To the Editor,

Hemoglobin disorders, especially hemoglobin E disorder, are a major problem in Thailand. Screening of pregnant subjects is among the new public health strategies for control of hemoglobinopathy in Thailand [1]. A number of screening methods for screening in pregnant subjects, such as osmotic fragility test and dichlorophenol indophenol (DCIP) test, have been evaluated [2]. Based on the modern electronic cell counter, quick differential screenings using discriminant functions (DFs) have been widely developed. However, there are only a few papers on this topic in pregnant subjects. According to our previous study using England and Frazer’s calculation method in screening for Hb disorders in Thai pregnant subjects, good diagnostic properties were determined [3]. Recently, Ittarat et al. [4] proposed the possibility of using some modified discriminant functions (DFs) as alternative tools for screening for such disorders among the general population. However, these DFs were originally primarily applied to the differentiation of iron deficiency anemia from beta-thalassemia. Only a few studies on DF properties in screening for other abnormal hemoglobins have been reported. In this study, the four most widely used DFs were evaluated for their abilities to identify HbE-containing blood samples among 114 Thai pregnant subjects. The functions evaluated were: a) $F_1=0.01\times MCH\times (MCV)^2$, b) $F_2=RDW\times MCH\times (MCV)^2/Hb\times 100$, c) $F_3=MCH/RBC$, and d) $F_4=MCH/RBC$. The correlation between DFs and HbE was evaluated according to the previous published method of Ittarat et al. [4]. DFs demonstrating a significant difference in distinguishing Hb disorders were selected for further evaluation of diagnostic properties (sensitivity, specificity, and false positive and false negative values). Only $F_4$ showed statistically significant differences in distinguishing between the EE group and the other groups ($p<0.05$) (Table 1). The sensitivity, specificity, and false positive and false negative values of using $F_4$ in identification of the EE group were 100%, 95.2%, 4.8% and 0%, respectively. In conclusion, the four tested DFs are not good screening tools.
for distinguishing the normal (A2A) from abnormal (disease: EE and carrier: EA) subjects. However, F4 might be used as a screening tool for disease (EE). Due to the fact that these DFs do not possess good diagnostic properties in screening for abnormal subjects and require automated analyzer, implying high screening costs, they do not appear to be appropriate screening tools for antenatal care in Thailand.

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**Conflict of interest statement**

None of the authors of this paper has a conflict of interest, including specific financial interests, relationships, and/or affiliations relevant to the subject matter or materials included.

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