

Intake of kidney bean (*phaseolus vulgaris*) extract as postpartum blues management

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Abstract

Background: Postpartum blues is common in postpartum Mother with more prone to crying, more anxious, often unstable and more emotional than usual. Zinc supplementation is one of the methods needed for postpartum blues conditions. Kidney bean (*Phaseolus vulgaris*) extract has the highest zinc content. This study aimed to examine the effect of intake kidney bean extract (*Phaseolus vulgaris*) as a zinc source as management mother with Postpartum Blues

Methods: Quantitative study with an experimental study design (Quasi Experiment Design) with a Pre and Post-test Control Group Design. The instrument used to measure the mood of a mother after childbirth was EPDS (Edinburgh Post-Partum Depression Scale). The total sample was 68 mothers who experienced postpartum blues in Ngerandu Ponorogo primary health care. The Mann-Whitney was used to analyse and find out the difference in mood improvement before and after the intervention in the experimental group and the control group.

Results: The results showed that there was a statistically significant difference in mood levels of mothers with postpartum blues before and after intervention (p value of 0.001 (<0.005)). This result indicated that intake of kidney bean (*Phaseolus vulgaris*) extract had an effect on the mood level of mothers with postpartum blue.

Conclusion: Intake of kidney bean (*phaseolus vulgaris*) extract on the incidence of postpartum blues possibly improvement mood in the experimental group after the treatment for 1 month. (*Health Science Journal of Indonesia 2021;12(2):117-24*)

Keywords: kidney bean (*phaseolus vulgaris*) extract, postpartum blues, postpartum mother

Abstrak

Latar belakang: Postpartum blues umum terjadi pada ibu postpartum dengan tanda sering menangis, khawatir yang berlebihan, emosional yang tidak stabil. Suplementasi zinc merupakan salah satu metode yang dibutuhkan untuk kondisi postpartum blues. Ekstrak kacang merah (*phaseolus vulgaris*) memiliki sumber nutrisi zinc yang tinggi, Penelitian ini bertujuan untuk menguji efek konsumsi ekstrak kacang merah (*Phaseolus vulgaris*) sebagai sumber zinc sebagai manajemen ibu dengan postpartum blues

Metode: Penelitian kuantitatif dengan design Quasi Experiment pre dan post control grup. Instrumen pengukur mood ibu setelah melahirkan adalah EPDS (Edinburgh Post-Partum Depression Scale). Total Sampel 68 ibu yang mengalami postpartum blues di Puskesmas Ngerandu Ponorogo. Analisis statistik menggunakan Mann-Whitney untuk menemukan perbedaan perubahan mood ibu postpartum blues sebelum dan sesudah dilakukan intervensi pada grup intervensi dan kontrol.

Hasil: Hasil menunjukkan bahwa terdapat perbedaan signifikan tingkat mood ibu dengan postpartum blues sebelum dan sesudah dilakukan intervensi (p : 0,001 (<0,005)). Hasil mengindikasikan bahwa konsumsi ekstrak kacang merah (*phaseolus vulgaris*) memiliki efek pada tingkat mood ibu yang sedang mengalami postpartum blues.

Kesimpulan: Konsumsi ekstrak kacang merah (*phaseolus vulgaris*) pada ibu postpartum blues memungkinkan untuk perubahan mood pada grup intervensi setelah diberikan treatment selama 1 bulan. (*Health Science Journal of Indonesia 2021;12(2):117-24*)

Kata kunci: ekstrak kacang merah (*phaseolus vulgaris*), postpartum blues, ibu postpartum

After going through the labor process, some women usually experience psychological changes. Psychological changes in the postpartum period consist of three forms, including postpartum blues, postpartum depression and postpartum psychosis. But in general, psychological problem often experienced is postpartum depression (PPD).¹ Women who experience postpartum blues are usually more prone to crying, more anxious, often unstable and more emotional than usual. Postpartum blues usually occur on days 3 to 5 after childbirth. According to Miller, the incidence of postpartum blues was not related to psychiatric history, environmental stress, cultural context, composition or parity. But these factors usually showed an effect when Postpartum Blues changed into depression.²

Globally the PPD prevalence is 35%, and in the United States it is around 21%. However, it is different from poor countries like South Africa wherein the prevalence is around 35%. PPD prevalence is 19% in Saudi Arabia, 11.2% in China and 27% in Japan.³ Physiologically, the cause of postpartum blues consists of several factors. First, nutritional deficiencies and metabolic imbalances. Second, a decrease in hormone levels, namely progesterone and estrogen which occurs quickly after delivery. Third, there is an alteration in the hypothalamic-pituitary-adrenal mechanism (HPA axis).⁴ In Indonesia, many incidents of postpartum blues are not documented. Not much has been done by health care facilities so that the data obtained from the results of previous research by Mursidin, it was found that 53.3% reported the incidence of postpartum blues in an "M" Hospital that needed special support and education, so that it did not develop into postpartum depression. Partum blues has a negative impact on maternal health and the mother's treatment of her baby.⁵

Kidney bean (*Phaseolus vulgaris*) is a member of leguminosae, phase-oleae, subfamily Papilionoideae. Most often, beans are usually used as dryseeds include one most of them is Kidney bean (*Phaseolus vulgaris*). Nutrition of Kidney bean (*Phaseolus vulgaris*) is a good source protein, starch, fiber, vitamin and mineral. Kidney bean (*Phaseolus vulgaris*) have the highest mineral content compared to other beans. Kidney bean (*Phaseolus vulgaris*) has important sources of iron, zinc, copper, phosphorus, and aluminum and other minerals are also significantly found amounts in Kidney bean (*Phaseolus vulgaris*). The level of zinc range of 10,1 – 10,9 µg/g.⁶ (Phytic acid is classified as an anti-nutritional substance because it forms complex bonds with iron or other minerals such as zinc, magnesium and calcium since

kidney beans have high viscosity and low absorption properties. It is seen that the zinc content of food and starch made of kidney beans have a quite significant advantage because these are viscous components.⁷

One micronutrient that plays an important role in depression is zinc. Zinc acts as a micronutrient that plays an important role as a neuroreceptor and neurotransmission. Zinc has a direct and indirect effect on the balance of glutamatergic.⁸ Zinc increases the constant dissociation of opioid receptors for naloxone. Zinc also affects the muscarinic acetylcholine receptors in the brain. These receptors are widely found in the cerebral cortex and hippocampus, where there is a high zinc concentration. Zinc is also needed in the formation of proteins needed for the formation of Gamma Aminobutyric Acid (GABA) and other neurotransmitters.⁹ In humans, low zinc levels are associated with a person's mood disorders. This relationship seemed consistent at various ages, from young adult, adult, to old age.¹⁰ Some studies showed a tentative relationship between zinc and mood regulation among infants and children.¹¹ Other studies showed that almost all pregnant women have a zinc deficiency. It can be indicated in the study conducted by Shah who found zinc levels among pregnant women.¹² Postpartum depression is often referred to as postpartum blues.¹³ Women who experience it often experience fear and anxiety related to labor and their new role as a mother or parent.¹⁴

There was a relationship between low zinc levels and mood disorders. This relationship seemed consistent at various ages, from young adult, adult, to old age.¹⁵ Some studies that examined the role of zinc showed that zinc played an important role in reducing stress in old age. Lower plasma zinc concentrations were associated with a number of lower psychological variables, such as cognitive status, mood and stress, especially in areas with low zinc intake, limited versions of foods high on zinc.¹⁶ In addition to psychological variables, low concentrations of zinc plasma can be influenced by the increased zinc needs of nursing mothers but insufficient fulfillment and absorption in the body that is not perfect. According to previous research, it was found that socioeconomic has an influence on serum zinc levels in the body.¹⁷ The results of the study stated that zinc levels in the body of someone who has a lower socioeconomic status compared to someone who has an upper middle socioeconomic level, because someone who has a low socio-economic level will consume more foods that are nutritionally unbalanced, such as foods that are rich in nutrients. carbohydrates, unsaturated fatty

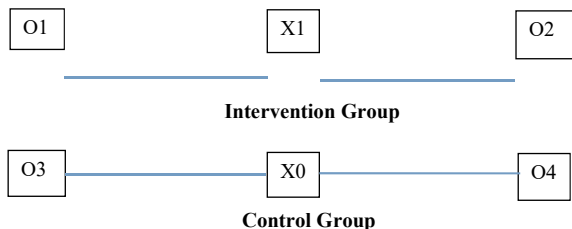
acid, because these foods have a low marketability value compared to other nutritious foods. Economic factors can influence zinc levels.¹⁸ Formal education can be a nutrition-sensitive intervention that supports the improvement and impact of special nutritional action. Food intake is highly dependent on education level and the economic. In rural areas, low economy status or poverty occupies the first position in society that causes lack of nutrition. Educational factors and low economic status will influence each other in influencing nutritional intake.¹⁹

This study aimed to determine the effect of the intake of kidney bean (*Phaseolus vulgaris*) extract as a zinc source as management postpartum blues. The results of this study are expected to provide information regarding the management of postpartum women who experience postpartum blues with a used herbal extract which is rich in zinc and minimal side effects and alternative herbal interventions related to postpartum blues.

METHODS

Study Design

This was a quantitative study with an experimental study design (quasi experiment design) with a Pre and Post-test Control Group Design. Pre-test was conducted in the intervention group (O1) and followed by treatment (X1), and a post-test was conducted in the intervention group after a period of time (O2). Pre-test was also conducted in the control group (O3) without treatment (X0) and followed by a post-test in the control group (O4).²⁰



Respondents

The sample of this study was 68 mothers who experienced postpartum blues in the work area of Ngrandu Ponorogo Community Health Center. Respondents were divided in two group the intervention group and control group with 34

respondents in each group. The method of sampling used here was non random sampling according to the established inclusion and exclusion criteria. The inclusion criteria for this study were the postpartum mothers, mothers who experienced the postpartum blues and the exclusion criteria was mothers who have confirm Schizophrenia disease.

Instrument

The instrument used in this study was EPDS (Edinburgh Post-Partum Depression Scale). EPDS (Edinburgh Post-Partum Depression Scale) is a measuring tool to assess the mood of a woman after childbirth. The instrument consists of 10 measurement items. EPDS (Edinburgh Post-Partum Depression Scale) is assessed by a score with a maximum score of 30. A score of 10 or more indicates possible depression.²¹ EPDS (Edinburgh Post-Partum Depression Scale) has been validated and used widely. Has a level of reliability from moderate up to height also has a good correlation with measuring instruments other than depression. Intake of nutrients especially micronutrients assessed with questionnaire semi-quantitative food frequency. An instrument for characteristic respondent uses general questionnaire.

Intervention

All postpartum mother was assessed their characteristic (age, education, parity, employment, family income, husband support, and family smoking status) with a questionnaire and then the respondent was determined with assessed all postpartum women with instrument EPDS (Edinburgh Post-Partum Depression Scale). Respondents consisted of two groups. The first group is the intervention group consisting of 34 postpartum mothers with postpartum blues and the second group is the control group which consists of 34 postpartum mothers with postpartum blues. The intervention group was given kidney bean extract (*phaseolus vulgaris*) as a source of zinc 1000 mg. Respondent was given 120 capsules, which was taken 3 times a day (morning, afternoon, evening). Take a capsule with water, 1-2 hours after eating and don't take foods or drinks that contain high calcium and phosphorus because it can inhibit the absorption of zinc. The control group were given a placebo. Respondent was given 120 capsules, which was taken 3 times a day (morning, afternoon, evening). Before the intervention, mothers with postpartum blues in both groups were measured first of micronutrient content especially zinc with

questionnaire semi-quantitative food frequency. The Intervention was carried out for 1 month in both groups. After that both groups were measured back the scale of mood mother with postpartum blues using instrument EPDS (Edinburgh Post-Partum Depression Scale) and zinc level with questionnaire semi-quantitative food frequency. To find out the respondent's compliance, the researcher called and gave the respondent a control sheet regarding the research. In addition, researchers also work with guardians so that they are always reminded when they are taking medicine.

Data Collection

After the data was collected, before being processed the data is edited first by researchers to avoid mistakes or doubts in order to get quality data. In this study, researchers examined the completeness of the questionnaire, the clarity of writing answers, relevance, and consistency with the questions. After the researcher checks the filling of the questionnaire, the incomplete, unclear, irrelevant or inconsistent questionnaire with the questions will be clarified to the respondent. The goal is to make it easier for researchers to analyze data.

The coding process was provided a code on the respondent's questionnaire sheet to facilitate data analysis and processing. At this stage the researcher gave code A followed by the serial number of the respondent (A1,2,3, ...) for the intervention group, and code B followed by the serial number of the respondent (B1,2,3 ...) for the control group. The researcher then changed the data in the form of letters into numeric data in the form of scores of respondents' answers based on the provisions set by the researcher to facilitate analysis and speed up data entry.

Scoring is done by giving a value to the data according to a predetermined score based on the measuring instrument made then giving the total score of all the answers. The score on the data in this study is 1-10 according to the anxiety scale observation sheet.

At this stage the researcher processes the data by entering data from each respondent into a computer program. The data is entered according to the respondent's number on the questionnaire and the number on the observation sheet and the respondent's answer, then it is entered into a computer program in numerical form according to the answer score that has been determined when coding. This cleaning stage aims to provide data from possible data that do not meet the requirements or are missing with the help of software. Researchers recheck the data

that has been entered. After confirming there are no errors, the next stage is carried out, namely data analysis according to the type of data.

Data analysis

The normality data were analyzed using the Shapiro-Wilk test, characteristic respondent analysis with descriptive analysis, and Food Frequent with AKG. The effect treatment kidney bean on postpartum blues was analyzed by independent t-test for data that were normally distributed and would be tested with the Mann-Whitney test if the data were not normally distributed.²²

Ethical Clearance

This Research passed an ethical clearance from the KEPK Poltekkes Kemenkes Semarang with number 060/EA/KEPK/2020.

RESULTS

The general respondent characteristics such as age, education, parity, employment, family income, husband support, smoker's family of the respondent are presented in Table 1. Most respondents had at risk age, low education level, parities, unemployment status, family income below upah minimum regional UMR, came from smoker's family in the intervention group. On these results, it shows that from each of the respondents both from the intervention group and the control group there is no significant difference from age, education, parity, employment, family income, husband support, smoker's family.

The dietary pattern consumption among respondents with the incidence of postpartum blues can be seen in Table 2. Result of dietary pattern consumption respondent before intervention in zinc, iron, cooper, folate, calcium, Vitamin B₆, and Vitamin B₁₂ are shown that the nutritional intake below RDA (Recommended Dietary Allowances). After intervention for 1 month, component of zinc, iron, copper, folate increased in both groups, but still below RDA (Recommended Dietary Allowances) except zinc, and iron content. According to RDA (Recommended Dietary Allowances) Normal zinc and iron level is 10 mg and 26 mg. In this result mean zinc level before intervention is 9,1 mg and after intervention 11,6 mg and mean of iron level before intervention is 20,9 mg and after the intervention is 26,0 mg.

Table 1. General characteristics of respondents based on psychological factor, postpartum blues incidence and zinc levels

Characteristic	Experiment Group		Control Group	
	n	%	n	%
Age				
At risk	22	64.7	20	58.8
No Risk	12	35.3	14	41.2
Education				
Low	26	76.4	24	70.5
High	8	23.6	10	29.5
Parity				
Primipara	20	58,8	16	47,0
Multipara	14	41,2	18	53,0
Employment				
Employed	10	29.5	14	41.2
Unemployed	24	70.5	20	58.8
Family Income				
Below Regional Min. Wage	25	73.5	21	61.8
Comply with Regional Min. Wage	9	26.5	13	38.2
Husband Support				
Yew	27	79.4	27	79.4
No	7	20.6	7	20.6
Family smoking status				
Smoker	20	58.8	21	70.5
Nonsmoker	14	41.2	13	38.2

Source: Primary Data of 2020

Table 2. Dietary pattern consumption among respondents with incidence of postpartum blues

Dietary Pattern	Before Intervention				After Intervention			
	Intervention Group		Control Group		Intervention Group		Control Group	
	Min	Max	Min	Max	Min	Max	Min	Max
Zinc (mg)	7,9	10,3	7,2	11,6	10,8	12,4	8,2	10,8
Iron (mg)	16,5	27,4	12,9	20,6	22,4	29,7	11,2	23,9
Copper (mg)	0,6	1,9	0,9	1,8	1,2	2,1	0,5	1,5
Folate (µg)	104,2	210,3	110,4	220,9	135,7	248,9	127,6	217,8
Calsium (mg)	700,5	900,6	864,9	1001,3	578,8	957,9	678,9	895,4
Vitamin B ₆ (mg)	0,6	1,0	1,2	1,5	0,4	1,4	0,9	1,3
Vitamin B ₁₂ (mcg)	1,3	2,0	0,7	1,3	1,2	1,8	0,8	1,0

Source: Primary Data of 2020

Paired T test pre and posttest in the intervention group can be seen in Table 3. The result showed that average pretest intervention in intervention group value was 6.4 and average posttest after intervention was 5.9. P value in this test was 0,001 ($p < 0,05$), which means can be concluded that significantly on the score of EPDS (Edinburgh Post-Partum Depression Scale) tools before and after intervention, this means there is a change in EPDS score before intervention

and after intervention in intervention group. The average pretest in control group value was 3.8 and the average posttest after being given a placebo was 4.4. P value in this test was 0,062 ($p > 0,05$), which means can be concluded that no significant change in the score means of EPDS (Edinburgh Post-Partum Depression Scale) tools before and after being given a placebo in control group.

Table 3. Paired T test pre and post test in the intervention and control group

Intervention Group	Mean	p
Pretest Intervention Group	6.4	
Posttest Intervention Group	5.9	0,001
Control Group		
Pretest Control Group	3.8	0,062
Posttest Control Group	4.4	

Effect of the intake of kidney bean (*phaseolus vulgaris*) extract as a zinc source as management postpartum blues can be seen in Table 4. On equal variance assumed obtained t value is 5.476 and significance level $p = 0.03$. These significant results indicate $p < 0.05$, which means that there were differences in score of EPDS (Edinburgh Post-Partum Depression Scale) in intervention group and control group. This result can be said that score of EPDS (Edinburgh Post-Partum Depression Scale) were fundamentally different between intake of kidney bean (*phaseolus vulgaris*) extract group than the placebo group.

Tabel 4. Independent samples test

F	Levene's Test of Equality of Variances	t-test for Equality of Means				
		Sig.	t	df	Sig. (2-tailed)	
Skor EPDS	Equal Variances assumed	.932	.104	5.476	82	0,03
	Equal variances not assumed			7.875	86.432	0,03

DISCUSSIONS

In this study, there was an effect of intake of red bean extract (*phaseolus vulgaris*) as a source of zinc for the management of postpartum blues. The EPDS score in Table 4 shows that there is a significant effect of $p=0.03$. Postpartum blues is common in postpartum mothers with more prone to crying, more anxious, often unstable and more emotional than usual.²³ Supplementation is one of the methods needed for postpartum blues condition. Kidney bean (*phaseolus vulgaris*) extract has the highest zinc content. This

study examines the effect of intake kidney bean extract as a zinc source as a management mother with postpartum blues.

The use of antidepressants and depression is bad for fetal growth and development. Depression in mothers is associated with preterm birth, low birth weight, impaired fetal growth as well as cognitive complications and emotional post-birth.²⁴ Antidepressant exposure is associated with preterm birth, reduced birth weight, pulmonary hypertension persistent and a visible postnatal adaptation syndrome correlated with autism syndrome. Paroxetine is related to heart formation disorders. According to previous research by Mubarak, nutritional Composition and Antinutritional Factors of Mung Bean Seeds (*phaseolus vulgaris*), stated that in *Phaseolus aureus* there is a zinc content of 1.40 mg of zinc in every 1 kidney bean seed (*phaseolus vulgaris*) extract.²⁵

A study conducted in France on mothers postpartum on day 3 after delivery found that there were 30% of mothers who had an EPDS score of 9 and 19% had score 11.²¹ Studies conducted in Italy found that about 15.7% of women on day 2 of delivery reported an EPDS score of more than 9. EPDS factors analyzed on day 2 indicated that there are 3 aspects that stand out, namely depression, anxiety and anhedonia.²

A phenomenon can be categorized as a problem in public health if the prevalence is more than 20% of the population.² Meanwhile in Indonesia, many postpartum blues incidents are not documented. Not much has been done by health care facilities, so from the data obtained from the results of previous research by Mursidin in 2017 it was found that 53.3% reported the incidence of postpartum. Incidence of postpartum blues need special support and education, so it does not develop into postpartum depression. Partum blues have a negative impact on the health of the mother and the mother's treatment of her baby.⁵ The problem of zinc deficiency should be a common concern considering its important role in supporting one's health. Moreover, the prevalence of zinc deficiency is very high. This study as well as previous studies show that zinc levels in pregnant and lactating women are very low. However, the issue of zinc deficiency has not been discussed in detail especially as a public health nutrition problem. Which become Health nutrition problem is Lack of Protein/Less Energy Chronic Energy, Iron deficiency anemia, Vitamin A deficiency, Disorders Due to iodine deficiency, and obesity. With great view a zinc

deficiency problem, hence hypozinkemia should be candidates for public health nutrition problems. In line with that study taking extracts (*Phaseolus vulgaris*) as a source of zinc was effective against the incidence of postpartum blues compared to a control group given a placebo.

In this study, there was an effect of intake of red bean extract (*phaseolus vulgaris*) as a source of zinc for the management of postpartum blues. The EPDS score in table 4 shows that there is a significant effect of 0.03. Previous research about supplementation of iron, zinc, and magnesium on mothers with postpartum depression showed that giving it to mothers with postpartum depression can be an alternative treatment for postpartum depression patients.² Several studies have shown that zinc sources are involved in the pathophysiology and therapy of depression. Another study showed that only after successful antidepressant therapy, the lower blood concentration of zinc was normalized in a depressed patients.¹⁶ Studies before conducted to assess work zinc as an antidepressant against mild stress Chronic / Chronic Mild Stress (CMS) and levels Brain-Derived Neurotrophic Factor (BDNF) protein as well as BDNF mRNA shows that zinc hydro aspartate (10 mg / kg BW) has an effective antidepressant that is very fast on CMS. Such zinc therapy has an effect after intervention a week. In long-term therapy, zinc was found to increase BDNF levels amounted to 17-39 percent in the mRNA level and hippocampal protein. That finding showed zinc acts as an antidepressant works very fast in dealing with CMS and increases BDNF.²⁹

There was a Cohort study conducted on 66 mothers. They give the supplementation zinc and tested to the subjects in 3 different periods ie: a month before delivery, three days, and thirty days after delivery. The results showed that level of zinc is associated with symptoms of severe depression in mothers with postpartum blues. The relationship between zinc and DPP is suspected, related to each other through glutamate hyperactivity. Glutamate is an excitation neurotransmitter major in the central nervous system and binds with a variety of ionotropic and metabotropic receptors.³⁰

With this study, it can be seen that consuming foods that contain higher zinc, such as kidney beans, which are easy to obtain and consume, can help reduce the incidence of postpartum blues. The limitations of this study, the respondent's food intake was only measured from a semi-quantitative meal frequency questionnaire so that it could not be strictly

controlled for the intake of food. Although they have been informed not to consume foods or drinks that contain high calcium and phosphorus because they can inhibit the absorption of zinc, there are some respondents who unknowingly have consumed them even if only once.

In conclusion, this study showed a result that there was an effect of kidney bean (*phaseolus vulgaris*) extract on the decreasing incidence of postpartum blues. Effect of the intake of kidney bean (*phaseolus vulgaris*) extract as a zinc source as management postpartum blues can be seen. There was an improvement in the mood of women with postpartum blues in the experimental group after the treatment of the administration of kidney bean (*phaseolus vulgaris*) extract tablets for 1 month. Meanwhile, women with postpartum blues who were given placebo tablets showed a similar mood and there was no change in it so that they still felt anxiety.

It is recommended for mothers who experience postpartum blues to always eat foods that contain higher zinc, such as nuts. The results of this study can be used as a reference for further research literature.

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