

pre-operative diagnosis of lymphangioma or possibly a branchial cyst was considered. On exploration and followed by histopathology this neck mass proved to be an intramuscular hydatid cyst. The patient was discharged from the hospital on oral treatment of mebendazole in 3 divided doses for 3 months. Three years follow up revealed no recurrence.

Hydatid disease is endemic in North East area of Saudi Arabia (near the Iraq border) where Hafer, Al-Batin is situated. The main occupation of people of this area is sheep rearing.<sup>1</sup> Hydatid disease is mostly acquired during childhood. It remains dormant for a long time due to slow rate of growth. It is estimated that the size of cyst increases from 1-30 mm per year.<sup>2</sup> It usually presents as a clinical problem in third to fourth decade of life. Mostly (72%) it involves a single organ but rarely presents as a disseminated disease in early childhood.<sup>3</sup> The most commonly involved organs are liver (65-75%) and lung (20-25%). It rarely involves muscles (5%).<sup>4</sup>

Our patient's father was a shepherd by occupation, living in the desert with poor hygienic conditions. The child had a frequent contact with sheep and dogs. The disease had involved only on the skeletal muscles of the neck with a history of slow growing swelling for approximately 3 years. The age of the child at presentation of the disease was 5 years that means the child had the a clinical infestation around the age of 2 years. There are several reports in Saudi literature of hydatid disease in very young children. In one such report, the child age was 3.5 years.<sup>1</sup> In another report, a 2-year-old child had disseminated abdominal visceral and lung hydatidosis.<sup>3</sup> However, in early childhood intramuscular hydatid disease in the neck region had rarely been reported.<sup>5</sup> Therefore, this case will be a valuable addition to already reported cases of hydatid disease where it involves unusual sites in early childhood. As far as the various diagnostic tools are concerned, routine hematological and biochemical tests may not be helpful in the initial diagnosis. However, serology and imaging study can establish the diagnosis of hydatid disease.<sup>4</sup> In this case, the IHA test and Casoni's test were negative. Both these tests have limitations, and different factors, which may cause false negativity such as calcification, infection, non-cracked cysts or stored reagents for long time and site of the hydatid cyst.<sup>1</sup> In a study, the sensitivity of serological test varies with site of the hydatid cyst. Enzyme-linked immunosorbent assay tests sensitivity in liver hydatid disease is 80-100%, which drops to 50-56% in the case of pulmonary cysts, and further decreases to 25-56% in hydatid

cysts involving the other organs.<sup>4</sup> In our case, as the cyst was single and deeply seated. This may be the reason for postoperative negative serology.

We conclude that in endemic areas such as Hafer, Al-Batin; hydatid disease should be considered in the differential diagnosis of mass lesion regardless of the age of the patient and site of the swelling.

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## References

1. Ahmad I. Hydatid Disease-A Clinicopathological Study of 72 Cases. *Biomedica* 1995; 11: 10-14.
2. Elton C, Lewis M, Jourdan MH. Unusual Site of Hydatid disease. *Lancet* 2000; 355: 2132.
3. Mahmud MS. Disseminated Hydatid disease in a two years old child. *The Practitioner East Mediterranean Edition* 1998; 9: 71-72.
4. Khuroo MS. Hydatid Disease; Current status And Recent Advances. *Ann Saudi Med* 2002; 22: 56-64.
5. John M. Poole JE, Friedland IR. Posterior neck mass in a four year old boy. *Pediatr Infect Dis J* 1995; 14: 1119,1122-1124.

Malaria awareness among medical and non-medical undergraduate students

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Malaria is the world's most prevalent vector-borne disease. Approximately 41% of the world's population are at risk of infection. Each year 300 - 500 million clinical cases of malaria are reported worldwide. The majority of malaria-endemic countries now have malaria control programs at various stages of implementing realistic plans of action. The implementation of these plans has resulted in a marked reduction in malaria morbidity and mortality in some countries (example, Brazil, Colombia, Egypt and Oman), and has allowed others (including countries in north Africa, Cyprus and Tunisia) to maintain their malaria-free status.<sup>1</sup>

Malaria is a serious disease transmitted to humans by the bite of an infected female *Anopheles* mosquito. Symptoms of malaria may include fever

and flu-like illness, including headache, chills, muscle aches, and fatigue. Malaria may cause anemia and jaundice. *Plasmodium falciparum* (*P. falciparum*) infections, if not immediately treated, may cause serious consequences such as kidney failure, coma, and death. Malaria can often be prevented by using antimalarial drugs and by using measures to prevent mosquito bites. Although malaria is under control in the Sultanate of Oman due to a successful campaign during the last 2 decades, still it is one of the most important health issues.<sup>2</sup> Malaria was common in the Sultanate of Oman due to the favorable environmental conditions for the breeding of the *Anopheles* mosquitoes. *Plasmodium falciparum* infections is the most common cause of malaria in Oman.<sup>2</sup> Lack of awareness of malaria contributed to the spread of the disease in the past. Prevention through education is probably the best way of controlling the disease.

This study, investigates the awareness of Omani pre-clinical medical and non-medical undergraduate students at Sultan Qaboos University (SQU), of malaria infection and their attitudes toward malaria patient's. The students represent a dynamic, highly educated and highly positioned group in the Omani society. Therefore, they are expected to play a crucial role in preventing malaria infection and in promoting health education in Oman. A total of 272 undergraduate students from the Colleges of Medicine and Health Sciences, Science, Arts and Social Studies of SQU participated in this survey. The male students constituted 45% (122 males) and the females constituted 55% (150 females). Of all respondents 124 (45.6%) were pre-clinical medical students, while 148 (54.4%) were non-medical students. The mean age of the whole cohort was 22 years (range 18-28 years). The questionnaire consisted of 28 different statements concerning basic knowledge of malaria, its modes of transmission, diagnosis, risk behaviors, prevention, treatment, beliefs as well as attitudes toward malaria

patients. The questionnaire was made by referring to other survey questionnaires used in previous research.<sup>3</sup> The first 9 statements were on general knowledge of the causes of malaria and its epidemiology. The next 3 statements were on the knowledge of the different modes of malaria transmission such as contracting malaria through any mosquitoes bite, blood transfusion, contaminated needles, or from mother to her unborn child through the placenta. Seven statements were on the diagnosis and symptoms of patients with malaria infection. Five statements were on treatment, methods of prevention and the availability of a vaccine for the prevention of malaria. Finally, 4 statements regarding personal attitudes toward malaria patients were asked. These included statements on behaviors and attitudes toward infected individuals, caring for patients, being with a patient in the same room and isolating the patients with malaria in hospitals. The responses to the questionnaire were in the form of agree, do not agree or do not know. The data was collected in 2003 and analyzed statistically using Statistical Package for Social Sciences program version 9 for Windows. Generally, this group of university students demonstrated good knowledge of the causes and ways of prevention of malaria and adequate knowledge on the symptoms of the disease. However, there were inadequate responses regarding attitudes toward malaria patients (**Table 1**). Medical students demonstrated good knowledge of the causes, symptoms and preventive methods and adequate responses on the attitudes toward malaria patients. The majority of the students considered malaria as an infectious disease (76.5%) and (79.4%) knew that malaria is caused by a *Plasmodium*. However, 56.3% of the participants did not know the fact that 4 different types of *Plasmodium* causing malaria exist, and only 37.1% of the students knew that *P. falciparum* is the dominant *Plasmodium* in Oman. Medical students

Table 1 - Summary of the level of knowledge on different aspects of malaria infection amongst Sultan Qaboos University students.

Group	Knowledge of causes and epidemiology	Modes of transmission	Diagnosis and symptoms	Treatment and prevention	Attitudes toward patients
<i>Medical students</i> (n=124)	Good	Good	Good	Good	Average
<i>Non medical students</i> (n=148)	Good	Good	Inadequate	Average	Inadequate
<i>All students</i> (n=272)	Good	Good	Average	Good	Inadequate
70% = Good knowledge, 51-69% = average knowledge, 50% = inadequate knowledge					

demonstrated better knowledge than non-medicals (Table 1). No significant differences were observed between males and female responses. The study group demonstrated good knowledge of the causes and modes of transmission of malaria. The majority of students (86.8%), were aware that *Anopheles* mosquitoes is an important vector for transmission of malaria. There is an overall agreement that blood transfusion and contaminated needles (77.9%) are amongst the modes of transmission of malaria. Sharing the same glass, spoon and plates with a malaria patient are considered hazardous in 20.2% of the students. When we compared medical and non-medical students knowledge of the modes of transmission of malaria, 42.7% of medical compared to 23% non-medical students were aware that a mother can transmit malaria to her fetus through the placenta ( $p < 0.001$ ). Another observation was that, 76.6% of medical students compared to 56% non-medicals ( $p < 0.05$ ) were aware that contaminated needles and blood transfusion are modes of malaria transmission. In general terms, and as expected, medical students have more knowledge of malaria and its modes of transmission than non-medical students. Fever and chills were the most well recognized symptoms by all students (88.2%). More symptoms and signs that are specific were not well known. Medical students demonstrated better knowledge on these specific symptoms (dark urine, anemia, hepatosplenomegaly and brain and kidney damage) than non-medical students ( $p < 0.001$ ). However, knowledge gaps of medical students include the dominant *Plasmodium* species causing malaria in Oman and relapse of disease. Quinin, as the choice for treatment of malaria, was appreciated by more medical (70.2%) than non-medical students (18.9%) ( $p < 0.001$ ). The majority of students (87.1%) believed that malaria infection is preventable and were aware of effective methods of prevention. Lack of a vaccine for malaria is a fact appreciated by more medical (43.5%) than the non-medical (8.8%) students ( $p < 0.001$ ). Being with a patient in the same room was accepted by 46% of the students. The majority of participants were either not sure or do not know whether patients with malaria should be isolated. The majority of students (69%) would feel uncomfortable to take care of a patient with malaria.

Health care professionals and the general public have been reported to have negative attitudes toward patients with infectious diseases, and usually nursing and first year medical students show great fear of contagion, negative emotions and professional resistance.<sup>4</sup> There are many factors associated with negative infectious diseases (such as malaria infection) related attitudes. These include: less liberal ideology, a low knowledge level, young age, fear, exaggerated risk assessment, not knowing someone with an infectious disease and lacking the

experience of caring for such patients.<sup>4</sup> This study is one part of a larger study, on infectious diseases, and is confined to students from SQU, whom we expected to have adequate and appropriate knowledge of infectious diseases, including malaria, compared to the rest of the Omani community.<sup>5</sup> The findings of this survey are, generally, satisfactory despite some disappointing facts on basic knowledge, for example, 20.5% of the participants either think that malaria infection, is not caused by a parasite or they do not know. Most of the respondents showed some knowledge regarding the modes of malaria transmission. For specific modes of transmission, example from mother to her fetus through the placenta or through blood transfusion, the majority of participants were not sure. In general terms, the majority of responses indicated that students knew what malaria is, and how it can be transmitted and how it can be avoided. Significant differences between medical and non-medical students were observed for the following modes of transmission: sharing needles ( $p < 0.05$ ), blood transfusion ( $p < 0.05$ ) and mother to fetus ( $p < 0.001$ ). Some misconceptions were observed, in the present study, regarding interaction with infected individuals especially taking care of a malaria infected patient. Although, most of the students indicated that they have never met a person with malaria, there were fears expressed regarding eating, or living with an infected individual. These misconceptions regarding the attitudes, reflects a false perception of the disease among those highly educated. Knowledge alone is not sufficient to bring about behavior change. Therefore, this calls for well-structured health education programs to address such misconceptions. These educational programs should be initiated at school level and extended beyond formal education to reach parents and other adults in the community.<sup>5</sup> Seminars, workshops and conferences will provide communication platforms for students at SQU and will be relevant for use at wider school and community levels. Collaboration amongst the University and other concerned ministries, for example the Ministry of Health, Ministry of Information, in addition to educational specialists should be built across the nation to implement comprehensive programs of research, prevention and treatment. Deficiencies in knowledge with regard to blood-borne pathogens such as the human immunodeficiency virus, hepatitis B virus and *Plasmodiums* may influence attitudes toward infected individuals and reduce compliance with infection control recommendations.<sup>5</sup> Our findings suggest that, although medical students demonstrated good knowledge of malaria infection, there is a need for educational intervention for non-medical students, and the general public, aimed at reducing the deficiencies in knowledge and attitudes toward malaria infection.

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## References

1. Implementation of the Global Malaria Control Strategy. Report of a WHO Study Group on the Implementation of the Global Plan of Action for Malaria Control 1993–2000. Geneva, World Health Organization, 1993 (WHO Technical Report Series, No. 839).
2. Scrimgeour EM, Mehta FR, Suleiman AJ. Infectious and tropical diseases in Oman: a review. *Am J Trop Med Hyg* 1999; 61: 920-925.
3. Singh TG, Singh RK, Singh EY. A study of knowledge about malaria and treatment seeking behaviour in two tribal communities of Manipur. *Indian J Public Health* 2003; 47: 61-65.
4. Jeffe DB, Mutha S, Kim LE, Evanoff BA, L'Ecuyer PB, Fraser VJ. Does clinical experience affect medical students' knowledge, attitudes, and compliance with universal precautions? *Infect Control Hosp Epidemiol* 1998; 19: 767-771.
5. Al-Jabri AA, Al Adawi S, Al Dhary SH. Awareness of hepatitis-B virus among undergraduate medical and non medical students. *Saudi Med J* 2004; 25: 447-449.

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## Supine versus turning position on bilirubin level during phototherapy in healthy term jaundiced neonates

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Phototherapy is by far the most widely used treatment for hyperbilirubinemia and it is both safe and effective. Even though phototherapy has been used on millions of infants for more than 30 years,<sup>1</sup> specific questions regarding methods of optimizing efficacy remain unanswered. Changes of position are believed to increase the efficacy of phototherapy<sup>2,3</sup> and this practice was routinely used in approximately all neonatal departments in our country. The aim of this study was to determine the effect of routine turning versus supine position on the total serum bilirubin (TSB) concentration during phototherapy.

In a randomized clinical trial 50 term jaundiced neonates who were admitted to the neonatal ward of

Emam-Reza Hospital, a University Hospital affiliated to Mashhad University of Medical Sciences, Iran were elected. All babies were healthy, exclusively breastfeeding, 49 hours postnatal age, birth weight more than 2500 grams, delivered at 38th - 41th weeks of gestational age after an uncomplicated pregnancy. They had indirect hyperbilirubinemia with total TSB 15 mg/dl in 49 - 72-hour-old jaundiced infant and equal or more than 17 mg/dl in 72 hour-old ones (same as practice parameter of American Academy of Pediatrics [AAP])<sup>4</sup> Infant with hemolytic disease, infection, congenital anomaly, closed hemorrhage (cephalhematoma), and metabolic disease were excluded. After parental permission, 25 babies (turning group) were randomly changed from supine to prone position every 150 minutes according to Shinwell study<sup>5</sup> followed by a break of 30 minutes for feeding and routine nursing care. The supine group (n=25) were kept in supine position during the entire study period. Total and direct TBS level were measured at the beginning, 12, 24 and 48 hours after phototherapy. Measurement of bilirubin and phototherapy were continued until the TSB declined to less than 14 mg/dl. All infants in this study were examined 2 days after discharge in the outpatient clinic for evaluation of recurrent jaundice. Laboratory investigations included of complete blood count, blood group typing of babies and their mothers, direct and indirect Coombs tests, reticulocyte count, TSB level (total and direct), blood peripheral smear and erythrocyte G6PD level. The clinical examination, gestational age, birth weight, gender, age, weight at admission, serial TSB and direct bilirubin were recorded. Serum bilirubin was measured by using a Unistat® Bilirubinometer (Reichert-Jung, Germany). The determination of direct bilirubin was made by colorimetric method of Lathe and Ruthven. Each phototherapy unit contain 4 blue fluorescent tubes (TL20W/52) at a wavelength of 420 - 480 nm positioned 20 cm above the infant's mattress. During phototherapy, the infants were naked except for a diaper and eye cover. Baby temperature was measured every 4 hours. The obtained data were analyzed with Statistical Package for Social Sciences. Numerical variables were compared between the 2 groups using the independent students, t-test, chi-square test and Mann-Whitney. P-value of less than 0.05 was considered statistically significant. There were no statistically significant difference between the 2 groups in gender ( $p=0.76$ , chi-square test), postnatal age ( $p=0.93$ , t-test), weight at admission ( $p=0.85$ , t-test) and duration of hospitalization ( $p=0.94$ , t-test). In addition, there were no significant differences between the 2 groups regarding reticulocyte count ( $p=0.49$ ) and hematocrit ( $p=0.99$ ). Therefore, 2 groups were comparable. The mean TSB in 2 groups at enrollment ( $p=0.93$ ) after