FACTORS ASSOCIATED WITH ANAEMIA AMONG PREGNANT WOMEN IN INDONESIA : A SYSTEMATIC REVIEW

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ABSTRACT

Pregnant women are vulnerable with anaemia. Quantitative studies related anaemia in pregnancy have been done in Indonesia including assessing factors associated with anaemia in pregnancy. However, none of studies provide a comprehensive view of factors that associated with anaemia in pregnancy. The aim of this review was to identify factors associated with maternal anaemia in Indonesia. The systematic scoping review method was used in this review. The databases were Indonesian electronic databases including; Google scholar, Kandaga, and Sinta. The keywords were bilinguals: Indonesia and English. The inclusion criteria of studies were focused on factors related to anaemia in pregnancy, research design included correlation and quasi-experimental, published from 2013 to 2018, full text, and Indonesian's studies. A total of 1986 papers were retrieved, but only 14 articles met the inclusion criteria and were included in the analysis. Factors associated with maternal anaemia in Indonesia including health professionals'roles, iron tablets consumption, antenatal care, education, nutrition, health knowledge, and awareness. Multi-factors are associated with maternal anaemia in Indonesia. There is a need for comprehensive approaches from health professionals and health services in dealing with anaemia in pregnancy.

Keywords: anaemia, factors, Indonesia, nursing, pregnancy, vulnerable

ABSTRAK

Anemia adalah salah satu masalah kesehatan pada perempuan hamil. Berbagai riset kuantitatif tentang anemia banyak dilakukan di Indonesia, tetapi penelitian yang mengkaji faktor-faktor penyebab anemia pada kehamilan secara komprehensif masih terbatas. Tujuan dari studi literatur ini untuk mengidentifikasi faktor-faktor yang berhubungan dengan anemia kehamilan secara komprehensif di Indonesia. Studi literatur ini menggunakan pendekatan metode Scoping review. Sumber data menggunakan Google scholar, Kandaga, dan Sinta. Pencarian artikel menggunakan kata kunci 2 bahasa, Indonesia dan Inggris. Kriteria inklusi dari artikel yang dianalisis: riset dengan topik faktor yang berhubungan dengan anemia kehamilan, design risetnya hubungan dan quasi-experiment, dipublikasikan pada tahun 2013-2018, artikel full text, dan riset berasal dari Indonesia. Hasil pencarian artikel mendapatkan 1986 artikel, akan tetapi hanya teridentifikasi 14 artikel yang memenuhi kriteria inklusi. Hasil analisa menunjukan faktor yang berhubungan dengan anemia pada ibu hamil di Indonesia adalah peran aktif petugas kesehatan, kepatuhan mengkonsumsi tablet Fe, kontrol kehamilan, pendidikan formal, status nutrisi, pendidikan kesehatan, dan kesadaran ibu hamil. Faktor yang berhubungan dengan penyebab anemia pada ibu hamil multi-faktor. Hasil studi literatur ini menginformasikan kebutuhan akan pendekatan yang komprehensif dari layanan dan petugas kesehatan dalam mengatasi anemia ibu hamil di Indonesia.

Kata kunci: Anemia, faktor-faktor, Indonesia, kehamilan, perawat

BACKGROUND

Anaemia is a condition when hemoglobin in the blood is less than 10 mg/dl, so the number of red blood cells or oxygen-carrying capacity in the blood is insufficient to meet body's needs (World Health Organization, 2018). Pregnant women are at risk of anaemia because during pregnancy, they produce more blood for the growth of their babies. Anaemia during pregnancy is known as anaemia in pregnancy. Anaemia in pregnancy is a high risk condition as less iron in the blood means less oxygen carried. This would affect ability of the uterus to contract, and increase the risk of maternal hemorrhage (Herawati & Selanty, 2017). Maternal hemorrhage is the most common causes of maternal mortality in Indonesia besides pre-eclampsia, infection, long-labor, and abortion (Kementerian Kesehatan R1, 2015). Prevalence of anaemia during pregnancy is high especially in some developing countries. In Indonesia, more than 50%, and 42% of pregnant women experienced anaemia (World Bank Group, 2017).

Indonesian government established programs to decrease prevalence of anaemia during pregnancy through government regulation which is Peraturan Menteri Kesehatan (the Ministry of Health regulation) No.88 year 2014. The program was providing 90 iron tablets for each pregnant woman during pregnancy (Kementerian Kesehatan RI, 2013). The coverage of this program reached 83.3% in 2011, and then increased up to 85% in 2012 (Kementerian Kesehatan RI, 2013). However, several studies conducted in several areas in Indonesia such as Bali, Sumatera Utara, and OKU district found that the prevalence of anaemia is still high (Astriana, 2017; Lestari et al., 2018; Suega, Dharmayuda, Sutarga, & Bakta, 2002). Those studies found that more than 40% of pregnant women were anaemic.

Studies that investigated the main cause of anaemia have been done in several countries with a massive number of respondents. A study from Mekelle town, Ethiopia that involved 68093 reproductive women, and 11011 of them were pregnant found that the main causes of anaemia in pregnancy were the meal frequency per day, a variety of diet, and parity (Abriha et al., 2014). Another study was conducted in Banke, Nepal that involved 1675 pregnant women (Ghosh et al., 2017). This study found that water sources, iron supplements, education, variety diet were associated with Anaemia. Several types of research in Indonesia also assessed factor associated with anaemia during pregnancy. Ariyani & Sarbini (2016) assessed anaemia influencing factors of 45 pregnant women from Mojolaban, Sukoharjo, Central Java. The study found that iron consumption was a factor that associated with maternal anaemia. Another study was conducted in Air Dingin, Kota Tengah, Padang, West Sumatra by Azra & Rosha (2015). Their study found that iron consumption and variety diet were contributed to anaemia in pregnancy. Studies related to factors associated with anaemia in Indonesia were not a new phenomenon. However, most of the studies were in the small scope and a minimal number of samples. As a result they only found one or two factors that influenced the occurrence of anaemia in pregnancy. The factors that associated with anaemia in pregnant women are not comprehensively known. This literature review aimed to identify factors that associated with anaemia incidence among pregnant women from various researches in Indonesia.

METHODS

This literature review is carried out using Systemic Scoping Review approach (Arksey and O'Malley, 2005). This approach is considered suitable to achieve the aims of this study that needs the various type of datasets and sources which then integrated into the finding in a final report. There are 5 steps in this method which are determining the literature topic, finding and searching sources, choosing the most relevant sources, organizing and analysing, and lastly summarizing. This literature review focuses on information related to factors contributed to anaemia in pregnant women in Indonesia. Articles were searched from the following databases: google scholar,

Kandaga and Sinta. These three databases were chosen because most Indonesian research in Bahasa Indonesia published in those databases. In addition, the Indonesian Ministry of Research and Technology provides the SINTA database for articles that were published in the various journal in Indonesia. The keywords used were bilinguals: Indonesia and English, including anaemia-anaemia, pregnancy-hamil, faktor-faktor, and Indonesia. The inclusion criteria were Indonesian studies, research design included correlation and quasi-experimental, the last five year of publication, full text, and the researchers'

education level minimally were a bachelor or mini thesis with supervision reports.

A total of 1986 papers were retrieved. However, only 580 met the year criteria, and 92 articles were full text. Finally, 14 articles met the inclusion criteria and included in the analysis. Diagram 1 describes the article selection process. After selecting the articles, the next step was analyzing the content which includes purpose, method, sample and setting, inclusion criteria and results. The result is presented in a table. Next was identifying and grouping the similar findings. Last step was making a summary.
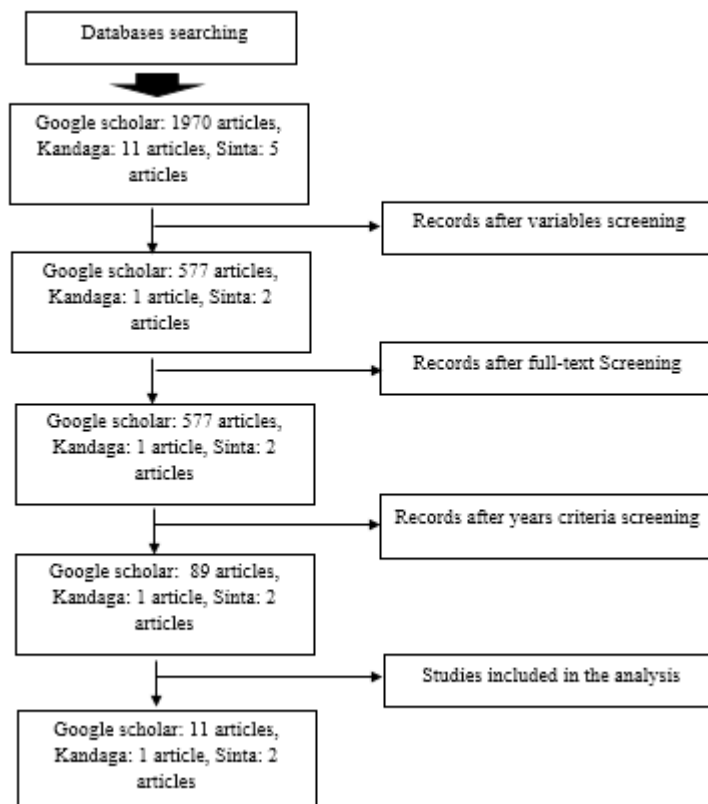

Diagram 1 : Article selection processes

RESULTS

From the 14 chosen articles, all of them were quantitative studies with cross sectional approach (n=9), quasi-experimental (n=2), and a retrospective study (n=1). Researches originated from 6 different provinces in Indonesia. Most of them were on Java Island which is Centre of Java, West Java, and East Java, while other from Sumatra island and Sulawesi

island; Lampung, West Sumatra, and North Sulawesi. Studies were conducted in a sub-district or a PHC (Public Health Centre). Sample on the researches were 30-154 pregnant women. Studies were carried out in 2013-2017. Most of the researches utilized cross sectional approach, probably due to its purpose that wanted to review anaemia in pregnancy

and its related factors. Studies were mostly carried out in Java Island because Java is the central of Indonesian development. It is supposed that researches are done in other area. All researches sample was pregnant women, and there had not been a research that reviewed possible factors that influenced anaemia in pregnant women from different perspectives, such as family, health workers, or community (community leader or health cadre). Details of articles are presented in table 1.

Table 1. The summary of articles on the use of smart phone applications as KIE media for adolescent reproductive health in 2013-2018 (n=20)

No.	Authors	Title	Year	Province	Design	Method	Respon dent	Sampling Technique	Inclusion Criteria	Findings
1	Ariyani, R., & Dwi Sarbini, S. S. T.	Factors associated with anaemia among pregnant women in the third trimester in Mojobolang PHC, Sukoharjo district	2016	Central Java	Quantitative	Cross sectional	45 people	Random sampling	Third trimester of pregnancy	60% of anaemic women did not consume iron tablet that provided by health professionals, regularly.
2	Purwaningty as M. L. & Prameswari, G. N	Factors associated with Anaemia in pregnancy	2017	Central Java	Quantitative	Cross sectional	74 people	Simple random sampling	Anaemic pregnant women	There was a significant correlation between nutrition status (p value 0,000) and anaemia.
3	Erwin, R. R., Machmud, R., & Utama, B. I.	Correlation among knowledge, attitude, and Iron tablet consumption in PHC Seberang, Padang.	2018	West Sumatera	Quantitative	Cross sectional	52 people	Total sampling	Third trimester of pregnancy	Lack of knowledge and awareness were an influence to the compliance of iron tablet consumption and increased anaemia in pregnancy (79%)
4	Rejeki, S. & Huda, A.	Women's characteristic in consuming Iron tablets and Anaemia in pregnancy in Kaliwungu PHC, Kendal district.	2014	Central Java	Quantitative	Cross sectional	30 people	Total sampling	Third trimester of pregnancy who visited health services for pregnancy check, and consumed iron tablet	Pregnant women who consumed iron tablets were not anaemic even though there were different number of tablets 20 tablets (n=3), 60 tablets (n=13), and 90 tablets (n=3) given
5	Susanti, A., Rusnoto., & Asiyah, N.	Food culture taboo, economic status, and knowledge of third trimester pf pregnancy and nutrition status	2013	Central Java	Quantitative	Cross sectional	45 people	Quota sampling	Third trimester of pregnancy third trimester of pregnancy, healthy, no history of disease.	The majority of pregnant women who anaemic were attended Senior High School. Respondents who have a good nutrition status, their energy were met with the body's need (73.3%).

No.	Authors	Title	Year	Province	Design	Method	Respondent	Sampling Technique	Inclusion Criteria	Findings
6	Setyawai, B., Syauqy, A.	The different consumption of protein, Iron tablet, folic acid, and vitamin B12 between anaemic and non-anaemic pregnant women in the Tanggungharjo PHC, Grobogan district	2014	Central Java	Quantitative	Cross Sectional	46 people: 23 anaemic pregnant women, and 23 non-anaemic	Consecutive sampling	Pregnant women ages 20-35 years, were minimal at 27 weeks of pregnancy, had no influenza, fever, or diarrhoea	(1) there was a different intake of protein and vitamin B12 between anaemic and non-anaemic pregnant women; (2) there was not a significant different of iron tablets and folic acid consumption between anaemic and non-anaemic pregnant women.(3) the causes of anaemia were a deficiency of vitamin B12 in the third trimester of pregnancy (anaemia megaloblastic).
7	Mariza, A	Correlation between education-social economic factors and anaemia in pregnancy in BPS T Yohan Way Halim Bandar Lampung	2016	Lampung	Quantitative	Cross sectional	30 people	Accidental sampling	Pregnant women with anaemia	78.6% of anaemic women in this study had a low level of formal education, while non-anaemic women attended universities. There was a correlation between education and anaemia in pregnancy (p value 0,026).
8	Rizki, F., Lipoeto, N.I., Ali, H.	Correlation between Fe tablet consumption and Hemoglobin level in the third trimester of pregnancy at Puskesmas Air Dingin Kota Padang	2014	West Sumatera	Quantitative	Cross sectional	66 people	Proportional random sampling	Pregnant women who consumed Fe tablets, had a Hb check, and nutrition status check)	Women who consumed iron tables > 90 had normal Hb (≥ 11 g/dL).

No.	Authors	Title	Year	Province	Design	Method	Respondent	Sampling Technique	Inclusion Criteria	Findings
9	Lesilolo, T.N; Engka, J.N.A; Wungouw, H.I.S	Correlation amongst Iron tablets, ANC Hb level in Bolaang North Mongondouw	2016	North Sulawesi	Quantitative	Cross sectional	71 people	Purposive sampling	Women with second and third trimester of pregnancy	The majority of women who consumed Iron tablet regularly had Hb Level more than 11 gr%. There was a relationship between ANC and the Hb level of pregnant women.
10	Antono, S. D.	The correlation between ANC visits and anaemia in pregnancy in Nganjuk hospital 2017	2017	East Java	Quantitative	case control, retrospective study	154 people	Disproportionate stratified random sampling	Women with third trimester of pregnancy (non-anaemic and anaemic)	Frequency of the antenatal care visits was influenced by anaemia in pregnancy
11	Agustini, A., Lestari, B.W., Agoes, R.	The influence of "an intervention package" (Distributing Anaemia Brochure, Group discussion, monitoring card of Iron consumption) to increasing HB level in anaemic pregnant women in Sukahajii sub-district, Majalengka	2014	West Java	Quantitative	RCT	88 people	Proportional random sampling	Anaemic pregnant women at first trimester (11-12 weeks) of pregnancy	There was a significance influence between the interventions package with the increasing level of hemoglobin
12	Alvionita, I., & Sulastri, S. K.	The influence of Poster and Texting *Reminder* to pregnant women's compliment of Iron consumption and the level of HB in the PHC of Sukoharjo	2017	Central Java	Quantitative	Quasi experiment	34 people	Purposive sampling	Anaemic pregnant women	Poster and texting were an influence on iron consumption and level of Hb

No.	Authors	Title	Year	Province	Design	Method	Respondent	Sampling Technique	Inclusion Criteria	Findings
13	Vernissa, V., Andrajati, R., & Supardi, S.	The effectiveness of providing leaflet and counselling of anaemia in pregnancy to the compliment of Iron consumption and the level of Hb at the PHCs in Bogor districts	2017	West Java	Quantitative	Quasi experiment	79 people	Consecutive sampling	All women who visited the PHC, diagnosed as anaemic , and had Iron tablet therapy	Providing leaflet and counselling had influenced to increasing Iron tablets consumption. The anaemic pregnant women who had a good compliment of iron consumption increased their Hb level 3.34 times higher than anaemic pregnant women who did not compliment
14	Adawiyani, R.	The influence of providing Anaemia Booklet to pregnant women's knowledge of Iron compliment and the HB level	2013	East Java	Quantitative	RCT	100 people: 50 intervention group and 50 control group	Random sampling	The second and third trimester of pregnancy (14-32 weeks with ANC check)	Providing booklet increased women's knowledge, Hb levels, and Iron compliment in the intervention group than control group.

Majority of studies only assess a single factor and did not provide a comprehensive view of factors that associated with anaemia in pregnancy. Analysis found that 4 out of 14 studies were identified that health professionals and health interventions were the most influencing factors related to anaemia in pregnancy. Health interventions including health education, leaflet distribution, and booklets were found to increase obedience on consuming iron tablet, so that anaemia can be avoided (Agustini et al., 2014; Alvionita & Sulastri, 2017; Andawiyani, 2013; Vernissa et al., 2017). Other influencing factors were the compliance to consume iron tablet supplement (n=3) (Ariyani & Sarbini, 2016; Rejeki & Huda, 2014; Rizki et al., 2014) , ANC (n=2) (Antono, 2017; Lesilolo et al., 2016), nutrient status (n=2) (Purwaningtyas & Prameswari, 2017; Setyawati & Syauqy, 2014), formal education levels (n=2) (Mariza, 2016; Susanti et al., 2013), and health knowledge and awareness (n=1) (Erwin et al., 2018).

Those articles informed that multi factors associated with maternal anaemia in Indonesia including health professionals' roles, pregnant women's behaviour in consuming iron supplement, nutrient status of pregnant women, formal education levels, and women's knowledge and awareness of anaemia in pregnancy and importance of liron supplement to prevent it.

DISCUSSION

This literature review found various factors associated with anaemia in pregnancy in Indonesia including health pprofessionals'' roles, pregnant women's compliance in consuming iron tablets, antenatal care, levels of formal education, nutrient status, and health knowledge and awareness.

Health Professionals' roles

The appropriate interventions and health workers' support were found to be dominant factors affecting pregnant women behaviour in preventing anaemia (Agustini et al., 2014; Alvionita & Sulastri,

2017; Andawiyani, 2013; Vernissa et al., 2017). These factors supported by M'Cormack and Drolet's research (2012). They suggested that pregnant women's awareness about the cause, prevention, and treatment of anaemia should be developed by health workers. Another study found health worker's differences er on performing or collaborating on hemoglobin check and educating about danger sign of anaemia (Rani et al., 2008). In addition, Lesilolo, Engka and Wungouw (2016) explained that health worker plays a role in providing counselling related to the needs of iron on pregnant women during ANC visits. However, in fact the availability of health workers in public health centre (PHC) is limited, and the health education about anaemia to patients was not optimal yet.(Adawiyani, 2013)

The majority studies identified the huge impact of health workers on health behavior. However few studies recognised lack roles of health workers. Health worker should be supported, so they can perform their roles. The support may be included providing health education facilities and infrastructures giving an incentive for health workers for their roles as health educator, and adding the number of health worker if possible. The ratio of health workers with the number of patient in Indonesia is not ideal yet particularly in rural areas (Kementerian Kesehatan Republik Indonesia, 2017).

The compliance of Iron tablets consumption

Obedience to consume iron tablet is one of the factors associated with anaemia in pregnancy (Ariyani & Sarbini, 2016; Rejeki & Huda, 2014; Rizki et al., 2014). Those studies found that pregnant women who consumed iron tablets regularly, did not experience anaemia in pregnancy. However, the prevalence remained high in Indonesia, because a lot of pregnant women were disobedient to consume iron tablet (Ariyani & Sarbini, 2016; Erwin et al., 2018). High prevalence of anaemia in pregnant women Indonesia is similar with other countries India and Nigeria (Mithra et al., 2014; Ugwu et al.,

2014). These two studies found pregnant women were disobedient in consuming iron tablet because of the following reasons including forgetfulness, gastrointestinal side effect (nausea, vomiting, gastritis, and constipation), on traveling, non-affordability of iron supplements, belief that they have an adequate diet and do not need any iron supplements. Other reasons were inadequate counseling from health professionals, problems related to distribution of iron tablets, difficult access and poor utilization of prenatal health care services, beliefs against consuming medications during pregnancy, and in most countries, fears that taking too much iron may cause too much blood or a big baby which, making delivery more difficult.

Increasing pregnant women's compliance for consuming iron table needs a comprehensive approach. Involving family members who live together with pregnant women would be effective to remind about iron tables consumption. In addition, proactive approaches and interventions from health professionals would be a potential in increasing pregnant women's compliance. The approaches and interventions include doing house visit, developing a digital or electronic reminder tool, and educating family members about anaemia and the prevention actions.

Antenatal Care (ANC)

The third factor that influenced anaemia in pregnancy was antenatal care (Antono, 2017; Lesilolo et al., 2016). Antenatal care service has a purpose for early identification of any possible abnormalities or complications during pregnancy including anaemia. The government stipulates that pregnant women have to visit health services for antenatal care minimally 4 times during pregnancy. However, the number of ANC visit in Indonesia decreased from 87,48% in 2015 to 85,35% in 2016 (Kementerian Kesehatan Republik Indonesia, 2017). The Indonesian Ministry of Health (MoH) indicated that one cause of decreasing the ANC coverage was the low quality of ANC. A study in Australia found that the ANC

services influenced pregnant women's health including anaemia (Bar-Zeev et al., 2014). Furthermore, Ikeanyi and Ibrahim (2015) study's suggested that a high quality of ANC is a significant action to prevent anaemia. It is necessary to increase the quality of health services and develop a strategy to increase ANC visit. Health professionals can establish various methods to increase the ANC visits including involving pregnant women's peer group, reminding ANC visit via electronic media, and empowering health cadres.

Level of formal Education

Level of education is another risk factor associated with anaemia in pregnancy. Mariza (2016) found level of formal education had a significant influence to anaemia in pregnancy. In that study, 16 out of 30 pregnant women were anaemic, with the majority of them (n=11) only attended primary education (9 years education) and 5 of them attended secondary and high education. This finding in line with an Ethiopian study found that level of education was a significant independent predictor for anaemia in pregnancy (Gebre & Mulugeta, 2015). However, several studies in Indonesia also found that pregnant women's who anaemic were attended senior high school (Purwaningtyas & Prameswari, 2017; Susanti et al., 2013). A Nepali study also found that there was no significant relationship between educational level of the women with incidence of anaemia in pregnancy (p > 0,05) (Prakash et al., 2015). Those studies revealed that anaemia in pregnancy were problems for both, low level of formal education, and high level of formal education. Purwoastuti & Walyani (2013) suggested that the higher someone's level of formal education, the easier for them to access and use information. Information literacy would have an impact on decision making process (Purwoastuti & Walyani, 2013). Nurses should encourage pregnant women to be active finding information from various sources such as from health professionals, peers, internet, and other media. Nurses' should be actively collaborating with the government and

other parties to provide health counselling through various information media.

Nutrition Status

Several studies found that pregnant women's nutrition status was a factor that assosiated with anaemia in pregnancy. Setyawati and Syauqy (2014)'s study found that there were different intake of Vitamin B12 and protein between anaemic and non-anaemic pregnant women. The respondents were the third trimester of pregnant women, and the majority of them had deficiency of vitamin B12 or anaemia megaloblastic. That finding in line with Purwaningtyas and Prameswari (2017), which found a significant relationship between nutrition status and anaemia in pregnancy (p value 0,000). Susanti et al. (2013) also found similar finding that pregnant women with a good nutrition status and no history of lack of chronic energy had not severe of anaemia during their pregnancy. The Indonesian studies are in agreement with several studies from overseas. A study in Turkey found factors associated with anaemia in pregnancy were including lack of iron 10%, vitamin B12 34,5% and lack of folic acid 71,7% having four or more living children, being at the third trimester, having a low family income, and soil eating tradition (Karaoglu et al., 2010). Furthermore, an Ethiopian study found that pregnant women who consumed good nutrition for example milk, animal protein, fruits, vegetables and plenty of vitamin A would decrease their risk of having anaemia in pregnancy (Zerfu et al., 2016). Nutritious food is important for pregnant women in preventing anaemia in pregnancy. Fulfilling pregnant women nutrition should involve family especially husbands. In Indonesia the majority of bread winner are husbands. Improving family support and involvement in providing nutritious foods are important to improve pregnant women' nutrition status.

Health Knowledge and Awareness

Three studies in this literature review found that health knowledge and awareness had influenced of the occurrence anaemia in pregnancy (Agustini et al., 2014; Erwin et al., 2018; Vernissa et al., 2017). Distributing a leaflet, developing a group discussion, and monitoring iron consumption using a card monitoring, and counselling had increased health awareness and prevented anaemia in pregnancy (Agustini, Lestari and Agoes, 2014; Vernissa, Andrajati and Supardi, 2017). In addition, health awareness is also influenced by education background. Women with low education background are at risk of anaemia in pregnancy due to low awareness and knowledge of the importance of consuming iron tablet (Erwin et al., 2018). Those Indonesian studies in line with an India study that found pregnant women who unaware of their health especially hemoglobin level had more possibility of having anaemia in pregnancy compared to women with good awareness (p value: 0,027) (Gowri et al., 2017). Lack of awareness also was found in a study from Nigeria. This study found that the majority of women perceived that anaemia was a normal phenomenon and they have just awared after pregnancy complications occurred (Onyeneho & Subramanian, 2016). According to Indonesian studies, active health education using many types of media was influenced pregnant women's awareness of anaemia. Nurses as an agent of change could use various media and method to improve health and prevent anaemia among pregnant women.

Study limitations

This literature review provides comprehensive information related to various factors that have associated with anaemia among pregnant women. However, it only looks at Indonesian studies. These findings may not applicable to pregnant women from other countries that have different characteristic to Indonesia.

CONCLUSION

This literature review highlights multi-factors associated with anaemia in pregnancy in Indonesia. These literature review findings are valuable information for nurses especially for maternity nurses. Nurses should aware that anaemia in

pregnancy related with multifactors. Nurses should have a comprehensive view to develop anaemia prevention programs and related interventions in health services in Indonesia such as hospitals or public health centres (PUSKESMAS).

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