Hypertensive disorders of pregnancy (HDP) management pathways: results of a Delphi survey to contextualise international recommendations for Indonesian primary care settings

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Abstract

Objectives: To reach consensus on evidence-based recommendations to develop HDP management pathways for Indonesian primary care. Design: A three-round Delphi survey Setting: N/A Population: Maternal health practitioners and experts, including GPs, midwives, nurses and health policy researchers from Indonesia and international background. Methods: Participants were asked to rate their agreement on whether each of 125 statements about HDP and HDP managements extracted from international guidelines were feasible in Indonesian primary care settings in a mix of quantitative and qualitative questions in three-rounds Delphi survey. A minimum of 70% agreement among participants was needed for a statement to be included for the HDP pathways that the pathways drafts were presented at the third-round survey. The participants' free text questions responses and suggestions were analysed thematically. Main Outcome Measures: Agreement scores of the statements. Results: A total of 52 participants participated, 48, 45, and 37 of them completed the first, second and third-round survey respectively. The consensus was reached for 115 of the 125 statements on HDP definition, screening, management and long-term follow-up. The agreement scores ranged from 70.8-100.0% and potential implementation barriers were also identified. Drafts of HDP management pathways were also agreed upon and received suggestions from the participants. Conclusions: Most evidence-based HDP management recommendations achieved consensus represented in the developed HDP management pathways can be implemented in Indonesian settings. Further investigations are needed to explore the acceptability and feasibility of the pathways in practice.

Keywords: Delphi survey, management, pathways, hypertensive disorders of pregnancy, preeclampsia, Indonesia, primary care

Twitable abstract (110 characters):

Contextualising international recommendations to develop HDP management pathways in Indonesian primary care settings.

Introduction:

Hypertensive disorders of pregnancy (HDP) cover a range of diagnoses, including chronic hypertension, gestational hypertension, white coat hypertension and preeclampsia/eclampsia [(1)]. In Indonesia, HDP remains the leading cause of maternal mortality, and with its current increasing trend, may soon replace postpartum hemorrhage as the most common cause of direct maternal mortality [(2, 3)].

Research shows that maternal mortality from HDP is preventable if the women receive appropriate management, however, many maternal deaths from HDP in Indonesia are not well anticipated due to lack of practice guidance in primary care[4]. Current Indonesian primary care guidelines merely recommend general practitioners (GPs) to refer women with HDP to hospitals[5-7], but details of further management such as screening, monitoring, and long-term postpartum follow-up treatment for HDP women are lacking[8]. Meanwhile, the country's disparities in health due to community beliefs, inadequate obstricians availability and geographical locations also challenges the referral which impact on the women often are already too severe for hospital management[3, 9, 10]. Due to these rationals, therefore, the need to upgrade primary care providers in HDP management is more than ever in Indonesia.

This research is part of a larger study to improve quality of HDP management in Indonesian primary care [11]. Our previous review has identified potential evidence-based practice improvements for HDP management [12]; and we have also explored the way HDP is managed in Indonesian primary care through interviews with key stakeholders [8]. However, to adopt these recommendations and to develop the HDP management pathways as improvement interventions would require additional contextualisation process. Findings in our review indicate that not all recommendations from the international HDP guidelines can directly be adopted into the local context due to different practice environments, such as different professional authority, facilities, policies or public insurance (*JKN/Jaminan Kesehatan Nasional*) regulation [8, 12]. There are also further considerations when contextualising HDP recommendations for Indonesian primary care. Public primary care services (Puskesmas/*Pusat Kesehatan Masyarakat*) in Indonesia has to undertake maternal surveillance and maternal audit processes in the community in addition to provide individual patient treatment[8]. There are also community health workers (cadres) involved in maternal health activities but their job description in the current Indonesian guidelines remains unclear [13, 14].

This research then aims to establish experts' consensus on the identified 125 international and local HDP management recommendations to develop HDP management pathways for Indonesian primary health care setting.

Methods

Study design: consensus development using Delphi technique

Consensus is usually defined as 'general agreement'[15]. Consensus development is a process commonly used in guideline or pathway development to determine general agreement from experts regarding recommendations used in the guideline[15], or to explore the experts' opinions regarding feasibilities of international recommendations to be used for a specific practice setting where evidence to support their implementation is limited [16].

One of the most common consensus development method in pathway development is Delphi technique-in which the experts provide their judgment directly or indirectly through surveys or interviews[17]. In the study, three rounds of anonymous online Delphi survey were used to develop consensus on the applicability of 125 statements based on HDP management recommendations and draft HDP pathways that can be used by GPs, midwives and nurses in Indonesian primary care settings [12].

Survey statements

HDP statements in the survey were extracted from the results of our review of HDP guidelines [12] and exploratory interviews in primary care [8]. The 125 HDP statements were then grouped into HDP definitions, risks, screening and diagnosis, prevention, management, monitoring, long-term follow-up, facilities, and HDP surveillance in primary care.

Participants

Indonesian and international experts in maternal health identified through the authors' professional networks

and snowballing recruitment process were invited to participate in this study. The participants inclusion criteria were[11]:

1. GPs, midwives, nurses, specialists, local health officers, or policymakers in maternal health.
2. Have a minimum of two years working experience;
3. Have an academic degree background in health sciences;
4. Familiar with the context of primary care in Indonesia or other low and middle-income countries (LMICs); and
5. Keen to participate in all three survey rounds.

Recruitment

All prospective participants were recruited by email and/or WhatsApp messenger[18] containing link for the study recruitment pages. The recruitment pages were provided bilingually in Bahasa Indonesia and English, and the participants were able to choose their preferred language. Prospective participants who did not meet the inclusive criteria were excluded and only those who satisfied the criteria were able to carry on to the survey's online plain language statement (PLS) and electronically sign the consent page. The participants' identity was confidential to other participants and was only be identifiable by researchers in this study.

Data collection

The data collection applied three rounds of online survey using the University of Melbourne REDcap (Research Electronic Data Capture) \soutplatform [19], and each survey round consisted of:

- a questionnaire asking participants to provide their judgement on statements on a five-point Likert scales (1= strong disagreement, 2 = disagreement, 3 = indicated neutral position, 4 = agreement, and 5 = strong agreement) [20, 21]. Participants were asked to rate their judgment on (i) whether the recommendation was useful to improve HDP management in primary care and (ii) whether the recommendation was likely to be applicable in practice in Indonesia or needed to be contextualised;
- free-text questions to ask the participants further suggestions related to the tested statements.

Participants were given three weeks to complete each round. They received short messages and email reminders on one week and three days before the survey closed. Once a round was completed, participants were sent a link to the next survey round.

First-round suvey

After completing the PLS and consent pages, the participants were sent with the first-round survey link asking them to rate 62 statements: HDP definitions (n=7), risks (n=16), screening and diagnosis (n=16), prevention (n=10), and long-term follow up (n=13) in primary care. Other than the basic free-text questions above, there were also initial three questions presented specified for the first-round[11]:

1. What are the roles of Indonesian primary care in HDP management?
2. What potential practices that can be conducted by primary care providers in HDP management?
3. What are barriers and facilitators of HDP management in Indonesian primary care?

Second-round survey

This round tested 63 statements regarding HDP management (n=14), monitoring (n=31), required facilities (n=8), and surveillance (n=10) in primary care. The survey pages also contained results of the first-round survey and participants were able to review and revise their responses on statements that had not reached consensus in the first-round survey.

Pathways development

Statements that reached consensus at the first and second-round survey were used to develop the pathways initialy designed by the first author. The pathways drafts however, were discussed, received suggestions and

agreed by all of the project investigators before their presentations to the participants in the third-round survey.

Third-round survey

The third-round survey asked for the participants' agreement and suggestions on the HDP management pathway drafts. Results of the second-round survey were also presented and the participants were able to review and revise their responses on statements that had not reached consensus. Statements that achieved consensus at this round, including the participants' suggestions were used to finalise the HDP management pathways.

Data analysis

The participants' agreement scores in each survey were analysed descriptively using Microsoft Excel software [(22)]. The participants' responses were calculated for each statement to generate total agreement scores, standard deviation and interquartile ranges. The minimum requirement set for each round was: at least 60% participation and the statements had to have at least 70% agreement to be included in the HDP pathway[(17)].

The free-text responses and suggestions from the participants were imported into the NVIVO software[(23)] and analysed thematically[(24)]. The free-text responses in Bahasa Indonesia were translated into English and are uploaded to the NVIVO for coding. Codes were grouped based on their similarities and patterns were then used to establish overarching themes and subthemes. Codes and themes were also discussed and mutually agreed by all project investigators. Presentation of this study follows standard of reporting intervention development studies (GUIDED) [(25)].

Language validation

All of the survey statements and questions were initially created in English. They were then translated into Bahasa Indonesia by the first author and presented to participants based on their language preference. Participants' responses written in Bahasa Indonesia were also translated into English to enable analysis and discussion between the project investigators. All questionnaires and a quarter of the free-text responses were also back-translated into English and were reviewed by another two native Indonesian speakers to ensure the translation validation.

Survey validation

The recruitment and survey pages were tested to ensure internal validation. Each of the survey pages had a minimum of ten trials by the validation participants before distribution to the survey participants.

Results

The surveys were conducted from November 2018 to May 2019. A total of 52 participants agreed to participants, of these, 48, 45, and 37 participants completed the first, second, and third round of surveys. The participants baseline demographic data are presented in Table 1.

[insert Table 1 here]

First-round survey

Around 85.5% of the statements reached consensus at the first-round survey and the agreement score ranged from 40.9% to 100.0%. Statements that achieved 100.0 % agreement include '*routine blood pressure measurement for HDP screening* ' and '*pregnant women have to be informed and counseled about HDP risk factors* '. Nine statements did not reach 70.0% agreement and these include statements of '*most antihypertensive medication can be used to control the women's blood pressure during breastfeeding periods* ' (43.2%) and '*most all contraception methods dan be prescribed for women with a history of HDP* ' (40.9%). These statements

were then brought forward into the second-round survey (Please refer to Table 2 and the supplementary table).

[Insert Table 2 here]

Free text-responses in the first-round highlighted the roles of primary care physicians in HDP management and the most prominent theme emerging in the analysis was authority (with 219 quotes). Most participants believed that primary care have responsibilities to conduct antenatal care (ANC), identify women with increased risks of HDP and refer patients who are at risk to obstetricians. They also had to not only provide HDP clinical management in primary care but also care coordination with hospitals.

The participants also conceded that routine ANC had already well applied in Indonesian primary care practice and blood pressure monitoring and dipstick urine tests been routinely conducted to screen for preeclampsia. However, some participants claimed that primary care had limited resources available in practice. For instance, only nifedipine was available as a treatment for pregnancy hypertension and the doctors' limited time for pregnancy consultation.

Interestingly, many of the clinician participants also indicated their own doubt with the quality of HDP management they currently provide in practice, particularly the referral timing and patient monitoring procedures. They also expected guidance and skills upgrades on such HDP management in primary care (Table 3).

(Insert Table 3 here)

Second-round survey

Most of the statements (92.0%) reached consensus in this round. Similar to the first-round survey results, the statements' agreement scores were high particularly on statements related to community surveillance and home visits for women with HDP (mean agreement scores: 98.0%). Five statements did not reach consensus in this round and the statements were re-tested in the third-round survey (Please refer to Table 2 and the supplementary table).

Seven participants also revised their responses to statements in the first-round survey and increased the agreement scores to above 70.0% for three statements: '*systemic lupus erythematosus as a risks factor for preeclampsia* ' (72.9%), '*serum creatinine as a baseline examination for women with preeclampsia risk factors* ' (70.8%) and '*low dose aspirin prescription by GPs* ' (70.8%).

Some participants in the free-text questions in this round raised further opinions regarding authority of HDP in primary care, such as suggesting different management of mild and severe preeclampsia based on their usual practice and a need for a government policy to facilitate the pathways' implementation in practice (Table 3). Again, a participant also wrote another limitation in practice, i.e that only certain medicine available in primary care.

Pathways development:

The HDP management pathways drafts had been developed from statements that reached consensus from the first and the second round survey. HDP management pathways drafts were presented in three flowcharts: (i) HDP diagnosis, (ii) HDP management, and (iii) HDP maternal surveillance flowchart in primary care. The HDP management pathway itself was divided into five sections: (i) screening for preeclampsia risk factors at the first pregnancy visit, (ii) HDP screening activities during routine ANC, (iii) HDP management and monitoring, (iv) delivery plans for women with HDP, and (v) postpartum follow up for women with HDP in primary care.

The project investigators also considered and discussed statements that had not achieved consensus at the first and second round survey. The pathways accomodated statements related to contraception and antihypertensive medication used for women with HDP history were later accommodated using information

tables (that are not included in this publication). Another statements were also considered not to be re-tested in the third-round survey, i.e IVF as isk factor for preeclampsia.

Third-round

Most participants agreed on the HDP management pathway drafts. The pathways' agreement scores ranged from 78.4% for HDP monitoring to 89.2 % for preeclampsia risk factors screening (Table 2). Eleven participants revised their response on statement that had not received consensus at the previous rounds. Their revised responses, however, only changed agreement score for platelet count as baseline data for pregnant women with risks of preeclampsia (from 68.2% to 70.8%). The complete final agreement score for each statement and the diagnosis flowchart are attached as supplementary materials.

There were participants opinions and suggestions obtained from the third-round free text questions. Spme participants suggested improvement on the triage for pregnant women. A participant expessed his disagreement on HDP pathway development through the survey. He mentioned that the pathways drafts were way too complicated and they should not be developed through surveys. There were, again, a suggestion to differentiate management of mild and severe preeclampsia and further pressure to refer women with HDP to hospitals. Further suggestion was also obtained for the HDP surveillance pathway to respect on the patients' confidentiality during patient management. It was previously mentioned at the surveillance pathways drafts that any HDP cases should be referred to public primary care clinics for surveillance data and be follow up by cadre home visits or receiving supports from community leaders. The suggestion on patient confidentiality was used to improve the statements listed in the surveillance pathway (Table 3).

Final revised pathways

The pathways drafts were revised after receiving the participants suggestions. The triage of women were improved by providing statements if aspirin was initiated before 16^{th} week and after 20^{th} week of pregnancy. However, the surveillance for HDP women were also added with statements to respect the patients confidentiality. The participant suggestion to differentiate management of mild-moderate and severe preeclampsia was not accommodated in this stage. The final HDP management pathways and surveillance pathways in primary care are presented in **Figure 1, and Suplementary Figure 1 and 2** .

[**insert Figure 1 here**]

Discussion

This study is the first study to seek experts' consensus and opinions on a set of HDP management recommendations for Indonesian primary care setting. Despite of some identified challenges that may limit their implementation in primary care, the surveys demonstrated that almost all of the HDP recommendations are suitable and the HDP management pathways have reached consensus for their implementation in Indonesia.

There were some statements that had not re-tested in the third-round survey due to local contextual considerations. In-vitro fertilisation (IVF) was not re-tested due to its irrelevance with the Indonesian population context as IVF is usually accessed by subfertile-married couples [26, 27]. Contraception and antihypertensive medication were further accommodated using two tables in the supplementary materials (that are not included in this publication) aiming to provide more comprehensive educational information for the targeted audience in primary care.

The developed HDP pathways provide step-by-step clinical guidance on HDO management embedded in the routine ANC and shift the clinicians' focus to early signs, symptoms and risk factors for preeclampsia. The developed pathways also have abilities to equip GPs and midwives in Indonesia with comprehensive HDP guidance in primary care as have been expected by key stakeholders in our exploratory consultation[8]. The pathways are also able to complement a preeclampsia management model recently developed for LMICs

that covers principles of the management but lack of detailed clinical recommendations for primary care[28] and other HDP guidelines which was published more than a decade ago and focused only on preeclampsia management and secondary care [5, 29].

Potential challenges that may limit the recommendations uptakes in practice have also been identified in the survey, such as tensions of interprofessional authority between the clinicians, and clinical inertia of the HDP management in primary care. It was implied in the survey results of the participants' hesitance to agree on some HDP managements, such as low-dose aspirin prescription even though, the medicine has benefits of reducing risks of preterm preeclampsia[30-32], relatively safe for pregnant women [33, 34], and is also widely available in Puskesmas [35]. The primary care participants also seems resign on the fact that only nifedipine that is available for HDP treatment in the Puskesmas and hesitance to agree on other antihypertensive agents prescriptions, such as methyldopa and labetalol that are only available in the hospitals or accessible throughs prescription in private pharmacies [36].

Some participants also recommended different preeclampsia management based on its severity cathegory according to their current standard that are different to the recommendations in international guidelines[1, 12]. Based on an Indonesian guideline, pregnant women with blood pressure [?] 140/90 mmHg and positive (+1) proteinuria or increased creatinine level are categorised as having mild to moderate preeclampsia, while women with severe preeclampsia are those who have blood pressure [?] 160/90mmHg, positive (+2) proteinuria and preeclampsia symptoms such asas headache or visual disturbance [7]. However, recent international guidelines on preeclampsia reccomend to avoid those categorisations above in practice, as they are often confusing and that women with preeclampsia can deteriorate very rapidly into more severe conditions [1, 37, 38]. It is therefore not surprising that some participants in the survey suggested formal policy changes to secure additional preeclampsia managenment in primary care while some obstetrician participants also voiced their opinions that the pathways should be developed by more competent experts.

The primary care clinicians' hesitance and inertia above are likely influenced by gaps of the clinincians' medical training and hierarchical culture in Indonesian health care. GPs in Indonesia are only required to complete a medical doctor bachelor degree in a university to be able to practice in primary care, whereas specialists are required to undertake another three to four years of specialty training at a hospital. This gave the misconception that GPs are less competent and confident than specialists resulting in GPs' low status in the eyes of patients and specialists [39-41]. However, if the GPs and midwives in primary care are not well supported and encouraged to perform HDP managements, then who will be able to appropriately manage HDP women at the first place considering challenges of referral and disparities in Indonesian health care.

Strengths and limitations of the study

Delphi technique in this survey is not bound by geographical locations of the participants and offers flexible opportunities for them to share their opinions and minimising bias of dominant experts[17, 42]. The process is anonymous and hence has the advantage of minimising challenges of the hierarchical culture that we would anticipate among Indonesian health care professionals[43-45].

Although sample size in this study was small, the recruitment of participants with various backgrounds and experiences have captured broad views and opinions from the experts [46]. The survey has also optimised the participants interaction by providing them opportunities to view and revise their responses at the previous rounds. Result validity of the study is justified by the high survey participation rates in each round and the high percentages of agreed statements completed with good agreement scores [17, 47].

Suggestion for further research

Further research is desired to investigate the pathways acceptability in practice and to confirm suitability of aspirin prescription for anemic women. Towards the end of the study, new evidence emerged to indicate that anaemia in pregnancy might also be a risk factor for preeclampsia in LMICs [48, 49]. This is directly relevant to situations in Indonesia where anemia prevalence is high due to malnutrition, genetics or infections such as malaria and hookworm, that cause inflammation in the placenta [48-51]. The use of aspirin in anaemic

women, however, is not currently supported in any of the existing international HDP guidelines [12] or tested in the survey, that therefore the management requires further careful clinical investigation.

Conclusion

Most of HDP management recommendations extracted from international HDP guidelines [12] achieved concensus in this study and the developed HDP management pathways are potentially implementable in Indonesian primary care. Further research is needed to explore the pathways' acceptability and feasibility in Indonesian practice and to investigate the appropriateness of anemia as another preeclampsia risk factors in LMICs, including the use of low-dose aspirin in anemic pregnant women with other underlying preeclampsia risk factors.

Declaration

Ethics approval and consent to participate

Ethics approval for this study has been obtained from The Human Ethics Sub Committee, The University of Melbourne (Research ID number 1853074.1).

Consent for publication

The participants had provided consent for their responses to be published in a peer-reviewed journal or conferences.

Availability of data and material

A supplementary data of the final agreement scores at the survey statements is included in this publication. However, raw qualitative data and survey response materials are not shared to protect the participants' confidentiality.

Competing interests

All authors declare no competing interests.

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Authors' contributions

All authors contributed to the study design and manuscript writings. FE recruited the participants, conducted the study and prepared the first manuscript draft. JG, SL, PL and SB were involved in the study design and provided significant contributions for the manuscript writing.

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Figure 1. HDP management pathway.docx available at https://authorea.com/users/349866/articles/474848-hypertensive-disorders-of-pregnancy-hdp-management-pathways-results-of-a-delphi-survey-to-contextualise-international-recommendations-for-indonesian-primary-care-settings

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Table 1. Summary of participants demographic background.docx available at https://authorea.com/users/349866/articles/474848-hypertensive-disorders-of-pregnancy-hdp-management-pathways-results-of-a-delphi-survey-to-contextualise-international-recommendations-for-indonesian-primary-care-settings

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Table 2. Summary of total agreement score.docx available at https://authorea.com/users/349866/articles/474848-hypertensive-disorders-of-pregnancy-hdp-management-pathways-results-of-a-delphi-survey-to-contextualise-international-recommendations-for-indonesian-primary-care-settings

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Table 3. Quotes from the participants' free-text questions responses in the survey.docx available at https://authorea.com/users/349866/articles/474848-hypertensive-disorders-of-pregnancy-hdp-management-pathways-results-of-a-delphi-survey-to-contextualise-international-recommendations-for-indonesian-primary-care-settings