there are no attributes that occupy quadrant IV. So that the attributes of the dimension *responsiveness* that have a priority to be fixed do not exist and that might be a consideration for improvement are employees reminding customers to wash their hands before entering a pharmacy and employees reminding them to use masks (Quadrant III). This attribute is often overlooked because pharmacies are busy so that when a customer buys medicine, employees are busy serving prescriptions or serving other customers who are asking for medicine. This often happens, considering that the employees at Gorontalo Medika pharmacy are still limited.

In the dimension, the *assurance* attributes that occupy the quadrant number 3, quadrant II are

occupied by attributes number 1, and 2, and quadrant III are occupied by attributes number 4 and 5. So that attribute with priority to be improved from the dimension *assurance* is the attribute "drug price is not exceeds the highest retail price (HET) and Drug Information Services carried out by Pharmacists and Pharmacists ensure that information about drugs is understood by customers "are included in low priority for repair. In the attribute "the price given does not exceed the HET (highest retail price)" it is difficult to do at this time because the price of drugs / medical equipment / BMHP in pharmacies is already in accordance with the considerations and calculations. So to overcome this, you may have to make some promos / discounts.

In the dimension, *tangible* there are no attributes that occupy quadrant I and quadrant IV, quadrant II is occupied by attribute numbers 2, 3, 4 and 5, quadrant III is occupied by attribute number 1. So that the attributes of the dimensions *tangible* that have priority to be fixed do not exist, and can be considered to improve the attributes in quadrant III, namely the layout of drugs / ordered goods.

In the dimension, the *empathy* attributes that occupy quadrant I, namely numbers 4 and 5, quadrant II are occupied by attributes number 1 and 3, quadrant III does not exist, and those that occupy quadrant IV are attribute number 2. So that the attributes of the dimension *empathy* have priority for corrected, that is, employees always ask about complaints or symptoms and employees can provide solutions if drugs are not available. The attribute "employees always ask for complaints or symptoms suffered" is included in the priority for improvement because it is possible that not all employees will ask for complaints from patients/ customers if the pharmacy is busy, so employees will immediately ask the patient / customer to buy or need what medicine without asking first the complaint. This should be a concern because our role as pharmacists must know and adjust the use of drugs with complaints to support implementation *patient-oriented*, so that patient safety in using drugs must be guaranteed. In the attribute "employees are able to provide a solution if the requested drug is not available" is included in the priority for improvement, but sometimes not all drugs that customers want that are not available pharmacies have supplies for replacements. This is even more so if the medicine requested is a combination medicine with a dose that no other product is like. However, if the medicine is requested for an empty stock at a Gorontalo Medika pharmacy, the employee will provide information on the nearest pharmacy. Based on research Putri & Kautsar (2018), the solutions offered are such as asking whether the customer's condition has contraindications to a drug, if any, Pharmacy employees must provide other safer alternatives for customer

consumption. In addition, Pharmacy employees must inform if there is no improvement in treatment and the complaint is getting worse, immediately visit the doctor for a consultation (Putri & Kautsar, 2018).

In the dimension *reability* attribute that occupies quadrant I, namely number 5 quadrant II is occupied by attributes number 1 and 2, quadrant III is occupied by attribute number 4, and attributes that occupy quadrant IV are number 3. So that the attributes of the dimension *reliability* have priority for repaired, namely the pharmacist provides a solution if there is a complaint on the drug given. This attribute is actually often done in Gorontalo Medika pharmacies, for example, patients complain of side effects, so pharmacists at Gorontalo Medika pharmacies will offer drugs that can reduce these complaints, if the patient complains that the drugs used have not had an effect the pharmacist will also provide further explanation regarding drug use and non-pharmacological therapy required by the patient / customer. If what is complained about is damage to the drug, the pharmacy cannot immediately replace it because it must be asked further about drug storage by the patient / customer. If it is purely the patient's / customer's fault, the pharmacy is not yet responsible for it. Customer satisfaction is influenced by information conveyed by pharmacists, language that is easily understood by customers, and friendliness in serving customers (Delladari, Auzal Halim, & Rahim, 2015; Putri & Kautsar, 2018).

CONCLUSION

The dimension with the highest level of satisfaction is the dimension *empathy*; The attribute that has the highest level of satisfaction is the employees being friendly in serving customers. The dimension that needs improvement the most is the dimension *responsiveness*, this dimension has the lowest level of conformity between expectations and reality compared to other dimensions. Of all the dimensions of the attributes that become the main priority that need to be improved is the dimension, *assurance* namely the price given does not exceed the HET (highest retail price). The attributes that are mapped on the most Cartesian diagram are in quadrant IV which shows the quality of services of the Gorontalo Medika Pharmacy providing special services. This shows that pharmaceutical services at Gorontalo Medika pharmacies continue to operate properly during the Covid-19 pandemic.

REFERENCES

- Caruana, A. (2002). Service Loyalty The Effects of Service Quality and The Mediating Role of Customer Satisfaction. *European Journal of Marketing*.
- Delladari, M., Auzal Halim, R., & Rahim. (2015). Pengaruh Kualitas Pelayanan Informasi Obat Kepuasan Pasien Apotek X Kota Padang. *Jurnal Ilmu Kefarmasian Indonesia*, 13(2), 201–204.
- Helni. (2015). Tingkat Kepuasan Pasien Terhadap Pelayanan Apotek Di Kota Jambi. *Jurnal Penelitian Universitas Jambi Seri Humaniora Informasi*, 17(51), 01–08.
- Ihsan, S., Rezky, R., & Akib, N. (2014). Evaluasi mutu pelayanan di apotek komunitas kota kendari berdasarkan standar pelayanan kefarmasian. *Jurnal Farmasi Dan Ilmu Kefarmasian Indonesia*, 1(2), 30–35.
- Karyono, K., Rohadin, R., & Indriyani, D. (2020). Penanganan Dan Pencegahan Pandemi Wabah Virus Corona (Covid-19) Kabupaten Indramayu. *Jurnal Kolaborasi Resolusi Konflik*, 2(2), 164. <https://doi.org/10.24198/jkrk.v2i2.29127>
- Kemenkes RI. (2016). *Peraturan Menteri Kesehatan Republik Indonesia No 73 Tahun 2016 Tentang Standar Pelayanan Kefarmasian di Apotek*. Menteri Kesehatan Republik Indonesia.
- Kemenkes RI. (2017). *Peraturan Menteri Kesehatan Republik Indonesia No 9 Tahun 2017 Tentang Apotek*. Kementerian Kesehatan RI. (2020). *Tentang Corona Virus disease (Covid-19)*.
- Kotler, P., & Keller, K. (2009). *Marketing Management, 12th edition*. Prentice Hall: New Jersey.
- Kotler, Philip, & Kevin, L. K. (2007). *Manajemen Pemasaran, Edisi Kedua Belas, Jilid 1* (B. Molan, Ed.). Jakarta: PT Indeks.
- Kusumo, A. R., Wiyoga, F. Y., Perdana, H. P., Khairunnisa, I., Suhandi, R. I., & Prastika, S. S. (2020). Jamu Tradisional Indonesia: Tingkatkan Imunitas Tubuh Secara Alami Selama Pandemi. *Jurnal Layanan Masyarakat*, 4(2), 1–7.
- Meilina, R., Dewi, R., & Nadia, P. (2020). *Sosialisasi Pemanfaatan Tanaman Obat Keluarga (Toga) Untuk Meningkatkan Imun Tubuh Di Masa Pandemi Covid-19 Socialization Of The Utilization Of Medicinal Plants To Improve Body Immune In The Pandemic Covid-19*. 2(2), 89–94.
- Narendra, M., Skarayadi, O., Duda, M., & Direstuti, P. (2017). Analisis Tingkat Kepuasan Pelanggan Terhadap Pelayanan Di Apotek Kimia Farma Gatot Subroto Bandung. *Jurnal Ilmiah Farmasi*, 5(1), 31–37.
- Parasuraman, A., Zeithaml, A., & Berry, L. L. (1994). Reassessment of Expectation as a Comparison Standart in Measuring Service Quality; Implications for Further Research. *Journal Marketing*, 58, 111–124.
- Pratiwi, H., Mustikaningtias, I., Widyartika, F. R., Setiawan, D., Nasrudin, K., & Julietta, L. (2020). Analisis Persepsi Masyarakat Terhadap Peran Apoteker Pada Layanan Kefarmasian Di Apotek Kecamatan Sokaraja, Baturraden, Sumbang, Dan Kedungbanteng. *JPSCR: Journal of Pharmaceutical Science and Clinical Research*, 5(1), 33. <https://doi.org/10.20961/jpscr.v5i1.39273>

- Putri, I. U., & Kautsar, A. P. (2018). Analisis Kepuasan Pelanggan Apotek “X” Di Bandung. *Farmaka*, 16(1997), 195–204.
- Samad, A. (2014). Examining the impact of perceived service quality dimensions on repurchase intentions and word of mouth: a case from software industry of Pakistan. *IOSR Journal of Business and Management*, 16(1), 37–41.
- Susilowati, N. (2020). Produktivitas jamu pada masyarakat argomulyo di masa pandemi. *Jurnal Ekonomi Dan Pendidikan*, 17(2), 60–69.
- Tjiptono, & Fandy. (2003). *Total Quality Service*. Yogyakarta: Andy Offset. Umar. (2003). *Metode Riset Perilaku Konsumen Jasa*. Jakarta: Ghalia Indonesia.
- Yulia, P. R., Baga, L. M., & Djohar, S. (2016). Kepuasan Konsumen Terhadap Pelayanan Apotek Dan Tingkat Pengetahuan Konsumen Mengenai Standar Pelayanan Kefarmasian Yang Berlaku (Studi Kasus Di Kota Depok). 2(3), 312–322. <https://doi.org/10.17358/JABM.2.3.312>

EFFECTIVENESS OF COMMUNICATION, INFORMATION AND EDUCATION IN COMPLIANCE THE USE OF ANTIBIOTICS IN PANGKALPINANG CITY

Rachmawati Felani Djuria, Syamsul Rizal Sinulingga
Pharmacy Department Health Polytechnic of the Ministry of Health
Pangkalpinang, Indonesia

E-mail: felandj87@gmail.com

Abstract

Various studies have found that about 40-62% of antibiotics are used inappropriately, among other things, for diseases that do not require antibiotics. In the study of the quality of antibiotic use in various parts of the hospital, it was found that 30% to 80% were not based on indications. The results of several studies indicate that the public needs information related to drugs from a reliable source, namely pharmaceutical personnel. The use of antibiotics in Pangkalpinang City with details of respondents who obeyed the use of antibiotics were only 46 respondents (11.5%) and those who did not comply were 354 respondents (88.5%). Method: The research design used was a quasi-experimental quantitative approach using pre-post-test only control group design. The community was measured adherence to the use of antibiotics both before and after the Communication, Information and Education training was carried out for pharmaceutical personnel. The research will be conducted in Pangkalpinang City in January-December 2020. This study used a sample of 400 people with accidental sampling technique and analyzed by univariate and bivariate analysis using t dependent and independent t test. Results: Adherence to antibiotic use by patients who were prescribed antibiotics in the working area of Pangkalpinang City Health Centers was in the low adherence category with an average of 5.39. In the intervention group there was significant difference in adherence to the use of antibiotics by patients after Communication, Information and Education training with a p value of 0.000. Conclusion: this study is that audiovisual Communication, Information and Education training on antibiotics is effective in increasing patient adherence to antibiotic use.

Keywords: *Communication, Information and Education, Antibiotic, Compliance*

INTRODUCTION

One of the drugs that is often used to treat infection problems is antibiotics. Various studies have found that about 40-62% of antibiotics are used inappropriately, among others, for diseases that do not need antibiotics (Hadi, et al, 2009). Based on the fact of more than 200 studies show that 50% of patients use the wrong drug and 50% of geriatric patients fail to adhere. Outpatients also showed that 48% of the community did not comply with the drug therapy regimen, 32% of patients did not take refill drugs and 20% of patients would use drugs in ways that were detrimental to their health. Recent literature shows that 5.5% of patients are hospitalized due to non-compliance with medication. FDA data also shows that since 1969,

there have been 400,000 adverse drug reactions (ADR) and 20% have been hospitalized or died (Ristiawati, 2019).

In order to achieve optimal public health status, various efforts must be made. According to the Indonesian Ministry of Health (2005), health efforts are carried out with the approach of maintenance, health improvement (promotive), disease prevention (preventive), disease healing (curative) and health recovery (rehabilitative) which are carried out comprehensively, integrated and continuously between the government and the community. One form of the Indonesian government's responsibility for efforts to control antibiotic resistance is to issue a Regulation of the Minister of Health of the Republic of Indonesia Number 2406 / MENKES/ PER / XII / 2011 concerning General Guidelines for the Use of Antibiotics. This regulation is made to optimize the prudent use of antibiotics. It is hoped that the General Guidelines for the Use of Antibiotics can be used as a national reference in formulating antibiotic policies and guidelines for hospitals and other health service facilities, both government and private (Indonesian Ministry of Health, 2011).

Knowledge about antibiotics is very important given to the community. Therefore, health workers, especially pharmaceutical workers, must work hard to increase public knowledge regarding the proper and correct use of antibiotics by implementing communication, information and education in every clinical pharmacy service activity. Djuria and Syamsul's research (2018) shows that the implementation of drug information services at Pangkalpinang City Health Centers is effective both for groups who only get drug information during prescription services and are accompanied by the provision of leaflets and wall magazines. However, there are significant differences in the gap / respondent satisfaction in the implementation of the drug information service dimensions of tangible, reliability and empathy in the intervention group. In the control group only tangible and empathy dimensions. Dewanti, Retnosari and Sudibyo's research (2015), also showed that counseling and leaflet distribution were equally effective in increasing self-efficacy and medication adherence, as well as reducing blood pressure in hypertensive patients at the Depok City Health Center. Kurniapuri and Woro (2015) also showed the same thing, namely that the provision of information on antihypertensive drugs had a significant effect on the compliance of hypertensive patients at the Umbulharjo I Yogyakarta Health Center. A similar study was also conducted by Tumiwa, Paulina and Gayatri (2015), which showed that as many as 96% of patients were adherent to treatment. Whereas PIO which is held at general teaching hospital Prof. Dr. R. D. Gandou

Manado is only passive in nature, namely providing drug information at the time of prescription service or when the patient / family asks questions. However, research by Ariani and Aditya (2016), shows that the provision of drug information by pharmaceutical personnel is not the only factor that affects medication adherence. Other factors that influence non-adherence to taking antibiotics are beliefs, attitudes and personality of patients, understanding of instructions and the quality of interactions between patients and health professionals.

The government has made various efforts to improve health in the community. One of the health information media used is public service advertisements. The influence of public service advertisements in general can increase knowledge and provide information to the public, while in particular it can affect the community so that there is a positive desire to follow what is implied in the advertisement. Djuria and Lana's (2019) research shows that public service advertisements about antibiotics are effective in improving antibiotic use. The use of antibiotics in Pangkalpinang City with details of respondents who obeyed the use of antibiotics were only 46 respondents (11.5%) and those who did not comply were 354 respondents (88.5%). The most widely used antibiotic was amoxicillin, namely 398 respondents (99.5%). Other antibiotics that have been used are clindamycin, chloramphenicol, metronidazole, ciprofloxacin, ampiclox and tetracyclines.

The results of some of the above studies indicate that the community needs communication, information and education from reliable sources, namely pharmaceutical personnel in terms of drug adherence, especially drugs that must not be arbitrarily used by several methods both visually and audiovisually. Therefore, it is necessary to conduct research on the implementation of communication, information and education in compliance with the use of antibiotics in Pangkalpinang City to obtain a permanent procedure that can be applied in reducing the number of antibiotic resistances.

METHODS

The research design used was a quasi-experimental quantitative approach using pre-post-test only control group design. The community was measured adherence to the use of antibiotics both before and after the Communication, Information And Education training was carried out for pharmaceutical personnel. The research will be conducted in Pangkalpinang City in January-December 2020. This study used a sample of 400 people with accidental sampling technique and analyzed by univariate and bivariate analysis using t dependent and independent

t test. The research data consisted of 2 types, namely primary and secondary data. Primary data is in the form of data obtained by researchers directly from the field and processed by researchers. Secondary data is data obtained from the Pangkalpinang City Health Office and Pangkalpinang City Health Center. Primary data collection uses a research instrument in the form of a questionnaire. The questionnaire contains eight indicators MMAS. Before taking primary data, the validity and reliability were tested at the Pangkalan Baru Health Center. Respondents also read consent after explanation form and then filled out the informed consent. There are two variables in this study, namely the independent variable (compliance use of antibiotic) and the dependent variable (Communication, Information and Education). This study has received ethical approval from the health research ethics committee of The Health Research Polytechnic of The Ministry of Health, Pangkalpinang.

RESULTS

The results showed that the measurement of adherence in the pre and post test in all groups increased with a significance value of p value also 0.000. This means that there is a significant difference in adherence to antibiotic use before and after the Information Communication and Education training. The highest average value of adherence in the control group in the post test measurement was 5.93, but all groups were still in the low adherence category.

In the measurement of pre-test compliance, there was no significant difference with a p value of 0.145 in the control and intervention groups. There is a significant difference in the measurement of the post test with a p value of 0.000 in the control and intervention groups. Based on pre-test measurement, the most patients were not compliant (70.5%) because when they traveled / left the house, sometimes patients forgot to bring antibiotics. In the post test measurement, the most patients were not adherent (52%) because patients often had difficulty remembering the use of antibiotics.

Table 1. Description of Research Respondents' Compliance Regarding the Implementation of Communication, Information and Education (IEC) in Compliance with the Use of Antibiotics in Pangkalpinang City in 2020

Pengukuran	Nilai Rata-Rata				Sig (2-tailed)
	Pre Test	Kategori	Post Test	Kategori	
Kelompok Intervensi	3,78	Rendah	4,85	Rendah	0,000
Kelompok Kontrol	3,32	Rendah	5,93	Rendah	0,000
Sig (2 tailed)	0,145		0,000		

DISCUSSION

The results showed that audiovisual communication, information and education training for pharmaceutical personnel could increase patient compliance in using antibiotics. This shows that communication, information and education by pharmaceutical personnel is effective in patient adherence to antibiotic use. In the measurement of pre and post test knowledge in the intervention group there was a decrease, but the significance value of p value 0.069 means that there is no significant difference in knowledge even though there is a decrease. The results of this study are different from the research by Timorini (2020) which shows a simultaneous effect on the intervention group between the 2015 version of the MTBM training on knowledge, attitudes, motivation and compliance of midwife neonatal visits in Tegal Regency with the results of Manova analysis showing a significance value of less than 0,05 ($p = 0.000$). However, the results of this study are supported by Latifiana (2007), which states that of the seven factors studied, age, education, knowledge, perceptions, attitudes, information and references, it turns out that only age has no effect on patient adherence to antibiotic use. oral according to a doctor's prescription. Information provided by pharmaceutical personnel during the implementation of Communication, Information and Education provides increased patient adherence to antibiotic use.

Yuniar, Handayani and Aryastami (2013) also stated that one of the external factors in adherence to the use of HIV AIDS drugs is the role of families, peer groups, NGOs and health workers as well as improving access, affordability and community education. In addition, Pratiwi and Perwitasari (2017) stated that the compliance of hypertensive patients in using hypertension drugs is influenced by the level of patient knowledge about hypertension and the role of health workers. However, it is different from the results of Tamayanti, Windrianita and Dian (2016) which state that there is no relationship between age, type, income, duration and pattern of antibiotic use, information on antibiotics, complaints and actions after antibiotic side effects are observed on patient compliance in taking antibiotics. except the pattern of antibiotic use in Pharmacy B with a significance value of p value 0.011.

There is an increase in patient compliance in using antibiotics because all training participants are pharmaceutical personnel at the Pangkalpinang City Health Center and all highly educated pharmaceutical personnel (at least Third Diploma of Pharmacy). This shows that the pharmacy staff at the Pangkalpinang City Health Center are competent people. Pharmacy personnel are pharmacists and pharmaceutical technical personnel who carry out obligations in

pharmaceutical services. Pharmaceutical services are integrated activities with the aim of identifying, preventing and resolving drug problems and health-related problems. Pharmaceutical personnel are demanded by patients and the community in improving the quality of pharmaceutical services which requires an expansion from the old product-oriented paradigm to a new patient-oriented paradigm with the philosophy of pharmaceutical care (Ministry of Health, 2016).

In the comparison of the pre-test adherence measurement there was no significant difference with a p value of 0.145 in the control and intervention groups. However, there was a significant difference in the post-test measurement with a p value of 0.000 in the control and intervention groups. In the table it can also be seen that the value of adherence is better in the control group than in the intervention group. This result may be influenced by even though the training was included only by pharmaceutical personnel from 5 health center, the training material was known to all pharmaceutical personnel in all health center in Pangkalpinang City. This is supported by the information obtained by researchers from several pharmaceutical personnel who were included in the control group who stated that they knew the training material from the Communication, Information and Education training participants (intervention group). The control group pharmacy staff also knew the results of the description of the patient's knowledge and adherence to the use of antibiotics, thus influencing their performance to improve.

In this study, it shows that IEC training is effective in increasing adherence to antibiotic use. This may be because the trainees carry out the technical procedure that the patient is asked to repeat so that the patient understands the use of antibiotics. This factor can be seen from the results of pre-test measurements that most patients did not comply (70.5%) because when they traveled / left the house, sometimes patients forgot to bring antibiotics. In the post test measurement, the most patients were not adherent (52%) because patients often had difficulty remembering the use of antibiotics. This is supported by the most adult respondents, namely 144 respondents (72%) in the pre-test measurement and the most respondents in the post-test measurement, which are also adults, namely 139 respondents (69.5%). Some deterioration in memory occurs during middle adulthood (40-60 years), although strategies can be used to reduce this deterioration. The deficiency is greater in long-term memory than in short-term memory. A bigger setback occurs when the information obtained is new or when the information currently received is not frequently used, and when the recall process is used

instead of the recognition process. Poor health and negative attitudes are associated with memory deterioration.

According to Ley and Spelman in Crofton (2002), more than 60% of respondents interviewed after meeting a doctor misunderstood the instructions given to him. Sometimes this is caused by a professional failure to provide complete information, use medical terms and provide many instructions that the patient should remember. Based on the results of observations of the drug information service, all pharmaceutical personnel at the health center did not provide complete information based on the 2016 Pharmaceutical Service Standards at the National Health Center, which consisted of drug names, preparations, dosages, methods of use, storage, indications, contraindications, stability, side effects, interactions and others. This may also be due to the condition of Covid-19 which causes the drug information provided to be incomplete. At the time of data collection, several health centers closed services because there were patients who were dishonest, causing a positive incident of Covid-19 among health center employees. In addition, several health center are also preparing for re-accreditation so that the focus of the work is divided on the administration which needs to be prepared in the field assessment later.

The information most often provided is the method and the rules of use. Therefore, at the time of the pre-test measurement, the patient was most correct in the group questions in question 12 and the order of the two was the way of using rules (most of all the questions on how to use the rules were correct). In the post-test measurement the patient was also the most correct about the methods and rules of use (most of all the questions on how to use the rules were correct). The class of drugs mentioned is the antibiotic class. All patients were aware that they were prescribed antibiotics. The increase in the capacity of pharmaceutical workers is also influenced by the age factor of the pharmaceutical personnel. This can be seen from all adult pharmaceutical workers (100%). At old age, the memory factor greatly affects a person's knowledge (Notoatmodjo, 2010). Hurclock in Wawan and Dwei (2010), also explained that the more old you are, the level of maturity and strength of a person will be more mature in thinking and working.

According to Nursalam (2003), education is the guidance that a person gives towards the development of others towards certain ideals that determine humans to act and fill life to achieve safety and happiness. Education is needed to get information, for example things that support health so that it can improve the quality of life. In general, the higher a person's

education, the easier it is to receive information. Therefore, it is easy for pharmaceutical personnel to remember in increasing knowledge so that they can change their behavior.

CONCLUSION

Conclusion this research is audiovisual Communication, Information and Education training about antibiotics is effective in increasing patient adherence to antibiotics.

REFERENCES

- Ariani N and Aditya M. (2016). The Relationship between Drug Information Providing and Compliance with Antibiotic Medication in Outpatients at Health Center Adolescents Samarinda. *Proceedings of National Working Meeting and Annual Scientific Meeting of the Indonesian Pharmacists Association* 2016.e-ISSN: 2541-0474.
- Dewanti, S.W, Retnosari, A and Sudibyo S. (2015). The Effect of Counseling and Leaflets on Self-Efficacy, Compliance with Medication and Blood Pressure of Hypertension Patients in Two Public Health Centers in Depok City. Research Articles. *Indonesian Pharmaceutical Journal* Vol 5 No 1 Feb. 2015: 33-40.
- Djuria, R.F dan Sari, L. (2019). The Effectiveness of Public Service Advertisements on the Use of Antibiotics in Pangkalpinang City. *Research Report*. Department of Pharmacy, Polytechnic of Health, Ministry of Health, Pangkalpinang. Pangkalpinang.
- Djuria, R.F and Sinulinggal, SR. (2018). The Effectiveness of the Implementation of Drug Information Services in Pangkalpinang City Health Centers. *Research Report*. Department of Pharmacy, Polytechnic of Health, Ministry of Health, Pangkalpinang. Pangkalpinang.
- .Hadi, U., Duerink, D.O., Lestari, E.S., Nagelkerke, N.J., Keuter, M., Veld, D.H. I., et al. (2009). Audit Of Antibiotic Prescribing in Two Governmental Teaching Hospitals in Indonesia. *Journal Compilation 2008 European Society of Clinical Microbiology and Infectious Diseases*. CMI, 14: 698–707. <https://doi.org/10.1111/j.1469-0691.2008.02014.x>
- Indonesian Ministry of Health. (2005). Technical Guidelines for Implementation of Pharmaceutical Service Standards in Pharmacy (Decree No 1027 / MENKES / SK / IX / 2004). Directorate of Community and Clinical Pharmacy Development. Directorate General of Pharmaceutical and Medical Devices Services, Ministry of Health, Republic of Indonesia. Jakarta.
- Indonesia Ministry of Health. (2016). Kemenkes RI. 2016. Minister of Health Regulation No. 74 of 2016 concerning Standard of Pharmaceutical Services at Health Center. Ministry of Health of the Republic of Indonesia. Jakarta.
- Latifiana U. (2007). Factors Influencing Patient Adherence to the Use of Oral Antibiotics according to a Doctor's Prescription (Study at Kima Farma 45 Pharmacy, Surabaya). Thesis Thesis. Airlangga University. Surabaya
- .Ristiawati, N. (2019). Core Competency Training Materials for Lecturers on Communication, Information and Patient Education. Bali Health Training Center. Bali.
- Tamayanti, W.D, Windrianita dan Dian. (2016). Use of Antibiotics in Two Pharmacies in Surabaya: Identification of Factors Affecting Patient Compliance. *Pharmaciana* Vol 6 No 2, November 2016 Pg 155-162. <http://journal.uad.ac.id/index.php/PHARMACIANA>

- Timorini, Y.A. (2020). The Influence of the 2015 Version of Integrated Management Training for Young Infants on Knowledge, Attitudes, Motivation and Compliance with Midwife Neonatal Visits in Tegal District. *Masters Thesis*. Semarang State University, Semarang.
- Yuniar, Y; Handayani dan Aryastami, N.K.(2013). Supporting Factors for Compliance of People With HIV AIDS (PLWHA) in Taking Antiretroviral Drugs in Bandung and Cimahi. *Medicine Bulletin of Health Research*.

FORMULATION AND EVALUATION OF ANTIOXIDANT CREAM AVAILABILITY TELANG FLOWER SARI (*Clitoria ternatea* L) WITH VCO CONCENTRATION COMPARISON

Muh.Ikhsan Umar*, Prisca S Wicita, Zulfiayu
Pharmacy Department, Health Polytechnic of Gorontalo, Indonesia

Abstract

*Free radicals are molecules that in their outer orbit have one or more, unpaired electrons, are very unstable and very reactive. In excess conditions, UV rays can cause several problems for the skin and free radicals can exacerbate the effects of UV rays. Therefore an antidote is needed from the dangers of free radicals that can cause damage to the skin. Free radical prevention is done by utilizing antioxidants. These antioxidants contain compounds that can counteract the negative effects of free radicals by donating an electron to free radical compounds so that their activity can be inhibited. One of the plants that can produce this antioxidant compound is the telang flower (*Clitoria ternatea* L.). its antioxidant activity using the FRAP method was 0.33 ± 0.01 mmol / mg ascorbic equivalent. The use of antioxidants in flower telang can be increased by formulating the telang flower in a preparation. The most popular preparations in society are topical preparations. One of the topical preparations is send. Cream preparations are widely chosen as topical preparations because creams can provide a shiny, oily, moisturizing effect, and are easy to spread evenly, easily penetrate the skin, are easy / hard to rub, easy / hard to wash water. In this study using Virgin Coconut Oil (VCO) in cream preparations aims to determine at what concentration VCO can be used as oil in cream preparations that can meet the physical evaluation requirements made with different concentrations. As oil, VCO (Virgin Coconut Oil) is used. with a concentration of 10%, 15% and 20%.*

Key words: *Telang flower; Virgin coconut oil; Cream; Antioxidant.*

INTRODUCTION

Free radicals are molecules that in their outer orbit have one or more, unpaired electrons, are very unstable and very reactive. In excess conditions, UV rays can cause several problems for the skin ranging from skin redness, pigmentation, even for a long time causing the risk of cancer and free radicals can exacerbate the effects of UV rays. Therefore we need an antidote from the dangers of free radicals that can cause damage to the skin. Free radical prevention is carried out by utilizing antioxidants (Soeksmanto et al., 2007). Antioxidants are compounds that are able to counteract the negative effects of free radicals by donating an electron to free radical compounds so that their activity can be inhibited, most people today prefer to use plants, one of which is the Telang flower (*Clitoria ternatea* L) from the papilionaceae tribe. Telang flowers are vines commonly found in yards or forest edges. This leguminous plant member of the legume tribe originates from tropical Asia, but has now spread throughout the tropics. Telang flowers

are included in the Papilionaceae or Fabaceae (legumes) tribe (Rai, 2010; Dalimartha, 2008).

Based on research, Telang flowers contain chemical compounds such as tannins, triterpenoids, phenols, carbohydrates, flavonoids, saponins, glycosides, flavonols, proteins, anthocyanins and have properties that are beneficial to health such as antidiabetic, anti-inflammatory and antimicrobial. A number of studies have shown that flavonoids have antiviral, anti-inflammatory and antioxidant activity. Telang flowers have been studied for their antioxidant activity using the FRAP method and obtained a value of 0.33 ± 0.01 mmol / mg ascorbic equivalent (Alanafi, 2016; Iamsaard et al., 2014). The use of antioxidants in flower telang can be increased by formulating the telang flower in a preparation. The most popular preparations in society are topical preparations. One of the topical preparations is cream. Cream is a semi-solid preparation, in the form of an emulsion containing not less than 60% water and is intended for external use. Cream can provide a shiny, oily, moisturizing effect, and is easily distributed evenly, easily penetrates the skin, is easy / difficult to wipe, is easy / difficult to wash water (Anonymous, 1979; Anwar, 2012).

Cream components, oil phase, water phase, surfactants and other ingredients. Oil as an emulsifier and surfactant functions to reduce the surface tension between the two phases that do not mix with each other in cream preparations and water functions as a solvent to dissolve materials that are difficult to dissolve. Based on the results of research that formulated cream preparations with a ratio of VCO using a concentration of 16%, 18% and 20% to produce a cream with good consistency and stability. VCO is a process made from fresh coconut meat which is processed at low temperature or without heating, so that the important content in the oil can be preserved. VCO contains 92% saturated fat, 6% mono unsaturated fat and 2% poly unsaturated fat (Mitsui, 1997; Ayup Setiawan, et al., 2019; Tanasale, 2013; Wardani, 2007). Based on the description above, the researcher is interested in conducting research on the formulation of telang flower extract cream (*Clitoria ternatea* L.) as a topical antioxidant by looking at the concentration ratio of VCO.

RESEARCH METHODS

Tool

The tools used in this research are glassware (measuring cup, beaker, micropipette, stirring rod, watch glass, porcelain cup), mixer, hot plate, water bath, devil horn.

Material

The materials used in this study were Telang flower extract, Vco, Cetyl Alcohol, Tween 80, Span 80, Nipagin, Nipasol, Propylene glycol, Alfatokoferol and Aquadest.

Work Procedures

1. Telang flower extract preparation.

Washed the telang flower, then weigh it as needed, measure the water and heat it at 90°C, then put the telang flower and heat it for 15 minutes, then remove it and let it stand, after that it is filtered and the juice is taken.

2. Table 1. Formulation of Telang Flower Sari Cream

Composition	F1(%)	F2(%)	F3(%)
Sari flower telang	5	5	5
VCO	10	15	20
Cetyl Alcohol	7	7	7
Tween 80	1,845	1,662	1,545
Span 80	0,385	1,338	1,455
Nipagin	0,18	0,18	0,18
Nipasol	0,02	0,02	0,02
Propylene glycol	10	10	10
Alfatokoferol	0,01	0,01	0,01
Aquadest	ad 100	ad 100	ad 100

2. Making Cream Preparations

Cream making begins with separating the oil phase and the water phase. The oil phase (cetyl alcohol, vco, nipasol, span 80) is put into a porcelain cup and then melted on a hotplat at a temperature of 70°-75°C. The water phase (tween 80, nipagin, propylenglycol, alfatocoferol and aquadest) is put into a beaker glass, stirred until homogeneous at 70°C. The melted oil phase is mixed into the water phase, gradually stirring until it forms a creamy mass. Telang flower extract is inserted into the cream mass that has been formed gradually and mixed until it is homogeneous (Saryanti et al., 2019).

3. Evaluation of Cream Preparations

a. Organoleptic test for cream preparations is intended to see the color, smell and shape of the cream preparations that have been made according to the color and smell of the extract used (Azkiya, 2017).

- b. PH test is carried out to see the acidity level of a cream preparation so that it does not cause irritation to the skin. The pH of the cream preparations used a universal pH indicator. The universal indicator is dipped into the cream preparation, left for a while and the results are adjusted to the universal pH standard. The pH of a cream preparation that meets the skin pH criteria is in the interval 4.5-6.5 (Tranggono and Latifa, 2007).
- c. The homogeneity test is weighed 0.1 gram of telang flower extract and then spread evenly on the glass object, the preparation must show a homogeneous arrangement and do not show coarse grains (Azkiya, 2007).
- d. The spreadability test is carried out to determine the evenness of the cream preparations when applied to the skin. The cream is weighed as much as 0.5 g then placed on a round glass with a diameter of 15 cm, another glass is placed on it and left for 1 minute to see the spreadability of a cream preparation. The diameter of the cream spread was measured, after which 50 g was added and then it was left to stand for 1 minute. Perform the experiment 3 times with an additional load of 100,150,200 and 250. The spreadability of a good cream preparation ranges from 5-7 cm (Cahyati et al., 2015; Garh et al., 2001).

RESULTS AND DISCUSSION

Telang flower (*Clitoria ternatea* L.) is a perennial vine that has round stems, the leaves are compound leaves with 3-5 leaflets. Telang flowers are compound flowers formed in the axillary of the leaves with cylindrical stalks that have a length of ± 1.5 cm, on the petals it has a funnel-shaped crown with a butterfly-shaped crown and has a blue color (Hartono et al., 2013).

Topical preparations that are widely used in the cosmetic world are creams. Cream is a semi-solid preparation containing one or more dissolved or dispersed medicinal ingredients in a suitable base substance designated for topical use. Cream is also a thick liquid or semi-solid emulsion of either water in oil or oil in water type. Generally creams spread easily and because they are oil-in-water emulsions they are easier to remove than most ointments. Creams are considered to have greater aesthetic appeal due to their non-greasy properties and their ability to penetrate rapidly into the skin. The stability of the cream will be damaged if the mixing system is disturbed mainly due to temperature changes, and the change in composition is caused by the addition of one of the phases excessively or the mixing of two types of cream if the emulsifiers are not mixed with each other. Dilution of cream can only be carried out if a suitable diluent is known and must be carried out using an aseptic technique. A cream preparation when used can provide several shiny, oily, moisturizing effects, spreads evenly and easily penetrates into the skin (DepKesRI., 1995; Aulton and Diana, 1991; Ansel, 1989;

Ministry of Health, 1979; Anwar, 2012). In this study using Virgin Coconut Oil (VCO) in cream preparations aims to determine at what concentration VCO can be used as oil in cream preparations that can meet the physical evaluation requirements made with different concentrations. VCO (Virgin coconut Oil) is used as oil with a concentration of 10%, 15% and 20%.

The antioxidant content in VCO is very high, such as alpha-tocopherols and polyphenols. The content of alfatocopherol (virgin coconut oil) can act as an antioxidant and can reduce oxidative stress (a condition in which the level of toxic intermediate reactive oxygen exceeds the endogenous antioxidant defenses) caused by exposure to UV light. These antioxidants function to prevent premature aging and maintain body vitality. Besides, VCO is effective and safe to use as a moisturizer on the skin so that it can increase skin hydration. The abundant availability of VCO in Indonesia has the potential to be developed as a carrier material, including as a penetration enhancer and emollient. Emollients work to fill the gaps between corneocytes. This can make the skin soft and moisturized so that it can reduce its diffusion resistance (Hermanto et al., 2008; Setiaji and Surip, 2006; Lucida et al., 2008; Agero and Verallo-Rowell, 2004).

In the process of making this telang flower cream, the oil phase and water phase are each melted at a temperature of $\pm 70^{\circ}\text{C}$, this is because the temperature can affect the interfacial tension so that it affects the physical properties of a cream preparation and heating aims to simplify the liquid material easier and more homogeneous than semisolid or solid materials. In this study also used cetyl alcohol as an additional ingredient. Ethyl alcohol as a stiffening agent or thickener. The concentration of cetyl alcohol is 2-10% (Setiawan et al., 2014).

The addition of these ingredients in the cream preparation must be considered, if the cream is too thick then the cream will be difficult to take or pour, whereas if the cream is thin it is more accurately described as a lotion. Based on research, it shows that the higher the concentration of cetyl alcohol, the greater the viscosity value and the physical stability of a preparation will increase. In this study, using tween 80 and span 80, where tween 80 and span 80 as emulsifiers. Tween is also called polysorbate which produces an oil-in-water type emulsion with a fine texture and is useful for the manufacture of a water-soluble, water-soluble cream preparation. Polysorbate is used as an emulsifying agent with a concentration of 1-15%. Spans are called sorbitan esters which are surfactants with hydrophobic groups that are oil-soluble and are used as water-in-oil type emulsifiers. Cream with sorbitan esters has a smooth and stable texture. In

this study using nipagin and nipasol, where nipagin and nipasol function as preservatives. Based on research, the use of nipagin and nipasol is effective as a preservative to prevent the growth of bacteria / fungi in the preparation. In this study using propylene glycol, where propylene glycol functions as a co-solvent and humectant. Based on the research, it was explained that propylene glycol is one of the ingredients that can bind water in a preparation so it does not evaporate and stabilizes a preparation and also acts as a skin moisturizer. In this study also used an antioxidant material, namely alpha-tocopherol, where this alpha-tocopherol is vitamin E which has the highest biological activity and functions as an antioxidant with a mechanism that can break the chain reaction of radical fats. In clinical studies it was found that vitamin E is safe for use in topical preparation formulations (Nurdianti and Rahmiyani, 2016; Setiawan., Et al., 2014; Nielloud and Mesters, 2000; Raden R., 2009; Nabila et al., 2014; Rowe et al. ., 2009; Aulton and Diana, 1991; Rival F., et al., 2016; Esti Hendradi., Et al., 2013; Schlossman, 2010; Thiele and Ekanayake, 2007). To find out whether the cream preparation can meet the physical evaluation requirements, namely by conducting tests, among others, organoleptic test, pH test, homogeneity test and spreadability test.

Organoleptic Test Results of Telang Flower Cream

The first physical test is the organoleptic test. Organoleptic test is shown to see the physical appearance of a preparation, namely shape, color and smell. The organoleptic test results of the three formulas of telang flower cream showed that the three of them had a slightly different appearance because they used different emulgator concentrations, namely VCO 10%, 15% and 20%. This test is carried out to determine whether the preparations made meet aspects that are acceptable to consumers or not (Utami, 2016).

Table 2. Organoleptic Test Results of Telang Flower Cream

Test Parameters	F1	F2	F3
Color Test	3	4	4
Odor Test	3	5	4
Consistency Test	1	4	3
Average	2	4	4

Note: 1 = All categories are bad; 2 = All categories are somewhat bad; 3 = All categories are good; 4 = All categories are fairly good; 5 = All categories are very good

Based on Table 1. The results of the organoleptic test for formula 2 and formula 3 for the formulation of telang flower cream show a rather good category because in terms of color for F2 and f3 it produces a color similar to the color of the telang flower and meets the aesthetic

standards of a cream and has a pleasant odor. Typical, while for F1 it shows a rather bad category because it has a low consistency because it uses a low VCO concentration so it has a bad consistency and does not meet the aesthetic standards of a cream preparation and does not have a distinctive odor for F1.

PH Test Results of Telang Flower Cream

The next physical test is pH testing. The pH test aims to determine the acidity level of the preparation and to find out whether the cream is safe and does not irritate the skin. The pH requirement for a good topical preparation is in accordance with the skin pH, namely 4.5-6.5 (Rachmalia et al., 2016).

Table 3. PH test results of Telang Flower Cream

Test Parameters	F1	F2	F3
pH with universal indicator	6	6	6

Based on table 2, the results obtained from the pH test of formulas 1,2 and 3 of telang flower cream preparations meet the requirements because they have a pH value that corresponds to the pH of the skin, which is in the range 4.5-6.5 If the pH of a preparation is acidic, its use can cause irritation to the skin and likewise if the pH of a preparation is alkaline, its use can cause dry skin (Ayup Setiawan, 2019).

Homogeneity Test Results of Telang Flower Cream

The next physical test is the homogeneity test for cream preparations. A good cream preparation must be homogeneous and free of lumpy particles. This homogeneity test aims to see and determine the mix of ingredients for cream preparations. The homogeneity test is a parameter that indicates the quality of the preparation because it will affect the therapeutic effect of a preparation. Homogeneity is carried out by applying the cream sample to the object of the glass and the preparation must show a homogeneous arrangement with no visible coarse grains (Anisa P., et al., 2013; Yenti et al., 2014).

Table 4: Homogeneity Test Results of Telang Flower Cream

Test Parameters	F1	F2	F3
Homogeneity	Homogeneous	Homogeneous	Not homogeneous

The results from the table above indicate that the cream preparations for F1 and F2 were made to produce a homogeneous preparation. And for F3 it is not homogeneous because there are coarse granules causing a cream preparation to be not homogeneous.

Results of the Telang Flower Cream Spreadability Test

The next physical characteristic test is the spreadability test. This test parameter aims to determine the ability to spread the cream on the skin surface. A preparation will be preferable if it can easily spread on the skin because it is easier and more comfortable to use. The dispersion requirements for topical preparations are 5-7 cm (Rachmalia et al., 2016).

Based on the dispersion power test results in Table 5, at the use of the same load, the dispersion power test results in the formula cause a difference in the diameter of the spread, but the difference in diameter is not much different, namely 6-7 cm susceptible. The results of the Spreadability Test for formulas 1 and 2 met the dispersion requirements for topical preparations and for formula 3 had poor dispersion because they exceeded the dispersibility parameters for topical preparations (Tiara M., et al., 2013)

Table 5: Results of the Telang Flower Cream Spreadability Test

Test Parameters	F1	F2	F3
Load 0	5	5,25	6,125
Load 50 g	5,75	6	7,325
Load 100 g	6,225	6,6	7,9
Load 150 g	6,675	7,475	8,125
Load 200 g	7,575	7,85	8,95
Load 250 g	7,575	7,85	8,95
Average	6	7	8

CONCLUSION

Based on the research above, it can be concluded that the telang flower can be formulated in topical antioxidant cream preparations where using VCO with a concentration of 15% and 20% is a better formula than the telang flower cream formula using VCO 10%.

REFERENCES

Anisa Puspa Juwita, P. V. (2013). Formulation of Seagrass Leaf Ethanol Extract Cream (*Syringodium isoetifolium*). Manado: Pharmaceutical Scientific Journal-UNSRAT.

- Aryani, R. (2015). Formulation and Stability Test of Combination Cream of Alpha Tocopherol Acetate and Ethyl Vitamin C as Skin Moisturizer. *Bakti Tunas Husada Health Journal*, Volume 14 Number 1 August 2015.
- Ayu Nirmala Sari, M. (2015). *Alternative Antioxidants to Ward off the Dangers of Free Radicals on the Skin*. Banda Aceh: Ar Raniry State Islamic University.
- Ayup Setiawan*, R. d. (2019). Use of VCO (Virgin Coconut Oil) Emulgators in Acetosal Transdermal Cream Preparations. Kendari-Southeast Sulawesi: Bina Husada Kendari Polytechnic.
- Dian Puspitasari *, D. P. (2019). Determination of SPF Value (SUN PROTECTION FACTOR) Cream of Ethanol Extract of Telang Flower (*Clitoria ternatea* L.) In Vitro Using Spectrophotometric Method. *Surakarta: Journal of Indonesian Pharmacy Personnel*, 2 (1) 118-125.
- Esti Hendradi *, U. C. (2013). Effect of Glycerin and Propylenglycol on Physical, Chemical and SPF Characteristics of Cream Form O / W Type O / W Extract of Cocoa Beans (*Theobroma cacao* L.). *PharmaScientia*, Vol. 2, No.1, July 2013.
- I Kadek Aditya Prasatya, L. S. (2020). The Effect of Phase Comparison of Virgin Coconut Oil (*Cocos nucifera* L.) and Cocoa Fat (*Theobroma Cacao* L.) and Temperature on the Characteristics of Cream Preparations. *Journal of Agro-industrial Engineering and Management*, Vol. 8, No. 2, 223-233 June 2020.
- Kusumowardani, R. R. (2010). Optimization of Emulsifying Agent Composition Tween 80 and Span 80 in Virgin Coconut Oil Cream: Factorial Design Application. Yogyakarta: Sanata Dharma University.
- Nabila Ayu Safitri *, O. E. (2014). Optimization of the Formula for Cream of Strawberry Extract (*Fragaria x ananassa*) as an Anti-Aging Cream. *FKUB Health Magazine*, Volume 1, Number 4, December 2014.
- PUTRI, A. A. (2020). Optimization of the proportion of stearic acid and triethanolamine in the ethanol extract of telang flower (*Clitoria ternatea* L.) cream. *Surakarta: S1 Pharmacy, Surakarta National College of Health Sciences*.
- Rival Ferdiansyah, R. R. (2016). Strawberry Juice (*Fragaria X ananassa* D.) Cream Formulation as Antioxidant. *Indonesian Journal of Pharmaceutical Science and Technology*, Vol. V, No.2, July 2016.
- Sari, T. I. (2011). The Effect of Avocado Butter on the Stability of Avocado Softening Cream. *Indonesian Pharmacy Magazine*, Vol. 22, (2), 98-105, 2011.
- Tiara Mappa, H. J. (2013). Gel Formulation of Sasaladahan Leaf Extract (*Peperomia pellucida* (L.) H.B.K) and its Effectiveness Test on Burns in Rabbits (*Oryctolagus Cuniculus*). *Pharmaceutical Scientific Journal*, Vol. 2 No. 02.

FORMULATION AND EVALUATION OF ORAL SUSPENSION PROVISION OF CHLORAMPHENICOL WITH NA CMC CONCENTRATION COMPARISON

Titi Nurul Huda K. Puluhulawa, Prisca S. Wicita, Zulfiayu
Pharmacy Departement, Healty Polytechnic of Gorontalo, Indonesia

Abstract

Suspension is a dosage form containing solid medicinal ingredients in a fine and insoluble form. The physical stability of a suspension is defined as the state in which the particles do not coagulate and remain evenly distributed throughout the dispersion system. Suspending agents are used to increase viscosity and slow sedimentation so that it can produce a stable suspension. The choice of suspending agent must be precise, single or combination and at the right concentration as well. Suspensions have many advantages including easy use and more precise dosage, faster effect than solid preparations such as tablets. A good suspension must have the following properties:

Keywords: Oral Suspension; Chloramphenicol; Na Cmc Concentration

INTRODUCTION

Chloramphenicol is a type of antibiotic derived from amphenicol which is naturally produced by *Streptomyces venezuelae*. Chloramphenicol has insoluble solubility in water. Solubility is a state of a compound, whether solid, liquid, or gas dissolved in solids, liquids, or gases which will form a homogeneous solution. The solubility depends on the solvent used as well as the temperature and pressure. Chloramphenicol solubility problem can be overcome by making a suspension formulation so that a stable preparation is produced. (Reynolds, 1982). (Indonesian Pharmacopoeia Edition 3) (Lachman, 1986).

Suspension can be defined as a preparation containing finely divided drug particles evenly distributed in a carrier wherein the drug exhibits very minimum solubility. The drug formulation in suspension has the advantage that it tastes better and it can increase drug absorption so that it can increase the bioavailability of the drug. Suspensions have many advantages including easy use and more precise dosage, faster effect than solid preparations such as tablets. A good suspension must have the following properties: settles slowly and must be dispersed again by carathe cornering light weight. The stable suspension must remain homogeneous, the particles are completely well dispersed in the liquid, the dispersed substance must be fine and must not precipitate quickly. The physical stability of a suspension is defined as the state in which the particles do not coagulate and remain evenly distributed throughout

the dispersion system. if the particles settle, they must be easily suspended again with a little shaking (Martin, et al., 1993). (Ansel, 2008). (Hussein et al., 2009). (Anief, 1999). To get a good dry oral suspension, a suspending agent is needed. One of the good suspending agents is Na CMC. Na CMC is a cellulose derivative that is produced commercially in greater quantities than other cellulose derivatives. Na CMC is used to increase viscosity and slow sedimentation so that it can produce a stable suspension. The choice of suspending agent must be precise, single or combination and at the right concentration as well. So we are interested in doing research by comparing the concentration of Na CMC. (Zulharmitta, et al., 2012: 92).

METHODS

Tool.

Sieve, Porcelain Cup, Beaker, measuring cup, Watch glass, Mortar and Stamper, Analytical balance, Oven, Spoon Horn.

Material.

Chloramphenicol, Na. CMC, Glycerin, PVP, Citric acid, Na. Citrate, Strawberry essence, Red Chery and Sucrose

Research Stage

Preparation of chloramphenicol suspense preparations with a combination of suspending agent Na. CMC and conducting physical quality tests for the suspension of chloramphenicol with the combination of Na CMC suspending agent.

Preparation Formulations

Table 1. Formulation of preparations

Material	Formula (%)		
	F1	F2	F3
Chloramphenicol	125 mg / 5 Ml	125 mg / 5 ml	125 mg / 5 ml
Na CMC	1%	3%	5%
Glycerin	10%	10%	10%
PVP	2%	2%	2%
As.Sitrat	1.26%	1.26%	1.26%
Na.Sitrat	0.162%	0.162%	0.162%
Strawberry Essence	qs	qs	qs
Red Cherry	qs	qs	qs
Sucrose	Ad 2 gr	Ad 2 g	Ad 2 gr

PROCEDURE

Prepare tools and materials, Weigh Na.CMC, PVP, Citric acid, Na. Citrate. Dissolve each material in the form of powder (Citric acid, Sodium citrate, Sucrose, PVP, Na.CMC, Strawberry essence, red chery), Dissolve PVP first, make the granulation mass of chloramphenicol, sucrose and PVP that have been dissolved and mixed until homogeneous until it becomes a granule fist, and sieve the granulation mass, then weigh the granulation, then dry it in an oven at 60o C for 15 minutes to remove the moisture content in the granule, after drying the granule is sifted with messh number 20, the mass of the granule is weighed. . After that, add the dye that is put into the bottle and then spray it into the granulation.

EVALUATION OF SUSPENSION AVAILABILITY

The evaluation of the suspension preparations is as follows:

1. Granule Flow Properties

The flow time is carried out by weighing each powder formula as much as 4 grams and then putting it into a funnel with the bottom hole closed and at the bottom of the funnel given a paper base. After the granule is well filled and even, the lid of the funnel is opened until the granule starts sliding. The time it takes for the powder to leave the funnel is recorded. For powders or granules, the flow time is good if it has a flow time of not more than 10 seconds.

2. Reduction Time

Filled the preparation with water up to the limit of the calibration shake the preparation in the bottle, the suspension is left to settle, the bottle is rotated 180 ° and turned over to its original position, Record the time the suspension can be dispersed again, the maximum dispersion time is 30 seconds (Gebresamuel & Gebre Mariam, 2013)

3. Sedimentation volume

Put it in a measuring cup with a volume of 10 ML, then leave it stored without interruption, record the initial sedimentation volume (V_o), keep it for a maximum of 4 weeks, record the final sedimentation volume (V_u) (Shah, et al., 2014)

4. Organoleptic

Organoleptic evaluation of suspensions was carried out by assessing changes in taste, color, and smell, see color then smell (Sana et al., 2012).

5. PH test

Put the preparation in the beaker glass, put the pH meter into the beaker, wait until the pH number on the screen stops (stable), this shows the amount of the pH value, Record the pH shown on the instrument screen (Aremu & Oduyela, 2015)

6. Suspension type weight

Use a clean, dry, and calibrated pycnometer by setting the weight of the pycnometer, weigh the empty pycnometer, record the weighing result of the pycno, fill in as many samples as the pycno weigh calibration contains the sample, record the weighing result. Calculate the pycno by subtracting the result of the weighing of the pycno containing the sample with the empty pycno divided by the volume of the pycno The density of a substance is the result obtained by dividing the weight of the substance by the weight of water in a pycnometer. Unless otherwise stated in the monograph both are set at 25o. (Indonesian Pharmacopoeia 4th ed, 1995)

7. Viscosity

Measured the 2 mL suspension, put it in the oswald viscometer then sucked it up to the upper limit, then calculate the length of time of flow using a stopwach from the upper limit to the lower limit. The Ostwald viscometer works with the concept of the flow velocity of a fluid in a tube pipe. The smaller the solution flow rate, the greater the viscosity value (Engel and Reid, 2006).

8. Volume Moved

A measuring cup with a volume of 100 ml is prepared in a dry and clean state, after that the chloramphenicol suspension is poured into the measuring cup slowly and carefully. First about 30 minutes, until free of air bubbles, Then the volume of the solution is accurately measured and determined. The same procedure is carried out for each preparation. (FI IV, 1089)

RESULTS AND DISCUSSION

Chloramphenicol or chloramycetin is a broad-spectrum antibiotic, derived from the fungus *Streptomyces venezuelae*, and now can be synthetically prepared in the laboratory. The preparation of dry oral suspension uses the active substance chloramphenicol because it aims to cover the bitter taste of the active substance. (Sumardjo, 2009).

Suspensions are preparations containing medicinal ingredients in a fine form which are insoluble but dispersed in liquid. The suspension generally contains additives to ensure its stability, as stabilizers, materials called emulsifiers can be used. In a good suspension, a suspending agent must be added. The purpose of adding a suspending agent in the form of Na CMC is to increase the viscosity of the suspension so that it can slow down the deposition. (Joenoos, 1990).

The materials used in the manufacture of dry suspensions are chloramphenicol as an active substance, Na CMC as a suspending agent, glycerin as a wetting agent, PVP as a binder, citric acid and sodium citrate as a buffer, strawberry essence as an aroma or flavor, red cherry as a dye and sucrose as a sweetener.

ORGANOLEPTICAL TEST RESULTS

Organoleptic test or sensory evaluation is a scientific measurement in measuring and analyzing the characteristics of a food material received by the senses of sight, taste, smell, touch, and interpreting reactions resulting from the sensing process carried out by humans which can also be called a panelist as a measuring tool. The importance of organoleptic tests on oral suspensions to determine the good taste, smell and color of the preparation made. (Waysima and Adawiyah, 2010).

Table 2. Organoleptic Test Results for Chloramphenicol Suspension

Test Parameters	Formula 1	Formula 2	Formula 3
Taste Test	1 (not delicious)	1 (not delicious)	4 (very tasty)
Color Test	1 (pale red)	1 (pale red)	1 (pale red)
Odor Test	1 (very smelly)	2 (slightly smelly)	4 (fragrant)
Clarity Test	2 (slightly blurry)	2 (slightly blurry)	2 (slightly blurry)

Based on the results of organoleptic measurements (table 2), it shows that the best formula is formula 3. From the organoleptic test, formula 3 has a good taste, pale color, fragrant smell and slightly opaque clarity.

GRANUL HUMIDITY TEST RESULTS

The granule moisture evaluation test is intended to determine the water level formed from the preparation made, so that it can be seen if the preparation made meets the moisture content requirements. As much as 1 gram of granule, put into the sample tray and analyzed for humidity by heating at 105°C. Recorded the water content formed, the moisture content according to the requirements of 2-5% (Williams and Allen, 2007).

Table 3. Granule Moisture Test Results

Test Parameters	Formula 1	Formula 2	Formula 3
(%) Percent Moisture Granule	2.19%	2%	2%

Based on (table 3) formula 1 has granule moisture as much as 2.19%, formula 2 as much as 2%, and formula 3 as much as 2%. The requirement for moisture content is 2-5%, this shows that the three formulas have moisture content in accordance with existing requirements. (Williams and Allen, 2007)

GRANUL FLOW PROPERTIES RESULTS

The granule flow properties test aims to determine whether the instant granule meets the requirements so that it is expected to produce a good granule. The flow rate is expressed as grams of powder passing through the funnel. A good flow rate is 4-10 grams / second (Aliyah, et al., 2009). (Gozali, 2008)

Table 4. Granule Flow Properties Test Results

Test Parameters	Formula 1	Formula 2	Formula 3
Flow Velocity Value and Alira Overview	5.97 (easy to flow)	0.12 (Very cohesive)	5.47 (easy to flow)

From table 4 it can be seen that the good granule flow properties are formula 1 then formula 3, this can be seen from the good flow rate requirements of 4-10 grams / second. formula 2 has poor granule flow properties because the drying process in the oven is not optimal. (Aliyah, et al., 2009).

DISPOSED TIME TEST RESULTS

Redispersion time is the time required for the suspension to be evenly dispersed again from the settled state. The redispersion ability is good when the suspension has been well dispersed when the suspension has been completely dispersed by agitation within a maximum of 30 seconds.

Table 5. Dispersed Time Test Results

Test Parameters	Formula 1	Formula 2	Formula 3
Redispersion Time (Seconds)	2 seconds	2 seconds	6 seconds

From table 5 it can be seen that Formula 1, Formula 2 and Formula 3 have a good dispersion time because a good suspension has a maximum dispersion time of 30 seconds.

SEDIMENTATION VOLUME TEST RESULTS

The sedimentation volume is a ratio of the final sedimentation volume (V_u) to the initial volume of the suspension (V_o) before settling. A good suspension requirement has an F value close to 1.

Table 6. Sedimentation Volume

Test Parameters	Formula 1	Formula 2	Formula 3
F value (sedimentation volume)	0.76	0.76	0.69

From table 6 it can be seen that Formula 1, Formula 2 and Formula 3 have good sedimentation volume because the terms of a good suspension have an F value close to 1.

PH TEST RESULTS

The pH evaluation test is intended to determine the pH of the preparation, according to the existing provisions or not. To find out which preparations are made acidic or alkaline.

Table 7. pH test

Test Parameters	Formula 1	Formula 2	Formula 3
pH with Universal Indicator	6 (sour)	6 (sour)	4 (sour)

Based on table 7, the results of formula 1 with pH 6 (acid), formula 2 with pH 6 (acid), and formula 3 with pH 4 (acid) are obtained. Judging from the literature FI ed IV, the pH requirement for chloramphenicol in the oral suspension is 4.3-7.0, so it can be concluded that the formula that does not meet the pH requirements is formula 3.

TYPE WEIGHT TEST RESULTS

The purpose of the specific gravity test on suspension preparations is to calculate the viscosity value of the preparation, because specific gravity is one of the factors that influence viscosity. Specific gravity for preparations with water carriers must be more than 1.00 g / mL, because water has a specific gravity of 1.00 g / mL (Wahyuni, 2017).

Table 8. Specific Gravity Test

Test Parameters	Formula 1	Formula 2	Formula 3
Specific Gravity (g / ml)	1 ml	70.62 ml	69.62 ml

Based on table 8, the results of formula 1 ml, formula 2 70.62 ml, and formula 3 69.62 are obtained. Among all formulas, formula 1 which specific gravity is not good.

VISCOSITY TEST RESULTS

Viscosity determines the ease with which a molecule can move due to the friction between the layers of the material. Hence viscosity indicates the degree of resistance of a liquid to flow. The greater the viscosity, the slower the flow will be. The amount of viscosity is influenced by several factors such as temperature, attractions between molecules and the size and number of dissolved molecules.

Table 9. Viscosity Test

Test Parameters	Formula 1	Formula 2	Formula 3
Viscosity (P) or (cps)	4.50 cps	445.70 cps	439,392 cps

Based on table 9, the results of formula 1 are 4.50 cps, formula 2 is 445.70 cps, and formula 3 is 439.392 cps. Among all formulas, formula 3 has the greatest viscosity so that the flow of the formula will be slow.

TEST RESULTS OF THE VOLUME REMOVED

The purpose of conducting the transfer volume test is to ensure that the volume of the suspension packed in the double dose container matches the volume indicated on the label. The requirement for the average volume of the suspension is not more than one volume less than 95% as stated in the label.

Table 10. Transferred Volume Test

Test Parameters	Formula 1	Formula 2	Formula 3
Volume Move (%)	93%	90%	93%

From table 10 it can be seen that Formula 1, Formula 2 and Formula 3 have a displaced volume that is not good because the average volume requirement of the suspension is not more than one volume less than 95%.

CONCLUSION

The dry oral suspension of chloramphenicol with suspending agent Na CMC showed that the organoleptic test of formula 3 was the best between formula 1 and 2, the granule moisture test of all formulas had good moisture content in accordance with existing requirements, a good granule flow properties test was a formula. 1 then formula 3 according to the requirements of a good flow rate is 4-10 grams / second, formula 2 has poor granule flow properties.

The dispersed time test and sedimentation volume test both get good results from all formulas in accordance with the existing requirements, the pH test that does not meet the requirements is formula 3, the specific gravity test results in formula 1, the density is the least good, the viscosity test is obtained. the results of formula 3 which has the greatest viscosity, the volume moved test results show that all formulas have a volume transferred that is not good.

REFERENCES

- Anonymous. (1979). Indonesian Pharmacopoeia III Edition. Jakarta: Ministry of Health of the Republic of Indonesia.
- Ansel, HC (2008). Introduction to Pharmaceutical Dosage Forms: Several Kinds of Preparations: Tincture, Dilute Extract, Water Extract, Ammonia, Dilute Acid, Spirtus and Radiopharmaceuticals, 4th Edition. Jakarta: UI Press.
- Anief, M. (1999). Dispersion Systems, Suspension and Emulsion Formulations. Yogyakarta: Gadjah Mada, University Press.
- Husein Umar. (2009). Research Methods for Thesis and Business Thesis. Jakarta: Rajawali Persada.
- Reynold, TD 1982. Unit Operation and Process In Environmental Engineering. Monterey-California.
- Lachman, L., HA Lieberman and JL Kanig (1986). Theory and Practice of Industrial Pharmacy, Third Edition. Jakarta: UI Press.
- Martin, A., Swarbrick, J., and A. Cammarata. 1993. Physical Pharmacy 2. Edition III. Jakarta: UI Press. Pp. 940-1010, 1162, 1163, 1170.
- Ministry of Health of the Republic of Indonesia. 2014. Regulation of the Minister of Health of the Republic of Indonesia Number 5. Jakarta: Depkes RI, p441-448.
- Martindale, The Extra Pharmacopoeia, 30th Edition, 1993. The Pharmaceutical Press, London, pp. 1233-1235.

- Zulharmita, Ummil Kasypiah, Harrizul Rivai, 2013, "Manufacture and Characterization of Dry Extract of Guava Leaves (*Psidium Guajava* L.)", *Higea Pharmaceutical Journal*, Vol. 5, No. 1, 2013.
- Gebresamuel, N., & Gebre-Mariam, T. 2013. Evaluation of Suspending Agent Properties of Two Local *Opuntia* spp. *Muchilago* on Paracetamol Suspension. *Journal of Pharmacy and Sciences*. 26 (1), 23-29
- Shah, S. et al., 2014, Evaluation and Comparison of Antimicrobial Activity of Tulsi (*Ocimum sanctum*), Neem (*Azadirachta indica*) and Triphala Extract Against *Streptococcus mutans* & *Lactobacillus acidophilus*: An In Vitro Study, *NJIRM*, 5 (4): 17-21.
- Anonymous, 1995, Indonesian Pharmacopoeia, Edition IV, Ministry of Health of the Republic of Indonesia, Jakarta.
- Engel, Thomas and Philip Reid. 2006. *Physical Chemistry Third Edition*. San Francisco: Pearson Education, Inc.
- Sumardjo, D. 2009. *Introduction to Chemistry Handbook for Medical Student Lectures and Undergraduate Programs*, Faculty of Bioexact. Jakarta: EGC
- Joenoel, N., Z. 1990. *Ars Prescribendi Rational Prescriptions*. Airlangga University. Surabaya.

ORAL SUSPENSION AVAILABILITY FORMULATION CHLORAMPHENICOL

Siti Nurkhalisa Akuba, Nur'ainun Panigoro, P risca S Wicita, Zulfiayu
Pharmacy Departemnt, Health polytechnic of Gorontalo, Indonesia

Abstrack

A suspension is a liquid preparation containing insoluble solid particles dispersed in the liquid phase. The physical stability of a suspension is defined as the state in which the particles do not coagulate and remain evenly distributed throughout the dispersion system. Based on research, chloramphenicol suspension with different concentrations of HPMC using 1%, 2%, and 4% formula 3 is the best formula. This is based on the evaluation of the organoleptic and viscosity tests carried out, formula 3 is a good formula. The three formulas have granule moisture, redispersion time, sedimentation volume, pH, specific gravity and volume that have met the requirements, while for flow properties there is no formula that meets the requirements. The research conducted was experimental research in the laboratory. The evaluation in this study includes organoleptic, pH, specific gravity, turbidity ratio

Keywords: Suspension; Formulation; Chloramphenicol;

INTRODUCTION

Suspension is a coarse dispersion in which the particles are insoluble, but dispersed in a liquid medium (Maritn et al, 1993). The dispersed substance must be smooth and should not precipitate quickly, if shaken slowly the precipitate must be immediately dispersed again. Suspensions generally contain additives to ensure their stability, as stabilizers, materials called emulsifiers can be used (Joenoos, 1990). Suspensions are widely used because they are easy to use in children, infants, and also for adults who have difficulty swallowing tablets or capsules. The suspension can also be given additives to cover the unpleasant taste of the active substance. Generally, the liquid form is preferred over the tablet or capsule form because it is easy to swallow and the dosage is easy to adjust for children (Ansel, 1989).

A suspension, from starting to be processed to become a product, which finally reaches the patient, takes a long time. Therefore, these preparations must remain stable, both in storage and in use. This is so that the medicine in its shape, smell, and taste can be received by the patient in good condition. Factors that affect the physical stability of the suspension are sedimentation volume, flow properties, and particle size (Ansel, 1989).

Chloramphenicol is white crystals that are difficult to dissolve in water (1: 400) and tastes very bitter. Chloramphenicol is an antibiotic that can inhibit bacterial growth. This drug works by

inhibiting bacterial protein synthesis by binding to the 50S subunit of the bacterial ribosome, thereby preventing the transfer of amino acids to the growing peptide chain, thereby inhibiting protein synthesis. The toxic effect of chloramphenicol on the hemopoietic system of mammalian cells is thought to be related to the mechanism of action of this substance. Chloramphenicol is generally bacteriostatic. At high concentrations, chloramphenicol is sometimes bactericidal against certain germs. Chloramphenicol is absorbed quickly. The peak level in the blood is reached 2 hours. For children, it is usually given the form of chloramphenicol palmitate or stearate ester which tastes less bitter. Chloramphenicol is difficult to dissolve in water, so chloramphenicol is made in a supposition. The advantage of the suspension preparation for chloramphenicol itself, in addition to helping its solubility, also keeps chloramphenicol from being easily damaged.

METHOD

Tool

The tools used in this research are glass tools (measuring cup, beaker glass, micropipette, watch glass), sieve, spray bottle, mortar and pestle, oven and horn spoon.

Material

Materials used: citric acid, glycerin, HPMC, chloramphenicol, sodium CMC, sodium citrate, red cherry, strawberry essence and sucrose.

Work procedures

All materials are weighed and measured, HPMC powder is dissolved and put into the mortar. Enter one by one the powder of Na CMC, Na Citrate, Sucrose, Citric Acid, and Strawberry Essence, crushed until homogeneous. Add a little glycerin while grinding until homogeneous. The mass of granulation head is made, then sieved, the result of the sieve is weighed and put in the oven until the moisture content reaches less than 3%. Spray the red cherry onto the suspension powder.

FORMULATION

Table.1 Formulation Table.1 Chloramphenicol oral suspension formula

Nama Bahan	F1	F2	F3
Kloramfenikol	125 mg/ 5 ml	125 mg/5 ml	125 mg/ 5 ml
Na CMC	1%	1%	1%
Gliserin	10%	10%	10%
HPMC	1%	2%	4%
As.Sitrat	1,55%	1,55%	1,55%
Na.Sitrat	0,633%	0,633%	0,633%
Strawberry Essence	q.s	q.s	q.s
Red Cherry	q.s	q.s	q.s
Sukrosa	Ad 2 gr	Ad 2 g	Ad 2 g

EVALUATION OF ORAL SUSPENSION AVAILABILITY

Granule Moisture Test

This test is carried out to see the water content in the granule. The water content of the suspension is not more than 3% (Anonymous b, 1995). The material to be dried (granulate) is weighed before and after drying. For the Granule moisture test using the following calculations:

$$\% = (W0-W1) / W1 \times 100\%$$

Granule Flow Properties Test

Granule flow properties test is done by weighing the amount of powder / granule then enter it into the flow meter, open the bottom and record the flow time. To test the flow properties of Granules using the following formula:

Redispersion Time Test

Redispersion time is the time required for the suspension to be evenly dispersed again from the settled state. The suspension is allowed to settle then shaken until all the sediment is dispersed again.

Sedimentation Volume Test

The chloramphenicol sedimentation volume test was carried out by inserting the chloramphenicol suspension into a measuring cup then leaving it to stand until a precipitate was formed. To test the volume of sedimentation using the formula below: $F = V_u / V_0$

Organoleptic Test

Organoleptic test is a test that can be done with the human senses, in the form of taste, color, smell and clarity.

PH test

The PH test is a test that determines the pH of a solution using a universal indicator.

Specific Gravity Test

Suspense specific gravity test was performed using a pycnometer. To determine the specific gravity of the suspension preparation, it was obtained from the difference between the pycnometer that contained the test sample and the empty pycnometer (Anonymous B, 1995).

Equation: $B_j = (b-a) / (\text{Picno volume}) = \text{g} / \text{mL}$

Viscosity Test

Test the viscometer for chloramphenicol suspension using an Oswald viscometer.

Move Volume Test

The mean volume of the suspension obtained from 3 samples of the suspense test was not less than 100% and none of the samples was less than 85% of the volume on the label (Anonymous, 1995).

RESULTS AND DISCUSSION

Chloramphenicol is white crystals that are difficult to dissolve in water (1: 400) and tastes very bitter. Chloramphenicol is an antibiotic that can inhibit bacterial growth. This drug works by inhibiting bacterial protein synthesis by binding to the 50S subunit of the bacterial ribosome, thereby preventing the transfer of amino acids to the growing peptide chain, thereby inhibiting protein synthesis. In this study, chloramphenicol was formulated in the form of a dry supposition dosage. Chloramphenicol is difficult to dissolve in water, so when it is made in a liquid preparation, chloramphenicol is more suitable to be made in a suspension. In addition, suspensi preparations can make chloramphenicol not easily damaged. To formulate a preparation, an examination of the additives that will be used must first be used (Anonymous 2008).

The suspension formula is made in 3 formulas, which differ in the concentration of HPMC as a binder. As an initial step in the manufacture of this suspension is the manufacture of ganul

using the wet granulation method. Wet granulation is carried out by adding a binder. This method is compatible with active substances that are resistant to moisture and heat. The granules are then sieved and dried in an oven to remove the solvent used in granule formation and to reduce moisture from the suspension preparations (Lachman, Lieberman and Kanig, 2000). The suspension agent used in chloramphenicol preparations is Carboxymethyl Cellulose Sodium (Na CMC). Na CMC is dry and easy to disperse and can expand easily if shuffled manually (Syamsuni, 2006). The concentration of Na CMC used for suspension preparations is between 0.1% -1.0% (Wade and Weller, 1994). Each oral pharmaceutical preparation contains flavorings and dyes to enhance the taste and enhance the aesthetic quality of the formula (Jones D, 2009). Therefore, Strawberry Essence is used as a flavoring and Red cherry as a dye.

Chloramphenicol has excellent stability at room temperature and a pH range of 2 to 7, its maximum stability is achieved at pH 6. At 25°C and pH 6, it has a half-life of nearly 3 years (Connors, 1992). To maintain the pH of the chloramphenicol suspension, pendapar citrate (citric acid and sodium citrate) is used. Citric acid is used because citric acid is easy to obtain, abundant, relatively inexpensive, very soluble, available as a free-flowing fine granule, available in anhydrous form and anhydrous form of food quality (Allen, 2011). The concentration of citric acid used ranges from 0.1-2.0%, while the concentration used for sodium citrate ranges from 0.3-2% (Rowe, R, C, et. All, 2006).

The description of chloramphenicol is that it has a very bitter taste (Anonymous, 1955). To cover the description, a sweetener is used, in this case, sucrose with a concentration range of 67% 0.3-2% (Rowe, R, C, et. All, 2006). Sugar or sucrose is a disaccharide that can be broken down by LAB into glucose or fructose so that it can produce metabolites in the form of lactic acid, ethanol and CO₂ (Oberman and Livudzisz, 1998)

Granule Moisture Test

wet granulation method is to wet the tablet mass with a certain binder solution until it gets a certain level of wetness, then the wet mass is granulated. Wet granulation is selected when the active ingredient is resistant to water / solvents and heat. Granules are formed by binding the powder with a binder, for example a binder in the form of a solution or a suspension and a binder in a dry form. From the results of the 3rd Granule Moisture Test the formula below is not more than 3% (Lachman et al., 1989).

Table 3 Granule Moisture Test Results

Test Parameters	Formula 1	Formula 2	Formula 3
(%)Moisture Percent Granule	2 %	2,6%	1,45%

Granule Flow Properties

Granule flow properties greatly affect the uniformity of tablet weight so it is necessary to test the flow properties in order to guarantee the tablet the resultant has a uniform weight. Granule flow properties can be known by measuring the flow time and angle of repose. Flow time is the time required to flow a certain amount of starch to the equipment used (Siregar, 2010).

Table. 4 Results of Observation of Granule Flow Properties

Test Parameters	Formula 1	Formula 2	Formula 3
Flow Rate Value and Flow Overview	2 gram / sec (Cohesive)	1 gram / second (Very Cohesive)	0.5 grams (Very Cohesive)

Redispersion Time Test

The redispersion test was carried out to determine the ability of the suspension to obtain homogeneously re-dispersed by light shaking. Redispersion is influenced (Nash, 1996) by the viscosity of the preparation, where the higher the viscosity, the redispersibility the resulting lower. Redispersion is also affected by the particles formed in a Supensi.

Table 5 Redispersion Time Test Results..

Test Parameters	Formula 1	Formula 2	Formula 3
Redispersion Time (Seconds)	3.73 S	3.21 s	2.10 S

Sedimentation Volume Test

The sedimentation volume test was carried out to determine the precipitation ratio that occurs during Supensi storage for a certain time.

Table 6 results of measurement of sedimentation volume

Test Parameters	Formula 1	Formula 2	Formula 3
F value (Sedimentation volume)	0,9	0,9	0,88

Organoleptic Test

Organoleptic test is a test using the human senses as the main tool for measuring the acceptance of the product. General appearance includes, color, presence or absence of smell, taste, and clarity. (MOH, 1995).

Table. 7 Organoleptic Test Results.

Test Parameter	Formula 1	Formula 2	Formula 3
Taste Test	2	1	2
Color Test	1	1	1
Odor Test	2	4	4
Clarity Test	1	3	3

PH test.

Chloramphenicol is one of the most chemically known antibiotics stable in all applications and has excellent stability at room temperature and a pH range of 2-7, the maximum stability is achieved at a pH of 6. At a temperature of 25°C. It is known that the PH of the three suspension formulas meets the PH test requirements (Connors, 1992).

Table 8 Observation Results of the PH Test

Test Parameters	Formula 1	Formula 2	Formula 3
pH with Test Parameter Indicator	5 (Sour)	7 (Netra)	5 (Acid)

Specific Gravity Test

Specific gravity test on suspension preparations is to calculate the value viscosity of the preparation, because specific gravity is one of the factors affect viscosity. (Anonymous, 1979)

Table. 9 Specific Gravity Test Results

Test Parameters	Formula 1	Formula 2	Formula 3
Specific Gravity (g / mL)	0,98	0,96	0,98

Viscosity Test

The viscosity test is carried out to find out how much consistency the preparation is and indicates the thickness of a preparation. Too high viscosity is not expected because it can cause problems with pouring the suspension from the container and the difficulty of the preparation to be dispersed again (Muchtar, 2015)

Table 10 Observation Results of the Viscosity Test

Test Parameter	Formula 1	Formula 2	Formula 3
Viscosity (P) or (cps)	2,079 P 207,9 cps	3,7026 P 370,26 cps	4,36 p 436 cps

Move Volume Test

Volume Test Transferred as an oral solution and suspension packed in a container, with the volume stated on the label not more than 250ml which is available in liquid form or a liquid preparation reconstituted from a solid form with the addition of a certain carrier with a specified volume, if removed from the original container, will give the volume of preparation as indicated on the label. From the results of the 3rd test, the average volume test formula is 100% according to the volume listed on the label (60 ml) (Ministry of Health, 2014)

Table 11 Tested Volume Moved

Test Parameters	Formula 1	Formula 2	Formula 3
Volume Moved (100%)	100%	100%	100%

CONCLUSION

Based on research, chloramphenicol suspension with different concentrations of HPMC using 1%, 2%, and 4% formula 3 is the best formula. This is based on the evaluation of the organoleptic and viscosity tests carried out, formula 3 is a good formula. The three formulas have granule moisture, redispersion time, sedimentation volume, pH, specific gravity and volume that have met the requirements, while for flow properties there is no formula that meets the requirements.

REFERENCE

- Anonim. 1993. *World Health Organization How to Investigate Drug Use in Health Facilities*. World Health Organization. Geneva.
- Ansel, H.C. 1989. *Pengantar Bentuk Sediaan Farmasi*. diterjemahkan oleh Farida Ibrahim, Asmanizar, Iis Aisyah, Edisi keempat. UI Press. Jakarta.
- Ansel, H.C., Popovich, N.G., Allen, L.V. 2011. *Pharmaceutical Dosage Form and Drug delivery System Ninth Edition*. Pharmaceutical Press. London.
- Chasanah, et al. 2011. Formulasi Suspensi Doksisisiklin Menggunakan *Suspending Agent* Pulvis Gummi Arabici: Uji Stabilitas Fisik Dan Daya Antibakteri. *Journal*. Universitas Muhammadiyah Surakarta. Surakarta.
- Connors, K.,A., 1992. *Stabilitas Kimiawi Sediaan Farmasi, jilid 1*. Penerjemah: Drs. Didik Gunawan. IKIP Press. Semarang.
- Departemen Farmakologi dan Terapeutik FK UI. 2007. *Farmakologi dan Terapi Edisi 5*. Bagian Farmakologi FK UI. Jakarta.
- Departemen Kesehatan Republik Indonesia. 1995. *Farmakope Indonesia Edisi IV*. Departemen Kesehatan Republik Indonesia. Jakarta.
- Harningsih, N, et al. Optimasi Natrium Bikarbonat dan Asam Sitrat Sebagai Komponen *Effervescent* pada Tablet *Floating* Nifedipin. *Journal*. Universitas Gajah Mada. Yogyakarta.
- Joenoos, N. Z. 1990. *Penulisan Resep yang Rasional*. Airlangga University Press. Surabaya.
- Jones, David. 2008. *FASTTrack: Pharmaceuticals – Dosage Form and Design*. Pharmaceutical Press. London.
- Lachman, L., Lieberman, H.A., and Kanig, J.L. 1986. *The Theory and Practice of Industrial Pharmacy, 2nd ed*. Lea and Febiger. Philadelphia.
- Martin, A., Swarbrick, J., dan A. Cammarata. 1993. *Farmasi Fisik 2 Edisi III*. UI Press. Jakarta.
- Nurlina, et al. 2014. Formulasi Suspensi Kering Kombinasi Ekstrak Etanol Kunyit (*Curcuma Longa* L.) Dan Serbuk Daging Buah Pisang Kepok (*Musa Balbisiana* Colla.) Dengan Variasi Bahan Pensuspensi. *Journal*. Universitas Muslim Indonesia & Universitas Hasanudin. Makasar.
- Novel, et al. 2019. Formulasi Dan Evaluasi Suspensi Ubi Cilembu Dengan Menggunakan Perbandingan *Suspending Agent* Antara Na CMC Dan Xanthan Gum. *Journal*. Universitas Sari Mulia Banjarmasin. Banjarmasin.
- Pujiharti, R. et al. 2015. Pengaruh Perbedaan Pembuatan Dengan Metode Dispersi Dan Presipitasi Pada Karakteristik Fisik Dan Rasio Kekeruhan Suspensi Kloramfenikol. *Journal*. Sekolah Tinggi Ilmu Kesehatan Kendal. Kendal.
- Rahman, I, et al. 2011. Uji Stabilitas Fisik Dan Daya Antibakteri Suspensi Eritromisin Dengan *Suspending Agent* Pulvis Gummi Arabici. *Journal*. Universitas Muhammadiyah Surakarta. Surakarta.
- Rowe, R.C. et Al. 2006. *Handbook Of Pharmaceutical Excipients, 5th Ed*. The Pharmaceutical Press. London.
- Wade, Ainley, Weller, Paul J. 1994. *Handbook of Pharmaceutical Excipients second edition*. Pharmacheutical Press. London.

- Wahyuni, R, Syofyan, Yunalti, S. 2017. Formulasi dan Evaluasi Stabilitas Fisik Suspensi Ibu Profen Menggunakan Kombinasi Polimer Serbuk Gom Arab dan Natrium karboksimetilselulosa. *Journal*. Universitas Andalas Padang. Padang.
- Wardani, C, et al. 2018. Pengaruh Konsentrasi *Natrii Carboxymethylcellulosum* (Cmc Na) Sebagai Suspending Agent Terhadap Stabilitas Fisik Pada Sediaan Suspensi Kloramfenikol. *Journal*. Sekolah Tinggi Ilmu Kesehatan Kendal. Kendal.
- Wirasti, Ulfah, F, Slamet. 2020. Karakterisasi Sediaan Suspensi Nanopartikel Ekstrak Etanol Daun Afrika (*Vernonia amygdalina Del.*). *Journal*. Universitas Muhammadiyah Pekajangan Pekalongan. Pekalongan.

THE EFFECT OF HEALTH EDUCATION USING BOOKLETS ON COMPLIANCE WITH TAKING MEDICINES OF LEPROSY PATIENTS

Hosiana L. Sombuk, Yayuk Nuryanti, Ivonne J Fabanjo
Diploma Three Nursing Study Programme
Health Polytechnic of Sorong, West Papua Province

Email: yayuk.nuryanti@yahoo.com

Abstract

Background: Leprosy is a chronic granulomatous infectious disease caused by the bacteria mycobacterium leprae. leprosy if not treated can cause disability. New cases in West Papua in 2018 were 949. Data for 2014-2015 new cases of leprosy in Manokwari Regency are 130. A number of 60% of leprosy patients registered at the Sanggeng Community Health Center, do not comply with the treatment program. Leprosy treatment is a long-term treatment, so that compliance is required to healing and prevent transmission. Research Purposes: To determine the effectiveness of health education using booklet on medication compliance at the Sanggeng Community Health Center, West Manokwari, based on knowledge, education, occupation, age, environment and social. Design: Quantitative research with Quasi Experiment post test only control group. Population and sample: The population of all leprosy patients registered at Sanggeng community health center is 70 people. The sampling technique used accidental sampling for 2 weeks. The sample was divided into 2 groups, the treatment group was applied to patients who came to the community health center a number of 32 and the control group to patients who visited at home a number of 31. Data were analyzed using Chi Square test with p value <0.05. Results: The percentage of adherence in the treatment group was found to be 80% in good knowledge, and 55% in the control group. The statistical test results obtained p value > 0.05 for the three factors, namely education, knowledge and environment, so that the hypothesis is rejected, the meaning is health education using booklet does not affect compliance with leprosy patients taking medication at the Sanggeng Community Health Center in Manokwari. Suggestion: Community Health Center staff must continue to monitor patients so that they can take medication regularly in an effort to healing and prevent disability, breaking the chain of transmission.

Keywords: Health Education, Booklet, Leprosy, Compliances

INTRODUCTION

Leprosy is a chronic granulomatous disease caused by Mycobacterium leprae, the disease remains a major health problem in Indonesia because of the impact of disability, social stigma and economic loss (Adriaty, et al, 2020). This disease mainly affects the skin, peripheral nerves, eyes and nasal mucosa. With early diagnosis and treatment the disease can be cured and people with leprosy can continue to work and lead an active life during and after treatment (CDC, 2017). Leprosy is categorized as a neglected tropical disease, and transmission still occurs in more than 120 countries, and each year more than 200,000 new cases are reported. At the end

of 2019 the number of cases in treatment based on data from WHO was 177,175. There was a decrease in the number of cases in all countries, except in America, an increase in the number of cases increased from 34,358 in 2018 to 35,231 in 2019 (WHO, 2020).

The national elimination of leprosy in Indonesia has been achieved in 2000, however until now the epidemiological situation tends to be static with the attainment of new cases ranging from 17,000 to 20,000 cases every year with varying numbers, especially in the eastern region. The cause is the existence of a social stigma against leprosy which is quite high in the community, the lack of community knowledge about leprosy, health workers hinder case finding and management of leprosy, comprehensive management of leprosy has not been maximized (Kemenkes, 2019). West Papua Province in 2018 found 949 cases with the highest number of cases in three regions, namely; Manokwari, Sorong City and Wondama Bay district (Profil Dinkes Provinsi Papua Barat, 2019). In Manokwari Regency in 2014-2015, there were 130 new cases (Dinkes Kab Manokwari, 2019). There are 70 people with leprosy at the Sanggeng Community Health Center, 42 people (60%) who do not comply with taking medication. Leprosy if not treated immediately, can cause disability in the patient's body and cause psychosocial problems, so that it creates a stigma or society views the patient badly (WHO, 2014).

Mulyadi, Cahyo, dan Eva (2017), explained that if leprosy is not treated, it can cause physical disability. The action must be taken by nurses is to recommend that they take Multidrug Therapy (MDT) drugs regularly and involve the family for supervision of taking medication. Medication compliance for patients with leprosy is the key to successful treatment and recovery. In order for the sufferers to comply, family support is needed to supervise and remind to take medication everyday so as not to stop taking the drug. The duration of treatment and side effects that can cause the patient to be bored and eventually will drop out of Multidrug Therapy (MDT) treatment. In case of breaking treatment then the patient will still be a source of transmission (Andriani, Khotimah, & Supriyadi, 2019). The role of health workers, especially nurses at community health center is very important for active prevention and detection of patients, also break the chain of transmission, no less important is to educate the patient about the disease and the importance of regular treatment without a break, as it also gives support and motivation for leprosy patients and families in efforts to prevent the degree of disability (Andriani, Khotimah, & Supriyadi, 2019).

Research conducted by Rustam 2018 on the determinants of success factors in the treatment of multibacillary type leprosy, shows that the role and good behavior of health workers in providing information about leprosy and its treatment makes it easy for patients to understand, It also motivates lepers to visit to the Puskesmas for treatment and still compliance to therapy. One of the leprosy prevention efforts that have been undertaken by the government both at central and local levels is the promotion of health, with the target of leprosy sufferers, families, and communities, to reduce the high number of new cases and disabilities, However, all of these efforts have not been optimally implemented because there are several obstacles such as not allocated funds for the leprosy program because they are still considered not a priority, limited trained personnel, program continuity has not run smoothly (Kemenkes, 2019).

Health promotion in the form of health education will have a good impact if it uses good and appropriate methods and media. Health education is a communication process in conveying information to achieve behavior change. The media and methods often used in health promotion are leaflets, booklets, videos, lectures, posters, flipcharts, and banners (Kemenkes, 2019). Research on the use of booklet media conducted by Hertanti Risma 2017 concerning education using booklets in elderly with hypertension shows that there is an effect of booklet media education on medication compliance. Considering that the incidence of leprosy at the Sanggeng Community Health Center has increased and no research has been conducted on leprosy patients on medication compliance, it is important to investigate about "The Effect of Health Education using booklets on medication adherence to leprosy patients at the Sanggeng Community Health Center, Manokwari Regency".

METHOD

The research design used a Quasi Experiment with posttest only control group. The population was taken all leprosy patients registered at the Sanggeng Community Health Center, the sampling technique by accidental sampling. Respondents were divided into 2 groups, namely group 1 as the treatment group who were given health education using a booklet, then the level of knowledge was measured using a questionnaire. Group 2 is a control group who was not given health education using booklets. The group was given a questionnaire, then gave a booklet. The results will be compared between groups 1 and 2.

After 2 weeks of explanation and data collection, respondents will be measured the level of compliance to taking their medication using the MMSA-8 questionnaire. Secondary data were collected through a health worker who is responsible for prevention and disease control

programs in Sanggeng Community Health Center. Secondary data includes leprosy patient data obtained from patient registers.

Univariate data analysis using the proportion formula, and bivariate using the Chi-square test, on the independent variables with significance level (p) was 0.05 with 95% confidence interval. Three ethical principles are applied in this research, namely informed consent, confidentiality and confidentiality.

RESULT

The population in this study were all leprosy patients registered at the Sanggeng Community Health Center in 2020, a number of 70 people. The sample is planned to be taken entirely by total sampling technique which is grouped into 2 groups by simple random, namely raffle technique. Respondent characteristics are described in Table 1.

Table 1. Respondent Characteristic

No	Variable	Group 1 (Treatment)		Group 2 (Control)	
		n	%	n	%
1	Gender				
	Famale	10	31,3	10	32
	Male	22	68,7	21	68
2	Age				
	Young Adult	18	56,2	18	58
	Adult	14	43,8	13	42
3	Education				
	High	13	40,6	11	35
	Low	19	59,4	20	65
4	Work				
	Working	11	34,4	10	32
	Not Working	21	65,6	21	68
5	Knowledge				
	Good	28	87,5	20	65
	Less	4	12,5	11	35
6	Environment				
	Accept	27	84,4	25	81
	No accept	5	15.6	6	19
7	Social				
	Interact	26	81,3	29	93
	No Interact	6	18,7	2	7

Patients who received the first lottery were entered into the treatment group, and the second lottery entered the group, and so on. In conducting the research, the situation and conditions

changed due to the Covid 19 pandemic, so the sampling technique was changed to be accidental. The patients who came to the community health center were included in group 1, namely treatment group and group 2 as a control group was taken from the results of home visits. For 2 weeks, the treatment group was 32 people, and the control group was 31 people.

The results of statistical tests on educational, knowledge and environmental factors using the chi square test, did not qualify, so that the p value was taken from the Fisher's Exact Test, which obtained three factors with a value of $p > 0.005$. The factor of the respondent's education level on medication adherence is described in table 2.

Table 2. The effect of health education on medication compliance based on educational factor

Variable	Group1 (Treatment)				<i>p</i>	Group 2 (Control)				<i>p</i>
			Not Compliance					Not Compliance		
	Compliance			Compliance						
	n	%		n		%	n		%	
Education										
High	12	37,5	1	3,1	1.00	9	29	2	7	2.81
Low	18	56,3	1	3,1		19	61	1	3	
	30	93,8	2	6,2		28	90	3	10	

The factor of the respondent's level of knowledge on medication compliance is described in table 3.

Table 3. The effect of health education on medication compliance based on Knowledge factor

Variable	Group1 (Treatment)				<i>p</i>	Group 2 (Control)				<i>p</i>
	Compliance		Not Compliance			Compliance		Not Compliance		
	n	%	n	%		n	%	n	%	
Knowledge										
Good	27	84,3	2	6,3	1.00	17	55	3	10	1.00
Less	3	9,4	0			11	35	0		
	30	93.7	2	6.3		28	90	3	10	

Environmental factors of respondents on medication compliance are described in table 4

Table 4. The effect of health education on medication compliance based on Environment factor

Variable	Group1 (Treatment)				<i>p</i>	Group 2 (Control)				<i>p</i>
	Compliance		Not Compliance			Compliance		Not Compliance		
	n	%	n	%		n	%	n	%	
Environment										
Accept	26	81,2	1	3,1	2.84	22	71	3	10	1.00
No Accept	4	12,5	1	3,1		6	19	0	0	
	30	93,7	2	6,3		28	90	3	10	

DISCUSSION

Education factor

The results showed that the education of respondents did not affect compliance with taking medication in leprosy patients. This Findings is in accordance with research conducted by Khumairah Rani (2014) on the effect of education level and family support on compliance with taking medication for leprosy patients. The results showed that there was no effect between education level and medication compliance. This result is not in accordance with YB Mantra quoted in Notoadmojo (2003), which states that a person's behavior can be influenced by his or her education. A person's behavior will motivate him or her to behave and participate in their life. The higher a person's education, it is easier to receive information, so that his attitude and motivation will be better.

The results of the study were found mostly in both groups with higher education, and most of them were compliance with taking medication. However, statistically it was found that the *p* value was greater than 0.05, which means that the provision of health education had no effect. Referring to the results of research data on medication compliance, most of whom have low education but have a high level of adherence, it could be because the patient's level of awareness to recover is high, they do not infect other people and do not want disability. Although statistically it does not show an effect, clinically there is a relationship between the level of education and the respondent's understanding which in turn will increase the compliance with taking medication.

Knowledge factor

The results showed that the respondents' knowledge did not affect the compliance of respondents in taking medication. This is not in line with L.W. Green in Notoatmojo (1993) states that one's knowledge is an initial influence on Individual behavior, so that in general knowledge will have a positive correlation with behavior. Another study from Susanto (2006) in Sukoharjo, found that a person's knowledge has a close relationship with disabilities in patients. Another study of Susanto (2006) in Sukoharjo, it was found that a person's knowledge are intimately connected with their disability in patients.

The results of this study are also not in line with Meru Sutik (2017) in his research, it was found that the results of bivariate analysis using chi square obtained a contingency coefficient of 6.667 with a significance p value of 0.025 ($p < 0.05$). With the conclusion that there is a significant relationship between the level of knowledge of leprosy patients with compliance with taking MDT with a low relationship. Another research result from Giantoro M (2019) states that there is a relationship between the respondent's knowledge and the level of compliance with the respondent's leprosy medication with a value (p value 0,000).

Compliance with taking medication in leprosy patients aims to cure and limit transmission and disability. This shows that patients with good knowledge are expected to have adherence in taking medication so that they can recover and avoid transmission to others and not cause disabilities. This discrepancy can be caused by differences in place of residence, culture, and beliefs. Because in general the community's stigma against leprosy is still high.

Environment factor

The results showed that most of the respondents' environment accepted the condition, and this factor statistically did not affect the respondent's compliance with taking medication.

The results of this study are in line with Giantoro, M (2019) who explained that family support has no effect on leprosy medication adherence with a p value > 0.005 . In this study were asked to the patient's environment are the questions- related to the family, how do the family's attention to the patient in going to the community health center and taking medication. Most families accept the patient's condition, meaning that the family supports the patient to recover by taking medication regularly and compliances to the treatment program. Another study from Saputri (2017) found that most respondents have good emotional support and prioritize taking good medicine, and most of them have good support.

CONCLUSION

Health education did not affect compliance with taking medication for people with leprosy at the Sanggeng Health Center, based on educational, knowledge and environmental factors.

SUGGESTION

The role of health workers, especially nurses at community health center are very important for active prevention and detection of sufferers and break the chain of leprosy transmission, so it is very important to continue and make home visits also provide education about taking medication regularly so that patients recover and avoid disability.

REFERENCES

- Adriaty,D., Rosita, C,SP., Iswahyudi., Agusni,I., & Izumi,S. (2020).Leprosy transmission in endemic and non-endemic areas based on the profil of antibody respon of PGL-1 and PCR detection of Mycobacterium leprae DNA from nasal swab among healthy children of East Java, Indonesia. *Infectious Disease Report 2020*: 12(s1):8748, 109-112
- Andriana, E., Khotimah, H., & Supriyadi, B.(2019). Dukungan keluarga dalam kepatuhan pengobatan pada penderita kusta. *Community of Publishing in Nursing*, ISSN:2303-1298.
- Arif Mulyadi, T. C. (2017). *Upaya Penderita Kusta Dalam Mencegah Peningakatan Derajat Kecatatan*. Malang: Jurnal Ners dan Kebidanan, Volume 4,.
- Dharma, K. K. (2011). *Metodologi Penelitian Keperawatan*. Jakarta Timur: CV Trans Info Media.
- Rustam, M.Z.A.(2018) Determinan keberhasilan pengobatan multi drug therapy pada penderita kusta tipe multibasiler. *Jurnal Manajemen Kesehatan yayasan RS.Dr, Soetomo*. Vol 4. ISSN: 2477-0140.
- Center for Disease Control and prevention (CDC).(2017). Hansen's disease (Leprosy). Diakses 8 Juni 2020. <https://www.cdc.gov/leprosy/index.html>
- Dinas Keehatan Provinsi Papua Barat, (2019). Profil Dinas Kesehatan Provinsi Papua Barat.
- Dinas Kesehatan Kabupaten Manokwari, (2019): Profil Dinkes Kabupaten Manokwari
- Giantoro. M, (2019) *Faktor-Faktor Yang Berhubungan Dengan Tingkat Kepatuhan Minum Obat Penderita Kusta Di Puskesmas Pasir Panjang Dan Puskesmas Alak Di Kota Kupang, Indonesia*, CDK-276/ vol. 46 no. 5 th. 2019
- Gunawan, P. A. (2018). Tingkat pengetahuan penyakit kusta dan komplikasinya pada siswa sekolah menengah atas negeri. *Dharmakarya: Jurnal Aplikasi Ipteks untuk Masyarakat*, ol. 7, No. 2, Juni 2018: 101 - 105.
- Hertanti Risma (2017). Pengaruh edukasi media booklet terhadap kepatuhan minum obat pada lansia dengan hipertensi di Puskesmas Kendalsari kota Malang. Tesis. Universitas Brawijaya.
- Notoatmodjo. (2003). *Pendidikan dan Perilaku kesehatan* . Jakarta: PT. Rineka.

- Kemenkes. (2019). Peraturan menteri kesehatan no.11 tahun 2019, tentang penanggulangan kusta. Jakarta: Kemenkes.
- Kemenkes. (2019). Keputusan menteri kesehatan no.HK.01.07/Menkes/308/ 2019, tentang pedoman nasional pelayanan kedokteran kusta. Jakarta: Kemenkes
- Khairunisa., R (2014). Pengaruh tingkat pendidikan dan dukungan keluarga terhadap kepatuhan minum obat penderita kusta di kabupaten aceh utara. Skripsi. Fakultas Kedokteran universitas Syah Kuala Aceh.
- Saputri. YP., Thohirun, dan Luthviation, (2017) Hubungan antara Dukungan Sosial Keluarga dengan Kepatuhan Minum Obat Penderita Kusta (Studi di Kecamatan Puger dan Balung Kabupaten Jember), *e-Jurnal Pustaka Kesehatan*, vol. 5, (no.3), september, 2017
- Susanto. (2006). Faktor- Faktor yang berhuungan dengan tingkat kecacatan penerima Kusta. *Yogyakarta Pascasarjana Universitas Gajah Mada*.
- WHO (2020). Global leprosy (Hansen disease) update, 2019: time to step-up prevention initiatives. *Weekly Epidemiological Record*. No.36;96:417-440
- Organization, W. H. (2018). *Weekly Epidemiological Record* . 93(35) 446-6.
- WHO (2014). *Weekly epidemiological record*. World Health Organization: from <https://www.who.int/wer/en/>.
- Organization., W. H. (2018). *Weekly epidemiological record*. World Health Organization: from <https://www.who.int/wer/en/>.

DESCRIPTIVE STUDY OF PREECLAMPSIA SCREENING IN THIRD TRIMESTER PREGNANT WOMEN (USING MAP (MEAN ARTERIAL PRESSURE), ROT (ROLL OVER TEST), BMI (BODY MASS INDEX), AGE DAN HISTORY OF PREECLAMPSIA)

Ade Nurul Ashifa, Triana Sri Hardjanti, Elisa Ulfiana
Departement of Midwifery Semarang Health Polytechnic Ministry of Health, Indonesia

Email: adenurulashifa@gmail.com

Abstract

One of five causes maternal death in Semarang is hypertension which can cause preeclampsia. Kedungmundu had 2.306 pregnant women with 27 hypertension cases (1,7%) and 5 preeclampsia cases (0,2%) back in 2019. The combination of blood pressure checks applied to Mean Arterial Pressure (MAP) formula and Roll Over Test (ROT) formula, body mass index (BMI) conditions, patient's age and patient's history of hypertension before pregnancy can be used as a predictor of preeclampsia. With descriptive correlative method and cross-sectional discussion. The population of this study used a total sampling method, all third trimester pregnant women who did antenatal care at PMB Eka Setyowati Kedungmundu, as many as 30 people. Data analysis in this study uses descriptive analytic technique central tendency. Results showed that most of third trimester pregnant women had negative MAP results (80.0%) and positive MAP (20,0%), negative ROT result (83,8%) and positive ROT (16,2%), normal BMI result (BMI<29) (80,0%), excessive BMI (20%) and exorbitant BMI (10%), normal age (age 25-35) (76,7%) and risky age (23,3%), pregnant woman without hypertension history (80,0%) and pregnant woman with hypertension history (20,0%), pregnant woman without preeclampsia (93,3%) and pregnant woman with preeclampsia (6,7%). The conclusion is that third trimester pregnant women in Kedungmundu do not have predisposition in preeclampsia. It is recommended for health workers to do screening preeclampsia at 16-24 weeks of pregnancy so that preeclampsia can be detected early and patients can be immediately given an active care in according with POGI recommendations.

Keywords: MAP; ROT; BMI; age; hypertension history; preeclampsia; pregnancy

INTRODUCTION

Based on Inter-Census Population Survey (ICPS) in 2015 which conducted every five years by the Central Statistics Agency (BPS), known that Maternal Mortality Rate (MMR) in Indonesia from 1991 to 2015 has decreased by 85 cases. The decrease in MMR didn't reach Indonesia's MDGs target, namely a reduction of 102 cases per 100,000 live births in 2015. To be able to realize the decrease in MMR, Indonesia is targeted in 2030 to reduce 131 events per 100,000 live births or decrease to 205 incidents by 2020.

The number of MMR in Semarang in 2019 caused by preeclampsia cases as much as 12% death caused by preeclampsia. Preeclampsia is a hypertensive disease caused by pregnancy characterized by hypertension with systolic/diastolic $\geq 140/90$ mmHg and proteinuria $\geq 300\text{mg}/24$ hours after 20 weeks of gestation. The edema criterion is no longer used as a diagnostic criterion because it is too common in normal pregnancies. Risk factors for preeclampsia include primigravida, diabetes mellitus, multi parity, age, family history of preeclampsia, history of hypertension, obesity, kidney disease and heart disease. (1)

A preliminary study conducted by re-searchers at Semarang Public Health Office showed that pregnant women with the highest hypertension rate were Kedungmundu area. With the number of pregnant women with hypertension in 2019 as many as 27 pregnant women and 5 pregnant women with preeclampsia. With fact the top five causes of maternal death in the city of Semarang are preeclampsia with one of the signs of preeclampsia is hypertension, and there is no screening method to detect preeclampsia independently. So researchers are interested in conducting research "Descriptive Study of Preeclampsia Screening Using MAP (Mean Arterial Pressure), ROT (Roll Over Test), BMI (Body Mass Index), Age and History of Hypertension in Third Trimester Pregnant Women".

THEORITICAL BASIS

Preeclampsia

1. Definition

Preeclampsia is a disease with typical signs of high blood pressure (hypertension), tissue swelling (edema) and presence of protein in the urine (proteinuria) that occurs during pregnancy or up to 48 hours postpartum. This disease generally occurs in the third trimester. Preeclampsia is also known as Pregnancy Induced Hypertension (PIH) gestosis or pregnancy toxemia. (2)

2. Etiology

Seeing the cause of preeclampsia isn't surely known until now, not only one factor but several factors and the big possibility preeclampsia will cause complications can end in death. However, preeclampsia can be detected as early as possible through regularly antenatal care from first trimester to third trimester to prevent preeclampsia from getting worse. (4)

3. Symptom and Sign

In general, the diagnosis of preeclampsia is based on the presence from two of three main signs: hypertension, edema, and proteinuria. This can be use for statistical purposes, but can be harm the patient because each sign can be a danger even if found alone. There are mild preeclampsia and severe preeclampsia. Mild preeclampsia is based on the onset of hypertension with proteinuria and or edema after 20 weeks of gestation. According to Prawirorahardjo in the title Maternal and Neonatal Health Services. (5) Severe Preeclampsia symptoms are found blood pressure of at least ≥ 160 mmHg systolic or ≥ 110 mmHg diastolic at two tests spaced 15 minutes using the same arm, proteinuria $> 5\text{g}/24$ hour or positive (+) 4, oliguria, urine production less than 500 cc/24 hour, increase in plasma creatinine levels, impaired vision, decreased consciousness, headache, blurred vision, epigastric pain, pulmonary edema and cyanosis, microangiopathic hemolysis, thrombocytopenia: platelets $< 100,000$ cells/mm or a rapid decrease in platelets, increase in transaminase concentration 2 times normal and / or the presence of pain in epigastric area / right region of the upper abdomen, impaired intrauterine fetal growth, HELLP syndrome (hemolysis, elevated liver enzymes, low platelets).

4. Preeclampsia's Screening

a. Body Mass Index (BMI)

Increased BMI is closely associated with the occurrence of mild hypertension or preeclampsia. Nutrient intake and weight gain during pregnancy are two main factors that can be modified affecting maternal and infant output. BMI also affects gestational age. Delivering a baby with sufficient gestational age is a major predictor of neonatal morbidity and mortality, whereas excessive gestational age poses a risk to the baby's long-term health.

(3)

Tabel 1 Body Mass Index (BMI)

Score	BMI Status
$< 16,5$	Severe underweight
16,5 – 18,5	Under weight
18,5 – 25	Normal
25 – 30	Overweight
30 – 35	Moderate Obesity
35 – 40	Severe Obesity
> 40	Morbid/ massive Obesity

Tabel 2 Recommended range of weight gain for pregnant women based on BMI

Kategori	IMT	Kenaikan BB (kg)	
Low	< 19,8	12,5 – 18	
Normal	19,8 – 26	11,5 – 16	
High	26-29	7 – 11,5	b.
Obese	> 29	≥ 7	c.

b. Mean Arterial Pressure (MAP)

Mean arterial pressure is the average value of arterial pressure assessed from diastolic and systolic measurements, then the average value of arterial pressure is determined. MAP is said to be positive if the result is > 90 mmHg, and negative if the result is <90 mmHg. In low-risk pregnancy, mean arterial blood pressure in the second trimester was a better predictor of preeclampsia than systolic blood pressure or diastolic blood pressure. (9). Mean arterial pressure is the main driving force delivers blood to the tissues. This pressure is monitored and regulated in the body, not only systolic pressure, arterial diastolic only or pulse pressure and also not in other parts of vascular area. (10)

Mean arterial pressure calculates as follow:

$$\text{MAP} = \frac{(2 \text{ diastolic} + \text{systolic})}{3}$$

c. Roll Over Test

Roll over test (ROT) is the measurement of blood pressure in two different positions, the sleeping position on the left side and the supine sleeping position. ROT is said to be positive if there is a change /increase in diastolic blood pressure between the side and supine sleeping positions ≥15 mmHg and negative if the diastolic change is <15 mmHg (9)

d. Age

Age greatly affects pregnancy and childbirth. A good age for pregnancy or childbirth ranged between 20-35 years. Mothers who have a risky age (<20 years or > 35 years) have risk factors for preeclampsia, while the age of 20-35 years is the best reproductive age to get pregnant. This gap may be due to preeclampsia is influenced by many factors such as genetic factors, young primigravida, environmental factors, women in both ends of reproductive age, chronic medical illnesses such as hypertension, diabetes mellitus and so forth. (12).

e. History of Hypertension

A history of hypertension has a risk of getting preeclampsia 6.42 times compared to pregnant women who do not have a history of hypertension. High blood pressure in

pregnant women impacts that range from mild to severe preeclampsia. Hypertension in pregnancy is divided into mild preeclampsia, severe preeclampsia, eclampsia, and superimposed hypertension (pregnant women who already have hypertension before pregnancy and hypertension continues during pregnancy). The signs and symptoms that occur and the management of each hypertension aren't the same. The results of Anggana's 2001 study showed that 8.1% of pregnant women had hypertension since the first trimester which then progressed to preeclampsia. Preeclampsia that occurs at > 35 years of age is likely the result of hypertension that is tightened by pregnancy. (17).

Overall screening for preeclampsia at 16-24 weeks of pregnancy was carried out by assessing the following conditions.

- Age: If the age is ≤ 20 years or ≥ 35 years and / or there is a history of chronic hypertension, diabetes mellitus (DM), heart or kidney disorders BMI ≥ 29 kg/m²
- MAP ≥ 90 mmHg
- ROT ≥ 20 mmHg

If the screening results are positive ≥ 2 , then pregnant women have a risk of developing preeclampsia (6).

METHOD

This study used a cross sectional approach. This research was conducted in April-May 2020. The research area was at PMB Eka Setyowati Kedungmundu, Semarang. The population in this study were all third trimester pregnant women who had pregnancy in the period March 2020 and had an estimated delivery in April-May 2020 at PMB Eka Setyowati Kedungmundu, a total of 30 pregnant women and using total sampling. Analysis of the data in this study using descriptive analysis measurement techniques. Descriptive analysis is the most basic analysis to describe the state of the data in general. This descriptive analysis includes several things, namely frequency distribution, measurement of central tendency, and measurement of variability (19)

RESULT AND IMPLICATION

The results of the study entitled "Descriptive Study of Preeclampsia Screening Using MAP (Mean Arterial Pressure) Method, ROT (Roll Over Test) Method, BMI (Body Mass Index), Age and History of Hypertension in Third Trimester Pregnant Women" were written based on the data obtained from filling in Preeclampsia screening sheets conducted by two enumerators who worked at PMB Eka Setyowati with 30 respondents in their third trimester pregnant

women who performed pregnancy examinations at PMB Eka Setyowati. This research was conducted from April to May 2020. Results of the study were in the form of univariate analysis to describe the frequency distribution of each research variable.

Table 3. Distribution of MAP, ROT, BMI, age, history of hypertension and features of preeclampsia in third trimester pregnant women

Variable	Mean	Median	Min	Max	SD
MAP					
MAP Positive	93,57143	93	90	103	93
MAP Negative	77,47826	80	70	87	6,200217
ROT					
ROT Positive	20	20	20	20	0
ROT Negative	7,777778	10	0	10	4,236593
BMI					
Low BMI score	16,6667	17	16	17	0,57735
Normal BMI	23,6476	22,9	17,8	28,5	3,45248
High BMI score	31,7333	30,4	29	35,7	3,08783
Age					
Risky Age	28,857	35	19	37	8,9336
Not Risky Age	27,552	28	22	34	3,7034

Variable	Frequency	Percentage
History of Hypertension		
Have History	6	20,0 %
Has no Hostory	24	80,0 %
Preeclampsia		
Preeclampsia	2	6,7 %
Not Preeclampsia	28	93,3%

Description of MAP of Third Trimester Pregnancy

Results of this study indicate most of the respondents in this study were pregnant women who had a negative MAP value, namely 80.0% or 24 respondents and 20.0% or 6 respondents who had a positive MAP value. Based on the result, most of the third trimester pregnancy had a negative MAP value with a mean or mean value of 81.23 mmHg from the minimum threshold for positive MAP ≥ 90 mmHg. In this case the mean MAP value doesn't appear to be risky and a small number of other respondents have a positive MAP value. In the preeclampsia screening results, it was found that two out of six respondents or 33% of respondents were detected to have a positive MAP or as much as 7% of the total sample of third trimester pregnancy in the Kedungmundu area were detected to have preeclampsia with MAP values of 90 mmHg and 103 mmHg. Physiologically, pregnant women will experience an increase in blood volume

accompanied by an increase in cardiac output, this is to prevent systemic vascular resistance (blood circulation obstruction), if the mother's blood vessels cannot adapt to this change it will cause an imbalance between blood volume and cardiac output. Systemic vascular resistance will cause disruption of the walls of blood vessels and an increase in MAP value followed by an increase in blood pressure in pregnant women. (20). In this study, the increase in blood pressure values of pregnant women occurred in the third trimester, which is one of the signs of preeclampsia, namely hypertension that appears after 20 weeks of gestation. (14) Thus, pregnant women in the third trimester in the Kedungmundu who were detected positive for preeclampsia had a positive MAP value.

Description of ROT of Third Trimester Pregnancy

Results showed that most of the respondents in this study were pregnant women who had a negative ROT value, as many as 83.8% or 25 respondents and 16.7% or 5 respondents who had a positive ROT value. Based on the results, most of the third trimester pregnancy in the Kedungmundu area had a negative ROT value with a mean or mean value of 9.6 mmHg from the minimum threshold for positive ROT ≥ 20 mmHg. In this case the difference between the mean values is below the minimum positive ROT value of 10.4 mmHg so that it isn't risky and a small number of 5 other respondents have a positive ROT value of more than 20 mmHg. In the preeclampsia screening results, it was found that one in five respondents (20%) with a positive ROT category with an ROT value of 20 mmHg and one in twenty-five respondents (4%) with a negative ROT category with a ROT value of 10 mmHg with preeclampsia. Positive ROT values > 15 mmHg that occur in pregnant women respondents state that there is a disruption in uteroplacental blood flow which causes a change in the profile value between the mother and the fetus who is in a blood pressure position.

The hypertensive response that occurs in changing the position of pregnant women from oblique to supine is a predictor of the incidence of gestational hypertension. And in this study, the increase in blood pressure values of pregnancy in the third trimester, which is one of the signs of preeclampsia, namely hypertension that appears after 20 weeks of pregnancy. (21) Thus, pregnant women in the third trimester in the Kedungmundu who were detected with preeclampsia had positive and negative ROT values.

Description of the BMI of Third Trimester Pregnancy

Results of this study indicate that most of the respondents in this study had a normal BMI,

namely 70.0% or 21 respondents, a BMI less than 10.0% or as many as 3 people and 20.0% or as many as 6 respondents were categorized as having excess BMI. A high BMI value > 26.0 has three times the chance of causing hypertension in pregnancy, this can increase hyper estrogenic, insulin resistance, free fatty acids and hyper androgen. This situation will affect the endothelium function which will activate IL-6 (interleukin-6) and C-reactive protein. There are several phases of preeclampsia. First, because of decreased blood circulation to the placenta. Second, because of oxidative stress. High BMI values are associated with dyslipidemia, which will increase serum / plasma triglycerides, LDL (Low Density Lipoprotein) and decreased VLDL (Very Low-Density Lipoprotein). This situation will induce oxidative stress and cause endothelial system dysfunction, which is the basic concept for preeclampsia.(22)

Based on the results, most of the third trimester pregnancy in the Kedungmundu area had normal BMI values and a few others had excess BMI values. In the preeclampsia screening results, it was found that one in six respondents with an excess BMI (17%) with a value of 35.5 and one in twenty-one respondents with a normal BMI (5%) with a value of 24 were detected to have preeclampsia. Thus, pregnant women in the third trimester in the Kedungmundu who were detected with preeclampsia had normal and excessive BMI values.

Description of the Age of Third Trimester Pregnancy

Results of this study showed most respondents in this study maternal age categorized in age aren't at risk, that is 76.7% or 23 respondents and 23.3% or 7 respondents fall within the age at risk. The age of pregnant women greatly affects the pregnancy process and the delivery process. The recommended age for being able to go through the process of pregnancy and childbirth is 20 to 35 years old. Pregnant women who have a risky age (less than 20 years and or more than 35 years) have a risk of developing preeclampsia while the age of 20 years to 35 years is the best reproductive age to get pregnant. (12). Based on the results, the number of respondents who aren't at risk (20-35 years) indicates that the respondents have a good level of reproductive health, although there are still respondents who have a risky age (≤ 20 years and ≥ 35 years). In the preeclampsia screening results, it was found that two out of twenty-three respondents (9%) who had no risk of having preeclampsia were detected. Thus, pregnant women in the third trimester in the Kedungmundu who were detected positive for preeclampsia occurred at a non-risk age (20-35 years).

Description of History of Hypertension in Third Trimester of Pregnancy

The results of this study showed most respondents in this study had no history of hypertension, as many as 80.0% or 24 respondents and 20.0% or as much as 6 respondents didn't have a history of hypertension. A risk of 6.42 times the incidence of preeclampsia can occur in pregnant women with a history of hypertension compared to pregnant women without a history of hypertension. The signs and symptoms that occur and the management of each hypertension aren't the same. Anggana's research, in 2011, found that 8.1% of pregnant women had hypertension since the first trimester of pregnancy, which then had a history of hypertension that developed into preeclampsia. Preeclampsia that occurs in pregnant women aged > 35 years is likely due to hypertension are tightened by pregnancy. (17). Based on the results, most of the third trimester pregnancy in the Kedungmundu area didn't have a history of hypertension and a few others had a history of hypertension. In the preeclampsia screening results, it was found that one in six respondents (17%) who had a history of hypertension and one in twenty-four respondents (4%) who didn't have a history of hypertension were detected to have preeclampsia. Thus, pregnancy in the third trimester in the Kedungmundu who have preeclampsia detected have and don't have a history of hypertension.

Description of Preeclampsia in Third Trimester of Pregnancy

Results of this study showed most respondents in this study isn't detected to have preeclampsia in third trimester, as many as 28 respondents, or 93.3%, while the Maternal Trimester III that preeclampsia is as much as 2 respondents or 6.7%. Overall screening of preeclampsia can be done since 16-24 weeks gestation to assess the conditions of age, if age ≤ 20 years or ≥ 35 years and or there is a history of chronic hypertension, BMI ≥ 29 / kg / m², MAP ≥ 90 mmHg and ≥ 20 ROT mmHg. If the screening results are positive ≥ 2 , then pregnant women have a risk of developing preeclampsia.(6). Based on the results, third trimester pregnancy in the area mostly undetectable Kedungmundu a small proportion of pre-eclampsia and pre-eclampsia is detected. The examination was conducted in three trimester pregnant women in PMB Eka Setyowati Kedungmundu area that has a gestational age ranging between 26-37 weeks with an average gestational age of 30 weeks, where preeclampsia appears in the third trimester of pregnancy. In the screening results, there were two respondents who had preeclampsia with positive MAP values (90 mmHg and 103 mmHg), negative ROT values (10 mmHg) and positive ROT values (20 mmHg), normal BMI (24) and excess BMI (35.5), Age isn't at risk (34 and 28 years), and there are those who have and don't have a history of hypertension. Thus, the preeclampsia

screening that was carried out on two respondents who detected preeclampsia in the third trimester in the Kedungmundu was supported by a screening score with a positive value ≥ 2 .

CONCLUSION

As many as of 24 or 80% of respondents have measurement results Mean Arterial Pressure (MAP) negative are not at risk of preeclampsia and the other fraction that is 6 or 20% of respondents have a positive value means MAP trimester pregnant women in Kedungmundu have no inclination have preeclampsia. As many as 25 or 83.3% of respondents had a negative Roll Over Test (ROT) measurement, which wasn't at risk for preeclampsia and a small proportion of 5 or 16.7% of respondents had a positive ROT value which means that the third trimester pregnant women in Kedungmundu don't have a tendency to develop preeclampsia.

As many as 24 or 80% of respondents have a normal body mass index (BMI) measurement that is not at risk of preeclampsia, 3 or 10% of respondents have a low BMI and a small proportion of 6 or 20.0%. Respondents have an excessive BMI value, which means that pregnant women in the third trimester in Kedungmundu Health Center don't have a tendency to experience preeclampsia. As many as 23 or 76.7% of respondents have a non-risk age, that is, they are not at risk of preeclampsia and a small proportion, 7 or 23.3% of respondents, have a risk age, which means that the mother is pregnant at the third age. trimester in Kedungmundu there is no tendency for preeclampsia.

As many as 24 or 80.0% of respondents didn't have a history of hypertension who were not at risk of preeclampsia and a small proportion of others, namely 6 or 20.0% of respondents had a history of hypertension, which means that pregnant women in the third trimester in Kedungmundu don't have a tendency to experience preeclampsia. As many as 28 or 93.3% of respondents had no preeclampsia detected and 2 or 6.7% of respondents had preeclampsia. Thus the results of the research for pregnant women in the third trimester in Kedungmundu didn't have a tendency to preeclampsia.

REFERENCE

1. Bernika M, Khoidar A, Nurul A, Ririn W, Ika S. Analisis Faktor Risiko Yang Memengaruhi Tekanan Darah dan Protein Urine pada Ibu Hamil dengan Preeklamsia di RSUD DR. H. ABDUL MOELOEK Provinsi Lampung 2017. J Kemas (Kesehatan Masyarakat) Khatulistiwa. 2017;
2. Suldanianti. Identifikasi Ibu Hmail Yang Mengalami Preeklamsia Di Rumah Sakit Umum Dewi Sartika Kendari Provinsi Sulawesi Tenggara Tahun 2016. 2017;

3. Syahriana. Analisis Mean Arterial Pressure, Roll Over Test, Indeks Massa Tubuh, Low Density Lipoprotein, Dan High Density Lipoprotein Sebagai Faktor Prediktor Hipertensi Dalam Kehamilan. 2018;(September):160–4.
4. Manuaba IAC. Ilmu Kebidanan, Penyakit Kandungan dan KB. Jakarta: EGC; 2010.
5. Saifuddin AB. Panduan Praktis Pelayanan Kesehatan maternal dan Neonatal. Jakarta: EGC; 2009.
6. Tim Bidan dan Dosen Kebidanan Indonesia. Kebidanan : Teori dan Asuhan. Volume 1. Jakarta: Penerbit Buku Kedokteran EGC; 2018.
7. Sinclair C. Buku Saku Kebidanan. Jakarta: EGC; 2009.
8. James D, Steer PJ, Weiner CP, Gonik B, Crowther CA, Robson SC. High Risk Pregnancy Management Options. fourth edi. United Kingdom: Elsevier; 2011. 1475 p.
9. Suprihatin E, Norontoko DA. Prediction of Preeclampsia by a Combination of Body Mass Index (BMI), Mean Arterial Pressure (MAP), and Roll Over Test (ROT). 2015;(November).
10. Sherwood L. Human Physiology from cells to system. Australia: Brooks/cole; 2010.
11. Manuaba IAC, Manuaba IBGF, Manuaba IBG. Buku Ajar Penuntun Kuliah Ginekologi. Jakarta: CV Trans Info Media; 2010.
12. Bobak IM. Perawatan Maternitas dan Ginekologi. Bandung: Yayasan Ikatan Alumni Pendidikan Keperawatan Pajajaran; 2000.
13. Rohjati P. Skrinning Antenatal Pada Ibu Hamil. Surabaya: Airlangga University Press; 2013.
14. Cunningham FG. Obstetri William. 23rd ed. Jakarta: EGC; 2014.
15. Osterdal ML, Storm M, Klemmensen AK. Does Leisure time physical activity in early pregnancy protect against pre-eclampsia? Prospective cohort in Danish women, British. J Obstet Gynaecol (Lahore). 2008;14–7.
16. Nyireda T, GS C, BM M. The Effect of Mother's Age, Parity and Antenatal Clinic Attendance on Infant Birth Weight. Malawi Med J. 2013;Vol 7 no.3.
17. Yuliawati S. Analisis Faktir Risiko yang Memengaruhi Terjadinya Preeklamsia di RS Boyolali. Universitas Gajah Mada; 2001.
18. Arikunto S. Prosedur Penelitian : Suatu Pendekatan Praktik. Jakarta: Rineka Cipta; 2010.
19. Gozali I. Analisis Multivariate dengan Program SPSS. Semarang: Badan Penerbit Universitas Diponegoro; 2005.
20. Sembiring rumelia lubina. Aktifitas fisik, stres, map, rot, dan kortisol sebagai prediktor hipertensi pada kehamilan. 2018;2:227–49.
21. Leslie D, Collins R. Hypertension in Pregnancy. BJA Educ. 2016;16:33–7.
22. Puspitasari DR, Setyabudi MT, Rohmani A. Hubungan Usia, Graviditas dan Indeks Massa Tubuh dengan Kejadian Hipertensi dalam Kehamilan. J Kedokteran Muhammadiyah. 2015;1.

PRENATAL YOGA REDUCES UNCOMFORTABILITY IN PREGNANCY

Nina Primasari, Jehanara, Mohammad Ali
Health Polytechnic of Jakarta III

Email: ninaprimasari@ymail.com

Abstract

Pregnant women really need a healthy and fit body. Therefore, apart from eating regularly, pregnant women must also get enough rest and exercise in accordance with the proportion of their needs. A fit and healthy body will keep pregnant women able to carry out their daily activities. So that stress due to anxiety before childbirth will be minimized. Many have proven that prenatal yoga really helps the delivery process because during Prenatal Yoga respective mothers are prepared both physically and mentally for a fast and spontaneous delivery so that it is hoped that labor can take place quickly, safely and spontaneously. Yoga in pregnancy is a motion training therapy that is given to pregnant women to prepare themselves, both physically and mentally, to deal with and prepare for a fast, safe and spontaneous labor (Huliana, 2008). The aim of the activity is to increase the implementation of yoga for pregnant women to reduce discomfort during pregnancy. The method used in this community service activity is live on Instagram. The results of the implementation of this activity were 35 participants who participated live on Instagram. The activity was held on May 12, 2020, centered at the Depok Jaya Maternity Home. By participating in this yoga activity, participants gain knowledge about the meaning of yoga, the purpose of practicing yoga and the benefits of yoga, which is to reduce discomfort during pregnancy so that it can reduce anxiety and pain before childbirth. Conclusion: participants have come to understand and understand the usefulness of practicing yoga during pregnancy. Participants provide live feedback on the implementation directly on Instagram. Suggestion: pregnant women practice yoga during pregnancy regularly to reduce discomfort during pregnancy and reduce anxiety and pain before childbirth.

Keywords: Yoga;Pregnancy;Discomfort

INTRODUCTION

In 2020, the world and Indonesia are experiencing a pandemic covid-19. The pandemic is caused by coronavirus (SARS-CoV-2). The Government of Indonesia makes various efforts, especially the implementation of health protocols that must be adhered to during the pandemic. People are encouraged to always use masks, wash their hands, keep their distance and avoid crowds. This condition certainly affects the Tri Dharma activities of universities carried out by lecturers. One of them is community service activities that must continue to run. In addition to offline activities carried out, online activities become one of the solutions to reduce exposure to coronavirus.

Pregnancy is a physiological condition in women but there is anxiety facing childbirth. The feeling of fear and anxiety in the face of childbirth is an element that can cause physical and psychic tension that can manifest in the muscles associated with the process of childbirth. (Varney, 2008) A midwife should be aware of these changes, in order to provide support, pay attention to concerns and fears so that those worries and fears do not continue until the eve of childbirth. (Lawani, 2016).

Changes that occur in pregnancy starting from the 1st trimester are characterized by body reactions in the form of morning nausea, breast tension, physical changes, sexual, diet, movement, increase in abdominal and breast size. (Varney, 2008) Emotional states occur fluctuatingly, this period is a risk factor for the occurrence of psychological disorders. These disorders include negative reactions to pregnancy, unpleasant previous pregnancy experiences, unclear motivational pregnancies, lack of family support and lifestyle changes, all seen in weeks I and II of pregnancy and ending in weeks X and XII. In the 2nd trimester, it is followed by slight emotional changes, and centers on the impression of the body, sexual and fetus it contains. (Varney, 2008).

The increase in the hormones adrenaline and noradrenaline or epinephrine and norepinephrine causes biochemical dysregulation of the body, resulting in physical tension in pregnant women. The impact of these physiological processes can arise on daily behavior. Pregnant women become irritable or offended, restless, unable to focus, hesitant, even likely to want to run away from the reality of life. This condition can cause further anxiety and tension, thus forming a feedback cycle that can increase overall emotional intensity. (Lawani, 2016). To break the cycle of anxiety in pregnancy, then pregnant gymnastics as one of the prenatal services, is an alternative therapy that can be given to pregnant women. Pregnant gymnastics can minimize the effects of physical and psychic changes in pregnant women resulting in a variety of complaints. When examined further, actually in the movement of pregnant gymnastics contained a relaxing effect that can stabilize the emotions of pregnant women. Pregnant gymnastics exercises are not uncommon, but that does not mean that everyone understands and realizes that this exercise is useful for pregnant women. (Lawani, 2016). Pregnant yoga will result in better childbirth outcomes, compared to pregnant women who do not do pregnant gymnastics. The use of pregnant gymnastics reportedly reduces the occurrence of low birth weight, decreased abnormalities of heart rate, umbilical cord and meconium, decreased energy use, reduced pain, reduces the occurrence of premature labor, reduces the incidence of sectio

caesarean section, and improves APGAR and psychomotor scores of fetuses. Pregnant gymnastics can also reduce the risk of stress and pain during childbirth. In addition, the essence of pregnant gymnastics itself is to train breathing before childbirth, so that in the time leading up to the birth of the baby, the mother can relax and master the situation. (JNPKKR, 2007).

A fit and healthy body will make pregnant women able to carry out their daily activities, so that the stress caused by anxiety ahead of childbirth can be minimized. Many prove that pregnant gymnastics is very helpful in the process of childbirth because during pregnancy gymnastics the mother-to-be is prepared both physically and mentally, so it is expected that childbirth can take place quickly, safely and spontaneously. (Wulandari, 2006) Natural and smooth childbirth can be achieved, if the uterus contracts well and rhythmic and strong with the lower segments of the uterus, cervix and pelvic floor muscles in a state of relaxation, so that the baby easily goes through the birth canal. Calmness and good relaxation of the body can be achieved when following pregnant gymnastics exercises. Feelings of fear and disturbing circumstances of the patient can cause tension. During childbirth, these feelings can be overcome by instilling confidence in yourself. (JNPKKR, 2007). The three core of components (breathing exercises, muscle strengthening and stretching exercises, as well as relaxation exercises), there are several types of relaxation that can be applied in pregnant gymnastics, namely respiratory and muscle relaxation or progressive. If pregnant women do the exercises correctly, there will be a relaxing effect that is useful to overcome the pressure or tension felt during pregnancy. This is in accordance with the opinion of Davies (1991) and Ford-Martin (2001) who stated that relaxation can be done in a variety of ways, including progressive relaxation and breathing. Physiologically, this exercise will reverse the effects of stress involving the parasympathetic part of the central nervous system. (Sun YC, Hung YC, 2016).

Relaxation will inhibit the increase of sympathetic nerves, so that the hormones that cause the body's dysregulation can be reduced in number. The parasympathetic nervous system, which has the function of working as opposed to the sympathetic nerve, will slow down or weaken the work of the body's internal tools. As a result, there is a decrease in heart rate, breath rhythm, blood pressure, muscle tension, metabolic rate, and production of stress-causing hormones. Along with decreasing levels of stress-causing hormones, the whole body begins to function at a healthier level with more energy for healing, strengthening, and rejuvenation. (Sun YC, Hung YC, 2016)

METHODS

This community service activity is one form of Tri Dharma activities of universities that must be carried out by lecturers. Community service activities are still carried out during the pandemic by paying attention to health protocols. But community service activities can also be carried out online. The implementation of yoga in pregnancy is carried out online through instagram and broadcast live. Participants as many as 35 pregnant women and follow the activity in full through instagram.

RESULTS AND DISCUSSION

Yoga in pregnancy according to Viscera (1995) is one of the activities in the service during pregnancy (prenatal care) that will provide a better result of pregnancy products or childbirth outcomes, than in pregnant women who do not do prenatal yogahamil (Dewi & Sunarsih, 2011). Prenatal yogahamil is a fitness program intended for pregnant women who have special movement principles tailored to the condition of pregnant women (Kushartanti et al., 2004). Yoga in pregnancy is an important method to maintain or improve physical balance towards the future mother (Maryunani & Sukaryati, 2011). Yoga in pregnancy is not a must. But by doing Yoga in pregnancy will provide many benefits in helping the smooth process of childbirth, among others can train breathing and relaxation, strengthen the pelvic and abdominal muscles, and train the right way to mendan. This readiness is an important provision for mothers-to-be during childbirth (Jannah, 2012). Yoga in regular pregnancy can reduce maternal discomfort and complaints in the face of pregnancy, such as: back pain, nausea, limb spasms, constipation, shortness of breath, and anxiety (Kusmiyati et al., 2008)

Yoga in pregnancy also aims to prevent the deformity (deformity) of the legs, train and master breathing techniques that play an important role in pregnancy and childbirth, strengthen and maintain the elasticity of the muscles of the abdominal wall, form a perfect posture during pregnancy, obtain perfect relaxation, and support physical tranquility (Pantikawati & Saryono, 2010). Some requirements that must be considered to do prenatal yogahamil according to Huliana (2008) namely: pregnancy that runs normally with recommendations / permission from doctors / midwives, pregnancy at least 5 months old, preferably in the first pregnancy or the next pregnancy that has difficulty childbirth or childbirth prematurely, exercise should be done regularly in a calm atmosphere, dressed quite loosely and using a mattress or mattress. So that physical exercise in pregnant women does not cause problems, it is recommended:

consult with health workers, seek help to determine regular physical exercise, avoid risky activities and exercises, and require strength such as surfing, mountaineering, running, practicing regularly at least 3 times a week, limit the activity time by resting two to three minutes after doing exercises for 10 to 15 minutes, calculate the pulse every 10 to 15 minutes while doing physical exercise, avoid overheating environments such as soaking in hot water and saunas (Maryunani & Sukaryati, 2011).

According to Huliana (2008) prenatal yogahamil can be applied in several stages of exercise, namely the stage of exercise I to exercise XII.

Exercise I

Exercises to relax the inner thigh muscles / from the groin to the inner knee. The use of exercise I is so that both thighs can be opened as wide as possible to expand the birth path at the time of childbirth. As for the attitude of the body when doing prenatal yogahamil is to sit cross-legged with comfortable, both palms are placed above the knees. Press both knees down with the help of weight so that it touches the mattress or mattress. Perform this movement 15-30 times in 1 exercise (1 day).

Exercise II

Exercises of leg muscles that serve to facilitate blood circulation in the legs, preventing swelling of the ankles. The attitude of the body when doing this exercise is to sit with both knees straight, leaning, both arms placed next to the body, perpendicular movements and bowing flat (dorsi flexion and plantar flexion), upright both soles of the feet. The position of the back knee presses the mattress so that the calves and the back knee hurt. Keep both soles of the feet together with the fingers in a flat position. Perform each movement 3-4 times in 1 exercise (1 day). In case of swelling, do this movement as much as possible.

Exercise III

Basic breathing exercises consist of abdominal breathing, rib breathing and chest breathing. The use is to relax the abdominal wall so that it will facilitate the examination done by the doctor or midwife, to obtain as much oxygen as possible needed by the mother and her fetus and to reduce the pain in childbirth. The stages of movement and attitude at the time of doing this exercise are loosened clothing (on the chest and waist), lying on the back with 1 pillow, both knees opened by 20 cm, both palms placed over the abdomen (around the center), ribs and upper chest alternately as a stimulant. Slowly, exhale from the mouth (inflatable) while putting

your hands against the abdominal wall (deflating the stomach). Breathe from the nose with the mouth closed (the abdomen will expand and push both hands up). Do as many as 6 movements in the morning (waking up) and at night (before going to bed).

Exercise IV

Exercises to correct the position of the pelvis that falls forward. With the age of pregnancy, the abdomen will fall forward and the buttocks will fall backwards. Through the discharge of abdominal muscles will occur hollow at the back waist (lordose attitude) so as to cause aches and pains. Through the stretching of the buttock muscles will cause pain in the thigh folds. The use of this exercise is to restore the position of the heavy pelvis forward and reduce / prevent fatigue, back pain, back pain and pain in the thigh folds. The attitude when performing this movement is to sleep on your back with a thin pillow, both knees bent, both hands fingering the protrusions of the bones in the front pelvis as controllers. Keep your head down, wrinkle your buttocks inwards so that they come off the mattress or mattress, deflate your stomach so that your back presses against the mattress and the bone protrusions will move backwards. Do as many as 15-30 times the movement in 1 exercise (1 day).

Exercise V

This exercise is useful to prevent the occurrence of hanging stomach and strengthen the abdominal muscles. Because the stronger the abdominal muscles, the smaller the cavity in the abdomen. In this way, the greater the energy available to strain during childbirth. Crawling position, both arms parallel to shoulders, both knees parallel to the pelvis, bow the head with weakness, deflate the abdomen, hold so that the back becomes bent and forward view. Do 6 moves in 1 exercise (1 day). This exercise can be done while mopping. The trick is to sit on the heel, the right hand holding the mop. Perform a crawling position, subdue the head with a limp, deflate the abdomen, then mop the floor by retreating while maintaining abdominal wrinkles. If tired again sit on the heel and remove wrinkles while rinsing the mop. Do the mopping of the floor until it is finished. Mopping is done only once a day and 1 room only.

Exercise VI

Exercises strengthen the buttock muscles, which are used to prevent the onset of hemorrhoids at the time of straining and strengthen the buttock muscles when hemorrhoids have arisen. The attitude of the body when doing this exercise is to sleep on its back without a pillow (so that the neck does not hurt), both knees are bent and slightly stretched and the heel is brought close

to the buttocks, both hands on the side of the body. Wrinkle the buttocks inwards so that they are removed from the mattress or mattress. Lift the pelvis up as far as possible, hold it for 6 counts, then lower the pelvis gently. Until below, remove the wrinkles of the buttocks. Do 6 moves in 1 exercise (1 day).

Exercise VII

Exercises strengthen the pelvic floor muscles which is useful to relax the strong pelvic floor muscles in a relaxed state. When straining the muscles will loosen actively so that the baby's head will come out easily. With it, the limp pelvic floor muscles will not be easily torn during childbirth. The attitude at the time of doing exercise VII is to sleep on your back with 1 pillow, both knees bent, and opened about 20 cm and both hands on the side of the body. Wrinkle the buttocks, pull the part between the groin inwards, and deflate the abdomen. This step is done such as holding the urination and holding it for up to 6 counts, then release it slowly. Do 6 moves in 1 exercise (1 day).

Exercise VIII

Exercises strengthen the calf muscles that are useful to prevent the occurrence of spasms in the calf. Stand upright behind a chair occupied by others or hold on to something heavy. How to hold it, thumbs facing down and other fingers facing up and legs slightly stretched about 20 cm, straight body and forward view. Keep your head down, then squat slowly without lifting the heel off the floor (the heel remains treading on the floor). After squatting, loosen the shoulders, deflate the abdomen and slowly return to standing upright. Do 6 moves in 1 exercise (1 day).

Exercise IX

Perfect attitude education that is useful to strengthen the muscles of the body so as to perfect the attitude of pregnant women. In this way, pregnant women have reflexes to maintain and maintain a good and perfect posture. The normal pelvic position of the pelvis is the key to a perfect posture. The perfect attitude position is the lying position (sleep on your back by placing both feet on the wall and the knee position straight), sitting position (sitting cross-legged and hands on the thighs), standing position (standing and positioning the neck so that the view is straight forward).

Exercise X

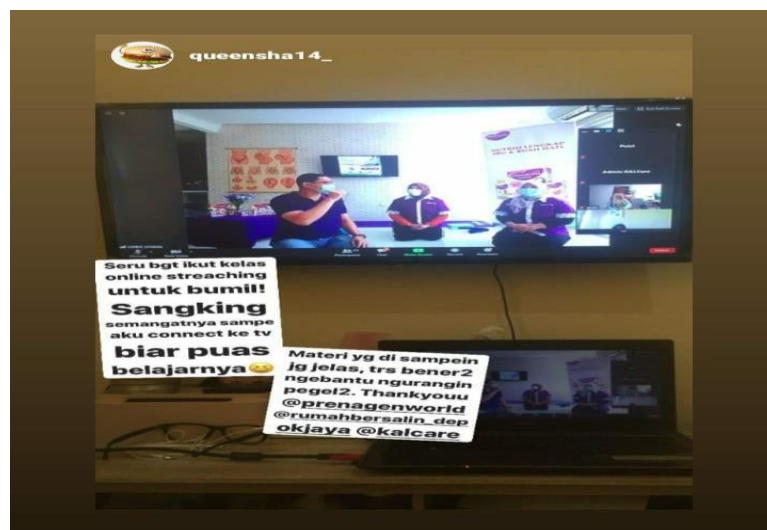
Anti-breech exercises that are useful to maintain and improve the position of the fetus to keep the head down. The position crawls on the mattress or mattress, both arms are shoulder-aligned, both knees are aligned and the pelvis is slightly stretched. Put your head between two hands. Turn your head left or right and place your elbows on the mattress or mattress, then keep your elbows as far away as possible on the left and right sides so that the chest touches the mattress or mattress. Do 3 moves, each with your head facing left and right in 1 exercise (1 day).

Exercise XI

Learning to strain is done if the pregnancy has reached the age of 8 1/2 months which is used to prepare for the actual straining condition. Sit cross-legged while leaning with 1 pillow across the back and both hands placed on the upper chest with limp elbows. Pull and exhale with your mouth open 3 times. Breathe deeply with your mouth open, keep your head down, deflate your stomach, and strain (like urinating). Do 3 strains in 1 exercise (1 day).

Exercise XII

Full / perfect rest that is useful to train calmness so that the mouth of the uterus / womb can open fairly and quickly so that the process of childbirth can run lancer. The sleeping position is tilted left or right so that the stomach can be well denied. The pillow is mounted obliquely, the head is placed on the upper pillow, the upper arm is placed on the side pillow with the armpits open. The lower arm is placed behind the back with slightly bent elbows. The upper leg is placed forward with the knee slightly bent, while the foot below is placed backwards with the knee slightly bent and the head is subdued so that the back becomes bent.



CONCLUSION

Community service activities that have been conducted about the implementation of yoga in pregnancy is seen that there is an increase in knowledge in pregnant women and husbands, stomach breathing techniques, and other types of breathing that are effective for pregnant women, ikap and physical exercises that are good for the mother in her pregnancy to prepare the birth process. All participants seemed very enthusiastic in participating in this activity, and Depok Jaya Maternity House gave strong support in the implementation of this activity. Almost all participants admitted that this activity is very useful and useful for mothers-to-be and fathers especially related to the role of husbands in the process of childbirth. Advice to all pregnant women to regularly perform yoga during pregnancy so as to reduce discomfort in pregnancy and can reduce anxiety and pain ahead of childbirth. It is expected that the husband and family provide motivation and support to the mother during pregnancy.

REFERENCES

- Aryastami, N. 2002. Inequity and Inequality in Health care Utilition in Indonesia 1997. Media Pengabmas dan Pengembangan Kesehatan Volume XII Nomor 4 Tahun 2002. Badan Pengabmas dan Pengembangan Kesehatan. Departemen Kesehatan RI Jakarta.
- Artikel Psikologi. Anciety Disorder. Melalui www.pikirdong.org. Diakses tanggal 6 Januari 2016.
- Brayshaw E. 2008. Prenatal yoga dan Nifas. EGC. Jakarta.
- Cuningham. 1997. Neurological and Psychiatric Disorder. Williams Obstetric, 20th ed. Toronto : Appleton dan Lange,
- Departemen Kesehatan RI. 2003. Dasar-dasar Asuhan Kebidanan. Jakarta : Direktorat Keperawatan dan Keteknisan Medik. Direktorat Jenderal Pelayanan Medik. Departemen Kesehatan RI.
- Domin V. Relaxation-How Good Are You Relaxing? Melalui www.hypnosis.com. Diakses tanggal 2 Februari 2016.
- Ginting. Faktor-faktor yang Berhubungan dengan Pemanfaatan Pelayanan Antenatal oleh Ibu Hamil yang Memiliki Risiko di Kecamatan Pesanggrahan Jakarta selatan Tahun 2001. Fakultas Kesehatan Masyarakat Universitas Indonesia.
- Guyton, AC. 2006. Textbook of Medical Physhiology, 9th ed. Philadelphia, WB Sanders Company.
- Hawari, D. 2004. Manajemen Stress, Cemas dan Depresi. Fakultas Kedokteran Universitas Indonesia. Jakarta.
- Indiarti. 2008. Senam Hamil dan Balita. Cemerlang Publishing, Yogyakarta,
- Kasdu, D, Meiliasari M, Purwaningsih R. 2005. Info Lengkap Kehamilan dan Persalinan. Jakarta , Gemini Mitra Gemilang.

- Kaswendi, Yuliza. 2002. Analisis Keteraturan Pemanfaatan Pelayanan Antenatal di Puskesmas Pulau Temiang Kabupaten Tebo Propinsi Jambi. Fakultas Kesehatan Masyarakat Universitas Indonesia.
- Lawani, MM, Allihonou E. ekplogan B. Effect of Antenatal Gymnastic on Childbirth. Melalui www.pubmed.com. Diakses tanggal 25 Januari 2016.
- Martaadisoebrota D, Djuwantono T, Lidyana L. 2007. Ansietas dan Depresi pada Peserta Teknologi Reproduksi Berbantu di Klinik Aster Rumah Sakit HASan Sadikin Bandung. Januari-Maret 2007, Pekan Ilmiah Tahunan POGI, Bandung.
- Ndama, M. 2001. Analisis Hubungan Karakteristik Sosiodemografi dan Pengetahuan Ibu Hamil dalam Pemanfaatan Pelayanan Antenatal di dua Wilayah Kabupaten Donggala Sulawesi Tengah. Fakultas Kesehatan Masyarakat Universitas Indonesia.
- Oetomo, Sofowan S. 2010. Pengaruh prenatal yoga Terhadap Lama Persalinan dan Luran Janin. Kongres Obstetri dan Ginekologi Indonesia. FK UGM Yogyakarta.
- Primadi H. 1980. Prenatal yoga. Bagian Obstetri dan Ginekologi Fakultas Kedokteran Universitas Bandung. Elstar Offset.
- Puspitorini M. 2009. Panduan Praktis Senam Hsmil. Diglosia Media. Yogyakarta.
- Rani, D. 2002. Perbedaan Tingkat Kecemasan Ibu Hamil dalam Menghadapi Proses Persalinan Perama ditinjau dari Keikutsertaan dalam Prenatal yoga. Universitas Muhammadiyah Malang.
- Saefudin, AB. 2001. Pelayanan kesehatan Maternal dan Neonatal. JNPKKR-YBPP. Jakarta.
- Prenatal yoga. Melalui www.pluithospital.com. Diakses tanggal 29 Januari 2016.
- Spielberger, Charles D. 2009. Anxiety ; Current Trends in Theory and Research volume 1. New York Academy Press.
- Suardi, D. 2010. Pengaruh Ansietas terhadap Proses dan Hasil Persalinan pada Primigravida. Unpad, Bandung.
- Sugiyono. 2005. Statistika Untuk Pengabmas. Alfabeta. Bandung.
- Sujatno, Muchtan. Etika Pengabmas. Diakses melalui www.repositorymaranatha.edu tanggal 16 Maret 2016.
- Sun YC, Hung YC. Effect of Prenatal Yoga Programme on The Discomfort of Pregnancy and Maternal Childbirth selfefficacy in Taiwan, Department of Nursing, Shin Kong wu Ho-Su Memorial Hospital, Taipei, Taiwan. Melalui www.pubmed.com. Diakses tanggal 25 Januari 2016.
- Suryani, A. 2004. Hubungan Karakteristik Sosiodemografi dan Pengetahuan Ibu Hamil dan Ibu Balita dengan Pemanfaatan Pelayanan Antenatal di Bekasi. Fakultas Ilmu Kedokteran Masyarakat Universitas Indonesia.
- Utami. 2001. Kecemasan Menghadapi Kehamilan Anak Pertama Ditinjau dari Emotional Focused Copping. Fakultas Psikologi. Universitas Muhammadiyah Surakarta.
- Varney, H. 2008. Kriebs JM. Gegor LC. Asuhan Kebidanan. EGC. Jakarta.
- Wulandari, YP. 2006. Efektivitas Prenatal yoga Sebagai Pelayanan Prenatal dalam Menurunkan Kecemasan Menghadapi Persalinan Pertama. Fakultas Psikologi Universitas Airlangga. Surabaya.

Yuni, S, Sulistyorini. 2007. Pengaruh Peran Serta Suami Terhadap Tingkat Kecemasan Ibu Hamil dalam Menghadapi Proses Persalinan di Desa Jepat lor Kecamatan Tayu Kabupaten Pati Yogyakarta.

Zung Self-Rating Anxiety Scale dalam Ian Mcdowell 2006. Diakses melalui www.jurnal.unpad.ac.id/ejournal pada tanggal 16 Maret 2016.

SIGNIFICANCE OF THE ROLE OF HUSBANDS IN SUPPORTING EXCLUSIVE BREASTFEEDING IN THE WORKING AREA OF PUSKESMAS KELURAHAN BARU KECAMATAN PASAR REBO JAKARTA TIMUR

Heriza Syam, Elly Dwi Wahyuni, Siti Masitoh
Midwifery Department, Jakarta 3 Health Polytechnics, Ministry of Health

Abstract

Exclusive breastfeeding is the best nutrition for babies in the first six months of life for healthy growth and development. Many factors are believed to influence the success of this exclusive breastfeeding. Support to mothers is an important factor that also influences mothers to provide exclusive breastfeeding. One of the most influential supports is husband's support. Psychologically, a wife who is supported by her husband will be more motivated to provide exclusive breastfeeding for her baby (Prasetyono in Sari, 2010). According to research by Britton (2007) found that family support from husbands, other family members (mothers) increases the duration of breastfeeding until the first 6 months postpartum and plays an important role in the success of exclusive breastfeeding. Community service is carried out in the form of counseling and assistance to the community, using educational media, namely leaflets. The number of couples of childbearing age and cadres who participated in this counseling was 17 people. The time for the implementation of the activity starts from August to December 2020. The location of the activity is planned in the Posyandu Melati Work Area, RW 09 Supported by the New Village Puskesmas, Pasar Rebo District, East Jakarta. Community service which was carried out in 3 stages, it was seen that the results of the pretest and posttest had an increase in the knowledge of EFA about the benefits of breastfeeding, on average 51.5% answered correctly before being given counseling after being given counseling, mothers answered 88.3% correctly. Knowledge about increasing breastfeeding and breastfeeding position, the average pretest results that answered correctly were only 38, whereas after being given counseling, mothers could answer correctly as many as 82. Knowledge about the role of husbands in exclusive breastfeeding, the average number of correct answers to pretest was only 50 % after being given counseling, there was an increase in knowledge as much as 95.5%.

Keywords: *Role of Husband, Exclusive Breastfeeding, Fertile Age Couples*

INTRODUCTION

Exclusive breastfeeding is the best nutrition for babies in the first six months of life for healthy growth and development. Many factors are believed to influence the success of this exclusive breastfeeding. Support to mothers is an important factor that also influences mothers to provide exclusive breastfeeding. One of the most influential supports is husband's support. Especially for working mothers

Psychologically, a wife who is supported by her husband or family will be more motivated to provide exclusive breastfeeding for her baby (Prasetyono in Sari, 2010). The success of

breastfeeding is very much determined by the role of the husband because the husband will help determine the smoothness of the expenditure reflex which is strongly influenced by the emotional state or feelings of the mother. Fathers can play an active role in helping mothers in breastfeeding.

The husband is considered the most capable of giving influence to the mother to maximize exclusive breastfeeding. Support or support from the husband is very important in the success or failure of breastfeeding. The results of the study (Monica, 2010) show that family support greatly determines the behavior of mothers in giving exclusive breastfeeding to their babies. Likewise, according to research by Britton (2007) found that family support from husbands, other family members (mothers) increases the duration of breastfeeding until the first 6 months postpartum and plays an important role in the success of exclusive breastfeeding. One of the obstacles is the husband's knowledge of the benefits of exclusive breastfeeding and the husband's role in helping mothers in the success of exclusive breastfeeding for 6 months. For this reason, it is necessary to provide information to the husband about the importance of exclusive breastfeeding for the growth and development and intelligence of the baby, so that the husband can provide support to breastfeeding mothers.

METHOD

Community service is made in the form of counseling and assistance to the community, using educational media, namely leaflets. Community service partners with the PKM scheme are fertile age couples and cadres. The number of couples of childbearing age and cadres who participated in this counseling was 17 people. The time for the implementation of community service activities from August to December 2020. The place of activity is planned in the Posyandu Melati Work Area, RW 09 Assisted by Puskesmas Baru Kelurahan Pasar Rebo District, East Jakarta. The methods used were interactive lectures, focused discussions, and giving leaflets to participants.

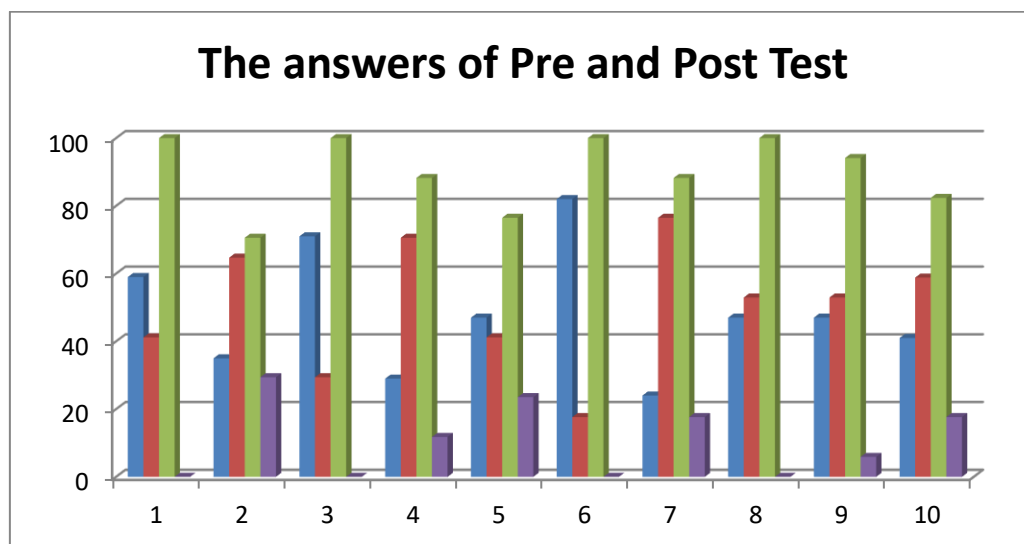
This community service is carried out in 3 stages, namely:

1. Counseling about the advantages and benefits of exclusive breastfeeding and the correct position and breastfeeding
2. Counseling about and the importance of husband's support for breastfeeding mothers
3. Evaluation (Pre and posttest)

RESULTS

Pre-Community service activities conducted a survey and filing for a permit to carry out activities to the Puskesmas Kelurahan Baru and the heads of RT and RW, Pasar Rebo sub-district, East Jakarta Plan outreach schedules and prepare leaflets. The first phase of outreach activities on the benefits of exclusive breastfeeding and the correct position of breastfeeding and the distribution of leaflets. The activity was carried out on September 12, 2020 which was attended by 17 PUS people and cadres. Before extension, a pretest was carried out. The pretest results are shown in the diagram below.

The second activity was carried out on October 4, 2020 which was attended by 17 PUS and cadres. In this second stage, counseling was carried out about and the importance of husband's support for breastfeeding mothers and providing leaflets. The third stage activity is the evaluation of the implementation of community service and post test. The results of the evaluation of the implementation of counseling on the significance of the husband's role in supporting exclusive breastfeeding went smoothly. This counseling was enthusiastically followed by participants, both PUS and cadres, with many questions related to exclusive breastfeeding. At this evaluation stage, 10 questionnaires were also carried out. The results of the pre test and post test are as follows.



From the diagram above, it can be seen that the knowledge of EFA about the benefits of breastfeeding (questions 1, 2,3 and 10) on average who answered correctly was 51.5% before being given counseling after being given counseling, the mothers answered correctly as much as 88.3%. Knowledge about increasing breastfeeding and breastfeeding position (questions 4

and 5), the average pretest results that answered correctly were only 38%, while after being given counseling, mothers could answer correctly as many as 82. Knowledge of the husband's role in exclusive breastfeeding (question 6 , 7,8 and 9) who answered correctly pretest only 50% after being given counseling, there was an increase in knowledge as much as 95.5%.

DISCUSSION

From the data from the pretest results, it can be seen that there is still a lack of knowledge of PUS about the benefits of breastfeeding (51.5), the correct breastfeeding technique and position (38%) and how the husband's role in supporting exclusive breastfeeding (50). Providing counseling with interesting leaflet media has an impact on increasing knowledge of PUS about the benefits of exclusive breastfeeding, techniques and correct breastfeeding positions and how the husband's role in supporting exclusive breastfeeding.

Extension is one way to increase knowledge, because at the time of extension, apart from obtaining the main material of extension, the PUS can also ask questions about issues related to exclusive breastfeeding. Knowledge is one of the foundations for the formation of a behavior. Behavior that is realized with knowledge will last longer than behavior that is not realized with knowledge (Notoatmodjo, 2010). The results of this community service are in accordance with Susanti's research, et al. (2017) on the effectiveness of leaflet media in increasing knowledge of dietary management for hypertension sufferers at Serasan Health Center, Natuna Riau Regency, which states that there is an increase in knowledge before leaflet is given the average knowledge is 4.93, while the average -the average after being given leaflet an increase was 6.59. The results of the independent T test showed that there was a significant difference between the seblem knowledge and after being given Leaflet (0.00).

Leaflet is an effective medium in increasing knowledge. This is supported by the theory of Pujriyanto (2009). Leaflet functions as a simple medium that is memorable and easy to read by the community, so that people can learn independently. The provision of interesting and communicative leaflets will make it easier for the public to understand the material presented, because only with a lecture, sometimes the material delivered will be difficult for the public to remember, with the leaflet it will make it easier for the community to recall the material provided at the time of counseling.

CONCLUSION

The activity of extension using leaflet media at Posyandu Dahlia RT 10 RW 06 Pondok Rangon is one of the activities that can increase the knowledge of EFA, namely:

- a. Increased knowledge about the benefits of exclusive breastfeeding from 50.5 to 90
- b. Increased knowledge about breastfeeding techniques and positions from 38 to 88
- c. Increased knowledge of the husband's role in supporting exclusive breastfeeding from 50 to 90

With increasing knowledge of EFA about the benefits of exclusive breastfeeding, techniques and positions of breastfeeding and the role of husbands in exclusive breastfeeding can increase the scope of exclusive breastfeeding so that it can make the next generation smart and healthy.

SUGGESTION

It is hoped that counseling with video media on techniques and positions of breastfeeding is expected because there are still many PUS who do not know about the correct breastfeeding position, with videos it will be clearer in providing the counseling. It is necessary to improve parenting programs in preparing PUS to become parents, so that they can meet the needs of nurturing, caring and fostering babies and children that can improve the health status of mothers and children in the Pasar Rebo district

REFERENCE

- Budiman and Riyanto, A. (2013) *Kapita selekta kuesioner pengetahuan dan sikap dalam penelitian kesehatan*. Jakarta: Salemba Medika.
- Britton. (2007). *Breastfeeding sensitivity, and attachment*. Tucson. Arizona : Pediatric
- Depkes.(2010). Peraturan pemerintah tentang ASI Eksklusif (diakses dari http://www.depkes.go.id/downloads/advertorial/adv_pp_as1.pdf diunduh pada 10 Februari 2017
- Depkes. (2013). Riskesda. (2013). www.litbang.dekes.go.id di Akses tanggal 3 Januari 2017
- Harjanto (2011) *Perencanaan Pengajaran*. Jakarta: Rineka Cipta.
- Monica.(2010) *Socio-cultural factors influencing breastfeeding practices among low-income women in Fortaleza-Ceará-Brazil : Leininger's Sunrise Model Perspective*. Enfermeria Global
- Notoadmodjo, S. (2013) *Promosi Kesehatan dan Perilaku Kesehatan "Edisi Revisi."* Jakarta: Rineka Cipta.
- Nurmadina, Mira (2010). *Hubungan antara Dukungan Sosial Suami terhadap Motivasi Ibu Memberi ASI pada Bayi 0-6 Bulan*. (diunduh tanggal 12 Februari 2017)

- Potter, PA. dan Perry, A.G (2005). *Buku Ajar Fundamental Keperawatan: Konsep, Proses dan Praktik*, Alih Bahasa, Y.dkk.Jakarta : EGC
- Proverawati. (2010). *Buku ajar kesehatan reproduksi untuk kebidanan*. Yogyakarta: Nuha Medika
- Roesli, Utami (2000). *Mengenal ASI Eksklusif*. Jakarta : Niaga Swadaya
- Suiraoka, I. P. and Supariasa, I. D. N. (2017) *Media Pendidikan Kesehatan*. Yogyakarta: Graha Ilmu.
- Susanti, dkk. 2017. Efektifitas Leaflet terhadap pengetahuan dan mengatur pola makan lansia penderita hipertensi di Puskesmas Serasan Kabupaten Natuna Riau. J. Photon. Bo. 7 No.2 Mei 2017.
- Susilowati, D. (2017) *Modul bahan Ajar cetak Keperawatan Promosi Kesehatan, Kementrian Kesehatan Republik Indonesia*.
- Susilowati D. 2017. Promosi Kesehatan. Vol 91. Jakarta: Pusdik SDM Kesehatan Kemenkes RI.
- Wahyuni ED, 2017. Hubungan Antara Dukungan Suami Terhadap Keberhasilan Pemberian ASI Eksklusif Pada Ibu Bekerja di Klinik Utama Depok Jaya

RELATIONSHIP OF ASSESSMENT OF CHILDREN'S GROWTH AND DEVELOPMENT WITH KADER'S SKILLS IN DETECTING EARLY STUNTING

Theresia Eugenie, Dewi Nirmala Sari, Niken Purbowati.
Midwifery Department, Health Polytechnic of Jakarta 3

Email: christineputriwiduri@gmail.com

Abstract

Background: The main data source for public health problems, especially under five, one of which is stunting is the recording and reporting of posyandu. The validity of the measurement results on children's growth and development is closely related to the skills of cadres in assessing this. However, until now, posyandu monitoring activities have focused more on children's weight growth. Monitoring the growth of body height / age and child development has not been a priority, as well as the skills of cadres in assessing these two aspects of growth and development have not been taken into account optimally. In fact, this is very important for early detection of stunting in children. Research Objectives: This study aims to determine the relationship between training in the assessment of Body height / age growth and child development with cadres' skills to detect early stunting. Methods: This study used a Quasi Experiment method with the sample of this study. is a posyandu cadre in the work area of the Tambora sub-district health center consisting of 30 cadres in the treatment group who received training and 30 cadres in the control group who only carried out conventional methods (counseling). This study also conducted a field evaluation of the two groups after training. Results: This study shows that there are differences in the average skills of the treatment and control groups in assessing the growth of body height / age (microtoise and length board) and children's development after training. There was a difference in the average skills in assessing body height/age in the treatment and control groups when the implementation evaluation was carried out, but the average skills in assessing children's development did not differ during the evaluation. The implementation of training further improves the skills of cadres after training and also has more impact on implementation at the posyandu compared to using conventional methods.

Key words: training, skills, growth in height / age, child development.

INTRODUCTION

Stunting is a short and very short body condition, less than -2 standard deviation, as an anthropometric index of body length or height according to age (body lenght./age, body height /age) (Kemenkes RI, 2014) which is one of the nutritional problems in the world, especially developing countries, including Indonesia. Indonesia is ranked fifth in the world for the number of children with stunting conditions. More than a third of children under five years of age are below the average (Picauly and Toy, 2013). Based on basic health research (Riskesdas) in 2013,

the national prevalence of stunting in Indonesia reached 37.2% (Kemenkes RI, 2014). The prevalence of stunting in children aged 24-59 months in Tambora District is 44.3% (Sari, 2016). Several studies have shown that children whose toddler years are stunted will have low cognitive, poor learning and psychosocial achievement (Achadi, 2012). The cognitive, memory and motor skills of stunted children were also lower than those of non-stunting children. Stunted children have slow motor development and lower levels of intelligence on locomotor, hand and eye coordination, hearing, speech, and performance when compared to normal children (Prendergast & Humphrey, 2014).

Early detection of stunting is very important, one way is to use the KIA book through a growth chart based on height / age (body height / age) in the Maternal Child Health (KIA) book. Growth monitoring, especially body height / age regularly and periodically in the KIA book, can find out growth disorders that occur in children early so that early prevention and treatment can be carried out. Monitoring of stunting through the MCH handbook also does not require a large amount of money, time and effort. Even so, the current use of the MCH Handbook to detect stunting is still not optimal. Sari's research results (2017) illustrate that 79.5% of body height registration at the Posyandu in the Tambora District area is not good, most of the results of the recording of the toddler's height at the posyandu are written on the family nutrition improvement effort card (UPGK), besides that there are those who record in addition to the growth chart. based on body height / age. This causes early detection of stunting through the KIA booklet cannot be done, even though most mothers have the habit of re-opening the MCH handbook to find out the results written by health workers and cadres, only 13.6% never reopened the KIA book after a visit to Integrated Healthcare Center. The habit of mothers under five years of reopening the MCH handbook should be the key to optimizing early detection of stunting in the family through the MCH handbook. On the other hand, the use of the KIA book is not optimal for posyandu cadres according to the research results (Sistentuki, C, et al., 2013), which stated that only 59.7% of cadres had good knowledge of the KIA book and only 53.7% of cadres had a good role in the use of the KIA book in Kaibogor District.

The low skills of both cadres and mothers of children under five in assessing the growth of children under five based on height / age, so this study wanted to see the relationship between training in toddler growth assessment based on body height/age with the skills of mothers under five and cadres in early detection of *stunting*.

The recording of body height under five in the MCH handbook at the posyandu was mostly poor. Many of the cadres' skills in weighing weight and measuring body height are still unskilled and there is a low frequency of training or refresher for cadres in monitoring child growth and development through the KIA book. The Purpose is to know the relationship between body height /age growth assessment training and child development with cadres' skills in early detection of stunting.

METHODS

Design

This type of research is a quasi-experimental research with a non-randomized control group pretest posttest design.

Population and Sample

The population in this study were all cadres in the work area of the Tambora subdistrict health center, West Jakarta. The number of samples needed in this study was determined using the hypothesis testing formula for two proportions, then the sample size was 60 cadres. As a treatment group 30 cadres and as control 30 cadres

RESULTS

Respondents in this study had an average age of 46.83 years, an average of 8 years as a cadre and for the education level of cadres 53.3% had elementary school education and 46.7% had a high school / university education.

In the treatment group and the control group, there was no difference in the mean age based on the Independent T test, there was no difference in the mean length of being a cadre based on the Mann Whithney test and based on the Chi Square test, the education level of cadres in the two groups was the same. Thus the treatment group and the control group have similar characteristics (homogeneous).

Table 1. Characteristics of Respondents based on Age, Length of becoming a Cadre and Level of Education (n = 60)

	Treatment Group (n=30)				Control Group (n=30)			
	Mean	Range (Min-Max)	SD	f (%)	Mean ($\pm$ SE)	Range (Min-Max)	SD	f (%)
Age	48,17	45 (28-73)	9,513	-	45,5	32 (26-58)	8,033	-
Duration of being a cadre	9,73	31 (2-33)	8,056	-	7,20	19 (1-20)	4,671	-
Level of education								
Elementary School	-	-	-	6,7				16,7
Junior High School				36,7				46,7
Senior High School				53,3				33,3
Under/PostGraduate				3,3				3,3

This is very important in quasi-experimental research because according to Widayatun (2009) and Notoadmodjo (2012), these three factors, namely age, length of time as a cadre and level of education are factors that can affect a person's skills so that the treatment group and the control group must have compatibility. one another.

Table 2: Skills of Cadres in body height /age Assessment and Child Development Before Training

Rating Skills	Mean Rank Group		<i>p</i>
	Treatment (n=30)	Control (n=30)	
Body Length	33,33	27,67	0,201
Body Height	34,67	26,33	0,059
Child Development	30,48	30,52	0,994

Based on the Mann-Whitney test, the average skills of cadres in measuring body length, height and assessing the development of children in the treatment group and the control group before being given treatment were the same.

Table 3. Skills of Cadres in body height/age Assessment after training

Rating Skill	Mean Rank		<i>p</i>
	Treatment (n=30)	Control (n=30)	
Body Length	38,35	22,65	0,000
Body Height	39,95	21,05	0,000

Table 4. Skills of Cadres in Child Development Assessment after training

Skills Assessment	Mean ($\pm$ SEM)		95% CI	<i>p</i>
	Treatment (n=30)	Control (n=30)		
Child Development	64,0333 ($\pm 0,80012$)	60,8667 ($\pm 0,80335$)	-5,436226 sd 0,89707	0,007

Based on the Mann-Whitney test, it was found that after training in the treatment group, the average skills of cadres in assessing body height /age both using body length and height in the treatment group were different from the control group. Meanwhile, based on the T-Independent Test, it was found that the average skills of cadres to assess the development of children in the treatment group after receiving training were different from the skills of cadres in the non-treatment group (control).

Table 5. Skills of Cadres Before and After Training in the Treatment Group (Assessment of Body Length and Height) and in the Control Group (Assessment of Height and Child Development)

Group		Mean	n	Mean Rank	<i>p</i>
Body Length					
Treatment	Pre Training	9,8667	Negative Rank	0	0,00
	Post Training	17,0333	Positive Rank	30	15,50
			Ties (sama)	0	
Haight Body					
Treatment	Pre Training	12,2667	Negative Rank	0	0,00
	Post Training	20,8000	Positive Rank	30	15,50
			Ties (sama)	0	
Control	Pre Training	11,5333	Negative Rank	0	0,00
	Post Training	19,2667	Positive Rank	30	15,50
			Ties (sama)	0	
Child Development					
Control	Pre	54,8000	Negative Rank	3	7,83
	Post	60,8667	Positive Rank	25	15,30
			Ties (sama)	2	

The average skill of cadres in assessing body height/age and child development in the treatment group was higher than that in the control group after the treatment group received training

Table 6. Skills of Cadres Before and After Training in the Treatment Group (Child Development Assessment) and the Control Group (Body Length Assessment)

Group		Mean	SD	CI	<i>p</i>
Body Length					
Control	Pre-Training	9,2000 ($\pm$ 0,33010)	1,80803	-7,14885 sd -5,38448	0,000
	Post Training	15,4667 ($\pm$ 0,29059	1,59164		
Child Development					
Treatment	Pre-Training	54,9333 ($\pm$ 0,57722)	3,16155	-10,90377 sd -7,29623	0,000
	Post Training	64,0333 ($\pm$ 0,80012)	4,38244		

Based on the Wilcoxon test in the treatment group for height and body length, paired-t test for child development, there is a difference in the average skills before and after training in the treatment group. Likewise in the non-treatment group (control), based on the paired-t test on the body length assessment and the Wilcoxon test on the assessment of height and child development, the average skills in the control group before and after without training were also different.

Table 7. Skills of Cadres in Body Height /Age Assessment in Training Evaluation

Rating Skill	Mean Rank Group		<i>p</i>
	Treatment (n=30)	Control (n=30)	
Body Length	38,55	22,45	0,000
Tinggi Badan	41,80	19,20	0,000

Based on the Mann-Whitney test, it was found that at the time of the evaluation after training, the average skill in assessing body height /age using length and height in the treatment group was different from the control group. Meanwhile, based on the T-Independent Test, it was found that during the evaluation after training, the average skill to assess children's development in the treatment group was the same as the control group.

Table 8. Skills of Cadres in Child Development Assessment in Training Evaluation

Skill Assessment	Mean (+SEM)		95%	<i>p</i>
	Treatment (n=30)	Control (n=30)		
Child Development	64,0667 ($\pm 0,82341$)	61,6333 ($\pm 0,78854$)	-4,71557 sd -0,15110	0,102

The average skill in assessing Body Height /Age with post training body length with subsequent evaluation was the same in the treatment group, while the control group had a difference in the mean.

Table 9. Skills of Cadres in the Assessment of Body Height /Age Post Training in the Treatment and Control Groups

Group			Mean	n	Mean Rank	<i>p</i>
1.Body Length						
Treatmen	Post	17,0333	Negative Rank	7	7,71	0,059
	Evaluate	16,5667	Positive Rank	4	3,00	
			Ties (sama)	19		
Control	Post	15,4667	Negative Rank	10	6,10	0,008
	Evaluate	15,0667	Positive Rank	1	5,00	
			Ties (sama)	19		
2. Body Height						
Treatmen	Post	20,80000	Negative Rank	7	8,50	0,371
	Evaluate	20,9667	Positive Rank	10	9,35	
			Ties (sama)	13		
Control	Post	19,2667	Negative Rank	13	10,50	0,180
	Evaluate		Positive Rank	7	10,50	
			Ties (sama)	10		

The average skill of cadres in assessing Body Height/Age with height and development of children was not different at post training with training evaluation, both in the treatment group and in the control group.

Table 10. Skills of Cadres in Post-Training Child Development Assessment and Training Evaluation in the Treatment and Control Groups

Child Development		Mean	SD	CI	<i>p</i>
Treatment	Post Training	64,0333 (+0,80012)	4,38244	-0,26296 sd 0,19629	0,769
	Training Evaluation	64,0667 (+0,80335)	4,51001		
Control	Post Training	60,8667 (+0,80335)	4,40010	-1,69532 sd -1,688	0,102
	Training Evaluation	61,6333 (+0,78854)	4,31903		

DISCUSSION

Characteristics of Cadres

The sample of this research was 60 posyandu cadres divided into 2 groups, namely 30 cadres of the training group and 30 cadres of the conventional (control) group. Respondents were selected purposively with posyandu representatives from each kelurahan in Tambora sub-district Puskesmas. Respondents in this study had an average age of 46.83 years, an average of 8 years became a cadre and for the education level of cadres 53.3% had elementary, junior high school education and 46.7% had high school education.

In the treatment group and the control group, there was no difference in the mean age based on the Independent T test, there was no difference in the mean length of being a cadre based on the Mann Whithney test and based on the Chi Square test, the education level of cadres in the two groups was the same. Thus the treatment group and the control group have similar characteristics (homogeneous). This is very important in quasi-experimental research because according to Widayatun (2009) and Notoadmodjo (2012), these three factors, namely age, length of time as a cadre and level of education are factors that can affect a person's skills so that the treatment group and the control group must have compatibility. one another.

Cadre Skills Assessing TB Growth by Age (Body Height / Age)

The high prevalence of stunting in Indonesia is probably due to the malfunction of monitoring the growth of Body Height/Age, especially those organized by Puskesmas through community participation, namely Integrated Service Posts (Posyandu). In the operational monitoring of Body Height /Age growth at Posyandu, the role of cadres in the five-table service system will never be separated, especially cadres who are in charge of registration, measurement of Body Height and recording. The results of this study showed that before training, the average skill of cadres in assessing height / age with body length in the treatment group was 33.33% and in the control group was 27.67%. While the average skill of cadres using height in the treatment group was 34.67% and 26.33% in the control group. The skills of cadres to assess the growth of Body Height /Age in the treatment group and the control group were the same. In assessing the growth of Body Height/Age with length board / body length (for children aged 0-24 months), the cadres have on average carried out the Body Height/Age assessment procedures as determined but have not been carried out correctly and correctly, such as allowing one items such as pigtails, headgear when measuring was 83.3%, only 8.3% of cadres positioned the back

of the child right on the board and 10% who attached the entire foot of the foot with the child's two feet perpendicular to the sliding tool correctly .

Cadre skills in assessing Body Height/Age growth with microtoise are not much different from length boards. Most of the procedures that had not been carried out correctly and were most often forgotten by cadres were the child's upright position and posture, foresight when measuring and only 5% of the cadres checked the correct position of the knees and heels. All the results of children's height measurements at posyandu that have been carried out by cadres are not recorded in the KIA book on the body height/age chart, but are recorded in the register book, UPGK card, posyandu notebook so that both the treatment group and the control group do not know how to carry out body height assessments/age in child.

Other studies have also shown similar results regarding the skills of cadres in assessing children's growth, especially the ability to measure children's height. Research by Nurainun, et al (2016) shows that 62.1% of cadres in the work area of Puskesmas Langsa Timur are not skilled at measuring weight and height. The unskilled procedures for cadres when measuring the length board include measuring positions and adjusting the position of the back of the child's body, while in microtoise measurements include: posture and body position that must be upright as well as looking forward and checking the position of the knees and heels. After training in the treatment group and in the control group only using conventional methods, it was found that the skills of cadres to assess the growth of body height /age with length board and microtoise in the treatment group were different from the control group. The average skill of cadres with both length board and microtoise in the treatment group was higher than the control group either.

The results of the comparison of pre and post skills in each group, the results of this study indicate that there is a difference in the average pre and post training in the treatment group for body height/age assessment by length board and microtoise, all cadres of respondents experienced increased skills after receiving training. Meanwhile, the results of pre and post comparisons in the control group also showed differences in the average skills of cadres in assessing body height /age with both length board and microtoise. So the results of this study indicate that the skills of cadres in assessing the growth of body height of children will improve both after providing training to cadres intensively, and only by means of conventional counseling.

Cadre Skills Assessing Child Development

One of the suboptimal assessments that may not even be carried out at the posyandu is the assessment of child development. In fact, the current MCH handbook has information along with a checklist for monitoring the development of this child. The results of this study stated that after the training, the ability of cadres to assess children's development was different in the treatment group than in the control group. The average skill of cadres in assessing child development was higher in the treatment group after receiving training compared to the control group.

The results of this study also showed that when the evaluation was carried out 1-3 months after training at the posyandu where the cadres were assigned, the average skill in assessing children's development in the treatment group was not different from the control group. The absence of a difference in the average skills of cadres in assessing the development of children in the treatment group and in the control group during the evaluation could be due to the fact that developmental assessment is still rarely done by cadres at the posyandu. Currently, posyandu activities are monotonous on growth monitoring activities, especially monitoring children's body weight. In fact, children's health is not only about growth but also development. Early detection to identify obstacles in child development is very important as a preventive measure against developmental disorders. Therefore most posyandu cadres are unfamiliar with how to assess child development, even though this assessment is easier to do than growth monitoring, which requires careful measurement. However, the general public stigma that development is difficult and takes a long time to be assessed is a major obstacle in implementing monitoring in posyandu.

The training that cadres have received is primarily concerned with monitoring growth, rarely receiving training on monitoring child development. Due to the absence of training frequency, posyandu activities that never assess children's development, the training that was recently received by the treatment group was not optimal in increasing the knowledge and skills of cadres to be applied in the field. Cadres in the treatment and control groups monitored children's development based more on their experiences and memories of their own children's development. In Hayati's research, et al (2015), 57% of posyandu cadres in Pleret sub-district already understand the stimulation of early childhood development and 47% of cadres understand early detection of children with special needs. Therefore, more intensive training and monitoring of child development at posyandu should be carried out more frequently by

cadres so that cadres become accustomed and have experience in assessing children's development.

CONCLUSIONS

Training in body height /age growth assessment and child development improves cadres' skills in early detection of stunting in children. The skills of cadres in assessing body height /age growth in terms of length board (body length) and microtoise (height) are still not carried out correctly and appropriately. The implementation of body height /age growth assessment training had a higher impact on the skills to assess cadres at posyandu than conventional implementation. The implementation of training with conventional implementation (extension) has the same impact on the skills of cadres to assess children's development at the posyandu. Recording of height and assessment of body height /age have not been carried out in the MCH Handbook. Suggestion: Cadre training or refresher needs to be carried out continuously and thoroughly, recording and reporting mechanisms for monitoring body height /age, child development needs to be held so that early detection of stunting and child development disorders can be optimal. There needs to be a rolling of tasks in 5 posyandu tables every 3 or 6 months so that all cadres have the same ability, measuring the length board and microtoise should not move from place to place in every posyandu activity. For Cadres. They need repeated application for growth monitoring and development of children in every posyandu. They should understand the contents of the KIA book, self-motivating by themselves to do the assessment in the MCH handbook and fill it out.

REFERENCES

- Adisasmito, W. 2008. *Health Systems*. Jakarta: PT Raja Grafindo Pesada
- Amareta, D.I., ArumP., Hikmah F. 2016. *Cadre Skills Improvement in Measuring Baby Body Length as an Effort to Detect Early Stunting in the Work Area of the Summersari Community Health Center*. Journal of J-Dinamika Community Service, 1 (1). E-JSSN: 2503-1112
- Directorate General of Nutrition and Maternal and Child Health. 2011. *Decree of the Minister of Health of the Republic of Indonesia No.1995 / MENKES / SK No.1995 / MENKES / SK / XII / 2010: Anthropometric Status Assessment of Children's Nutritional Status*. Jakarta: Ministry of Health of the Republic of Indonesia, Director General of Nutrition & KIA
- Fatmah. 2013. *The Effect of Training on Increasing Knowledge and Technical Skills of Obesity and Hypertension Counseling for Posbindu Cadres in Depok City*. Makara Series Health, 17 (2): 49-54. DOI: 10.7454 / msk.v17i2.xxx

- Firmawan, Y. 2018. *Standard Operating Procedures for Measuring the Length or Height of Babies and Toddlers*. UPTD Puskesmas Kalimanggis. Downloaded on February 16, 2018 at <http://www.academia.edu/31135097/>
- Fuada N., Salimar., Irawati A. 2014. *The Ability of Posyandu Cadres in Measuring Toddler Height*. Journal of Health Ecology, 13 (3): 229-239.
- Hayati N., Muthmainnah, Fatimaningrum A.S. 2015. *Training for Posyandu cadres in the detection of early childhood development*. Journal of Children's Education, Vol IV, Issue 2
- RI Ministry of Health. 2012. *Curriculum and Modules: Training for Posyandu Cadres*. Jakarta Ministry of Health of the Republic of Indonesia
- RI Ministry of Health. 2015. *Technical Guidelines for the Use of Maternal and Child Health Books*. Jakarta: Ministry of Health, Republic of Indonesia
- RI Ministry of Health. 2016. *Maternal and Child Health Book*. Jakarta: Ministry of Health of the Republic of Indonesia
- Mangkunegara, AA. Anwar Prabu. 2014. *Planning and Human Resource Development*. PT. Refika Aditama. Bandung
- Notoatmodjo S. 2012. *Health Promotion and Health Behavior*. 2012 Revised Edition. Jakarta Rineka Cipta
- Nurainun, Ardiani F., Sudaryati E. 2016. *Description of Cadre Skills in Measuring BB and TB Based on the Characteristics of Cadres in the Work Area of the Langsa Timur Community Health Center, Aceh Province in 2015*. Download January 30, 2018 at <https://jurnal.usu.ac.id/index.php/gkre/article/view/13676>