Jurnal Ners
Jurnal Ners
Vol. 16, No. 2, October 2021
http://dx.doi.org/10.20473/jn.v16i2.26674

Original Research

Empowering Health Cadres on Nutrition Education for Pregnant Women in Industrial Areas during the Pandemic

Lasiyati Yuswo Yani, Raras Merbawani, and Asef Wildan Munfadlila

STIKes Bina Sehat PPNI Mojokerto, Mojokerto, Indonesia

ABSTRACT

Introduction: Pregnant women living in industrial areas are exposed to higher levels of toxic substances, pollutants, and other chemicals; this is exacerbated by the pandemic conditions. Improving the nutritional status of pregnant women can be pursued through nutritional education for pregnant women. This study aimed to determine the differences in nutrition fulfilment patterns of pregnant women, before and after nutrition education.

Methods: This study used quasi-experimental research with a one group pre post-test design. The samples were 51 pregnant women in industrial areas. Treatment in this study was nutrition education by empowering health cadres. The instrument of this research is an observation sheet that has been tested for validity and reliability. Data analysis used a statistical paired t-test.

Results: Knowledge of pregnant women increased by 5.21% after treatment, and behaviour increased by 5.2%. The t-test showed that the the nutrition education model for pregnant women in industrial areas could significantly increase the knowledge (p-value = 0.000) and improve the behaviour (p-value = 0.000) of pregnant women.

Conclusion: Nutrition education for pregnant women provided by health cadres is proven to increase knowledge of pregnant women about nutrition and behaviour of fulfilling nutrition during pregnancy in a pandemic situation. During the pandemic, pregnant women can increase knowledge related to nutrition fulfilment through the assistance of health cadres without worrying about being exposed to viruses from care providers.

ARTICLE HISTORY

Received: July 14, 2021
Accepted: November 16, 2021

KEYWORDS

nutrition education; knowledge; behaviour

CONTACT

Lasiyati Yuswo Yani
yuswoyani@gmail.com
STIKes Bina Sehat PPNI Mojokerto, Mojokerto, Indonesia

Cite this as: Yani, L. Y., Merbawani, R., & Munfadlila, A. W. (2021). Empowering Health Cadres on Nutrition Education for Pregnant Women in Industrial Areas during the Pandemic. *Jurnal Ners,* 16(2). 177-182. doi: http://dx.doi.org/10.20473/jn.v16i2.26674

INTRODUCTION

A healthy and balanced diet is important in the lifecycle and during pregnancy. The mother's diet must provide sufficient energy and nutrition to meet the usual needs of the mother, as well as the needs of the growing foetus and allow the mother to maintain her own stores of nutrients necessary for the health of the foetus and infant and for the practice of breastfeeding during the puerperium (Fallah et al., 2013). Pregnant women are among the vulnerable population groups with a need to take additional protection against the COVID-19 outbreak (H. Liu et al., 2020).

The nutritional status of pregnant women is a concern of many countries in the world, this is related to the immunity of pregnant women in pandemic conditions (Amini et al., 2021; Whitaker et al., 2021). In Indonesia, the problem of fulfilling nutrition for pregnant women during the pandemic is also a major concern for the government in protecting pregnancy (Abadi & Putri, 2020; Soewondo et al., 2021).

In addition, the fulfilment of the nutritional needs of pregnant women during this pandemic is also influenced by the knowledge of pregnant women about nutrition (Darnton-Hill & Mkparu, 2015; Prado et al., 2012)

Pregnant women who have good knowledge about nutrition will try their best to meet their nutritional needs during pregnancy (Anwar et al., n.d.), (Shah et al., 2017). One of the efforts that can increase the knowledge of pregnant women about the fulfilment of their nutrition is through nutrition

education (Hakim et al., 2014; Nimbalkar et al., 2017; Otoo & Adam, 2016).

During this pandemic, nutrition education for pregnant women cannot be carried out intensively by care providers because of restrictions to reduce the transmission rate of the coronavirus disease (Amini et al., 2021; N. Liu et al., 2009; Whitaker et al., 2021).

This study aims to increase the knowledge of pregnant women in industrial areas with an outreach approach by health cadres. It is hoped that even though this nutrition education is not provided directly by the care provider, pregnant women can still optimize the fulfilment of nutrition during pregnancy through nutrition education provided by health cadres in the village.

Pregnant women living in industrial areas are exposed to higher levels of toxic substances, pollutants, and other chemicals, this has been exacerbated by the pandemic conditions (Balabaeva et al., 1993). Exposure to industrial chemicals is associated with pregnancy outcomes, such as low birth weight (Lin et al., 2001; Phatrabuddha et al., 2013).

This is exacerbated because during this pandemic there are regulations limiting physical contact, especially with care providers. This contact restriction causes pregnant women to be limited in receiving knowledge related to pregnancy, including the problem of fulfilling nutrition during pregnancy.

Research conducted on working pregnant women showed that 76.5% had anaemia and 23.5% were not anaemic. In contrast to pregnant women who do not work, this is because pregnant women who work, especially in factories, have less free time that can be used to participate in health education (Purbadewi & Ulvie, 2013). The knowledge that pregnant women do not work has an effect on the lower incidence of anaemia in pregnant women compared to working mothers.

In the midst of a still threatening pandemic, the fulfilment of balanced nutrition is needed to maintain the immunity of pregnant women as well as the growth of the foetus. The problems encountered today are not a few pregnant women who are worried about contact with health workers; this is because they are worried about being exposed to the coronavirus. This phenomenon makes nutrition education during pregnant women also less well received by pregnant women. This study applies a nutrition education model for pregnant women by optimizing the role of health cadres in order to minimize the contact between pregnant women and health workers. It is expected that there will be changes in the fulfilment of nutrition patterns before and after the provision of education.

MATERIALS AND METHODS

This study was conducted in a quasi-experimental one-group pre-post design. The population was 90 pregnant women in industrial areas. Purposive sampling was used to recruit the participants. The explanation of the terms and conditions of the study was given and informed consent for study participation was obtained. All respondents were assured of the voluntary and confidential nature of the study. A total of 51 pregnant women participated as respondents in this study. The criteria for respondents in this study were 1st trimester pregnant women who lived in industrial areas and also work as factory workers or factory office administrators and were willing to be observed during the study.

There were two kinds of instruments used in this study. To assess the nutritional status of pregnant women using analysis of anthropometric measurements of BMI, measurements of upper arm circumference and haemoglobin levels. Meanwhile, to assess the mother's knowledge about the fulfilment of maternal nutrition during pregnancy, a questionnaire instrument was used that has been tested for validity and reliability with Cronbach's alpha of 0.760, with a sensitivity ranging from 0.450 to 0.829. The questionnaire consists of 25 statements on a Likert scale that explores the mother's knowledge about the basic concepts of nutrition: what are the views of

Table 1. Characteristics of pregnant women in industrialized areas

Variable	n	%
Age (year)		
< 21	8	16
21-35	41	80
>35	2	4
Education		
Elementary school	6	12
Junior high school	5	10
Senior high school	31	60
Higher education	9	18
Parity		
Primi para	20	40
Multi para	29	56
Grande multi	2	4
Salary		
Below USD 314	24	47
Above USD 314	27	53

Table 2. The level of knowledge of pregnant women before and after treatment

Knowledge	Before		After	
	n	%	n	%
Poor	18	35	0	0
Satisfactory	26	51	14	27
Good	7	14	37	73
p-value = 0.000				

Table 3. The behaviour of nutritional consumption in pregnant women before and after treatment

Behaviour	Before		After	
	n	%	n	%
Poor	16	31	0	0
Satisfactory	20	39	11	22
Good	15	30	40	78
p-value = 0.000				

pregnant women about nutrition and pregnancy, food sources of nutrients, and how pregnant women improve nutrition during pregnancy.

The treatment in this study was the provision of nutrition education by health cadres. Health cadres, also known as village health promoters, are volunteers selected by the community and tasked with developing the community, usually dealing with health in the community. The health cadres that have been selected are given training beforehand on the fulfilment of nutrition for pregnant women by nutritionists and care providers at the community health centre. Cadres are provided with a guidebook for the fulfilment of nutrition for pregnant women, this includes food sources containing iron and how to process them. The guide is equipped with leaflets and nutrition booklets as media used by cadres for nutritional assistance. Assistance is carried out by cadres visiting pregnant women's homes once a week until the gestational age of pregnant women at the end of 2nd trimester. After being given this treatment, pregnant women are assessed post-test. The data scale of this study is the ratio interval, so the statistical test used is a parametric test. based on the normality test, the data is declared to be normally distributed, then data processing is carried out with a paired T-Test. The ethical permit approval number 141/EC/KEPK-HW/07/2020 was requested from the Health Office of the Research Ethics Commission Hafsyawati Zainul Hasan Genggong. The ethical requirements and rights of respondents have been fulfilled during the research process to collect data and not cause damage or interference.

RESULTS

Characteristics of pregnant women in industrialized areas can be seen in Table 1. Most of the respondents are of reproductive age, namely 21-35 years of age (80%), with the educational background of most of the high school seniors (60%), parity status is more than half of 56%, age of pregnancy in the first trimester is 30%, the second trimester 35%, and the third trimester 35%. Meanwhile, 47% of economic status earn less than the standard minimum fee of industry employees and 53% earn more than the regional minimal wage (±USD 314).

The results of the analysis in Table 2 show that after being given treatment there was an increase in good knowledge by 73% and no respondent had a lack of knowledge. The analysis showed that 42 people experienced an increase in their level of knowledge and 9 people had no change in their level of knowledge. From the results of the SPSS output, the p = 0.000, which means that the H0 is rejected, meaning that there is an effect of nutrition education on the knowledge of pregnant women on nutritional consumption during pregnancy.

The results of the analysis in Table 3 show that after being given the nutrition education model, there was an increase in the consumption of appropriate nutrition by 78% and there were no respondents who behaved inappropriately. The analysis showed that 36 people experienced an increase in their nutritional consumption behaviour during pregnancy and 15 people had no change in their nutritional consumption behaviour during pregnancy. The p-value is 0.000, which means that H0 is rejected, meaning that there is an effect of the nutritional education model on the nutrition consumption behaviour during pregnancy.

DISCUSSION

This study shows that the nutrition education model during pregnancy provided by health cadres during the pandemic has been proven to increase knowledge of nutrition consumption behaviour. Similar results were reported by a randomized study conducted at the University of Ghana showing that nutrition education that emphasizes consumption of iron-rich foods is positively associated with increased haemoglobin levels (Otoo & Adam, 2016). A quasi-experimental study conducted by El-guindi et al, (2010) showed a significant positive relationship between dietary practices and increased haemoglobin levels of pregnant women (El-guindi et al., 2010). Similarly, in a pre-test post-test study on pregnancy conducted by Garg & Kashyap (2006), individual counselling significantly increased mean haemoglobin levels in pregnant women (0.97 vs 1.58, P <0.001) (Garg & Kashyap, 2006). Likewise, in a randomized control trial among pregnant Nepalese women, the educational programme saw only significantly higher haemoglobin changes (0.23 gm / dl) compared to the control group (P <0.01) (Adhikari et al., 2012). While a randomized control trial conducted in Greece did not show a significant effect of nutrition education and counselling on haemoglobin levels in the intervention group compared to the control group (Kafatos et al., 1989).

A review of previous randomized control trials and quasi-experimental studies reported substantial and significant effects when nutritional education and counselling was provided with nutritional supplements, mostly via micronutrients, compared to nutrition education alone (Girard & Olude, 2012).

The Nepal Demographic and Health Survey report shows that only 42% of women used the recommended dose of iron during pregnancy and 41% of women between the ages of 15 and 49 are anaemic (Ministry of Health, 2016). Thus, adherence to iron supplementation is still low in pregnant women in Nepal. According to the Multi-Sectoral Nutrition Plan II, Nepal has a target to reduce the prevalence of anaemia among women of reproductive age by up to 50% in line with the Sustainable Development Goals (Ministry of Health, 2016). Counselling on nutrition education and a diet plan based on iron-rich foods for pregnant women can be effective strategies to reduce anaemia among pregnant women.

The nutrition education intervention and diet plan based on iron-rich foods were significantly associated

with improved maternal nutritional knowledge scores of anaemia and intake of iron-rich foods in the intervention group compared to the control group (66% vs 24.1%). A randomized study conducted at a Ghanaian university reported that a significant increase in knowledge was demonstrated by the intervention group at the end of the intervention period (Otoo & Adam, 2016). Studies conducted in Ethiopia revealed that the knowledge of pregnant women about nutrition during pregnancy increased significantly after the provision of nutrition education and special dietary practices (Mwangi et al., 2017; Robertson & Ladlow, 2017).

The intervention study design was conducted in Kalyobia Governorate (Moshtoher, KafrShoukr, and Kaha) (n = 200). The results showed 78% of pregnant women had achieved a good nutritional knowledge score after the intervention (El Hameed et al., 2012).

However, most of the counselling performed during antenatal visits tends to be general in nature in the Nepalese context. Our findings suggest that pregnant women who have good nutritional knowledge can increase haemoglobin levels. Thus, nutrition education and counselling during antenatal visits can increase the nutritional knowledge of mothers about iron-rich foods. Similar results were reported by another study conducted, an intervention study that after a nutrition education session, there was a significant increase in the nutritional knowledge score that could help prevent anaemia (Nimbalkar et al., 2017).

Another study conducted by Kafatos AG et al. indicated that nutritional counselling during pregnancy can increase food intake and increase maternal weight (Kafatos et al., 1989). The results of this study indicated that pregnant women who received nutrition education and an iron-based diet experienced a significant increase in the consumption levels of red meat, fish liver, fruits rich in vitamin C, dairy products, eggs and dark green vegetables compared to controls. group. The study conducted by Liu et al. (2009) also showed that fruit consumption increased by more in the intervention group than in the control group (N. Liu et al., 2009). Pregnant women in the intervention group reflected a change in behaviour by practicing a minimum dietary consumption of 3 or more (Daniel et al., 2016; McLean et al., 2009). Nutrition education and counselling have been found in other studies to improve maternal diet including dietary practices and consumption of macro and micro nutrients (Adhikari et al., 2012; Essén et al., 2005).

Micronutrient deficiencies can lead to poor maternal health outcomes and pregnancy-related complications. Previous research showed that increasing the consumption of micronutrients in pregnancy can improve the nutritional status of pregnant women. Research conducted by Emilia (2009) also revealed the need to implement nutrition education as an effort to change behaviour to improve nutrition (Emilia, 2009). Health education with the Information Motivation Behaviour Skill (IMB) approach plays a role in increasing knowledge and patterns of vegetable and fruit consumption in pregnant women (Farhati et al., 2019).

Our study has several limitations. Our study sample size is insufficient because the findings cannot be generalized to a wider population. Adherence to nutritional education and diet plans based on iron-rich foods was not assessed in this study. Only haemoglobin levels were measured so we could not assess the differentiation of anaemia, such as iron deficiency, nutrition, genetics, and infectious anaemia in this study. There is a possibility of bias because there was no control group in this study.

CONCLUSION

Nutrition education for pregnant women during the pandemic by village health cadres is proven to increase knowledge of pregnant women in meeting nutritional needs. This increased nutritional knowledge resulted in changes in the pattern of nutritional fulfillment of pregnant women for the better. It is recommended for pregnant women to increase their knowledge related to nutritional fulfillment intensively in assisting health cadres without worrying about being exposed to the virus from service providers. For community health centres it is recommended to increase the capacity of health cadres by more intensively providing training as a provision in assisting pregnant women in the community.

REFERENCES

Abadi, E., & Putri, L. A. R. (2020). Konsumsi Makronutrien pada Ibu Hamil Kekurangan Energi Kronik (KEK) di Masa Pandemi Covid-19. *Jurnal Kesehatan Manarang*, *6*(2), 85–90.

Adhikari, B., Koirala, U., Lama, S., & Dahal, P. (2012). Situation of Iron Deficiency and Its Management Prioritizing Dietary Intervention in Nepal. *Nepal J Epidemiol*, *2*(2), 182–90. https://doi.org/https://doi.org/10.3126/nje.v2i2.6573

Amini, S., Mohseni, H., Kalantar, M., & Amani., R. (2021). Nutrition in Caring for Pregnant Women During the COVID-19 Pandemic in Low-Income Countries. *Nutrition Today*, *56*(2), 80–84.

Anwar, A., Bashir, M. K., Adil, S. A., Hassan, S., & Ali, A. (n.d.). *FOOD AND NUTRITIONAL SECURITY OF PREGNANT WOMEN IN RURAL AREAS: THE CASE OF DISTRICT LAHORE, PAKISTAN*.

Balabaeva, Tabacova, S., & Liudmila. (1993). Environmental Pollutants in Relation to Complications of Pregnancy. *Environmental Health Perspectives Supplements*, *2*(2), 27–31.

Daniel, S., Pu, G., Gnanaraj, S., & Sharmine, E. (2016). Effect of nutrition education among pregnant women with low body mass index: a community based intervention. *Int J Community Med Public Heal*, *3*(11), 3135–3139. https://doi.org/DOI:10.18203/2394-6040.ijcmph20163924

Darnton-Hill, I., & Mkparu, U. C. (2015). Micronutrients in Pregnancy in Low- and Middle-Income Countries. *Nutrients*, *7*(3), 1744–1768. https://doi.org/10.3390/nu7031744

El-guindi, F., Soliman, N., & El-Nana, H. (2010). Effect of nutritional interventions on anemic pregnant womens health promotion model. *Med J Cairo Univ*.

El Hameed, H. S. A., Mohammed, A. I., & El Hameed, L. T. A. (2012). Effect of nutritional educational guideline among pregnant women with iron deficiency anemia at rural areas in kalyobia governorate. *Life Science Journal*, *9*(2), 1212–1217.

Emilia, E. (2009). Pendidikan gizi sebagai salah satu sarana perubahan perilaku gizi pada. *Jurnal Tabularasa*, *6*(2), 161–174.

Essén, B., Sjöberg, N.-O., Gudmundsson, S., Östergren, P.-O., & Lindqvist, P. G. (2005). No association between female circumcision and prolonged labour: a case control study of immigrant women giving birth in Sweden. *European Journal of Obstetrics & Gynecology and Reproductive Biology*, *121*(2), 182–185. https://doi.org/10.1016/j.ejogrb.2004.12.010

Fallah, F., Pourabbas, A., Delpisheh, A., Veisani, Y., & Shadnoush, M. (2013). Effects of nutrition education on levels of nutritional awareness of pregnant women in western Iran. *International Journal of Endocrinology and Metabolism*, *11*(3), 175–178. https://doi.org/10.5812/ijem.912

Farhati, F., Resmana, R., & Nurhadianti, D. (2019). Pendidikan Kesehatan dengan Pendekatan Model Information Motivation Behavior Skill (IMB) terhadap Peningkatan Pengetahuan dan Pola Konsumsi Sayur dan Buah pada Ibu Hamil. *Jurnal Kesehatan*, *10*(3), 320–328.

Garg, A., & Kashyap, S. (2006). Effect of counselling on nutritional status during pregnancy. *Indian JPediatr*, *73*(8), 687–692.

Girard, A., & Olude, O. (2012). Nutrition education and counselling provided during pregnancy: Effects on maternal, neonatal and child health outcomes. *Paediatr Perinat Epidemiol*, *26*(1), 191–205.

Hakim, E. W., Moffat, M., Becker, E., Bell, K. A., Manal, T. J., Schmitt, L. A., & Ciolek, C. (2014). Application of educational theory and evidence in support of an integrated model of clinical education. *Journal of Physical Therapy Education*, *28*, 13–21.

Kafatos, A. G., Vlachonikolis, I. G., & Codrington, C. A. (1989). Nutrition during pregnancy: the effects of an educational intervention program in Greece. *The American Journal of Clinical Nutrition*, *50*(5), 970–979. https://doi.org/10.1093/ajcn/50.5.970

Lin, M., Yu, H., Tsai, S., Cheng, B., Hsu, T., Wu, T., & Yang, C. (2001). Adverse pregnancy outcome in a petrochemical polluted area in Taiwan. *Journal of Toxicology and Environmental Health Part A*, *63*, 8.

Liu, H., Wang, L., Zhao, S., Kwak-kim, J., Mor, G., & Liao, A. (2020). *Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID- 19 . The COVID-19 resource centre is hosted on Elsevier Connect , the company ' s public news and information*. *139*(January), 2–4. https://doi.org/https://doi.org/10.1016/j.jri.2020.103122

Liu, N., Mao, L., Sun, X., Liu, L., Yao, & Chen, B. (2009). The effect of health and nutrition education intervention on women's postpartum beliefs and practices: A randomized controlled trial. *BMC Public Health*, *9*(45), 1–9. https://doi.org/doi:10.1186/1471-2458-9-45

McLean, E., Cogswell, M., Egli, I., Wojdyla, D., & de Benoist, B. (2009). Worldwide prevalence of anaemia, WHO Vitamin and Mineral Nutrition Information System, 1993–2005. *Public Health Nutrition*, *12*(04), 444. https://doi.org/10.1017/S1368980008002401

Ministry of Health. (2016). *New ERA, The DHS Program ICF. Nepal Demographic and Health Survey*.

Mwangi, M. N., Prentice, A. M., & Verhoef, H. (2017). Safety and benefits of antenatal oral iron supplementation in low-income countries: a review. *British Journal of Haematology*, *177*(6), 884–895. https://doi.org/10.1111/bjh.14584

Nimbalkar, P., Patel, J., Thakor, N., & Patni, M. (2017). Impact of educational intervention regarding anaemia and its preventive measures among pregnant women: an interventional study. *Int J Reprod Contraception, Obstet Gynecol*, *6*(12), 5317–5321.

Otoo, G., & Adam, Y. (2016). Effect of Nutrition Education with an Emphasis on Consumption of Iron-Rich Foods on Hemoglobin levels of Pregnant Women in Ghana. *FASEB J*, *30*(1).

Phatrabuddha, N., Maharatchpong, N., Keadtongtawee, S., & Saowakhontha, S. (2013). Comparison of Personal BTEX Exposure and Pregnancy Outcomes among Pregnant Women Residing in and Near Petrochemical Industrial Area. *EnvironmentAsia*, *6*(2).

Prado, E. L., Ullman, M. T., Muadz, H., Alcock, K. J., & Shankar, A. H. (2012). The effect of maternal multiple micronutrient supplementation on cognition and mood during pregnancy and postpartum in indonesia: A randomized trial. *PLoS ONE*, *7*(3). https://doi.org/10.1371/journal.pone.0032519

Purbadewi, L., & Ulvie, Y. N. S. (2013). Hubungan Tingkat Pengetahuan Tentang Anemia Dengan Kejadian Anemia Pada Ibu Hamil. *Jurnal Gizi*, *2*(1).

Robertson, N., & Ladlow, B. (2017). Effect of individual dietetic intervention on gestational weight gain and associated complications in obese pregnant women. *Aust N Z J Obstet Gynaecol*.

Shah, S., Sharma, G., Shris, L., Shah, S. K., Sharma, M., & Sapkota, N. K. (2017). Knowledge on dietary patterns among pregnant women attending antenatal care check-up in Narayani hospital, Nepal. *International Journal Of Community Medicine And Public Health*, *4*(5), 1466–1472.

Soewondo, M., Prastuti, Sakti, Koemara, G. M., Irawati,

Oktiana, D., Pujisubekti, Retno, Rahmayanti, Maretia, N., Sumartono, Indrawan, A. H., & Nurfitriyani. (2021). Potret Adaptasi Dan Inovasi Layanan Gizi Di Masa Pandemi Covid-19: Studi Kasus Di 8 Kabupaten/Kota Di Indonesia. In *Prosiding Forum Ilmiah Tahunan (FIT) IAKMI*.

Whitaker, K. M., Hung, P., Alberg, A. J., Hair, N. L., & Liu, J. (2021). Variations in health behaviors among pregnant women during the COVID-19 pandemic. *Midwifery*, *95*, 102929.