

## Short Notes

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# The quality of field malaria diagnosis in Iranshahr, Iran

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Malaria is one of the most prevalent infectious diseases in the world. Convenient diagnosis of the disease in endemic area is essential for appropriate follow-up and treatment of the disease. Standard thick and thin blood smears examined under the microscope still remains the most reliable and definitive method for diagnosis of malaria<sup>1,2</sup>. It has been shown that performance of quality control programme for malaria diagnosis is necessary for appropriate diagnosis of the disease<sup>3,4</sup>. In Iranshahr which is one of the most important malaria endemic areas in Iran, the disease is diagnosed by preparation and examination of thick and thin blood smears. Investigations were carried out in Iranshahr, Iran to evaluate the quality of malaria diagnosis by examining blood smears collected routinely in the field.

In this descriptive investigation 3783 Giemsa stained blood smears in Iranshahr field diagnosis laboratories were collected randomly during May 2001–May 2002 were included. In each case, information such as smear size, the quality of staining, the qualification of the microscopist and type of microscope were collected by a questionnaire. All blood smears were then re-examined by expert microscopist. The results of the field diagnosis (primary diagnosis) and expert microscopist diagnosis (secondary diagnosis) were then compared and analysed.

From those smears 3467 (91.7%) were thick smears and 316 (8.3%) were thin smears. The quality of the smear staining has been summarised in Table 1. In field work 91.3% of the slides had been read with microscope using electric light and 8.7% by microscope using solar light. Also 60% of the slides were prepared by microscopist and 40% by other staff of the Iranshahr health network. Moreover 40% of the slides were prepared actively and 60% of them were prepared passively. The results of malaria diagnosis in field work (primary diagnosis) and expert microscopist work (secondary diagnosis) have been shown in Fig. 1.

From 315 positive cases in the secondary reading 229 (72.7%) were infected with *Plasmodium vivax*,

**Table 1. Quality of Giemsa smear staining in the selected slides for quality control of field malaria diagnosis in Iranshahr, Iran**

Quality of staining	Number	Percent
Good	1284	34
Moderate	1485	39.2
Weak	1014	26.8
Total	3783	100

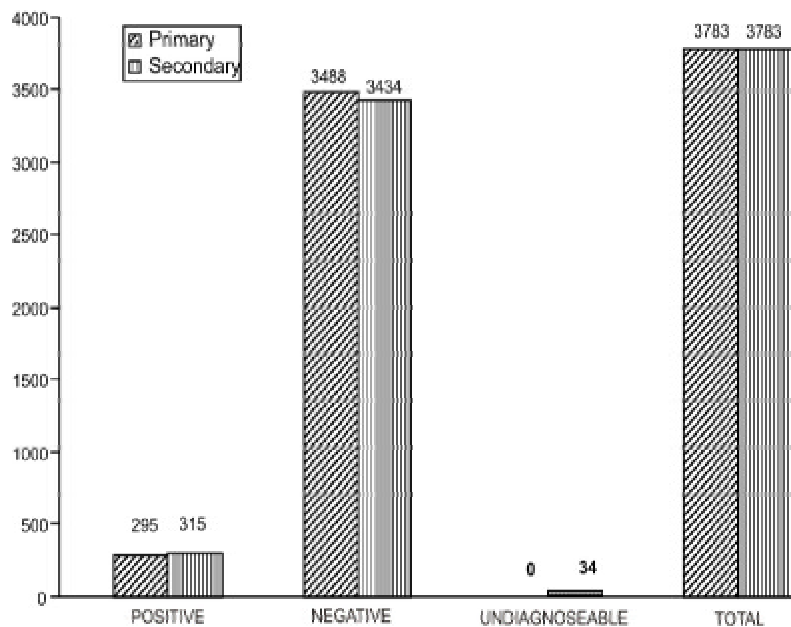


Fig. 1: Results of the primary diagnosis (field diagnosis) and secondary diagnosis (expert microscopist diagnosis) of malaria in the selected slides for quality control of malaria diagnosis in Iranshahr, Iran

78 (26.4%) with *P. falciparum* and 3 (1%) had mixed infection. From 295 positive cases in primary reading 216 (73.2%) had *P. vivax*, 78 (26.4%) had *P. falciparum* and 1 (0.4%) had mixed infection. Results of the secondary reading showed that in primary reading 32 false diagnosis (26 false negatives and six false positives) have been reported. The quality of slide staining in those 32 slides has been shown in Table 2. From 32 slides with false diagnosis in field work 25 slides were diagnosed by microscope using electric light and seven slides by microscope using solar light. The relation between the qualification of the microscopists and accomplishment of the false diagnosis was analysed using *t*-test but there was no significant difference.

Results of this study revealed that field microscopy was sensitive for diagnosis of malaria with a predictive positive value of 93.6% and predictive negative value of 98.5%. Necessity of performance of quality control programme for malaria diagnosis to achieve an

appropriate diagnosis has been shown by previous investigations<sup>3-6</sup>. Hemme and Gay<sup>3</sup>, studied quality of malaria diagnosis in 10 laboratories on the Thai-Myanmar border. They showed that field diagnosis had predictive positive value of 92-98%, predictive negative value of 94.3% and sensitivity of 92.6-96.6%. Coleman *et al*<sup>5</sup> showed that field microscopy was 99.3% specific but not enough sensitive for the diagnosis of *P. falciparum*. They concluded that field microscopy is not an effective method for active

Table 2. Quality of slide Giemsa staining in 32 slides with false diagnosis for quality control of malaria diagnosis in Iranshahr, Iran

Quality of staining	Number	Percent
Good	2	6.25
Moderate	12	37.5
Weak	18	56.25
Total	32	100

malaria surveillance in western Thailand where prevalence and parasite rates are low.

Results of this investigation in Iranshahr showed that about 99% of the malaria smears in field work had been diagnosed perfectly. This high quality of malaria diagnosis in Iranshahr may be related to experience of the microscopists and their effective training programmes. In this context the effect of educational strategies in improvement of malaria diagnosis has been shown<sup>7</sup>. However, a quality control study of blood slides in Tanzania revealed a sensitivity of 55% and specificity of 72%<sup>8</sup>.

Kilian *et al*<sup>9</sup> found a high level of discrepancy between the quality control and routine slides reading results in the slides with low parasite densities. In our investigation we did not consider the parasite densities. However, 26 slides which were evaluated negative in routine examination were really positive when they re-read by expert microscopists in quality control investigation.

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