

Malaria-treatment-seeking behaviour in the southern Punjab, Pakistan

Official medical statistics based on attendance records at government-run health facilities (GHF) may under-estimate actual disease prevalences if no estimate is made of the attendance figures at other health facilities. A planned investigation of linkages between malaria transmission and irrigation in the Punjab province of Pakistan provided the opportunity to initiate a study to determine the accuracy of routinely collected, government, health statistics, by assessing the health-seeking behaviour of individuals with presumptive malaria.

The study area is located in a part of Punjab that has, historically, been regarded as one of the most malarious regions in South Asia (Christophers, 1911); official figures state that the annual parasite index (API) for Pakistan as a whole has been maintained at a rate of around 1/1000 inhabitants for the past 18 years (A. Mahmood and G. Nadeem, unpubl. obs.). However, within the districts of the Punjab there remains considerable variation in the epidemiology, and consequently the importance, of malaria (Strickland *et al.*, 1987).

SUBJECTS AND METHODS

The study area was the Chistian irrigation sub-division of the Fordwah Eastern Sadiqia Irrigation and Drainage Project, around the towns of Chistian and Hasilpur in the south-eastern Punjab, approximately 200 km from the provincial capital, Lahore. The total estimated population of the sub-division was 1.28 million in 1994, of which approximately 80% lived in rural areas and were involved in farming activities, with access to irrigation water (Anon., 1994).

The study data were collected on questionnaires from October to December, 1995, as part of a larger, socio-economic survey. Overall, 552 farmer households in a community

living and working around an irrigation system in the study area were selected, by a process of stratified, random sampling based upon the irrigation infrastructure. The heads of the households, predominantly men, were interviewed by male enumerators, and each was asked to recall details of the most recent household case of what he or she presumed was malaria, including the treatment-seeking behaviour of the case and when the case occurred.

All data were analysed using version 6 of the EPI-INFO software (Centers for Disease Control and Prevention, Atlanta, GA).

RESULTS AND DISCUSSION

The presumed cases recorded in the present survey were based on self-diagnosis within each household studied. Interviewees identified malaria attacks on the basis of symptoms of periodic fever, overall pain and headaches, and appeared to distinguish malaria from enteric fevers. Studies in other areas where malaria is endemic have shown that self-diagnosis can produce reliable estimates of malaria cases (Philipps *et al.*, 1996). However, as self-diagnosis is not an infallible method of diagnosing malaria, inferences were made solely about health-seeking behaviour in the present study population and not about the prevalence of malaria.

Of the 549 respondents, 454 each claimed to have had an episode of presumed malaria in their household during the period July 1995–October 1995, 145 claiming to have had an episode during the month of October 1995. Of the reported episodes, 308 were in males and 146 in females. The initial analysis of the data from the questionnaires was carried out using a recall period of 4 months and, in order to assess the accuracy of this recall period, one of 1 month, the last month of the study. There

TABLE
Treatment-seeking behaviour of the 454 suspected cases of malaria

<i>Source of treatment</i>	<i>No. and (%) attending</i>	<i>No. and (%) attending exclusively</i>
Government health centre	62 (14)	9 (2)
Government CDC officer	15 (3)	0 (0)
Private health facilities*	393 (87)	267 (59)
Traditional†	106 (23)	13 (3)
Pharmacy	51 (11)	15 (3)
Home care	—	3 (1)

* Includes Western-type medical establishments serviced by both medically qualified professionals and semi- or un-skilled personnel.

† Spiritual, religious and herbal medical practitioners.

CDC, Communicable-disease-control.

was no significant difference ($P > 0.05$) in the proportions of patients attending each type of facility during each of the recall periods. The 4-month recall period was used for further analysis (see Table) because it gave larger samples and approximated to the peak season for malaria transmission.

Overall, 32% of the cases sought treatment at more than one facility. Exclusive use of government health centres and communicable-disease-control (CDC) officers by the cases was very low (2%) and only 17% made any use of GHF.

Most (87%) of the reported cases made use of a private establishment, 59% exclusively. The logistical constraints faced by local GHF (including limited manpower), combined with the socio-cultural traditions of the study community, made private practitioners and the use of over-the-counter antimalarials an appealing alternative to the GHF. In urban areas of Karachi, as many as 51% of children may be given medicines obtained without prescription (Haider and Thaver, 1995). A series of focused group discussions with farmers and teachers from the study area revealed a number of common reasons why private facilities were more widely used than government-run clinics: shortages of appropriate drugs and poor quality of service at the basic health units run by the government; and provision of more effective anti-malarials at private clinics. The present study was partly limited by the fact that most respondents were the male heads of the selected households. This is a pos-

sible explanation for the unexpected 2:1 male:female ratio found among the cases reported. Although, this ratio could be a result of higher exposure in males it is more likely to be either a reluctance on the part of the male respondents to venture information concerning the women in their families or a simple lack of knowledge of the medical histories of the women within their compounds. Enumerators reported that interviewees were often embarrassed by questions which referred to the sex of the last person with an episode of fever. It would be informative to extend the study to determine how treatment-seeking behaviour varied between sexes and between socio-economic groups.

In conclusion, the official data on malaria prevalence, based on attendances at GHF, cannot be comprehensive (because < 17% of potential cases visited a government clinic) or even representative (as the potential cases presenting to GHF were biased by the quality of service offered and by the proximity to other health-care providers). Although official statistics on the local malaria situation are readily available, their accuracy must be doubted. They appear to be based on an exceptionally small sample of the total number of malaria cases. As in Africa (Greenburg *et al.*, 1989), most malaria cases are being treated outside of the official health-care system.

To what extent this finding is applicable to all of the Punjab, or other areas of Pakistan, is still uncertain. The study population, of farmers, was representative of around 80% of the

population of the Punjab. When Donnelly *et al.* (1997) conducted a study, similar to the present one, in the districts of Faisalabad and Sheikhupura, north-west of Lahore in the province of Punjab, they found that only 12% of potential malaria cases made use of GHF, up to 65% using a private health centre. Strickland *et al.* (1987) found that malaria prevalences in four villages in southern Punjab were considerably higher than indicated by the official figures, and monthly parasite prevalences in excess of 10% have been observed in Pakistani villages and Afghan refugee camps in the North Western Frontier province (Bouma and Rowland, 1995; Rowland *et al.*, 1996). The World Health Organization (1996) officially estimated an API close to 2/1000 for the whole of Pakistan, although it noted the likelihood of under-reporting. If the present findings are applicable across Pakistan, then the actual API may be about five cases/1000 population (i.e. approximately 5-fold higher than that indicated by official statistics from Pakistan). A cautious estimate of the annual incidence of malaria cases in Pakistan would then become 500 000, making malaria a far more significant public-health problem than formerly realised.

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REFERENCES

- ANON. (1994). *Punjab Development Statistics*. Lahore: Bureau of Statistics.
- BOUMA, M. & ROWLAND, M. (1995). *Transactions of the Royal Society of Tropical Medicine and Hygiene*, **89**, 351–353.
- CHRISTOPHERS, S. R. (1911). *Malaria in the Punjab*. Calcutta: Superintendent of Government Printing.
- DONNELLY, M. J., BIRLEY, M. H. & KONRADSEN, F. (1997). *An Investigation of the Relationship between Depth to Groundwater and Malaria Prevalence, Punjab, Pakistan*. Working Paper No. 40. Colombo: International Irrigation Management Institute.
- GREENBURG, A. E., NTUMBANZONDO, M. N., NTULA, N., MAWA, L., HOWELL, J. & DAVACHI, F. (1989). *Bulletin of the World Health Organization*, **67**, 189–196.
- HAIDER, S. & THAYER, I. H. (1995). *Journal of the Pakistan Medical Association*, **45**, 297–298.
- PHILIPPS, J., RADLOFF, P. D., LEHMAN, L. G., BAKSAI, L., MILOVANOVIC, D., NKEYI, M., WERNSDORFER, W. H. & KREMSNER, P. G. (1996). *Transactions of the Royal Society of Tropical Medicine and Hygiene*, **90**, 42.
- ROWLAND, M., BOUMA, M., DUCORNEZ, D., DURRANI, N., ROZENDAAL, J., SCHAPIRA, A. & SONDRP, E. (1996). *Transactions of the Royal Society of Tropical Medicine and Hygiene*, **90**, 357–361.
- STRICKLAND, G. T., ZAFAR-LATIF, A., FOX, E., KHALIQ, A. A & MANZOOR, A. (1987). *Transactions of the Royal Society of Tropical Medicine and Hygiene*, **81**, 36–41.
- WORLD HEALTH ORGANIZATION (1996). *The Work of the WHO in the Eastern Mediterranean Region. Annual Report of the Regional Director*. Alexandria: WHO.

