ANNUAL PROGRESS REPORT

SEATO Medic Study No. 106	Glucose-6-Phosphate Dehydrogenase Deficiency in Thailand
Project No. 3A 025601 A 811	Military Medical Research Program S.E. Asia
Task 01:	Military Medical Research Program S.E. Asia
Subtask 01:	Military Medical Research Program SEASIA (Thailand)
Reporting Installation:	US Army-SEATO Medical Research Laboratory, APO 146 San Francisco, California
	Division of Clinical Research
	Hematology and Biochemistry Section
Period Covered by Report:	1 April 1963 to 31 March 1964
Principal Investigator:	Lt.Colonel Phairojana Thirayothin, MC*
Associate Investigator:	Prasertsri Sitachitt Ph.D.**
Reports Control Symbol:	MEDDH-288
Security Classification:	UNCLASSIFIED

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** Kasetsart University, Bangkok, Thailand

ABSTRACT

SEATO Medic Study No. 106	Glucose-6-Phosphate Dehydrogenase Deficiency in Thailand
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The objectives of this study are to obtain the percentage of Glucose-6-Phosphate Dehydrogenase deficiency in Bangkok; to evaluate the methods to be used in determination, and to determine the correlation between

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Glucose-6-Phosphate Dehydrogenase deficiency and hemoglobin level; Glucose-6-Phosphate Dehydrogenase and abnormal hemoglobin. Two methods of determinations were evaluated: Calbiochem spot test kits (Fairbank & Beutler) and Methemoglobin Reduction test (Brewer & Alving). Percentage of Glucose-6-Phosphate Dehydrogenase deficiency in both male and female inhabitants of Bangkok is around 13% (including intermediate females). The calbiochem spot test can be performed only on the male blood sample. The intermediate female deficiency cannot always be detected by this method. The correlation between Glucose-6-Phosphate Dehydrogenase and hemoglobin level; Glucose-6-Phosphate Dehydrogenase and abnormal hemoglobin is now in the process of statistical analysis. It is therefore not possible to make any conclusions prior to the completion of this analysis.

BODY OF REPORT

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Objectives: The objectives of this study are:

a. To obtain the percentage of Glucose-6-Phosphate Dehydrogenase deficiency in Bangkok.

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b. To evaluate the two methods of Glucose-6-Phosphate Dehydrogenase determination using the Calbiochem spot test kits (Fairbank and Beutler) and the Methemoglobin Reduction test (Brewer and Alving).

c. c. To examine if there are correlations between Glucose-6-Phosphate Dehydrogenase deficiency and abnormal hemoglobin; Glucose-6-Phosphate Dehydrogenase deficiency and hemoglobin level.

Description and Progress:

a.,(1) Field test study, using Calbiochem spot test kits, was performed on blood samples drawn from male donors and male patients of Pramongkut Klao Army Hospital. The findings are:

Number of tests	1287
Number of deficiencies	71
Percentage of deficiency	5.51%

(2) Clinical test using Methemoglobin reduction method was performed on blood samples drawn from the Army Blood Bank and from some of the Military units. The findings are as follows:

Number of tests	306
Number of deficiencies	20
Percentage of deficiency	6.53%

b. The evaluation of the two methods of Glucose-6-Phosphate Dehydrogenase determination, the Calbiochem spot test and the Methemoglobin reduction test, we were using blood samples collected from Kasetsart University students both male and female. The two methods were working side by side for comparison of the results.

(1). Calbiochem spot test

Number of tests	335
Number of deficiency	24
Percentage of deficiency	7.16%

(2). Methemoglobin reduction test. Percentage of total hemoglobin pigment remaining as Methemoglobin was used at the end of incubation to interpret the results, as follows:

Table 1. Interpretation of Results of Clinical Test

Type of individual	Percentage of total Hb pigment remaining as Met Hb at the end of incubation
Non sensitive	10 or less
Intermediate expression	10 - 70
Full expression (hemizygous males, homozygous female)	72 - 95

Table 2. Comparison of Two Tests

Methemoglobin Reduction Test (Brewer and Alving)			Calbiochem Spot Test (Fairbank & Beutler	
	No. of test	Methemoglobin Remaining	No. of Neg	No. of Pos
Normal Thai Female	69	0 - 10%	all neg	-
Normal Thai Male	223	0 - 10%	all neg	
Heterozygous Thai Fe.	19	0 - 70%	all neg	-
Homozygous Thai Female	2	72 - 95%	-	all pos
Hemizygous Thai Male	22	72 - 95%	1	21

c. (1) Abnormal Hemoglobin determination from 309 male and female students has a frequency of 7.76% (AE type).

(2) Hemoglobin levels lower than 12.5 gms for female have a frequency of 6.81% whereas levels lower than 14.0 gms for male have a frequency of 3.67%.

Statistical analyses for possible correlations are now in progress.

Summary:

a. Percentage of Glucose-6-Phosphate Dehydrogenase deficiency in male inhabitants of Bangkok is around 6-7%.

b. Percentage of Glucose-6-Phosphate Dehydrogenase deficiency in male and female (including intermediate heterozygous female) inhabitants of Bangkok is 12.83%.

c. Calbiochem spot test can only be used to detect Glucose-6-Phosphate Dehydrogenase deficiency in male blood samples in which this deficiency is fully expressed. The intermediate expression in heterozygous female can not be detected by this test, therefore the methemoglobin reduction test is more sensitive.

Conclusion: The correlation between Glucose-6-Phosphate Dehydrogenase and hemoglobin level; Glucose-6-Phosphate and abnormal hemoglobin is now in the process of statistical analysis. It is therefore not possible to make any conclusion prior to the completion of this analysis.