

Clinical-Epidemiological Study of Imported Malaria in Dubai 2017-2018

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ABSTRACT

Background: Malaria still constitutes a major global health burden, with 214 million cases diagnosed globally in 2015 which resulted in almost 500,000 case fatalities secondary to the infection. In 2007, the United Arab Emirates (UAE) was declared officially as Malaria Free Country. However, in view of the demographic nature of the country, imported malaria remains as a major cause of fever in returning or visiting travelers diagnosed in all emirates across the country. Malaria Vivax and Malaria Falciparum are the most commonly diagnosed types of malaria and patients are usually arriving from Indian subcontinent and Africa.

Objectives: This study aims to look into the Clinical and Epidemiological profiles of imported Malaria cases presenting to Rashid Hospital, Dubai in 2017-2018.

Methodology: A retrospective medical record review of patients above the age of 13 years who presented to our hospital as fever in a returning/visiting traveler and had a confirmed diagnosis of imported malaria from April 2017 until October 2018. Patient's demographic, clinical and laboratory data were collected, and WHO severity criteria were used for severity classification among admitted patients.

Results: From April 2017 to October 2018, we had 628 malaria patients. 90.1% of these patients were male, and around 48.1% were of Pakistani nationality. It was noticed that we had a significant number of vivax cases as compared to falciparum and further analysis revealed that vivax malaria was the predominant subtype in patients from Pakistan and Indian subcontinent, whereas in those from African descent such as Nigeria and Kenya; Falciparum malaria outweighed the numbers of vivax., thereby reconfirming the prevalence and predominance of falciparum in that region. Only one patient out of the 628 presented with a Glasgow coma scale (GCS) of less than 11 and three patients presented with seizures as the initial presentation. The majority of the patients had a classical history of, nighttime fever and generalized body aches. 3 out of the total number of patients went on to have complications of ARDS. Laboratory values of all patients were looked into, in order to assess for indicators of severity five out of the 628 patients had an abnormal PH result four patients had an abnormal hemoglobin result 57 patients showed derangement in bilirubin values. 65.1% had normal glucose and 86 patients had normal creatinine values. One patient was found to have a positive blood culture. Out of the 628 patients, 247 patients proved to be candidates for admission based on clinical and laboratory parameters with only 84 patients meeting the criteria of at least one positive indicator of severity. Amongst the admitted patients 86.9% were males, with age range of a minimum 15 years to a maximum age of 57 years. The majority of them being vivax cases, and out of whom 62 required admission and the average days of admission were about 3.6 days.

Conclusion: Most of the imported malaria cases admitted to hospital had at least one indicator of severity; nevertheless, there were no mortality cases recorded over study period which reflects that optimal standards of care have been implemented.

Keywords

Clinical-Epidemiological, Imported Malaria, Dubai, Severity.

Introduction

In 2007, the WHO has certified UAE as free of endemic Malaria, yet imported malaria is still recognized as a burden that we may continue to see. The most common clinical malaria presentation frequently encountered in Dubai are Malaria vivax and Malaria Falciparum, which is frequently encountered among travelers from the Indian subcontinent and Africa [1]. Malaria Falciparum is considered the most severe form of malaria, which contributes to most fatality [2], severe malaria vivax has also been reported in the literature [3]. About 214 million cases of malaria have been estimated worldwide in 2015, out of which almost 438 000 deaths reported and attributed to it globally [4].

Traveling to malaria-zones by mass population has been increasing steadily for many decades [5]. It has been revealed by recent literature that significant morbidity associated with malaria. Socio-demographic factors like age and ethnicity may indicate the potential for developing severe malaria in travelers, but these cannot be used as reliable clinical markers [6,7]. Regional differences in malaria mortality have been observed within the UK and it appears that regions with fewer cases tend to report higher mortality [8]. Due to e rapid economic growth and fast growing of commercial markets, UAE attracts more labor forces from Asia and Africa, which put the country at the high-risk potential of imported Malaria. Recognized as one of the burdens on the health system in Dubai, for many reasons, due to the cost of the case, an increasing number of cases.

Imported malaria and the severity patterns of case presentation along with multiple complications. This study is aiming at addressing gaps in handling similar cases in terms of clinical management, identifying a high index of suspicion and identifying mechanisms of possible avoiding such cases at earlier stages and the patients home levels. Moreover, to the testing of hypothesis whether nationalities may or may not associated with clinical types of malaria.

Objectives

- To study the incidence rate (Period prevalence) of imported Malaria in Dubai.
- To study the clinical characteristics of severe malaria cases presented to the Emergency Department at Rashid hospital.
- To explore laboratory findings that might reflect the severity status of malaria cases

Methodology

This Retrospective study was carried in Rashid Hospital (Major referral health care facility in Dubai), Biggest Governmental hospital located in the emirate of Dubai consisting of 770-bed and serving almost all specialties of medical and surgical care services, in addition, RH, is the referral center for all infectious diseases in Dubai including malaria cases. Dubai is one of the seven emirates of the United Arab Emirates having an estimated population of

3,192,275 as per 2018 statistics among which 92% are expatriates, with a considerable portion from Asian country's origins.

The Emergency Department, which is considered one of largest and busiest in the region, consists of 73 beds distributed in different clinical areas like major area, minor/fast track area, along with isolation and resuscitation rooms. It managed more than 160,000 patients in 2015 and continue to evaluate between 350 and 550 patients daily [9].

Cases of malaria are been diagnosed and confirmed by an experienced laboratory team at our hospital in addition to cases referred to our facility from other healthcare entities with the diagnosis of malaria to receive the required treatment. This Retrospective was conducted in Rashid Hospital, in Dubai from April 2017 to October 2018, 628 malaria cases have been reported and classified in different severity based on clinical and laboratory assessment. 90.1% of these patients were male, and around 48.1% were from the Pakistani nationality, (WHO standard case definition has been adopted for clinical diagnosis, blood investigations malaria-specific laboratory investigations have been done for all suspected cases).

Inclusion and exclusion criteria were applied. Malaria is considered to be one of the notifiable diseases in the United Arab Emirates, so all confirmed cases of malaria are been followed by the public health team to confirm the source of infection and recent travel from endemic areas. All cases diagnosed as uncomplicated vivax malaria, are managed by emergency physicians as an outpatient, while severe cases and patients diagnosed with malaria falciparum are been admitted to hospital and managed by experienced Infectious disease team using the WHO guidelines [10]. As a national clinical protocol for malaria treatment, not yet developed.

Impaired consciousness	A Glasgow Coma Score <11 in adults or a Blantyre coma score <3 in children
Acidosis	A base deficit of >8 meq/l or, if unavailable, a plasma bicarbonate of <15 mM or venous plasma lactate >5 mM. Severe acidosis manifests clinically as respiratory distress – rapid, deep and labored breathing
Hypoglycemia	Blood or plasma glucose <2.2 mM (<40 mg/dl)
Severe malarial anemia	A hemoglobin concentration <5 g/dl or a hematocrit of <15% in children <12 years of age (<7 g/dl and <20%, respectively, in adults) together with a parasite count >10 000/II
Renal impairment (acute kidney injury)	Plasma or serum creatinine >265 IM (3 mg/dl) or blood urea >20 mM
Jaundice	Plasma or serum bilirubin >50 IM (3 mg/dl) together with a parasite count >100 000/II
Pulmonary edema	Radiologically confirmed, or oxygen saturation <92% on room air with a respiratory rate >30/min, often with chest in drawing and crepitation's on auscultation
Significant bleeding	Including recurrent or prolonged bleeding from nose gums or venipuncture sites; hematemesis or melena

Shock	Compensated shock is defined as capillary refill ≥ 3 s or temperature gradient on leg (mid to proximal limb), but no hypotension. Decompensated shock is defined as systolic blood pressure < 70 mm Hg in children or < 80 mm Hg in adults with evidence of impaired perfusion (cool peripheries or prolonged capillary refill)
Hyperparasitaemia	<i>P. falciparum</i> parasitaemia $> 10\%$

Table 1: WHO Definition of severe malaria [11].

Case Identification

The EPIC system is currently been used at our facility in Rashid hospital. Malaria cases were identified by searching the database of our electronic medical records for patients with the final diagnosis of malaria and a confirmed laboratory smear test of malaria species. Cases without a confirmed malaria smear test were excluded from the study. Electronic Medical Record of each patient included in the study was reviewed and required data extracted for analysis.

Malaria standard case Definitions

A positive malaria case is defined as any adult patient (> 13 years) presenting to the Rashid hospital emergency department within the study period (April 2017 – October 2018) and has a positive malaria smear test done within our facility.

Statistical Analysis

Data were analyzed using IBM SPSS version 24. Numerical variables were summarized by means and standard deviations for bell-shaped variables, medians and ranges for skewed variables. Categorical variables were summarized by counts and percentages. Chi-squared test was used to compare categorical variables across different groups. A p-value < 0.05 is considered as statistically significant result.

Results

From April 2017 to October 2018, about (628) malaria patients admitted to the emergency department, Rashid Hospital with the clinical picture of suspected malaria. Almost 90.1% of these patients were male, and around 48.1% were from Pakistani nationality as noted in Figure 1 which shows the distribution of malaria cases according to type and nationality. It was noticed that a significant number of malaria vivax cases reported as compared to malaria falciparum classes.

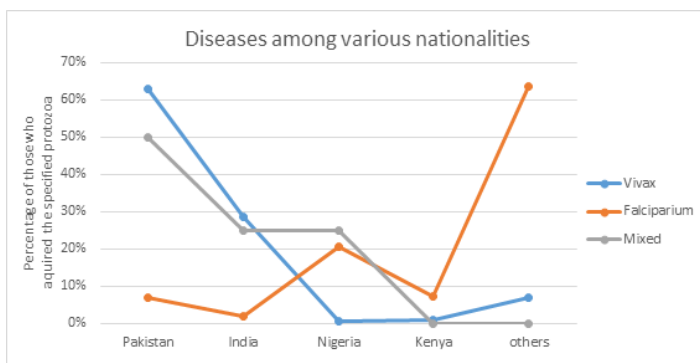


Figure 1: Distribution of Imported Malaria cases according to types of malaria and nationalities in Dubai 2017.

When malaria cases carefully inspected and looked at side-by-side with the nationalities it was interesting to find that from those patients from Pakistani and Indian origin, vivax was still the predominant subtype of malaria whereas with those from African descent such as Nigeria and Kenya Falciparum malaria outweighed the numbers of vivax. Just reconfirming the prevalence of falciparum in that region. Only one patient out of the 628 presented with a GCS of less than 11 and three patients presented with seizures as the initial presentation.

The majority of the patients had a classical history of, nighttime fever and generalized body aches. About 3 out of the total number of patients went on to have complications of acute respiratory distress symptoms (ARDS). Laboratory values for these patients were looked into, in order to assess for indicators of severity.

Numbers of indicators of severity

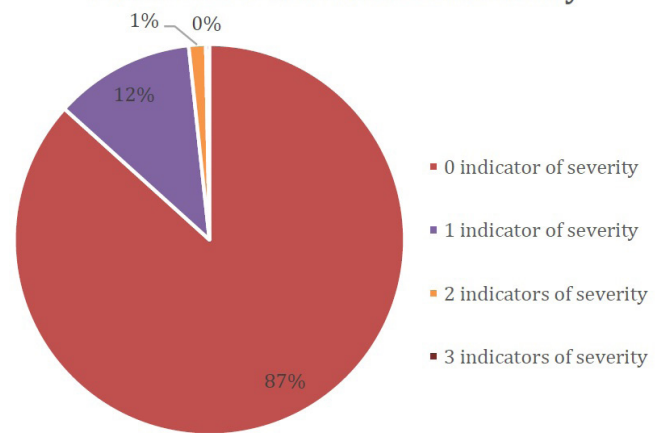


Figure 2: Percentage revealing the number of indicators of severity among patients presented to Rashid Hospital.

Figure 2 shows the number of severity indicators among malaria patients while Figure 3 shows which severity indicator was found according to WHO guidelines [11]. It was noticed that five out of the 628 patients had an abnormal PH result four patients had an abnormal hemoglobin result whereas 57 patients showed derangement in bilirubin values. About 65.1% had normal glucose and 86 patients had normal creatinine values. One patient was found to have a positive blood culture. Out of the 628 patients, 247 patients proved to be candidates for admission with only 84 having at least one positive indicator of severity. 86.9% of these patients were male and the age varied from a minimum age of 15 years to a maximum age of 57 years.

The majority of whom were vivax cases with 62 of them requiring admission and the average days of admission were about 3.6 days. The 84 patients were labeled as "severe". 46.4% of these were vivax cases and received treatment with a combination of chloroquine and primaquine and 44% of patients were treated as falciparum malaria and received a combination of doxycycline and quinine. 82 out of the 84 patients survived even with an indicator of severity. Overall, no mortality occurred in all cases that presented to our emergency.

PERCENTAGE OF REUSLTS FOUND TO BE ABNORMAL

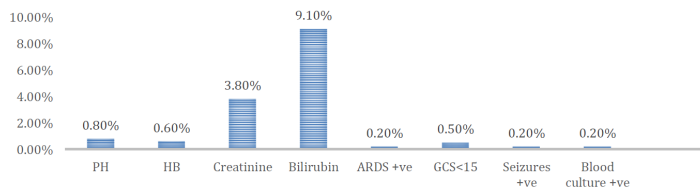


Figure 3: Percentage of abnormal Lab Values/Clinical Examinations among patients presented to Rashid Hospital.

Discussion

The current study showed that there are enormous number of imported cases of malaria have been reported in Dubai in about one-year' time, about 700 cases reported between April 2017 and October 2018, this finding is almost similar to a finding in Oman, as one of the major concerns for the Omani Health Authorities is that migrants mainly originate from countries in Southeast Asia with endemic *P. vivax* malaria. These immigrants work for several months on building construction sites and in agriculture, live in close proximity to water tanks, and are thus subject to mosquito bites (12,13). As the economic contexts of GCC countries almost similar in terms of immigrant laborers, it is expected to have a similar incidence of malaria area all over the region. Not only that but also the clinical types of malarial infection as the target population are coming from the same origins. These findings were expected in Arabia Saudi as well, Kuwait and Bahrain kingdom.

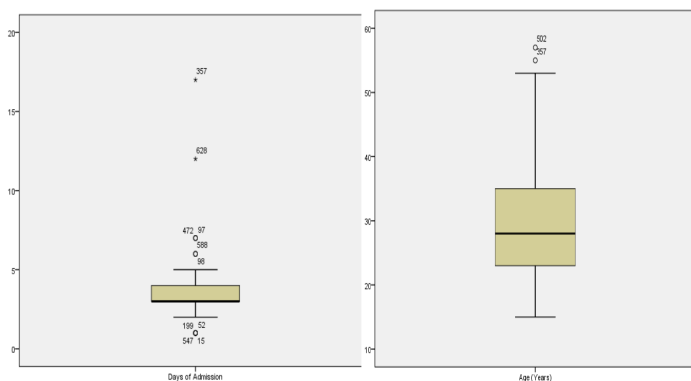


Figure 4: Distribution of malaria cases according to their severity.

As a current study in Dubai showed severe clinical presentation, another study in Saudi Arabia revealed that Most of the detected malaria cases in this setting were among expatriates, particularly from the Indian subcontinent, while the predominant species was *P. vivax*. More than 50% of the cases presented with severe malaria (14, 15). Another study in Saudi Arabia showed that due to an increase in international transportation, imported malaria has become a significant clinical and public health issue (4). This study describes the status of imported malaria cases in the Qassim region where it depicts that a total number of 46 cases were detected with *P. vivax* being the most frequently identified strain (41 cases), followed by *P. falciparum* (1 case). Identification and definition of high risky groups of imported malaria in Dubai will be of significant value that can affect preventive and curative

directions. The current study was not able to study many gaps in imported malaria infection in Dubai, which can be delegated to future studies to answer many still UN- answered questions and non-tested hypothesis.

Conclusion

Most of the imported malaria cases report in Dubai showed severe course profile, nevertheless, no mortality reported out of this, reflected standard golden managing approach. Malaria cases were of specific types and among specific nationalities, which can be classified on the high index of suspicion approach.

Recommendations

A high index of clinical and epidemiological case suspensions needs to be developed and applied for imported malaria at the Dubai level and UAE level. Strategy at early avoiding and importing cases through certain regulations, measures will be of great impact on declining imported cases of malaria and reducing the care cost burdens.

Ethical Issues

Ethical standards and procedures have been applied through all stages of the current study

References

1. Nilles EJ, Alert M, Mohtasham MA, et al. Epidemiological and clinical characteristics of imported malaria in the United Arab Emirates. *J Travel Med.* 2014; 21: 201-206.
2. Gachot B, Houze S, Le Bras J, et al. Possible prognostic significance of a brief rise in parasitemia following quinine treatment of severe *Plasmodium falciparum* malaria. *Trans R Soc Trop Med Hyg.* 1996; 90: 388-390.
3. Rahimi B, Thakkinstian A, White NJ, et al. Severe vivax malaria: a systematic review and meta-analysis of clinical studies since 1900. *Malar J [Internet].* 2014; 13: 481.
4. <https://www.who.int/malaria/publications/world-malaria-report-2018/en/>
5. <https://www.e-unwto.org/doi/book/10.18111/9789284418145>
6. Muhlberger N, Jelinek T, Behrens RH, et al. Age as a Risk Factor for Severe Manifestations and Fatal Outcome of *Falciparum* Malaria in European Patients: Observations from TropNetEurop and SIMPID Surveillance Data. *Clin Infect Dis.* 2003; 36: 990-995.
7. Phillips A, Bassett P, Zeki S, et al. Risk Factors for Severe Disease in Adults with *Falciparum* Malaria. *Clin Infect Dis.* 2009; 48: 871-878.
8. Checkley AM, Smith A, Smith V, et al. Risk factors for mortality from imported falciparum malaria in the United Kingdom over 20 years: An observational study. *BMJ.* 2012; 344: 1-11.
9. [https://www.dha.gov.ae/DHAOpenData/Annual Statistical Books/Annual Statistical Report 2017.pdf](https://www.dha.gov.ae/DHAOpenData/Annual%20Statistical%20Books/Annual%20Statistical%20Report%202017.pdf)
10. World Health Organization. Guidelines for the Treatment of Malaria-Third Edition. WHO Libr Cat Data Guidel [Internet]. 2015; 1-317.
11. Malaria S. Severe malaria. *Trop Med Int Heal.* 2014; 19:7-

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- 131.
12. Simon B, Sow F, Al Mukhaini SK, et al. An outbreak of locally acquired *Plasmodium vivax* malaria among migrant workers in Oman. *Parasite*. 2017; 24.
13. Andriopoulos P, Economopoulou A, Spanakos G, et al. A local outbreak of autochthonous *Plasmodium vivax* malaria in Laconia, Greece-a re-emerging infection in the southern borders of Europe? *Int J Infect Dis* [Internet]. 2013; 17: e125-e128.
14. Musa IR, Gasim GI, Eltoum AO, et al. Imported malaria at Buraidah Central Hospital, Qassim, Saudi Arabia: A retrospective analysis. *Travel Med Infect Dis* [Internet]. 2014; 12: 733-737.
15. Al-Seghayer SM. Malaria control in the Kingdom of Saudi Arabia. *Saudi Epidemiol Bull*. 1996; 3: 4.