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النشرة الوبائية السعودية

تصـــدرها وزارة الصحـــة
الـوكالـة المسـاعدة للطب الـوقـائي وبرنـامج الـوبائيـات الحقلي
المجلد السادس - العدد الأول - يناير - مارس ١٩٩٩م

Transfusion malaria in Riyadh: Is improved screening needed?

On June 15, 1998, the infection control officer at a Riyadh hospital reported a case of locally acquired malaria in a 6-week-old infant who was born 28-weeks premature. The infant was admitted to a public pediatric hospital on April 12, 1998, with severe respiratory distress, anemia, thrombocytopenia, jaundice, hydrocephalus, and interventricular hemorrhage. The infant developed *Plasmodium falciparum* malaria after receiving multiple blood transfusions in the hospital. The officer requested help from the Field Epidemiology Training Program (FETP) to determine whether the malaria had been acquired by blood and blood-product transfusion or by another mode of transmission, and to suggest a practical approach in preventing transfusion malaria.

We reviewed the medical files of the infant and interviewed the infant's mother about history of malaria both before and during pregnancy, any symptoms of malaria, or any recent travel to malarious areas. We also reviewed the mother's medical file of prenatal visits. At the hospital, we reviewed heparin preparation and administration, and intravenous device procedures to find any malpractice in these procedures. Then, we reviewed the malaria log books in the hospital parasitology lab for 2 months prior to admission of the infant, during admission, and 2 months after admission. We interviewed the nursery physicians about any suspected cases of malaria, such as any febrile cases in the nursery.

We also reviewed records of the source of blood units transfused to the infant and interviewed donors of these blood units about exposure to malarious areas. We reviewed the screening procedures at the blood bank and did parallel screening interviews of 80 new donors and also reviewed other transfusion malaria reports from Riyadh. No cases of *P. falciparum* malaria were detected in any admitted patients or health workers in the hospital for 6 months before the premature infant's admission, during the period of his admission, or for 3 months after his admission.

Between April 16 and May 24 the infant received 19 blood transfusions. On April 19, 22, and 29, the infant received 3 blood units from 3 donors who had a history of travel to malarious villages in southwest Saudi Arabia. On May 3, the

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Transfusion malaria in Riyadh: Is improved screening needed?

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infant developed the first spike of fever (37.8° C). On May 8, he received blood units from a Yemeni donor who had travelled recently to a malarious area in Yemen. On May 13, 18, and 21 the infant developed 3 spikes of high grade fever (37.9° C, 39° C, and 38° C, respectively) (Figure 1). On May 24, a blood smear showed (20-25%) red cells infected (RBCs) with ring form of *P. falciparum* malaria. Gametocytes and schizonts also were present. On May 24, the infant deteriorated and developed cardiac arrest. He was resuscitated but there was no response and he was pronounced dead.

From 1996 through 1998, 9 transfusion malaria cases (2 deaths) occurred in Riyadh. From 19,580 transfusions in 1998, there were 4 transfusion malaria cases (15 per 100,000 transfusions). Moreover, only 7 malaria-positive thick films were found in the blood bank during the same time. From 80 potential donors we found 17.5% unsuitable for donation because of recent exposure to malarious areas. However, regular screening on these same 80 donors rejected only 2.5% for reporting a malaria infection.

—Reported by: Dr. Abdulaziz Al-Mazam, Dr. Robert E. Fontaine, Dr. Abdullah Al-Saigul, (the Saudi Arabian Field Epidemiology Training Program)

Editorial note:

Riyadh has never been known to be a malarious area. The city has cold winters (average temperature, 16° C) and hot summers (average temperature, >34° C). Because of these temperature extremes, anopheline mosquitoes are not found here. Riyadh has experienced rapid changes in population demographics, increased international travel, and immigration from malaria endemic areas of Saudi Arabia. The vast majority of malaria cases are imported by patients who have acquired infection outside of Riyadh but have become ill here. However, minute numbers are acquired either by blood transfusion or malpractice in intravenous procedures leading to transmission of malaria from malarious patients to persons free from malaria. From 1989 to 1992, 12 malaria cases in Riyadh were found to be post-blood transfusion (1). In January 1992, 2 Saudi patients in Madina underwent cardiac surgery and developed post-operative transfusion malaria after discharge (2).

The suspected source of infection in this infant is blood transfused to him from 1 of the 4 donors who had a history of travel to malarious areas. The most likely donor to have transmitted the infection was the donor from Yemen. High-grade parasitemia was detected in the infant after 16 days; very few parasites may be transmitted with packed cells. Fever spikes might be due to malaria pigments. A high rate of parasite multiplication took place and high-grade parasitemia was detected on May 24. Death occurred because of heavy infection or severe malarial complications.

Generally, the following evidence will support the probability of transmission of infection through blood of donors from malarious areas. First, the questionnaires regarding malaria used at local blood banks do not exclude any donors with history of exposure to malarious areas. The forms

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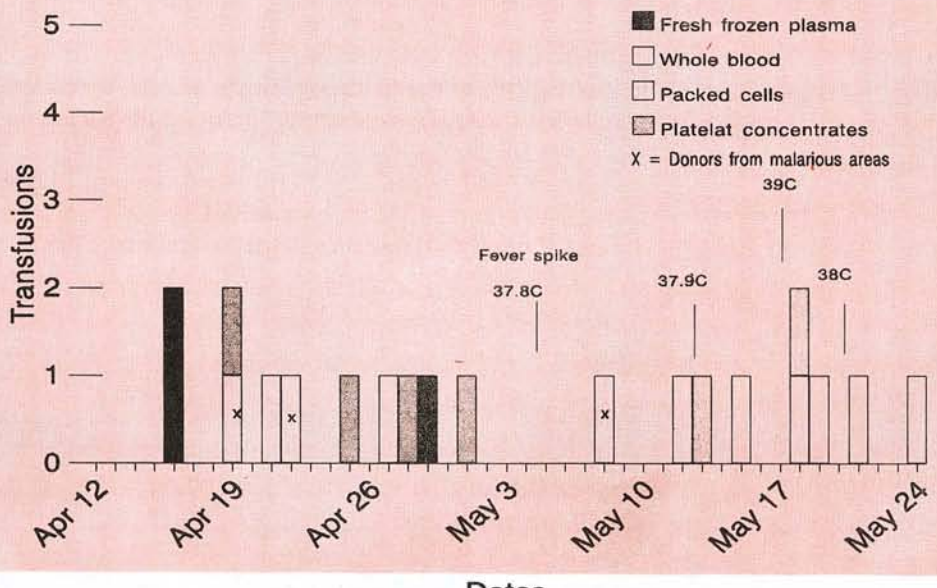
Figure 1: Dates of transfusion of blood or blood products and fever spikes for a case of transfusion malaria, hospital A Riyadh, April-May 1998



Anthropometric measurements in a well-baby clinic, Riyadh, March 8-28, 1997

Primary health care centers (PHCCs) in Saudi Arabia provide regular checkups for children aged 0 to 5 through the well-baby clinics. The checkups include anthropometric measurements, the study of human body measurements, especially on a comparative basis. The measurements are taken when a child is vaccinated as well as four additional times during regular clinic visits in the first 5 years of life. Beyond this point there is no routine reporting of under- or overnourished children or reporting of anthropometric data. The Field Epidemiology Training Program (FETP) conducted a cross-sectional study to measure nutritional status for children under 5 years of age who attended a well-baby clinic and to discover ways to improve the nutritional surveillance system.

We conducted the study at a selected well-baby clinic (out of 54 PHCCs) in the Rawda district of Riyadh. There were 484 children involved in the study, aged 0 to <5 years, which ran from March 8 – 28, 1997 (29/10 - 19/11/1417H). A questionnaire about feeding history, history of diarrhea, family size and other anthropometric data was completed by clinic nurses through interviews with the persons accompanying target children and through vaccination cards. Weight and length or height were obtained by measuring the children during the visit. A p-value of <0.05 was considered significant.

Of children who visited the Rawda PHCC, 14% had a recorded low birth weight (LBW). The mean weight-for-age index (WAZ) was slightly lower than the World Health Organization reference standard. Underweight children (<-2.0 z) accounted for 3.7% of the population compared to the 2.1% expected from the reference standard (the z-score noted is the standard deviation score of anthropometric indicators). The height-for-age (HAZ) of 6% of children was below (-2.0 z) the 2.1% expected from the reference standard (p<0.05).

The mean WHZ of 4.5% of the children exceeded 2.0 z compared to the 2.1% reference standard. Multiple regression analysis of WAZ, HAZ, and WHZ against four explanatory variables revealed that only age and birth weight were associated with changes in WAZ, HAZ, and WHZ. Excluding birth weight from regression analysis, differences in anthropometric scores related to total siblings. A decrease of -0.55 WAZ (95% CI -0 076, -0.034) was most evident between 0 and 18 months of age. WAZ and WHZ decreased with an increasing number of children in the family. The WAZ for families of 1 to 3 children was not different from the reference standard. However, for all families with more than 3 children, WAZ was less than -0.32 and differed from the reference standard ($p < 0.01$ t-test). There was an association between Saudi nationals (82% of children) and decreased WAZ and WHZ. Of mothers, 84% began weaning within the normal age range recommended by pediatricians. We found no association between WAZ, HAZ and WHZ and the initiation of weaning. There was no association between breast-feeding or artificial feeding and deviations from reference anthropometric values or between recent diarrheal illness and decreased anthropometric indices.

—Reported by: Mr. Abdullah Khawajah, Dr. Robert E. Fontaine, Dr. Nasser Al Hamdan (the Saudi Arabian Field Epidemiology Training Program)

Editorial note: Nutritional surveillance and anthropometric measures are important tools in developing meaningful indicators for assessing the health and nutritional status of children and in establishing growth reference curves to compare the observed anthropometric measurements with expected values (1,2). An association of low anthropometric scores with age, Saudi nationality, birth weight and total siblings was found. The mean for WAZ in our study was only slightly different from the reference standard. This difference could be accounted for by low birth weight, genetic factors, or undernutrition. The association with Saudi nationality could represent genetic factors or problems related to nutrition practices in Saudi households. Other factors that could indicate less than perfect feeding, such as recent diarrhea, breast-feeding or age at weaning, showed little effect on anthropometric scores. Only total siblings in a family showed a relationship; this could reflect a family's socioeconomic level or education, or the time and attention paid to individual children by the mother. The irreversible association found between WAZ, HAZ, WHZ and age may be because undernutrition occurs with increasing age. We saw no association of anthropometric scores with weaning or breast-feeding, so it is unlikely that lower scores were related to infant feeding practices. It is possible that infants were above normal size resulting from some factor such as a high prevalence of gestational diabetes. The decrease with age would then be caused by infants of diabetic or pre-diabetic mothers losing their excess birth weight. Collection of anthropometric data is routinely done in well-baby clinics but no targeting is done for nutritional surveillance. These data would be useful for targeting purposes, such as the study of individual types of nourishment on a population basis.

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The utilization of primary health care services at Mina during Hajj, 1998

The annual pilgrimage to Makkah (Hajj) is a unique gathering of Muslims from all over the world. Pilgrims (Hajjees) vary considerably in their sociodemographic characteristics, health-related behaviors and their underlying health status. As a result, they vary in their medical needs.

In addition to the institution of numerous preventive public health measures, the Saudi Arabian health authorities provide free medical services for all religious visitors, including dispensed medicines and cost of hospitalization (1, 2, 3). Despite these arrangements for organization and management of the Hajj event, there is an increasing need for better understanding of the medical needs of Hajjees during Hajj. Such information is needed for planning new medical programs and evaluation of ongoing medical services.

The objectives of this study were to identify the pattern of the workload at the primary health care centers (PHCCs) in Mina, and the age-, sex-, and nationality- distribution of the common illnesses among Hajjees treated at these PHCCs.

PHCCs provide pure ambulatory, curative services 24 hours a day from 7 *Dhul Hijja* through 12 *Dhul Hijja* (April 4 - 9). There are about 20-35 health workers assigned to each center. A systematic random sample was selected from the records of patients who visited 15 of the 22 PHCCs and 1 of the 3 hospitals serving Hajjees in Mina. The nationalities of Hajjees were divided into 8 groups according to the administrative organization of the Ministry of Hajj. Illnesses were also regrouped into 8 groups according to the systems affected.

Of 1,323 records reviewed of more than 44 nationalities, the male to female sex ratio of PHCCs users was 2:1. About 10-12% of all patients across different nationalities were 65 years or older except Hajjees from Gulf Cooperative Council countries (GCC) (1.8%) and Iran (17.3%). The workload at the PHCCs in Mina increased steadily and progressively, reaching its peak on 12 *Dhul Hijja* (Figure 1). The workload showed consistent daily bimodal pattern; the busiest periods were between 6-10 AM and 7-10 PM. However, the workload was relatively low in the morning of 10 *Dhul Hijja* and the evening of 12 *Dhul Hijja*. Moreover, on 12 *Dhul Hijja,* the workload started about 2 hours earlier.

The leading causes of morbidity among Hajjees diagnosed at the PHCCs in Mina were respiratory diseases (48.6% of all illnesses), gastrointestinal illnesses (10.7%), skin diseases (7.6%) and diseases of the muscles and joints (7.4%). Heat exhaustion, cut wounds, and chronic illnesses, such as diabetes mellitus and hypertension, constituted less than 2% each (Table 1). Acute respiratory infection (ARI) spread in waves from one nationality group to another, and by 12 *Dhul Hijja* all nationality groups were affected.

—Reported by Pharm. Abdullah A. M. Abu Dahish and Dr. Hassan E. El Bushra (the Saudi Arabian Field Epidemiology Training Program)

Editorial note: The workload at the PHCCs varied. Of all the PHCCs, those located close to *Al-Jamarat* area

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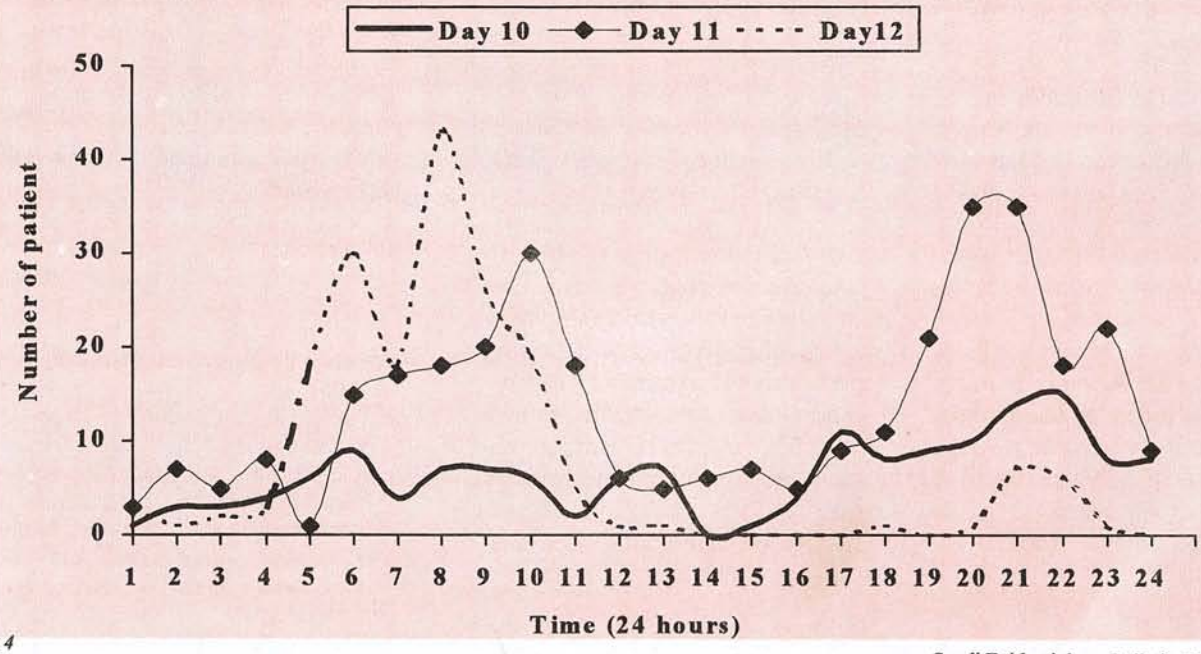
Figure 1: Hourly distribution of Hajjees visiting primary health care centers during Hajj, Mina, Saudi Arabia, 1998G (1418H)



Utilization of PHCC services at Mina

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were the busiest. A similar observation was noted by another survey conducted in 1992, although the workload at the other PHCCs in that year did not agree completely with our study (1). Some nationalities utilized PHCC services in Mina more than others. This could be attributed to the relatively large numbers of Hajjees from these nationalities such as those from Southeast Asia. Unfortunately, lack of data needed for denominators made it difficult to calculate useful rates on utilization of the PHCCs during Hajj.

The hourly variations in the workload at the PHCCs could help decision-makers in redistribution of the health manpower between and within the PHCCs to design a more efficient schedule for general practioners and other medical staff within the PHCCs. The remarkably wearisome physical effort a Hajjee would undergo could probably explain the increased utilization of PHCC services. Occurrence of illnesses could reflect some undesirable risk behaviors among certain nationality groups.

The movements of Hajjees on foot on 9 *Dhul Hijja* makes illnesses such as heat exhaustion and skin morbidity conditions more predominantly seen on 10 *Dhul Hijja*, whereas, gastrointestinal illnesses (GIT) that require a relatively longer incubation period, are mainly seen on 11 and 12 *Dhul Hijja* (4). Occurrence of more GIT illnesses could reflect some undesirable risk behaviors among certain nationality groups such as reliance on street venders for meals, especially at Arafat, or poor storage of leftover foods in Mina or Arafat (4). The spread of ARI in waves from one nationality group to another seemed to be related to the geographical location of the camps of Hajjees.

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Table 1: Distribution of illnesses during Hajj diagnosed at primary health care centers according to the nationality of Hajjees, Mina, 1418H (1998)

NATIONALITY GROUP	ARI * N (%)	Gastro-intestinal N (%)	Skin N (%)	Muscles & joints N (%)	Chronic illness+ N (%)	Wounds N (%)	Heat exhaustion N (%)	Others N (%)	Total ** N (%)
Turkey, N. America, Europe, Australia	2 (20)	3 (30)	0 (0)	3 (30)	0 (0)	0 (0)	1(10)	1 (10)	10 (0.7)
Gulf countries	50 (67.6)	4 (5.4)	3 (4.1)	4 (5.4)	1 (1.4)	1 (1.4)	1 (1.4)	10 (14)	74 (4.9)
Iran	77 (33)	17 (7.3)	22 (9.4)	17 (7.3)	2 (0.9)	0 (0)	2 (0.9)	96 (41)	233 (15.4)
Other Arab countries	159(43.8)	47 (12.9)	40 (11)	26 (7.2)	7 (1.9)	15 (4.1)	12 (3.3)	57 (16)	363 (24)
Southeast Asia	10 (66.7)	2 (13.3)	0 (0)	1 (6.7)	0 (0)	0 (0)	1 (6.7)	1 (7)	15 (1)
Indian subcontinent	237 (55)	42 (9.7)	26 (6)	39 (9)	2 (0.5)	5 (1.2)	4 (0.9)	76 (18)	431 (28.5)
Sub-Saharan Africa	97 (56.7)	18 (10.5)	11 (6.4)	9 (5.3)	9 (5.3)	1 (0.6)	2 (1.2)	24 (14)	171 (11.3)
Unknown	104(48.1)	29 (13.4)	13 (6)	13 (6)	8 (3.7)	5 (2.3)	4 (1.9)	40 (19)	216 (14.3)
Total	**736 (48.6)**	**162 (10.7)**	**115 (7.6)**	**112 (7.4)**	**29 (1.9)**	**27 (1.8)**	**27 (1.8)**	**305 (20.2)**	**1513 (100)**

* Acute respiratory infection. One hundred and seventy-five (175) patients presented with 2 illnesses, eight with 3 illnesses, thus the total exceeds 1323 (the total number of patients' records).
\+ Chronic illnesses include diabetes mellitus and/or hypertension.
** Column total and percentages add to 100%.

إستخدام مراكز الرعاية الصحية الأولية خلال حج ١٤١٨هـ

يستقطب الحج المسلمين من كافة أنحاء العالم، من هنا تتفاوت حاجاتهم تبعاً لسلوكهم وحالاتهم الصحية.

الهدف من هذه الدراسة هو تحديد نمط ضغط العمل في مراكز الرعاية الصحية الأولية بمنى وأيضاً تحديد العمر والجنس والجنسية للحجاج المُعالجين تبعاً للأمراض الشائعة.

تم اختيار عينة عشوائية من سجلات المرضى الصحية في ١٥ من ٢٢ مركزاً وفي واحد من ٣ مستشفيات في منى. بعد مراجعة ١٣٢٣ ملفاً صحياً لأكثر من ٤٤ جنسية كان معدل الذكور للإناث ٢ : ١. كانت أعمار ١٠-١٢ ٪ من المرضى بمختلف جنسياتهم تبلغ ٦٥ سنة فأكثر ما عدا حجاج مجلس التعاون الخليجي وإيران (١,٨٪) و (١٧,٣٪) على التوالي.

يختلف ضغط العمل بين المراكز الصحية في منى خاصةً المراكز القريبة من منطقة الجمرات حيث يتصاعد ضغط العمل تدريجياً وأصلاً ذروته في اليوم الثاني عشر من ذي الحجة. كما يظهر نمط يومي ثابت حيث تبدأ الفترة المزدحمة من الساعة ٦ -١٠ صباحاً ومن الساعة ٧-١٠ مساءً.

إن السبب الرئيسي الذي يجعل الحجاج يراجعون المركز الصحي أمراض الجهاز التنفسي (٤٨,٦٪) وأمراض الجهاز الهضمي (١٠,٧٪) وأمراض الجلد (٧,٦٪) وأمراض العضلات والمفاصل (٤,٧٪)، بينما مثل الإجهاد الحراري والجُروح وأمراض السكر وضغط الدم المرتفع أقل من٢٪ لكل منها.

إن تفاوت ضغط العمل بين المراكز الصحية يمكن أن يساعد المسئولين على إعادة توزيع القوى العاملة فيها. كما يمكن أن يبرر الجهد البدني الذي يبذله الحجاج زيادة حالات الإجهاد الحراري. أيضاً كثرة اضطرابات الجهاز الهضمي يمكن أن تعكس بعض السلوكيات الخطرة مثل تناول الأطعمة من الباعة المتجولين والحفظ السيئ للطعام.

إعداد: ص. عبد الله أبو داهش

برنامج الوبائيات الحقلي

الملاريا المنقولة عن طريق الدم

في ١٤١٩/٢/١٦هـ (١٥ يونيو ١٩٩٨م) قام مسؤول مكافحة العدوى بإحدى مستشفيات الرياض بالتبليغ عن حالة ملاريا خبيثة لرضيع يبلغ من العمر شهر ونصف تمت ولادته مبكراً في الأسبوع ٢٨ من الحمل وكان مصاباً بأنيميا حادة مما تطلب نقل عِدة وحدات دم له. بدأنا بالتقصي الوبائي لمعرفة مصدر هذه العدوى والبحث عن أية حالات أخرى مماثلة.

تمت مراجعة سجلات جميع وحدات الدم المنقولة للرضيع المصاب كما تمت مقابلة المتبرعين وسؤالهم عن سفرهم لمناطق موبوءة بالملاريا. كذلك رُوجعت عملية الفحص الروتيني في بنك الدم ومقابلة ٨٠ متبرعاً جديداً، كما راجعنا حالات الملاريا المُبلغة في الرياض والناتجة عن عمليات نقل الدم. في ١٩ و ٢٢ و ٢٩ من شهر أبريل تلقى الرضيع ٣ وحدات دم من ثلاثة متبرعين أفادوا بسفرهم إلى مناطق موبوءة بالملاريا خلال السنة الماضية.

خلال الفترة من ١٩٩٦ -١٩٩٨م وُجدت ٧ حالات أصيبت بالملاريا عن طريق نقل الدم في الرياض، وفي عام ١٩٩٨م تم القيام بـ (١٩٥٨٠)عملية نقل دم نتج عنها إصابة ٣ حالات بالملاريا(١٥ لكل١٠٠٠٠٠ عملية نقل دم) كما تم اكتشاف ٧ حالات ملاريا إيجابية عن طريق فحص الشريحة السميكة في بنك الدم خلال تلك الفترة.

وفي هذه الدراسة تبين لنا أنه من بين٨٠ متبرعاً كان ١٧,٥٪ غير ملائمين للتبرع بالدم نظراً لعودتهم القريبة من مناطق موبوءة بالملاريا بينما لم يرفض الفحص الروتيني سوى ٢,٥٪ منهم لإصابتهم بالملاريا.

مما سبق نوصي بنوك الدم في المملكة برفض المتبرعين الذين زاروا مناطق موبوءة بالملاريا خلال ستة أشهر والذين اخذوا علاجاً وقائياً خلال ٣ سنوات سابقة لتبرعهم بالدم .كذلك نوصي باستخدام وسائل فحص أكثر حساسية مثل ICT لاكتشاف طُفيل الملاريا بالدم حتى وان كانت الإصابة بسيطة.

إن الارتفاع الكبير لحالات الملاريا المنقولة بالدم كان نتيجة لعدم إكتمال فحص المتبرعين خاصة القادمين من المناطق الموبوءة.

إعداد : د. عبد العزيز المزم

برنامج الوبائيات الحقلي

Transfusion malaria in Riyadh

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include only one question about history of malaria in the past 3 years, but no questions about any recent travel to malarious areas in the 6 months preceding donation, and no questions about history of travel to malarious areas without prophylaxis in the past 3 years. Second, the rejection rate of donors using the standard questionnaires from the American Association of Blood Banks (AABB) is higher than the rejection rate without those questionnaires. This allows the donors with history of exposure to be included in the local blood banks (3). Third, the sensitivity of routine thick films is low and donors with low parasitemia (such as cases of malaria with recent exposure or taking chemoprophylaxis), might be missed (4,5).

We recommended that the blood banks in the Kingdom exclude donors who traveled to malarious areas during the preceding 6 months or if prophylaxis was taken during the past 3 years. We also suggested a more sensitive (e.g. immunochromatographic) test to detect low parasitemia (6). The high rate of transfusion malaria has resulted from incomplete screening of donors for travel to malarious areas.

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Mark your calendar . . .

Inside the Kingdom

Nov. 6, 1999: 2nd International Symposium on Hospital-acquired Infections. King Fahad National Guard Hospital, Riyadh. Contact: Infection Prevention and Control Program, P.O. Box 22490, Riyadh, 11426, Tel: 9661-252-0088 ext 3718/3720; Fax: 9661-252-0437.

Nov. 7-9, 1999: Training course in Hospital Epidemiology & Infection. King Fahad National Guard Hopsital, Riyadh. Contact: Infection Prevention and Control Program, P.O. Box 22490, Riyadh, 11426, Tel: 9661-252-0088 ext . 3718/3720; Fax: 9661-252-0437

Outside the Kingdom

Oct. 3-5, 1999: Annual meeting of the American College of Epidemiology: Epidemiology, Risk Assessment and Public Policy. Bethesda, MD, USA. Contact the college at 4101 Lake Boone Trail, Suite 201, Raleigh, NC 27607, USA. Tel: (919) 787-5181 Fax: (919) 787-4916.

Nov. 28-Dec. 2, 1999: 48th Annual Meeting, American Society of Tropical Medicine and Hygiene, Washington, DC, USA. Contact: ASTMH, 60 Revere Dr., Suite 500, Northbrook, IL 60062 USA. E-mail: www.astmh.org. Online submision process: http://abstract.cornester.com.

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Welcome and Marhaba

The Field Epidemiology Training Program welcomes the following doctors who are joining our staff:

Dr. Tajammal Mustafa,
Consultant Epidemiologist
Dr. Adel Turkistani,
Epidemiologist

Send correspondence, comments, calendar listings or articles to:

Saudi Epidemiology Bulletin
Editor-in-Chief
P.O. Box 6344
Riyadh 11442, Saudi Arabia

☎For epidemiological assistance, call or fax the FETP at
01-496-0163
e-mail: fetp@naseej.com.sa

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Department of Preventive Medicine:
Dr. Yagoub Al-Mazroa
Assistant Deputy Minister for Preventive Medicine, and SEB Supervisor
Dr. Mohammed Al-Jefri
General Director, Parasitic and Infectious Diseases Department
Dr. Amin Mishkas Director, Infectious Diseases Department

Field Epidemiology Training Program:
Dr. Nasser Al-Hamdan, FETP Supervisor and SEB Editor-in-Chief
Dr. Mohammed A. Al Mazroa
Assistant Supervisor, FETP
Dr. Haya Al Eid, Ms. Linda Dobbs, SEB Editors

Selected notifiable diseases by region, January-March 1999

	Riyadh	Makkah	Jeddah	Taif	Madinah	Qassim	Eastern	Hasa	Hafr Al Batin	Asir	Bisha	Tabuk	Hail	Al Shmal	Gizan	Najran	Baha	Al Jouf	Goriat	Gonfuda	Total
Measles	75	59	60	119	52	76	8	11	193	23	68	242	39	100	12	10	7	19	0	0	1173
Mumps	52	64	265	84	16	27	24	2	16	33	6	5	13	7	16	7	6	6	5	2	656
Rubella	7	7	36	4	2	7	3	0	0	4	0	3	2	2	2	0	0	0	0	1	80
Varicella	1023	159	733	273	243	288	1259	810	217	680	44	479	91	37	0	222	59	19	49	20	6705
Brucellosis	88	13	23	38	32	319	30	24	50	376	79	15	154	8	33	42	34	38	7	5	1408
Meningitis, mening.	2	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5
Meningitis, other	45	49	13	11	8	8	1	8	6	7	0	6	3	1	8	2	0	9	0	0	185
Hepatitis A	29	19	39	0	38	73	40	7	34	64	27	23	6	3	10	44	2	38	59	1	556
Hepatitis B	63	86	135	0	14	18	170	3	5	45	18	5	8	2	4	7	29	1	1	2	616
Hepatitis C	40	85	95	0	22	3	65	2	2	3	4	2	3	0	1	1	35	0	0	1	364
Hepatitis, unspecified	12	44	24	0	1	0	5	11	0	38	0	7	29	0	21	4	0	0	0	0	196
Typhoid & paratyphoid	12	17	5	0	2	1	14	5	0	6	2	0	7	0	0	0	4	0	0	0	75
Amoebic dysentery	31	0	618	13	6	47	15	7	0	206	24	19	0	0	1	18	0	0	3	0	1008
Shigellosis	23	0	44	0	0	3	31	2	17	1	0	17	0	0	2	25	9	0	0	0	174
Salmonellosis	62	5	35	0	3	6	192	8	16	5	0	18	0	0	0	9	10	0	0	0	369
Syphilis	5	0	7	0	0	0	17	4	0	0	2	0	0	0	0	0	0	0	0	0	35
VD, other	7	0	29	0	0	1	26	22	3	5	1	0	0	0	6	0	1	0	4	0	105

Comparisons of selected notifiable diseases, Jan - Mar 1998-1999

DISEASE	Jan Mar 1999	Jan Mar 1998	Change %	Jan Mar 1999	Jan-Dec 1998	DISEASE	Jan Mar 1999	Jan Mar 1998	Change %	Jan Mar 1999	Jan-Dec 1998
Diphtheria	0	0	0	0	0	**Meningitis, other**	185	94	97	185	629
Pertussis	3	10	-70	3	85	**Hepatitis A**	556	830	-33	556	3350
Tetanus, neonatal	1	1	0	1	10	**Hepatitis B**	616	711	-13	616	3411
Tetanus, other	0	2	-100	0	11	**Hepatitis C**	364	302	21	364	1420
Poliomyelitis	0	1	0	0	1	**Hepatitis, un-spec.**	196	308	-36	196	1253
Measles	1173	788	49	1173	5519	**Typhoid/ paratyph.**	75	66	14	75	280
Mumps	656	533	23	656	3762	**Shigellosis**	174	207	-16	174	628
Rubella	80	82	-2	80	361	**Salmonellosis**	369	380	-3	369	2383
Varicella	6705	5496	22	6705	22473	**Amoebic dysentery**	1008	1050	-4	1008	3821
Brucellosis	1408	1420	-1	1408	7468	**Syphilis**	35	50	-30	35	243
Meningitis, mening.	5	7	-29	5	42	**VD, other**	105	105	0	105	401

Diseases of low frequency, January - March 1999

Yellow fever, plague, diphtheria, poliomyelitis, viral encephalitis, rabies, tetanus other, hemolytic uremic syndrome, puerpural sepsis, transverse mylitis: No cases
Pertussis: 3 (Makkah 1, Hail 2
Neonatal tetanus: 1 (Taif 1)
Guillain-Barre syndrome: 13 (Riyadh 4, Asir 2, Taif 3, Madina 1, Hasa 1, Baha 1, Goriat 1)
Echinococcosis: 4 (Riyadh 2, Asir 1, H. Albatin 1)
Puerpural sepsis: 1 (Asir 1)