



EFFECT OF ADMINISTERING BLACK CUMIN (NIGELLA SATIVA) TOWARD POSTPARTUM MICE (MUS MUSCULUS L)

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ABSTRACT

Objective: The aim of this study was to investigate effect of administering black cumin (*nigella sativa*) toward postpartum mice (*mus musculus L.*).

Methods: This type of research was true experimental, group P0: control group, treatment groups by administering *nigella sativa* P1:2.6mg/day, P2:3.9mg/day, P3:5.2mg/day, and P4:6.5mg/day, which each group 5 samples.

Results: The average amount of leukocytes after given *nigella sativa* 2.6mg/day for 7 days (P1) which was 7.10 ± 0.57 ($\times 10^3$ cells/mm³), and at least in female mice after given *nigella sativa* 6.5mg/day for 7 days (P4) which was 6.62 ± 0.52 ($\times 10^3$ cells/mm³). The average amount lymphocytes after given *nigella sativa* 2.6mg/day for 7 days (P1) which was 63.40 ± 4.77 ($\times 10^3$ cells/mm³), and least in female mice after given *nigella sativa* 3.9 mg/day for 7 days (P3) which was 47.00 ± 14.58 ($\times 10^3$ cells/mm³). Amount of monocytes after given *nigella sativa* 5.2mg/day for 7 days (P3) which was 5.40 ± 0.55 ($\times 10^3$ cells/mm³), and least in female mice after given *nigella sativa* 2.6mg/day for 7 days (P1) which was 4.80 ± 1.30 ($\times 10^3$ cells/mm³).

Conclusion: The results obtained in this study that administering of *nigella sativa* did not affect the average number of leukocytes adult female mice after childbirth (*mus musculus L.*), administering of *nigella sativa* did not affect the average number lymphocyte adult female mice after childbirth (*mus musculus L.*), and administering of *nigella sativa* did not affect the average number of adult female mice monocytes after childbirth (*mus musculus L.*).

KEYWORDS: Prevention of infection, Postpartum, *Nigella sativa*

INTRODUCTION

The period of childbed is a period that a risk of childbirth complications, either directly or indirectly.¹ According to ministry of health, Indonesia postpartum infection in humans are the number three cause of death after bleeding (28%), pre-eclampsia (24%) and infections (11%) and occurs after discharge from the hospital.² Infection in this period characterized by postpartum fever with a temperature of 38°C on any 2 of the first 10 days after excluding the first 24 hours.³

The assortment of the bacteria into the uterus that can cause postpartum infections such as exogenous (bacteria coming from outside) are caused by the *streptococcus haemolyticus anaerobic bacteria, clostridium welchii staphylococcus aureus, and escherichia coli*. The inflammatory process in postpartum infection will cause a decrease in the immune system which is the body's mechanism for maintaining the integrity of the body as a protection against the danger of an antigen or foreign body (bacteria, viruses, fungi, and parasites).⁴

One of the plants that can be used to boost the immune system is *nigella sativa* (black cumin) that inhibit apoptosis by inhibiting viral replication, with a

decrease in lymphocytes, this process inhibits viral replication in target cells. ⁵

Nigella sativa also known as black cumin, kalonji, habitus cauda, black seed, love in the mist, fitches, black caraway, black onion seed, Charnushka have a therapeutic effect broad and significant to many diseases such as skin diseases, jaundice, indigestion, anorexia, conjunctivitis, dyspepsia, rheumatism, diabetes, hypertension, intrinsic bleeding, paralysis, amenorrhea, asthma cough, bronchitis, headache, fever, influenza, and eczema.⁶

Active substance contents: *thymoquinone, dithymoquinone, thymohydroquinone, and thymol. Thymoquinone* is active substances principal of volatile oil (essential oil) but it is also made up of amino acids, proteins, carbohydrates, alkaloids, saponins, fatty acids, especially fatty acids essential unsaturated namely *alpha-linolenic acid* (Omega-3) and *linoleic acid* (Omega-6) as forming cells.⁷ *Thymoquinone* (TQ) effects the antimicrobial, has a broad antimicrobial spectrum, including gram-negative, gram-positive bacteria, viruses, parasites and fungi *Schistosoma*,⁸ by inhibiting inflammatory.

The result scientific studies extracts seed *nigella sativa* shown to improve the function of polymorphonuclear cells (PMN), cytokines stimulate Macrophage Activating Factor (MAF) thereby improving the function of macrophages, which play a role in the immune system mobile.⁹ *Nigella sativa* has activity as anti inflammatory and bronchodilation through the mechanism of reduction in eosinophil, IgG1 and IgG2a, inhibition of the enzyme cyclooxygenase (COX) and lipoxygenase, as well as the inhibition of prostaglandin D2 and activity immunomodulator which plays an important role in the stabilization of Th1 and Th2 closely related to the reaction inflammation.¹⁰ Methanol extracts of *nigella sativa* seeds effectively used in invitro assays and in vivo against the bacterium that causes mastitis in cows injected with the bacteria that cause mastitis.¹¹

MATERIALS AND METHODS

This study was conducted on 25 adult female mice (*mus musculus L*) after giving birth to determine infection prevention management post Partum with alternative methods administering *nigella sativa*.

Rate incidence of infection through total levels of leukocytes, lymphocyte, and monocytes mice adult female postpartum (*mus musculus L*) after administering *nigella sativa* in the control group and the intervention group with P1 dose:2.6mg/day, P2:3.9mg/day, P3:5.2mg/day, P4:6.5mg/day.

Implementation of extraction *nigella sativa* held for one week. Its activities consist of refining cumin in a blender, the determination of the amount of the judgment, and then soaked with ethanol for 24 hours. Then the material is filtered or passed through the refining process (filtration). The next process material extract obtained was concentrated using a rotary evaporator at 70% according to the boiling point of ethanol to obtain a thick extract is used for the sample.

RESULTS

Amount of leukocytes

The average amount of leukocytes of female mice after childbirth of each treatment found to be most numerous in the group after getting treatment given *nigella sativa* 2.6mg/day for 7 days (P1) which is 7.10±0.57 (X10³cells/mm³), and at least in female mice after getting treatment given *nigella sativa* 6.5mg/day for 7 days (P4) which is 6.62±0.52 (X10³cells/mm³), but both results when respectively compared to the control results found no real difference. Similarly, between each treatment when compared to one another with the treatment they found no significant difference.

Table 1: The average amount of leukocytes

| Treatment | Leukocytes (X10 ³ cells/mm ³) |
|-----------|--|
| P0 | 6,00 ± 1,06 |
| P1 | 7,10 ± 0,57 |
| P2 | 6,58 ± 0,35 |
| P3 | 6,34 ± 0,44 |
| P4 | 6,62 ± 0,52 |

Amount of lymphocytes

After an assessment of the amount lymphocytes female mice after childbirth and given *nigella sativa* in each group showed the average amount of lymphocytes female mice after give birth of each treatment was found to be most numerous in the group after getting treatment given *nigella sativa* 2.6mg/day for 7 days (P1) which is 63.40±4.77 (X10³cells/mm³), and least in female mice after getting treatment given *nigella sativa* 3.9mg/day for 7 days (P3) which is 47.00±14.58 (X10³cells/mm³), but both the results when compared with the respective control results found no real difference. Results between each treatment compared with other treatments one still found no real difference.

Table 2: The average amount of lymphocytes

| Treatment | Limfosit (X10 ³ cells/mm ³) |
|-----------|--|
| P0 | 59,40 ± 8,29 |
| P1 | 63,40 ± 4,77 |
| P2 | 58,80 ± 2,59 |
| P3 | 47,00 ± 14,58 |
| P4 | 53,40 ± 8,32 |

Amount of monocytes

After an assessment of the amount of monocytes female mice after childbirth and given *nigella sativa* in each group showed the most numerous in the group after getting treatment given *nigella sativa* 5.2mg/day for 7 days (P3) which is 5.40±0.55 (X10³cells/mm³), and least in female mice after getting treatment given *nigella sativa* 2.6mg/day for 7 days (P1) which is 4.80±1.30 (X10³cells/mm³), but both results when respectively compared to the control results found no real difference. For results between each treatment compared with other treatments one not found a noticeable difference.

Table 3: The average amount of monocytes

| Treatment | Monosit (X10 ³ cells/mm ³) |
|-----------|---|
| P0 | 6,40 ± 0,89 |
| P1 | 4,80 ± 1,30 |
| P2 | 5,20 ± 1,10 |
| P3 | 5,40 ± 0,55 |
| P4 | 5,00 ± 0,71 |

DISCUSSION

In this study found the average amount of leukocytes, lymphocytes, and monocytes show the change in the direction of normal, but showed no real difference in either the control group or an intervention group. Levels of leukocytes, lymphocytes, and monocytes were found on average showed normal values. This ensures that *nigella sativa* influence to increase and decrease the levels of leukocytes. Increased levels of leukocytes to the condition after childbirth due to the resistance to the possibility of infection that can be derived from the birth way of body defense mediated effector mechanisms of innate immunity and adaptive immunity. Innate Immunity consists of cellular and biochemical defense mechanisms that have been formed even before the infection. Innate immunity is also called non-specific immunity. In contrast to innate immunity, adaptive immunity is an immune response that is stimulated. By the entry of infectious agents and adapt to such infections. Adaptive immunity have extra capacity of distinguishing assortment of microbes and molecules are very similar, so it is also called specific immunity.

Hexane extracts of black cumin seeds (*nigella sativa lour*) can enhance the activity of macrophage female mice strains.¹² Other benefits also can strengthen the immune system against viruses and bacteria. One of the properties that have been tested for the immune system is black cumin can increase the amount of lymphocytes and monocytes. Black cumin can increase the ratio of T helper cells to suppressor T cells by 72% which means increasing the functional activity of immune cells.¹³

The results of this study different from the results of research Zikriah who found that the ethanol extract of black cumin in mice was able to influence the amount of total leukocyte and lymphocyte percentage with results significantly different (p<0.05) but not able to affect the percentage of monocytes.¹⁴

Monocytes are one of the large nucleated leukocytes with the double size larger than erythrocytes red blood cells. Levels also the largest in the blood circulation and lymphatic tissue produced in. The normal value in the body:2-8% of all leukocytes. The increase in monocytes present in viral infections, parasites (e.g, worms), cancer, etc. While the decline in monocytes present in lymphocyte leukemia and aplastic anemia. For lymfosit, this is one of the leukocytes that play a role in immune processes and the formation of antibodies. The normal value:20-35% of all leukocytes. Increased lymphocyte leukemia contained in limpositic, viral infections, chronic

infections, etc. Decrease in lymphocytes occurs in patients with cancer, aplastic anemia, kidney failure, etc.¹⁵

CONCLUSIONS

Based on the results and the above discussion, it can be concluded that:

1. Provision of *nigella sativa* did not affect the average number of leukocytes adult female mice after childbirth (mus musculus L).
2. Provision of *nigella sativa* did not affect the average number lymphocyte adult female mice after childbirth (mus musculus L).
3. Provision of *nigella sativa* did not affect the average number of adult female mice monocytes after childbirth (mus musculus L).

Recommendations

1. Suggested further research by examining various indicators of infection after childbirth.
2. Comparing *nigella sativa* in suppressing oxidants (free radicals) that is caused by the birth process in humans.

Ethical Approval

This research was accepted by the Ethics Committee of Faculty of Medicine, Department of Biomedical, Universitas Sumatera Utara.

Conflict of interest : None declared

REFERENCES

1. Cunningham GF, Levano KJ, Gilstrap LC, et al. *Puerperal Infection*. 22nd ed. New York: McGraw-Hill;2005.
2. Kemenkes RI. *Profil Kesehatan Indonesia*. Jakarta: Kementrian Kesehatan Republik Indonesia;2014.
3. Monif G R and D A Baker 2008 *Infectinus Diseases in Obstetrics and Gynecology*vol 6 (Informa).
4. Baratawidjaja K, Regaganis I. *Imunologi Dasar*vol. 8th ed. Jakarta: Balai Penerbit Fakultas Kedokteran Indonesia;2009.
5. Gerige SG, Mahesh. *Analisis Of Nigella Sativa seeds and Antimicrobial activity of its violatile oil*. India: Departement of biotechnology Sri Krishnadevereya University;2008.
6. Ahmad A, Husain A, Mujeeb M, Khan SA, Njami AK, Siddique NA. *A review on therapeutic potential of Nigella sativa: A miracle herb*. *Asian Pac J Trop Biomed* 2013;3:337-352.
7. Temburne SV, Feros S, Sakarla DM. *A review on therapeutic potential of Nigella sativa (kalonji) seeds*. *Journal of Medicinal Plants Research* 2014;8:166-177.
8. Fatemeh F, Bibi S, Band HH. *Black cumin (Nigella sativa) and its constituent (thymoquinone): a review on antimicrobial effects*. *Iran J Basic Med Sci* 2014;17:920-938.
9. Dipiro JT. *Pharmacotherapy Handbook*. 7th ed. New York: Mc Graw Hill;2008.
10. BrosKabady MH, Amery S, Valudi N, Khakzal MR. *The effect of Nigella sativa alone, and in combination eith dexamethasone, on tracheal muscle responsiveness and lung inflammation in sulfur mustard exposed guinea pigs*. *Journal of Ethnopharmacology* 2011;137:1028-1034.
11. Monika T, Sasikala P, Vijaya B, Reddy M. *An investigational study of antibacterial activities of Negella sativa on Mastitis in dairy crossbred cowm*. *J. Adv. Scient.Tecch.Res* 2013;3: 273-283.
12. Akrom, Fatimah. *Ekstrak Heksan Biji Jintan Hitam (Nigella Sativa L) Meningkatkan Aktivitas Fagositosis Makrofag Tikus Betina Galur SD (Sprague Dawley) yang Diinduksi DMBA (7,12-dimetilbenz (α) antrasen) secara in*

- Vitro. Pharmacia* 2015;5:69-76.
13. Massuod H.S.A, Mahfuds L.D, Suprijatna E. *Effect of cage density and supplementation black cumin in the diet on blood status of broiler. Australian Journal of Basic and Applied Sciences* 2014;8:354-359.
 14. Zakriah. *Uji Imunomodulator Ekstrak Etanol Jinten Hitam (Nigella Sativa L) Terhadap Jumlah Total Leukosit, Persentase, Limfosit, Persentase Monosit dan Kadar Interleukin-1 β Pada Mencit Balb/c. Jakarta:Fakultas Kedokteran dan Ilmu Kesehatan Program Studi Farmasi; 2014.*
 15. *Lab kesehatan 2012 Available in:<https://infolaboratoriumkesehatan.wordpress.com/tag/nilai-normal-leukosit-sel-darah-putih> Accessed on November 2016.*