Editorial

Screening of Preeclampsia for the Reduction of Maternal Morbidity and Mortality in Indonesia

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Hypertensive disorders of pregnancy including preeclampsia (PE) and eclampsia are the most common causes of maternal and perinatal morbidity and mortality. They are responsible for 16% of maternal deaths in high-income countries and approximately 25% in low and middle-income countries.[1] In Indonesia, they contribute to approximately 33.07 %, followed by hemorrhages 27.03, non-obstetric complications 15.7% and others.[2]

Screening in terms of accurate prediction by identifying women at high risk of developing PE is one of the pivotal steps to prevent its occurrence, allowing antenatal preventive measures to anticipate the onset of clinical syndrome and manage it promptly.

It is well established that a number of maternal risk factors are associated with the development of PE. These risk factors have been described by various professional organizations for the identification of women at risk of PE. Women should be considered to be at high risk of developing PE if they have any one high-risk factor (hypertensive disease in previous pregnancy, chronic hypertension, chronic renal disease, diabetes mellitus, or autoimmune disease) or any two moderate-risk factors (nulliparity, age ≥40 years, BMI ≥35 kg/m^2, family history of PE, or interpregnancy interval >10 years).[3]

An alternative approach to screening for PE is to use Bayes theorem to combine the a *priori* risk from maternal characteristics and medical history with the results of various combinations of biophysical and biochemical measurements. The four potentially useful biomarkers at 11-13 weeks of gestation are mean arterial pressure (MAP), uterine artery pulsatility index (UTPI), serum pregnancy associated plasma protein-A (PAPP-A) and serum placental growth factor (PLGF).[3]

The Fetal Medicine Foundation (FMF), has been developed the first trimester screening for PE which has been endorsed by the FIGO. Based on this approach, a competing risk model treats the gestational age at delivery with PE as an event in time by a survival-time model, that can be picked up freely from https://fetalmedicine.org/research/assess/pre-eclampsia/first-trimester

Recent advancements in preeclampsia research have led to the identification of novel markers that not only are helpful in detecting the disease earlier but also hold promise in enhancing our understanding of it. These emerging markers include a range of biological molecules, specific proteins, micro-RNAs, and metabolites such as elevated levels of visfatin, which is also known as nicotinamide phosphoribosyltransferase (NAMPT), uric acid, and allopurinol.[4]

By the advancements of technology on softwares and AI (artificial intelligence) methods that are most helpful in the prediction of the risk of preeclampsia, this way allowing physicians closer surveillance and to intervene earlier. In these softwares, physicians can type in the data of the mothers, biophysical and biomarkers measurements and automatically the program gives the approximate risk for the development of preeclampsia later during the pregnancy. Some of these programs are also available in the form of a mobile phone application, this way being more accessible to professionals.[4]

Finally, I would bring forward an eight-year work (2015-2022) of my colleagues in Bandung West Java who developed the so called 'ZerO mOther Mortality preeclampsia (ZOOM) program' aimed at reducing maternal mortality due to preeclampsia and hypertension in pregnancy (HIP) in dr. Hasan Sadikin Hospital Bandung. This is a community intervention study implementing four types of intervention i.e. re-education (identification of risk factors, early detection using uterine artery pulsatility index (UTPI); prevention (calcium 1000 mg/d and low dose aspirin 80 mg/d); timely referral system (all HIP mothers should be delivered in hospital), and updated protocol (active management at $\geq$ 34 weeks gestation, MgSO4, and antihypertension). They analysed 19,176 deliveries and associated maternal deaths due to HIP. As the result, there was a significant reduced of MMR from 61% to 10%, and significant reduced of case fatality rate from 2.6 to 0.2. [5] Indonesia scenario, by identifying maternal risk factors of PE combined with early detection of abnormal UTPI, followed by administration of calcium and low dose aspirin, timely referral, and prompt management could reduce maternal morbidity and mortality due to eclampsia and HIP significantly.

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