Conference Paper

Do the User of Nutrition Information System (SISFORNUTRIMIL) Application Have an Impact on Maternal Eating Behaviour and Pregnancy Outcomes?

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Abstract

Background: In several studies have reported that complications of pregnancy could be indicated by inadequate nutrition during pregnancy. In this regard, some of the pregnant women are limited-time engagement with health professionals, lack resources and education of nutrition, and consume unhealthy food. Often found that pregnant women and family are difficult to estimate nutrient intake in line with dietary targets and guidelines and nutrient reference value. The Nutritional Information System (SISFORNUTRIMIL) is an application which helps the pregnant women to estimate nutrient intake and record their food intake. **Objectives**: The study aims to determine the maternal eating behaviour and pregnancy outcomes measurements. **Methods**: This study involved two phases. **Phase one:** Conducting a literature search required engaging in an extensive and systematic search strategy to be able to identify articles related to this study. **Step two:** this study will randomized control trial (RCT) and allocate participants 1:1 to the SISFORNUTRIMIL application user and non-user application. The Minimum Dietary Diversity for Women of reproductive age (MDD-W) indicators and Adult Behaviour Eating Questionnaire (ABEQ) will be used to identify maternal eating behaviour. In additional, maternal weight gain, blood sample test, and birth weight examination used to measure pregnancy experience and pregnancy outcome. **Discussion**: Nutrition intervention during pregnancy is an important strategy to improve health pregnancy in reduced the healthcare and health promotion issue. The SISFORNUTRIMIL application for individual preferences for nutrition intervention and optimal pregnancy outcomes, suggesting a need for food intake guidelines that facilitate pregnant women involvement in eating properly. Furthermore, this research as a proper foundation to contribute to decreasing the morbidity and mortality rate.

Keywords: eating behaviour, nutrition, pregnancy, system information

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1. Introduction

There is no doubt that during pregnancy, the organisms respond to the surrounding environment especially on the development period and thus, the risk of many diseases determined during this period (Bernal & Jirtle, 2010). The emphasis of healthy pregnancy has often been defined by positive pregnancy experience including maternal and foetal/neonatal outcomes of interest on infection, anaemia, pre-eclampsia/eclampsia, gestational diabetes mellitus, mode of delivery, excessive weight gain, small for gestational age, low birth weight, preterm birth and macrosomia/large for gestational age (WHO, 2016). Nutritional factors play an essential role in pregnancy periods to ensure optimal birth outcomes, maternal health and determine the quality of human resources in the future. However, there is no study has demonstrated a direct association between energy intake and fetal growth (Scott, 2007). Estimates indicate that maternal and infant mortality in the world is a contribution from several countries in South Asia.

Soedarmono 2017, cited by Koeryaman (2019) stated that a massive number of maternal death during pregnancy dominated by bleeding 30.3%, hypertension 27.1%, and infections 7.3%. However, the success rate of maternal and infant health services is related to the nutritional status of pregnant women, family planning programs, environmental conditions, and socioeconomic conditions (WHO, 2016). In the last three years, the incidence of anaemia and KEK dominated at several cities of West Java, Indonesia. One of the causes is due to nutritional imbalance during preconception (Riskesdas, 2016).

Online technology has used to assess dietary intake to improve nutritional assessment and food intake monitoring. This method helps to reduce inaccurate nutrient calculation and effectively. In turn, these features are likely to reduce costs associated with dietary-related research and health care. Of particular interest the use of mobile phones in aiding nutrition intervention.

This study will identify maternal eating behaviour among pregnant women through the Nutrition Information System (SISFORNUTRIMIL) application. This research is novel due to provide The Nutritional Information System (SISFORNUTRIMIL) as an application which helps the pregnant women to estimate nutrient intake and record their food intake. The essential functions of this application are to manage food intake and food habits monitoring systems for the expectant mothers, especially in pregnancy period that have a risk of inadequate nutrition. Moreover, pregnant women can eat proper nutrition and lead to improved overall diet quality and optimal pregnancy outcomes.

2. Methods

2.1. Study setting, design and period

To determine the research protocol, the researcher divide into two-phase research design. **Phase one:** A protocol developed in the style of Cochrane review for the conduct of both literature reviews. The researcher has read extensively about a research topic to profile the previous studies conducted in the field of mobile application, nutritional intervention and pregnancy. Literature review enabled the researcher to determine outcome measurement. Conducting a literature search required engaging in an extensive and systematic search strategy to be able to identify articles related to this study. This section looks at the methodology used during this review. A systematic literature review based on bibliography PubMed, CINAHL, and relevant search terms were. Articles published in several countries period 2012 to 2018 were identified using the following MeSH search terms and Boolean algebra commands: ((nutrient*) or (nutrition pregnancy) or (food intake) or (food pattern) or (food habits) or (dietary intake) or (nutritional) or (nutritional status) or (nutrition education) or (eating behaviour) or (food restriction) or (dietary) and (mobile application)). The following search terms used: ((pregnancy outcomes) or (maternal outcomes) or (infant outcomes) or (birth weight) and (web application)). The searches were not limited to words appearing in the title of the article and information in abstract was used to find specific information to determine each article for review. All of the published articles are quantitative studies. For an article to achieve inclusion in the review, it had to fulfil the following inclusion criteria:

1. The study published between May 2012 and 2018 (6 years) and available in the English language;

2. The study was carried out in developed and developing countries;

3. The study identified of eating behaviour and nutrient intake;

4. The study included the quality of pregnancy outcomes.

5. The study identified the mobile application

Phase two: Quantitative data to determine food intake and pregnancy outcomes among pregnant women will obtain from observation and questionnaires form. This research programme delivered as an intervention:

- To pregnant women who were receiving monitoring in maternal and child clinical in health care centres.

- In their own online devices

- Access minimum of three days every week within the six weeks

- as an information system with content determined by the researcher

- Incorporating elements of nutrition information and change behaviour

The Randomized control trial (RCTs) method will use to address the research objectives by extension answer the research question. This method identifies the tailored intervention that is going through of pregnant women who receive health services from health professionals plus used 'SISFORNUTRIMIL' application and the control group without used application.

2.2. Source population and study population

The study will use a matched pair randomization helps to ensure balance and reduces the required sample size (White at al., 2018). The matched pair strategy refers to reduce the chances of unequal groups or individuals assigned to either an intervention arm or a control arm. The selecting control group pregnant women who were similar to the intervention group pregnant women based on five characteristics, such as similarity of age, gestational age, income, education level, and household food security. Two samples in which the members are clearly paired or are matched explicitly by the researcher.

2.3. Sample size and sampling techniques

The sample size calculated according to the previous study. About 102 participants will recruit (51 each group). The allocate both groups; the researcher will use free online randomizer "QuickCalcs" by GraphPad. This software allows a researcher to specify the number of participant and number of groups, and quickly return a list showing which participant go to which groups (White at al., 2018). Data will conduct at two places of maternal and child health clinic, PUSKESMAS in Bandung city, Indonesia. The data are a collection in two-time points for maternal measurement and one time for infant measurement: baseline (mid-term of pregnancy) during 13 – 30 weeks of gestation, follow-up at six weeks after baseline, and the end of pregnancy periods (birth). The data will carry out on the day when pregnant women come to antenatal care and delivery baby.

2.4. Data collection tools and procedures

The quantitative data collection of this study will divide by:

1) Socio-demographic and economic status questionnaires will use to obtain data on standardised of personal data and health status of pregnant women. This measure is widely used in Indonesia to describe the socio-economic status of the Indonesia population (mother age, gestational age, number of pregnancy and children, education level, occupation, ethnic group, daily language practice, health history and medication history, degree of physical activity, antenatal care frequency.

2) Food log history will use to record the food intake through a day and night for three days (2 days in a workday and one day in a weekend) during the six weeks. The seven food groups are carbohydrates, protein, vegetables, fruits, light meals, fast food, and beverages. Whereas, the paper-based 7-Day Food Diary record to assess food intake will be used by a control group to estimation their energy and nutrient intake. The food record to estimation and classify subject correctly according to the natural energy and nutrient intake (Pereira, 2010). The criteria of sufficient nutrient per kilocalorie of energy intake categorized into four groups according to Institute of Medicine (2005): Good (>80% RDA), modest (70-79% RDA), poor (60-69% RDA), and deficit (<60% RDA). Besides, the Adult eating behaviour questionnaire (ABEQ) will use to identify the eating behaviour of pregnant women.

3) Pregnancy experience assessment will be measured using a blood sample test. It screens pregnancy complication includes anaemia and gestational diabetes mellitus (GDM). Standard procedures used for biochemical analyses such as haemoglobin (Hb) and blood glucose test (Symington, 2018). According to the World Health Organization, anaemia diagnosed when a blood test shows of haemoglobin level less than 110 g/L in pregnant women (Wang, 2018). Additionally, the GDM diagnostic criteria for non-fasting glucose test followed the World Health Organization (1999) and America Diabetes Association (2003) are categories non-diabetes Mellitus (<140 mg/dL), impaired glucose tolerance (140 mg/dL - < 200 mg/dL), and diabetes mellitus (>200mg/dL).

4) Pregnancy outcomes measurement will take at the end of pregnancy. The infant is weighed on a calibrated scale with a minimum of clothing, namely only a vest, and without nappy, and recorded to the nearest 5 g (Symington, 2018). The birth weight according to Chan et al. (2011) divided into three groups: very-low birth weight (<1.500g), low birth weight (<2.500g), and normal birth weight (2.500 or more).

The data will be analysed using the SPSS statistical software package version 25. To determine whether there are any statistically significant differences between the

groups. The data will examine the appropriate parametric or non-parametric tests. The two independent sample t-test or Mann u Whitney test, and ANOVA test will use for continuous data dependent on the distribution. To examine the relationship between variables and maternal characteristics, we will use simple linear regression and multiple linear regression.

Chi-square test will use for categorical variables. Mean (SD), or median (IQR) will report for continuous data. Number and proportions will indicate for categorical data. The statistical significance will set to 5%, where a p-value of <0.05 is statistically significant.

3. Discussion

Maternal health behaviour during pregnancy plays an essential role in determining pregnancy outcomes. Inadequate dietary practice during pregnancy may result in increased rates of pregnancy complication. In this study assessed the simple application as nutrition intervention through the SISFORNUTRIMIL. In this study, we seek to find an answer to how the SISFORNUTRIMIL application can be developed to guarantee individual women more awareness during decision making in food consumption. This study may lead to recommendations for potential effective strategies that can be used by nutrition intervention guideline and made available to pregnant women. Our goal is to generate input for the development of a feasible and efficient strategy for individual monitoring preferences into community practice guideline. In the future, we aim the SISFORNUTRIMIL application for personal preferences for nutrition intervention and optimal pregnancy outcomes. This application is suggesting a need for food intake guidelines that facilitate pregnant women involvement in eating properly.

4. Conclusion

The expected outcome is to be able to describe in detail the difference between user SISFORNUTRIMIL application and non-user application groups on food consumption and associations with maternal weight gain, blood pressure, biochemical measurement, and pregnancy outcomes. These outcomes will help health professionals in the maternal area develop implementing nutrition interventions. This application helps pregnant women to record the food intake and calculate the nutrients values in each food they have consumption.

Through food record, and thereby provide not only the nutrition monitoring of pregnant women but also increase the chances that reform efforts using system information

with SISFORNUTRIMIL application will prove fruitful on quality of subsequent diet than other ways.

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