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Beliefs about medicines in pregnancy: a survey using the beliefs about medicines questionnaire in Indonesia

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Abstract

Background Many studies examine the use of medicines among pregnant women, however few studies report the pregnant women's belief for taking medication during pregnancy. Individual factors such as patients' beliefs about their medications have been known to influence medication adherence. **Objective** This study aimed to examine beliefs about medicines among pregnant women in Indonesia and how these varied across pregnancy trimesters. **Setting** We conducted a cross-sectional survey of pregnant women who had regular visits at 63 community health centres in Surabaya, Indonesia. **Methods** Participants were approached while they were in the waiting room and were asked to complete the questionnaire. The survey package contained information about the study, an informed consent form, and the Beliefs about Medicines Questionnaire (BMQ). **Main outcome measure** Beliefs about medicines were assessed using the BMQ, which comprises four subscales: general-overuse, general-harm, specific-necessity, and specific-concern. Differences in medication beliefs between pregnancy trimesters were assessed using suitable statistical tests according to data normality. **Results** A total of 492 pregnant women completed the survey. The majority were aged 21–30 years (57.1%), housemakers (68.7%), and educated to high-school level (51.4%); 92.9% did not have any chronic diseases, and more than 90% took vitamins and/or supplements. The difference between Specific-Concern and Specific-Necessity scores was calculated for each participant, and more than half of the participants (59.6%) were thus classified as having negative beliefs about medications. In the first trimester of pregnancy, women's beliefs about medication necessity were stronger than in the third trimester ($p=0.033$). **Conclusion** Medication beliefs of pregnant women regarding their concerns and the necessity of medication taken in different trimesters of pregnancy were varied. The results of this study highlight the difference in medication beliefs during trimesters in pregnancy.

Keywords Beliefs about medicine · Indonesia · Medicine · Pregnancy · Survey

Impacts on practice

- The varied medication beliefs in different trimesters of pregnancy warrant pharmacist to pay attention when counselling pregnant women who take medication.
- Interventions by pharmacists, such as providing education for pregnant women with chronic diseases who take regular medication during pregnancy are crucial, particu-

larly for those women who are highly concerned about using medication during pregnancy.

Introduction

According to the World Health Organization (WHO), medication adherence refers to patient behaviours related to compliance with medication use, diet, and lifestyle as instructed by healthcare providers [1]. Individual and disease factors, medication regimens, and patient-healthcare provider interactions are known to influence medication adherence. Medication adherence supports the achievement of therapy goals. Individual factors include age, education, working status, economic level, and others. Beliefs about medicines are considered an individual factor that can also influence medication adherence.

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There is a lack of a of studies investigating the medication non-adherence in pregnant women. Studies have shown that most pregnant women, regardless of their condition, prefer to be very careful when taking medication during their pregnancy. A study in Canada showed that many pregnant women worry about taking medication for their morning sickness symptoms because of teratogenicity; furthermore, they felt more secure taking herbal remedies than conventional medications, and their perceptions about medication influenced their decisions regarding medication use [2]. The WHO conducted an extensive study involving 14,778 pregnant women from 22 countries on four continents, which revealed that 2068 (14%) pregnant women did not get their prescriptions filled whether it was their regular medication from before the pregnancy or vitamins and mineral that had been prescribed by their doctors [3]. Moreover, in a study in the UK, more than half of pregnant women (72.8%) stated that they deliberately avoided using certain over the counter (OTC) medicine—such as paracetamol, ibuprofen and combination products, and cold medication—during pregnancy with the most common reason being fear of harming the unborn child [4]. These variations in non adherence rates in these studies are consistent with a review [5] which showed that primary non-adherence in the general population varied from 0.5 to 31.3%. We also know that medication adherence is affected by a multitude of factors [5].

Meanwhile, other studies showed that some pregnant women, particularly those with chronic diseases, need to take regular medication for their condition. Medication adherence is vital in the presence of chronic diseases such as asthma and hypertension. In a study in the ambulatory care unit of the Royal's Women Hospital in Melbourne, about one-third of pregnant women (39.2%) had at least one chronic disease: asthma (12.7%), blood-related disorder (12.1%), gestational diabetes (8.1%), or gestational hypertension (3.4%) [6]. These chronic diseases could affect foetal development and increase risks for the mother when not treated correctly. Hypertension during pregnancy can affect the blood supply to the placenta, disrupting foetal growth, which could lead to results ranging from premature birth to neonatal death [7]. In a study in Australia [6], 59.1% of pregnant women did not adhere to their medication regimen. Furthermore, in Norway, specific perceptions regarding medication were found to be significant factors of low medication adherence during pregnancy [8]. According to the literature, individual factors, including beliefs about medicines have been found to influence whether a prescribed medication will be taken or not. Moreover, many pregnant women have worries or concerns related to medication use and prefer taking herbal medicines [6, 9].

This study was conducted at community health centres in Surabaya. Even though not all primary health care centres in Indonesia have a pharmacist, in Surabaya there is

at least one pharmacist in all primary health care centres, who is responsible for the managerial aspect of drug management and also conducting clinical pharmacy services. According to the Standard of Pharmaceutical Services in Primary Health Care Center from the Indonesian Ministry of Health, the managerial aspect of pharmaceutical services includes procurement planning, drug storage management and distribution, administration, and documentation, while clinical pharmacy service covers medication compounding, dispensing, counselling, monitoring, providing drug information, and drug utilization evaluation [10].

Aim of the study

This study aimed to identify the profile of medication beliefs among pregnant women in Surabaya, Indonesia and compare them across pregnancy trimesters.

Ethics approval

This research was approved by the Human Research Ethics Committee of the Faculty of Public Health at Universitas Airlangga in Surabaya, Indonesia (No: 90-KEPK). All participants provided written informed consent to participate in this study.

Methods

This was a cross-sectional survey. Data collection was conducted at 63 community health centres in Surabaya over a 4 months period between February and May 2017. All community health centres have an antenatal outpatient clinic where general practitioners, nurses, and midwives serve the patients. Pharmacists in the centres are more involved in the pharmacy department. Participants were included in the study if they were (1) pregnant, (2) aged 18 years or over, (3) Javanese speakers, (4) able to read and write, and (5) willing to participate in this study and provided informed consent. Participants were approached while they were in the waiting room and were asked to complete the questionnaire. If necessary, participants could also arrange a meeting with the researcher whenever they had time to complete the questionnaire. The survey package contained information about the study, an informed consent form, and the Beliefs about Medicines Questionnaire (BMQ) [11]. The author of this questionnaire granted permission for the researcher to use it. The BMQ was validated using principal component analysis and has been trialled with various populations, including patients with asthma, diabetes, cardiovascular disease, renal impairment, and psychiatric disorder, as well as general

medical patients. This questionnaire assesses respondents' beliefs regarding medications with four subscales: General-Overuse, General-Harm, Specific-Necessity, and Specific-Concern. The questionnaire has two sections: Specific (10 items) and General (8 items). Each section was then divided into two subscales and were analysed separately. The BMQ Specific comprises two five-item subscales: the 'Specific Necessity' subscale (i.e. beliefs about the necessity of taking a specific medication to remain healthy) and the 'Specific Concerns' subscale (i.e. concerns about the negative effects of taking a particular medication). The BMQ-General comprises two four-item subscales assessing beliefs that medicines are harmful and should not be taken continuously (General-Harm) and that medicines are overused by doctors (General-Overuse). All items on the BMQ are rated on a 5-point Likert scale ranging from 1 to 5 (1 = strongly agree and 5 = strongly disagree). Scores obtained for the individual items are summed to give a total score for each subscale, and the two sections of the BMQ can be used in combination or separately [11].

Translation of the BMQ questionnaire into Bahasa was carried out after obtaining permission from the developer of the original English version [11]. Forward and backward translations of the questionnaires were carried out by two bilingual individuals with medical backgrounds (pharmacists). They independently translated the original English measures into Bahasa, and then combined the translations into a single Bahasa translation. A further two bilingual translators then carried out a backward translation into English. A final English translation of each measure was sent to the original author (Professor-Robert Horne). No changes were suggested to the back-translated questionnaire. Pilot testing was conducted for the final Bahasa translations on 50 candidates who met the inclusion criteria as a pilot trial to ensure that participants understood the questionnaire items. The BMQ in Bahasa revealed that both questionnaires were clear and understandable to participants (Cronbach's $\alpha=0.819$).

Data were analysed descriptively using frequencies and percentages. Difference testing was performed using Kruskal–Wallis and Mann–Whitney tests to reveal the differences in pregnant women's beliefs about medicines based on the trimester of pregnancy. Data normality was assessed to decide the type of statistical analysis needed. All data were analysed using IBM SPSS Version 22.0.

Results

Demographic characteristics

The characteristics of participants are presented in Table 1. The average weekly number of pregnant women who visit

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Table 1 Characteristics of the respondents (N=492)

Characteristics	n (%)
Age (years)	
18–20	30 (6.1)
21–30	281 (57.1)
31–40	167 (34.0)
>40	14 (2.8)
Occupation	
None	338 (68.7)
Private	113 (23.0)
Entrepreneur	22 (4.5)
Public officer	4 (0.8)
Other	15 (3.0)
Education	
None	3 (0.6)
Elementary school	61 (12.4)
Junior high school	98 (19.9)
Senior high school	253 (51.4)
Diploma	25 (5.1)
Bachelor and above	52 (10.6)
Smoking status	
Never	485 (98.6)
Stopped smoking before pregnancy	5 (1.0)
Stopped smoking immediately after getting pregnant	1 (0.2)
Smoker	1 (0.2)
Total number of pregnancies (including current pregnancy)	
1	174 (35.4)
2	174 (35.4)
3	83 (16.9)
4	47 (9.6)
5	9 (1.8)
Other	5 (1.0)
Trimester of pregnancy	
1	94 (19.1)
2	180 (36.6)
3	218 (44.3)
National health coverage	
Yes	285 (57.9)
No	207 (42.1)
Family income (IDR)	
<3,000,000	307 (62.4)
3,000,000–6,000,000	167 (33.9)
6,000,000–12,000,000	17 (3.5)
>12,000,000	1 (0.2)
Self-medication during pregnancy	
No	462 (93.9)
Yes	30 (6.1)
Source of medical expenses	
Salary	311 (63.2)
Government insurance	147 (29.9)
Salary and government insurance	31 (6.3)

Table 1 (continued)

Characteristics	n (%)
Company insurance	2 (0.4)
Other insurance	1 (0.2)
Medical expenses per month (IDR)	
< 100,000 (\$7)	394 (80.1)
100,000–500,000 (\$7–\$36)	90 (18.3)
500,000–1,000,000 (\$36–\$72)	4 (0.8)
> 1,000,000 (> \$72)	4 (0.8)

IDR Indonesian Rupiah

the community health centres is 50. During the study, 535 women were approached and 492 of them agreed to participate in the study; they independently completed the questionnaire. This total represents approximately 60% of total deliveries in the community health centres in Surabaya during the study period.

More than half the participants were aged 21–30 years (57.1%), 68.7% were homemakers, and a majority had been educated to a high-school level (51.4%). Almost all participants were non-smokers and only one smoked during pregnancy. More than half (71.0%) were in their first or second pregnancy. Participants were in their first, second, or third trimester of pregnancy, 19.1%, 36.6%, and 44.3%, respectively. More than half (57.9%) had national health coverage insurance; however, 63.2% paid for some services out-of-pocket. There were 14 pregnant women aged over 40 in the study. According to one study, pregnant women aged over 40 were more likely to have pre-gestational chronic or pregnancy-induced hypertension as well as gestational diabetes [12].

In this study, almost all respondents (92.9%) stated being healthy or without any disease. Nevertheless, 6.9% (34 participants) had chronic diseases including hypertension (17 participants), asthma (3 participants), tuberculosis (1 participant), and haemorrhoids (1 participant), as shown in Table 2. Most pregnant women in this study (> 450 or > 94%) took vitamins, minerals, or supplements such as folic acid to support nutrition for the optimum growth of

Table 2 Illness during pregnancy (N=492)

Illness	n (%)
None	457 (92.9)
Hypertension ^a	17 (3.5)
Asthma	15 (3.0)
Tuberculosis	1 (0.2)
Haemorrhoid	1 (0.2)
Common cold	1 (0.2)

^aOne pregnant woman with hypertension and diabetes

the foetus. All medications including vitamins and minerals taken by the participants are summarized in Table 3. Similar to these findings, a study in Norway found that 93.4% of the participants (198 pregnant women) used vitamins, minerals, or herbal remedies [8].

Profiles of beliefs about medicines

Regarding the beliefs about medicine, based on the BMQ General-Overuse, 346 participants in this study (70.3%) disagreed that their physicians prescribed them too many medications (Table 4). In this study, similar numbers of respondents stated that there should be a 'rest' period in the chronic use of medication (40.6%) and that medication causes dependency (46.3%). Almost half of the pregnant women in this study believed that medication use requires the attention of healthcare providers and patients as users. However, more than half of the respondents (65.2%) still believed that medications prescribed by their healthcare providers caused more benefit than harm (Table 4). Similarly, more than half of the participants (79%) disagreed that all medicines were poisonous. Around 50% of respondents disagreed that having to take medicines made them worried. However, when asked about prolonged use of medicines as a worry, the number of participants who agreed it was increased around 20% (35.7% vs. 54.5%) as shown in Table 4. On the other hand, more than 50% of the participants disagreed that medications disturbed their life or gave them unpleasant side-effects, although a cohort study found that adverse drug reactions in high-risk pregnancy reached 10.7% [13]. Participants also tended to believe that knowing their medications increased their confidence in using them. The mean General-Overuse and General-Harm scores were 11.65 and 10.85, respectively (both range from 4 to 20). For

Table 3 Medications taken during pregnancy

Types of medications ^a	n (%)
Vitamins (A11)	471 (95.7)
Supplements (A12)	464 (94.3)
Anti-emetics (A04)	93 (18.9)
Analgesics (N02)	64 (13.0)
Cold and cough medications (R05)	50 (10.2)
Anti-hypertension (C02)	18 (3.7)
Herbals	12 (2.4)
Anti-asthma (R03)	10 (2.0)
Anti-diarrhoea (A07)	9 (1.8)
Antibiotics (medication for infectious disease)	3 (0.6)
Antihistamine	1 (0.2)

^aATC codes based on WHO classification (2013); total is more than 492, since each participant could take more than one type of medication

Table 4 Pregnant women's profile of beliefs about medicines (N = 492)

Code	Item	Strongly agree (5)	Agree (4)	Uncertain (3)	Disagree (2)	Strongly disagree (1)
		n (%)	n (%)	n (%)	n (%)	n (%)
<i>General-overuse</i> 20						
G1	Doctors prescribe too many medicines	5 (1.0)	93 (18.9)	39 (7.9)	346 (70.3)	9 (1.8)
G4	Natural remedies are safer than medicines	11 (2.2)	171 (34.8)	128 (26.0)	175 (35.6)	7 (1.4)
G7	Doctors place too much trust on medicines	11 (2.2)	219 (44.5)	82 (16.7)	170 (34.6)	10 (2.0)
G8	If doctors had more time with patients, they would prescribe fewer medicines	13 (2.6)	200 (40.7)	95 (19.3)	178 (36.2)	6 (1.2)
<i>General-harm</i> 4						
G2	People who take medicines should stop their treatment for a while every now and again	11 (2.2)	189 (38.4)	87 (17.7)	198 (40.2)	7 (1.4)
G3	Most medicines are addictive	12 (2.4)	216 (43.9)	55 (11.2)	202 (41.1)	7 (1.4)
G5	Medicines do more harm than good	5 (1.0)	82 (16.7)	84 (17.1)	309 (62.8)	12 (2.4)
G6	All medicines are poisons	8 (1.6)	46 (9.3)	49 (10.0)	349 (70.9)	40 (8.1)
<i>Specific-concern</i> 3						
S2	Having to take these medicines worries me	16 (3.3)	148 (30.1)	45 (9.1)	263 (53.5)	20 (4.1)
S4	I sometimes worry about long-term effects of these medicines	29 (5.9)	239 (48.6)	48 (9.8)	162 (32.9)	14 (2.8)
S6	These medicines are a mystery to me	3 (0.6)	95 (19.3)	53 (10.8)	317 (64.4)	24 (4.9)
S8	These medicines disrupt my life	5 (1.0)	70 (14.2)	45 (9.1)	347 (70.5)	25 (5.1)
S9	I sometimes worry about becoming too dependent on these medicines	14 (2.8)	178 (36.2)	45 (9.1)	236 (48.0)	19 (3.9)
S11	These medicines give me unpleasant side-effects	4 (0.8)	85 (17.3)	40 (8.1)	343 (69.7)	20 (4.1)
<i>Specific-necessity</i> 5						
S1	My health at present depends on these medicines	12 (2.4)	80 (16.3)	19 (3.9)	349 (70.9)	32 (6.5)
S3	My life would be impossible without these medicines	8 (1.6)	58 (11.8)	15 (3.0)	347 (70.5)	64 (13.0)
S5	Without these medicines, I would be very ill	7 (1.4)	60 (12.2)	30 (6.1)	346 (70.3)	49 (10.0)
S7	My health in the future depends on these medicines	3 (0.6)	37 (7.5)	26 (5.3)	368 (74.8)	58 (11.8)
S10	These medicines protect me from getting worse	9 (1.8)	244 (49.6)	37 (7.5)	187 (38.0)	15 (3.0)

Specific-Concern, the mean score was 16.06 (with a range of 6–30), and for Specific-Necessity, 12.00 (ranging from 5 to 25).

This study also assessed whether participants had positive or negative beliefs about medications. The Specific-Necessity profile in this study showed a skewed curve to the left side (low scores) (Fig. 1), indicating that respondents tended to have weaker beliefs regarding their need for medications. Participants were categorized as having positive beliefs if their Specific-Necessity scores were higher than their Specific-Concern scores. On the other hand, participants had negative beliefs about medications if their Specific-Concern scores were higher than their Specific-Necessity scores, and neutral beliefs if the scores were equal. Since the number of items in those two constructs is unequal, a score conversion was performed before subtracting the total Specific-Concern score from the total Specific-Necessity score for each participant. Almost 60% of pregnant women in this study had negative beliefs about medications (Table 5). In [10], study, differences in medication beliefs between women in the first, second, and third trimester of pregnancy were assessed. The

Kruskal–Wallis test showed a significant difference in medication belief scores between the groups ($p = 0.047$). Further analysis using the Mann–Whitney test found that the difference was between the first and third trimester groups in terms of beliefs about medication necessity ($p = 0.033$).

6 Discussion

To our knowledge, this is the first study specifically exploring the beliefs in medication in pregnant women across 28th trimester of pregnancy. The characteristics of pregnant women who participated in this study, based on their age group and education level, are representative of the population of pregnant women in Indonesia, particularly in urban areas such as Surabaya.

The General-Overuse subscale assesses beliefs that physicians or healthcare providers have a very high acceptance or trust in drugs; thus, they prescribe them too often, even when they are not needed. Although the majority of the participants disagreed that their physicians prescribed them too

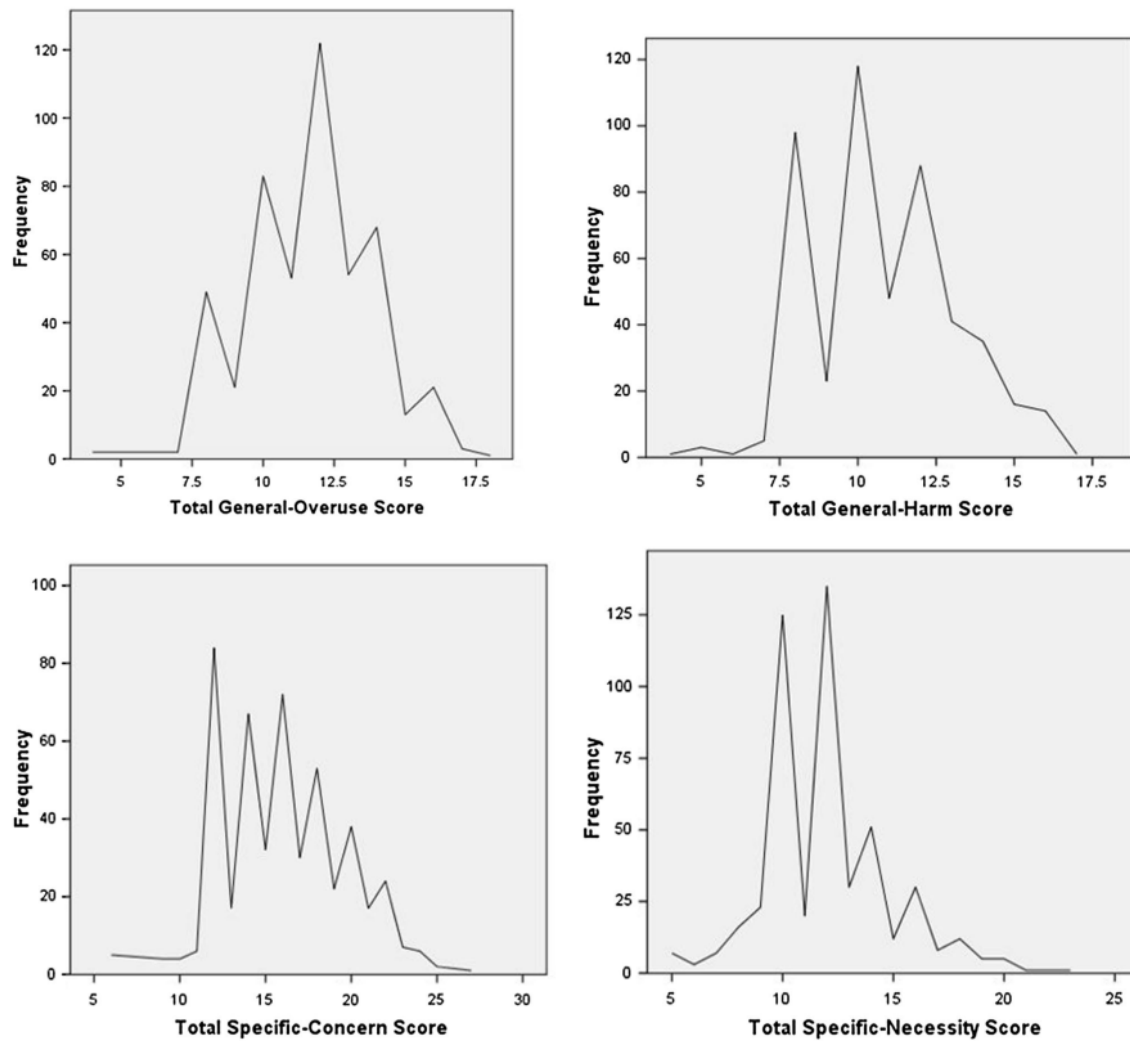


Fig. 1 Respondents' scores distribution for each subscale of the beliefs about medicines questionnaire

Table 5 Medication belief category (N = 492)

Category	Frequency (%)
Positive belief	155 (31.5)
Negative belief	293 (59.6)
Neutral	44 (8.9)

many medications, participants tended to agree that if their physicians spent more time listening to their explanations or examining their medical problems, the number of medications prescribed may decrease. As for other items, almost identical profiles were observed for the beliefs that physicians place too much trust on medications and that herbal remedies are safer than modern medicines.

Overall, participants in this study tended to have positive beliefs regarding their physician, which is beneficial, since this could improve beliefs about the medications they prescribe. However, previous research yielded different results. According to a study conducted in Norway using the same questionnaire, most pregnant women agreed with the statement that physicians prescribed them too many medications [14]. Differences in education level may influence the thoughts regarding and the ability to criticize the decisions of healthcare providers. In a study in Nigeria, 67.5% of 565 pregnant women used herbal remedies either in crude or packaged forms [15]. In Bangladesh, 70% of 243 pregnant women used herbal medicines, but only 23.5% disclosed it to their physician or midwife [16]. However, different

healthcare settings in various countries could produce different results. In some countries, a pharmacist is considered as the source of information for medicines equal to getting advice from doctors or physicians [4]. While in other countries, including Indonesia, pharmacists are not yet included in the routine care of pregnant women. There is still more work to be done to explore some concerns regarding the use of medicines in pregnant women. Hence, healthcare providers, especially pharmacists, should actively ask their patients, particularly pregnant women, about all medications consumed, including vitamins, supplements, and herbal remedies, to monitor the necessity, effectiveness, and problems related to the medications.

The items in the General-Harm subscale assess the beliefs about medicines' risks. Pregnant women with chronic illnesses need to have more positive beliefs about their medications. Furthermore, it is crucial for pregnant women with hypertension to take medications to control their blood pressure in order to prevent harm to the foetus as a consequence of high blood pressure. A study investigating drug-related problems in pregnant women found that 10.5% of problems were related to medication adherence [11]. Thus, it is important for healthcare providers, including pharmacists, to assess medication beliefs and monitor medication adherence in pregnant women with chronic conditions.

The BMQ Specific-Concern subscale assesses concerns or worries during and after taking medications. It is strongly recommended that healthcare professionals including pharmacists provide brief information about the medication profile, safety, and benefit to their patients, especially pregnant women, so that they can take their medications with fewer concerns. The BMQ Specific-Necessity subscale assesses beliefs about dependency on medications. The Specific-Necessity profile in this study showed that respondents tended to have weaker beliefs regarding their need for medications. This result possibly occurred because the health profile of pregnant women in this study was good; most respondents were young and only took vitamins and other supplements for their pregnancies, and the number of pregnant women with chronic diseases was very low. In other populations with chronic diseases, beliefs about medication necessity might be more frequent and vital in determining adherence. Respondents showed a strong belief only regarding medications that prevented the worsening of their health condition. In other words, women in this study believed that their medications had a protective effect, but they were not dependent on them.

The negative beliefs about medications showed by the participants may be related to the low scores on medication necessity, since most participants did not have a specific disease and the most commonly used medications were vitamins and supplements. Those kinds of medications have relatively few adverse effects; despite the benefits of

specific vitamins and supplements for pregnant women such as folic acid, calcium, vitamin D, vitamin C, and iron, they are not intended to cure a disease. Although the prevention of pregnancy problems such as abnormalities in the foetus is crucial, individuals tend to perceive prevention as an additional intervention less important than curing a disease; thus, their beliefs about the necessity of medications were lower than the concerns about the negative effects of medication. Concerns in this study were possibly higher because being pregnant led participants to be more careful with their health, especially regarding the pregnancy and the condition of the foetus.

Participants in this study were pregnant women in their first, second, or third trimesters. Medications could harm foetal development in several ways, such as directly acting on the foetus, changing the function of the placenta, or promoting early labour [17]. According to the Food and Drug Administration (FDA), some medications are classified in the X category, for instance, simvastatin, atorvastatin, warfarin, and methotrexate, as they were proven to cause foetal abnormalities; thus, the risks outweigh the benefits. However, in 2015, the FDA released a new regulation recommending that manufacturers provide more information on medication labels or leaflets in relation to pregnancy so that healthcare providers can assess the risks and benefits before prescribing them to pregnant women [18].

There was no difference between the groups in other subscales. The significant difference in beliefs about medicine between the first and third trimester suggests that individuals, in this case pregnant women, tend to have stronger beliefs regarding the necessity of medications during the initial phase of use. The duration of treatment is known to be a factor influencing medication adherence [19]. However, since the majority of pregnant women in this study (more than 92%) had no chronic diseases and only a few of them (less than 10%) took medications for their chronic condition, it was somewhat difficult to compare the adherence between the two groups. Additionally, this study did not measure medication adherence for pregnant women who take regular medications that treat their chronic diseases. Nonetheless, the adherence to medication during pregnancy should be a concern for pharmacists and other healthcare providers, who need to continue encouraging pregnant women to maintain medication adherence during their pregnancy. All healthcare providers, including pharmacists, need to discuss such beliefs with their pregnant patients during counselling sessions in order to increase medication adherence and monitor them in the second and third trimesters to ensure that adherence is maintained.

Although this study found no significant differences in medication concerns between the three trimesters of pregnancy, overall, almost half of the respondents (48.6%) worried about a medication's effects when they used it for long

periods. Moreover, around one-third (36.2%) had concerns about the dependency that they perceived they might be developing. Similarly, Canadian pregnant women had concerns about taking medication for their nausea and vomiting and preferred herbal remedies to manage their symptoms [2], and WHO data from 22 countries showed that 14% of pregnant women did not fill their prescriptions [3]. Thus, for pregnant women with more serious illnesses such as asthma, hypertension, diabetes, or folic acid deficiency, adherence to the medication regimen is particularly crucial and needs to be maintained and monitored by healthcare providers.

This study showed that the majority of pregnant women who visited the antenatal clinic at community health centres in Surabaya take vitamins, minerals, or other supplements during their pregnancy. The major strength of this study is that it is the first attempt to study the difference of beliefs regarding medication during the three trimesters in Indonesia. Such data may contribute to evidence-based policymaking and health awareness campaigns, particularly for the different trimesters in pregnancy. This study has a distinct limitation. This study did not measure adherence to medication, therefore we could not estimate the difference in medication adherence during pregnancy between those with and without chronic diseases. An additional limitation is that there was no data on the profile of respondents' antenatal visit to their physicians. Women who had better profiles of doctor visits possibly had different beliefs regarding medication.

13 Conclusion

The results of this study highlight that there was a difference in medication beliefs across the trimesters, in which beliefs about medication necessity were strongest in the first trimester of pregnancy. Since beliefs about medicine are known to influence medication adherence, a further study measuring this relationship during pregnancy is warranted.

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References

1. World Health Organization. Adherence to long-term therapies: evidence for action. Geneva: World Health Organization; 2003.
2. Baggeley A, Navioz Y, Maltepe C, Koren G, Einarson A. Determinants of women's decision making on whether to treat nausea and vomiting of pregnancy pharmacologically. *J Midwifery Womens Health*. 2004;49(4):350–4.
3. Briggs G, Freeman R, Yaffe SJ. *Drugs in pregnancy and lactation*. Philadelphia: Lippincott Williams & Wilkins; 2011.
4. Twigg MJ, Lupattelli A, Nordeng H. Women's beliefs about medication use during their pregnancy: a UK perspective. *Inter J Clin Pharm*. 2016;38:968–76.
5. Seal F, Cave JA, Atkinson LL. Primary non-adherence of prescribed pharmaceutical treatments and interventions: an investigative review to improve quality in primary care. *Qual Prim Care*. 2017;25:344–59.
6. Sawicki E, Stewart K, Wong S, Leung L, Paul E, George J. Medication use for chronic health conditions by pregnant women attending an Australian maternity hospital. *Aust N Z J Obstet Gynaecol*. 2011;51:333–8.
7. Duley L. The global impact of pre-eclampsia and eclampsia. *Semin Perinatol*. 2009;33:130–7.
8. Smedberg J, Brathen M, Waka M, Jacobsen A, Gjerdalen G, Nordeng H. Medication use and drug-related problems among women at maternity wards—a cross-sectional study from two Norwegian hospitals. *Eur J Clin Pharmacol*. 2010;72:849–57.
9. Lupattelli A, Spigset O, Nordeng H. Adherence to medication for chronic disorders during pregnancy: results from a multinational study. *Int J Clin Pharm*. 2014;36:145–53.
10. Indonesian Ministry of Health, Peraturan Menteri Kesehatan No.74 Tahun 2016 tentang Standar Pelayanan Kefarmasian di Puskesmas, Jakarta. 2016.
11. Horne R, Weinman J, Hankins M. The beliefs about medicines questionnaire: the development and evaluation of a new method for assessing the cognitive representation of medication. *Psychol Health*. 1999;14:1–24.
12. Diel A, Cupisti S, Beckmann MW, Schwab M, Zollner U. Pregnancy and obstetrical outcomes in women over 40 years of age. *Geburtshilfe Frauenheilkd*. 2015;75:827–32.
13. da Silva KDL, Fernandes FEM, de Lima Pessoa T, Lima SIVC, Oliveira AG, Martins RR. Prevalence and profile of adverse drug reactions in high-risk pregnancy: a cohort study. *BMC Pregnancy Childbirth*. 2019;19:199.
14. Nordeng H, Koren G, Einarson A. Pregnant women's beliefs about medications—a study among 866 Norwegian women. *Ann Pharmacother*. 2010;44:1478–84.
15. Fakeye TO, Adisa R, Musa IE. Attitude and use of herbal medicines among pregnant women in Nigeria. *BMC Complement Altern Med*. 2009;9:53.
16. Ahmed M, Hwang JH, Hasan MA, Han D. Herbal medicine use by pregnant women in Bangladesh: a cross-sectional study. *BMC Complement Altern Med*. 2018;18:333.
17. Sachdeva P, Patel BG, Patel BK. Drug use in pregnancy: a point to ponder! *Indian J Pharm Sci*. 2009;71:1–7.
18. Food and Drug Administration. Pregnancy and Lactation Labeling (Drugs) Final Rule. 2014. www.fda.gov/Drugs/DevelopmentApprovalProcess/DevelopmentResources/Labeling/ucm093307.htm Accessed 20 August 2018.
19. Hussar DA. Remington: the science and practice of pharmacy. In: Hendrickson R (ed) 21st ed. Lippincott Williams & Wilkins, Philadelphia, 2005; p. 1782–1795.

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