



The Sociocultural Determinants of Omega-3 Fatty Acids Intake Among Women Experienced 40-days of Postpartum in Indonesia

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Abstract: Food intake among postpartum women is still a concern due to taboo among cultural people. This study aimed to examine the impact of sociocultural factors on Omega-3 fatty acids intake among women who experienced 40-days postpartum. The data used Indonesia Family Life Survey with total sample 11,135 women. The dependent variables are Omega-3 fatty acids intake which derived from the intake of eggs, fish, meat, and dairy by following the Mediterranean Diet Foundation. The result of this study revealed that only 5% out of total respondents who had adequate Omega-3 fatty acids intake. Based on the multivariate analysis above, the most significant predictors of having adequate Omega-3 fatty acids intake are graduated from undergraduate. Other variables that are significantly related are graduated from junior high school, senior high school, vocational, and others, were Catholic, Protestant, Buddha, Konghucu, from Sunda and other ethnic groups. There is a need for post-natal education to improve eating habits after delivery besides having graduated from university.

Keywords: Omega-3 fatty acids; Postpartum; Sociocultural; Indonesia Family Life Survey

Introduction

Omega-3 fatty acids play a crucial role in various aspects of women's health, particularly during pregnancy and postpartum. The intake of omega-3 fatty acids during pregnancy and lactation is of significant interest due to its impact on maternal and fetal health (Jouanne et al., 2021). Research suggests that the demand for omega-3 fatty acids is higher in multiple pregnancies compared to singleton pregnancies, emphasizing the importance of adequate intake in postpartum women (Simmonds et al., 2020). Furthermore, an imbalance between omega-6 and omega-3 polyunsaturated fatty acids in early pregnancy has been linked to postpartum

depression, the potential implications of omega-3 fatty acid intake on mental health (Hoge et al., 2019).

The association between omega-3 fatty acid intake and depression has been extensively studied, with evidence suggesting an inverse relationship, particularly in postmenopausal women (Chae & Park, 2021). Additionally, omega-3 fatty acid supplementation has been explored in the context of preventing perinatal depression, with some studies indicating small but statistically significant improvements in gestational length and birth weight (Force et al., 2019). However, the relationship between omega-3 fatty acid status and the risk of recurrent early spontaneous preterm birth remains complex, as higher total long-chain omega-3

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fatty acid status has been associated with increased rates of early preterm birth (Goodfellow et al., 2021).

The impact of omega-3 fatty acid intake extends beyond mental health, as studies have also investigated its role in fertility and gestational diabetes. Low omega-3 fatty acid intake has been associated with reduced fertility among women aged 20–44 years, emphasizing its relevance in the preconception and postpartum periods (Wang et al., 2022). Moreover, women with gestational diabetes have been found to have lower plasma omega-3 fatty acid levels, the potential link between omega-3 fatty acids and metabolic health during pregnancy (Udupa et al., 2022).

Despite the recognized benefits of omega-3 fatty acids, studies have indicated low consumption levels among child-bearing-age, pregnant, and lactating women in the United States (Devarshi et al., 2019). This underscores the need for targeted interventions and education to promote adequate omega-3 fatty acid intake in this population. Furthermore, the composition of omega-3 fatty acids in breast milk has been found to be related to maternal dietary intake, emphasizing the importance of maternal nutrition in influencing the quality of breast milk (Bzikowska-Jura et al., 2019).

The intake of omega-3 fatty acids is a critical consideration for women, particularly during pregnancy and postpartum. Studies have shown that omega-3 fatty acid intake is inversely proportional to depression in postmenopausal women, emphasizing its potential role in mental health (Chae & Park, 2021). Additionally, research has focused on the awareness, knowledge, and intention to increase omega-3 fatty acid intake among pregnant and breastfeeding women, the significance of this nutrient during the perinatal period (Seymour et al., 2019; Tesha et al., 2022). Furthermore, the influence of omega-3 fatty acids on fertility and hatchability has been investigated, indicating its potential impact on reproductive health (Saber & Kutlu, 2020). Moreover, the protective effect of omega-3 fatty acids in fish consumption against breast cancer in Asian patients has been highlighted, underscoring its relevance to women's health (Nindrea et al., 2019). Additionally, the influence of omega-3 fatty acids on semen quality markers has been systematically reviewed, indicating its potential role in male reproductive health (Falsig et al., 2019). Furthermore, the ratio of omega-6 to omega-3 fatty acid intake has been associated with enhanced adiponectin levels in obesity, suggesting its relevance to metabolic health (Fabiani et al., 2021). Lastly, the biological activity of omega-3 fatty acids on body mass index, glucose, total cholesterol, and blood pressure in obese children has been studied, indicating its potential impact on childhood obesity and metabolic parameters (Elodia et al., 2018). This study aimed to examine the impact of sociocultural factors on Omega-3 fatty acids intake

among women who experienced 40-days postpartum aged 15 to 49 years old.

Method

The fifth wave of the 2014–2015 Indonesian socioeconomic and health longitudinal survey is known as IFLS 5. The 1993 respondents lived in 13 different provinces and made up 83% of Indonesia's overall population. Ethical licensing evaluations have been conducted on the IFLS 5 survey and processes. Both the participating Gadjah Mada University (UGM) in Indonesia and the Institutional Board Review (IRB) in the United States have authorized them. RAND's Human Subjects Protection Committee (IRB) assigned IFLS 5 the ethical clearance number s0064-06-01-CR01. The data is available online after approved for registration through the link: <https://www.rand.org/well-being/social-and-behavioral-policy/data/FLS/IFLS.html>.

The unit of analysis of this study was women who experienced 40-days postpartum with total number 11,135 after data cleaning and managing. The four primary food groups high in omega-3 fatty acids—fish, meat, eggs, and dairy—were the basis for the consumption of omega-3 fatty acid dietary sources. With the codes FM02B and FM03B for eggs, FM02C and FM03C for fish, FM02D and FM03D for meat, and FM02E and FM03E for dairy, food consumption frequency was noted in book 3B. The frequency of consumption of these food groups was recorded one week prior to the commencement of data collection. High omega-3 fatty acid consumption is supported by the categorization conducted by the Mediterranean diet standard. This study adhered to the Mediterranean Diet Foundation's dietary guidelines (2011). It is advised to have eggs no less than twice a week, fish no less than twice a week, meat no less than twice a week, and dairy products no less than seven times a week or every day. If a subject met all the requirements, it was said to have "adequate" intake. Results were deemed "low" intake if they weren't.

The independent variables in this study were focused on sociocultural such as ethnicity, religion, religiosity, education level, and age group. The data analysis was done using STATA version 17 for univariate, bivariate (Chi-Square test), and Multivariate (Binary Logistic Regression).

Result and Discussion

The results in this study were done by univariate, bivariate, and multivariate tests. Table 1 below describes the univariate results to explore the general

characteristics of informants. It was revealed that only 5% out of the total respondents had adequate Omega-3 fatty acids intake during their experiences of 40-days after delivery. The majority of respondents were aged 35 to 44 years old (41.23%), graduated from elementary school (29.36%), were married (89.31%), Islam (90.12%), very religious (80.22%), and from Java (39.67%).

Table 1. General Characteristics of Respondents

Predictors (n=11,135)	Frequency (%)
Omega-3 Fatty Acids Intake	
Low	10,576 (94.98)
Adequate	559 (5.02)
Age group (years old)	
15 - 24	769 (6.91)
25 - 34	4,159 (37.35)
35 - 44	4,591 (41.23)
45 - 49	1,616 (14.51)
Educational level	
Elementary school	3,269 (29.36)
Junior high school	1,879 (16.87)
Senior high school	1,850 (16.61)
Vocational high school	1,338 (12.02)
Undergraduate	662 (5.95)
Others	2,137 (19.19)
Marital Status	
Unmarried	1,190 (10.69)
Married	9,945 (89.31)
Religion	
Islam	10,035 (90.12)
Catholic, Protestant, Buddha, Konghucu	568 (5.10)
Hindu	532 (4.78)
Religiosity	
Very religious	8,933 (80.22)
Somewhat religious	1,957 (17.58)
Not religious	245 (2.20)
Ethnicity	
Java	4,417 (39.67)
Sunda	1,289 (11.58)
Bali, South Sumatera, Batak	1,468 (13.18)
Tionghoa, Madura, Sasak	859 (7.71)
Others	3,102 (27.86)

Table 2 below explains the correlation between each independent variable and Omega-3 fatty acids intake. It was found that the variables of educational level, religion, religiosity, and ethnicity were significantly correlated with Omega-3 fatty acids intake by using Chi-square test. However, the variables of age group and marital status did not find any significant correlation with Omega-3 fatty acids intake.

Table 3 below shows the multivariate analysis by adjusting all independent variables with dependent variables. According to educational level, it was found that compared to those who graduated from elementary school, those who graduated from junior high school, senior high school, vocational high school, undergraduate, and others were 1.44, 2.13, 1.43, 2.54, and

1.82 times more likely to have adequate Omega-2 fatty acids intake after adjusted to all independent variables (respectively). Moreover, compared to Muslim women, women who were Catholic, Protestant, buddha, and Konghucu were decreasing 50% the probability of having adequate Omega-2 fatty acids intake after adjusting to all independent variables. Additionally, compared to women who reported being very religious, those with not religious were decreasing 76% the probability of having adequate Omega-2 fatty acids intake after adjusting to all independent variables. According to ethnicity, women from Sunda and other ethnic groups were 1.61 and 1.40 times more likely to have adequate Omega-2 fatty acids intake after adjusted to all independent variables (respectively) compared to Javanese women.

Table 2. The correlation between each independent variable and Omega-3 fatty acids intake

Predictors (n=11,135)	Omega-3 Fatty Acids Intake		Total
	Low	Adequate	
Age group (years)			
15 - 24	739 (96.10)	30 (3.90)	769 (100)
25 - 34	3,956 (95.12)	203 (4.88)	4,159 (100)
35 - 44	4,348 (94.71)	243 (5.29)	4,591 (100)
45 - 49	1,533 (94.86)	83 (5.14)	1,616 (100)
Educational level			***
Elementary school	3,157 (96.57)	112 (3.43)	3,269 (100)
Junior high school	1,793 (95.42)	86 (4.58)	1,879 (100)
Senior high school	1,728 (93.41)	122 (6.59)	1,850 (100)
Vocational high school	1,278 (95.52)	60 (4.48)	1,338 (100)
Undergraduate	609 (91.99)	53 (8.01)	662 (100)
Others	2,011 (94.10)	126 (5.90)	2,137 (100)
Marital Status			
Unmarried	1,127 (94.71)	63 (5.29)	1,190 (100)
Married	9,449 (95.01)	496 (4.99)	9,945 (100)
Religion			*
Islam	9,519 (94.86)	516 (5.14)	10,035 (100)
Catholic, Protestant, Buddha, Konghucu	552 (97.18)	16 (2.82)	568 (100)
Hindu	505 (94.92)	27 (5.08)	532 (100)
Religiosity			**
Very religious	8,459 (94.69)	474 (5.31)	8,933 (100)
Somewhat religious	1,875 (95.81)	82 (4.19)	1,957 (100)
Not religious	242 (98.78)	3 (1.22)	245 (100)
Ethnicity			**
Java	4,229 (95.74)	188 (4.26)	4,417 (100)
Sunda	1,204 (93.41)	85 (6.59)	1,289 (100)
Bali, South Sumatera, Batak	1,403 (95.57)	65 (4.43)	1,468 (100)
Tionghoa, Madura, Sasak	818 (95.23)	41 (4.77)	859 (100)
Others	2,922 (94.20)	180 (5.80)	3,102 (100)

However, some variables such as age group and marital status did not show any significant association with Omega-3 fatty acids intake.

Table 3. The binary logistic regression result

Predictors (n=11,135)	Adj. Odd Ratio	95% Conf. interval	p-value
Age group (years)			
15 - 24 (ref)			
25 - 34	1.34	0.89 - 2.02	0.159
35 - 44	1.49	0.99 - 2.24	0.054
45 - 49	1.47	0.95 - 2.30	0.086
Educational level			
Elementary school (ref)			
Junior high school	1.44	1.08 - 1.93	0.013*
Senior high school	2.13	1.63 - 2.79	0.000***
Vocational high school	1.43	1.03 - 1.97	0.032*
Undergraduate	2.54	1.81 - 3.57	0.000***
Others	1.82	1.40 - 2.37	0.000***
Marital Status			
Unmarried (ref)			
Married	0.94	0.71 - 1.25	0.665
Religion			
Islam (ref)			
Catholic, Protestant, Buddha, Konghucu	0.50	0.29 - 0.85	0.010*
Hindu	0.94	0.59 - 1.51	0.806
Religiosity			
Very religious (ref)			
Somewhat religious	0.79	0.62 - 1.01	0.057
Not religious	0.24	0.08 - 0.76	0.015*
Ethnicity			
Java (ref)			
Sunda	1.61	1.23 - 2.09	0.000***
Bali, South Sumatera,	1.15	0.82 - 1.63	0.415
Batak			
Tionghoa, Madura,	1.08	0.76 - 1.53	0.662
Sasak			
Others	1.40	1.13 - 1.73	0.002**

Pseudo R2= 0.0200, Log likelihood = -2172.78

Based on the multivariate analysis above, the most significant predictors of having adequate Omega-3 fatty acids intake are graduated from undergraduate. Other variables that are significantly related are graduated from junior high school, senior high school, vocational, and others, were Catholic, Protestant, Buddha, Konghucu, from Sunda and other ethnic groups. There is a need for post-natal education to improve eating habits after delivery besides having graduated from university.

The social and cultural factors related to omega-3 fatty acids intake are multifaceted and encompass various aspects of health and well-being. The modification of asthma severity and response to indoor air pollution in children has been associated with omega-3 and omega-6 intake, indicating the influence of cultural dietary patterns on respiratory health (Brigham et al., 2019). Moreover, the intake of omega-3 long-chain polyunsaturated fatty acids in children with attention deficit and hyperactivity disorder has been studied, reflecting the cultural considerations in pediatric mental health and dietary practices (Fuentes-Albero et al., 2019). Additionally, the relationship between dietary long-chain omega-3 fatty acids and impulse control in adolescents underscores the cultural impact of dietary

habits on cognitive and behavioral development (Darcey et al., 2019). The influence of the dietary omega-6 to omega-3 fatty acid intake ratio on adiponectin levels in obesity highlights the cultural implications of dietary patterns on metabolic health (Fabiani et al., 2021). Furthermore, the long-term effects of parental diets rich in long-chain PUFA on the offspring's growth and immune system-related genes emphasize the cultural and intergenerational aspects of dietary practices (Türkmen et al., 2019). The biological activity exerted by omega-3 fatty acids on body mass index, glucose, total cholesterol, and blood pressure in obese children underscores the cultural relevance of dietary interventions in childhood obesity (Elodia et al., 2018). Moreover, the inhibitory effect of omega-3 fatty acids on alveolar bone resorption and osteoclast differentiation highlights the potential cultural implications of dietary habits on oral health and bone metabolism (Ozaki et al., 2020). These findings collectively underscore the intricate interplay between social, cultural, and dietary factors in shaping the impact of omega-3 fatty acid intake on various aspects of health and well-being.

The dietary intake of omega-3 fatty acids and its implications for health have been studied in various ethnic and cultural contexts. Research has explored the dietary intakes of breastfeeding women from different ethnicities in New Zealand, potential variations in omega-3 fatty acid consumption among diverse cultural groups (Butts et al., 2018). Additionally, the modification of asthma severity and response to indoor air pollution in children has been associated with omega-3 and omega-6 intake, indicating potential ethnic disparities in dietary habits and their impact on respiratory health (Brigham et al., 2019). Furthermore, the association between dietary omega-3 fatty acid intake and depression in postmenopausal women has been investigated, suggesting the need for large cohort studies to verify the causality between omega-3 fatty acids and depression in specific ethnic populations (Chae & Park, 2021). Moreover, a genetic study of the Arctic CPT1A variant has suggested that its effect on fatty acid levels is modulated by traditional Inuit diet, emphasizing the influence of cultural dietary practices on genetic factors related to fatty acid metabolism (Senftleber et al., 2020). Additionally, the awareness and intentions of Australian pregnant women from diverse ethnic backgrounds to increase omega-3 fatty acid intake for preventing preterm birth have been examined, underscoring the cultural considerations in prenatal care and nutrition (Seymour et al., 2019). These studies collectively highlight the importance of considering ethnicity and cultural factors in understanding the dietary intake and health implications of omega-3 fatty acids.

Based on the provided references, several sociocultural factors related to food intake in Indonesia can be identified. These factors encompass a wide range of influences, including cultural beliefs, socioeconomic status, and environmental conditions. The impact of sociocultural factors on dietary practices among pregnant women in Indonesia, including food taboos and beliefs that influence food choices (Koeryaman et al., 2023; Sarmah & Saikia, 2022). Additionally, the influence of ethnicity on food choice and dietary patterns has been explored, emphasizing the need to consider cultural and ethnic differences in developing public health messages and interventions (Beasley et al., 2020; Bennett et al., 2022; Shareck et al., 2019). Furthermore, the impact of socioeconomic status on food choice and availability has been noted, particularly in relation to household food security and nutritional status (Gelebo et al., 2021; Hidayat et al., 2020; Rustam et al., 2021; Srinita, 2018). Moreover, the COVID-19 pandemic has affected food access and income, underscoring the intersection of sociocultural and environmental factors in shaping dietary practices (Pansawira, 2021). These findings collectively highlight the complex interplay of sociocultural, economic, and environmental factors in influencing food intake and nutritional practices in Indonesia.

Conclusion

The result of this study revealed that only 5% out of total respondents who had adequate Omega-3 fatty acids intake. Based on the multivariate analysis above, the most significant predictors of having adequate Omega-3 fatty acids intake are graduated from undergraduate. Other variables that are significantly related are graduated from junior high school, senior high school, vocational, and others, were Catholic, Protestant, Buddha, Konghucu, from Sunda and other ethnic groups. There is a need for post-natal education to improve eating habits after delivery besides having graduated from university.

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Author Contributions

Conceptualization, Y.P.R., and T.B.; methodology, Y.P.R.; software, Y.P.R.; validation, Y.P.R., T.B. and E.K.; formal analysis, Y.P.R.; investigation, E.K.; resources, Y.P.R.; data curation, Y.P.R.; writing—original draft preparation, Y.P.R.; writing—review and editing, T.B.; visualization, E.K.; supervision, Y.P.R.; project administration, Y.P.R.; funding acquisition, Y.P.R., All authors have read and agreed to the published version of the manuscript.

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Conflicts of Interest

The authors declare no conflict of interest.

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