

Introduction

Knowledge of methicillin-resistant *Staphylococcus aureus* (MRSA) infection and colonization rates is important for clinical and infection control purposes.

Objective

This was a systematic review and meta-analysis to investigate MRSA rates in adults in Africa and Middle East (AFME).

Methods

- During September 2013 PubMed and Medline Plus were searched using pre-specified keywords.
- Non-AFME, case reports, reviews, editorials and study protocols were excluded.
- Data were extracted and stratified by infection or colonization.
- MRSA infection rates were calculated using weighted averages of MRSA to *Staphylococcus aureus* (SA) infection ratio with 95% confidence intervals (mean, 95% CI).
- The ratio of individuals with MRSA colonization to number of people tested was used to calculate MRSA colonization rate (mean, 95% CI).
- Data were analyzed using Microsoft Excel and SAS 9.3 (SAS Institute, Cary, USA).

Results

- Eighty-four MRSA infection studies (15,789 individuals; 23,170 isolates) and 30 MRSA colonization studies (5,894 individuals, 3,773 isolates) were identified.
- Overall, MRSA constituted 48.8% (40.4-57.2%) of all SA infections, including 46.9% (36.9-56.9%) of blood stream, 42.1% (31.8-52.4%) of skin and soft tissue and 57.3% (46.2-68.3%) of bone and joint infections. The rates varied from one region within AFME to another [Figure 1].
- Only 5 studies (n=3660) presented both community (CA) and healthcare-associated (HA) MRSA infections. In these studies, the mean CA-MRSA to all MRSA infection ratio was 14.4% (5.9-22.8%).
- Within AFME, MRSA infection rate was highest in the Arabian Peninsula (66.4%; 60.7-72.2%), followed by Northern Africa (48.6%; 39.2-57.9%), the Middle East (47.5%; 38.7-56.4%), sub-Saharan and central Africa (40.4%; 32.5-48.3%) and South Africa (24.4%; 14.8-34.0%) (p=0.0465) [Figure 2].
- The average MRSA colonization rate was 15.5% (13.4-17.6%). However, MRSA colonization rates were highest in South Africa (21.2%; 9.8-32.5%) followed by Middle East (15.8%; 14.0-17.6%), sub-Saharan and central Africa (14.1%; 9.8-18.4%) and the Arabian Peninsula (6.0%; 2.8-9.1%) (p=0.0589) [Figure 3].
- MRSA colonization rate was 24.1% (21.6-26.5%) in individuals with chronic medical conditions, 2.3% (1.5-3.2%) in healthy subjects and 5.8% (3.4-8.2%) in healthcare workers (p=0.0182) [Figure 4].
- While MRSA infection and colonization rates are similar among Middle Eastern states, they vary considerably among Northern and sub-Saharan and Central African countries. The data were, however, available for less than half of the countries involved [Figure 5].
- Crude mortality, reported in only 9 studies (n=4444), was relatively high at 43.8% (36.1%-51.6%).

Figure 1: MRSA infection rates by region and infection site. Based on site of infection, infections type were stratified into following groups: blood stream infections, bone and joint infections, diabetic foot infections, pneumonia, skin and soft tissue infections and other infections. While all six types were reported in the Middle East population, five types were present in Arabian Peninsula and Northern Africa, three in sub-Saharan and Central Africa and only two in South Africa.

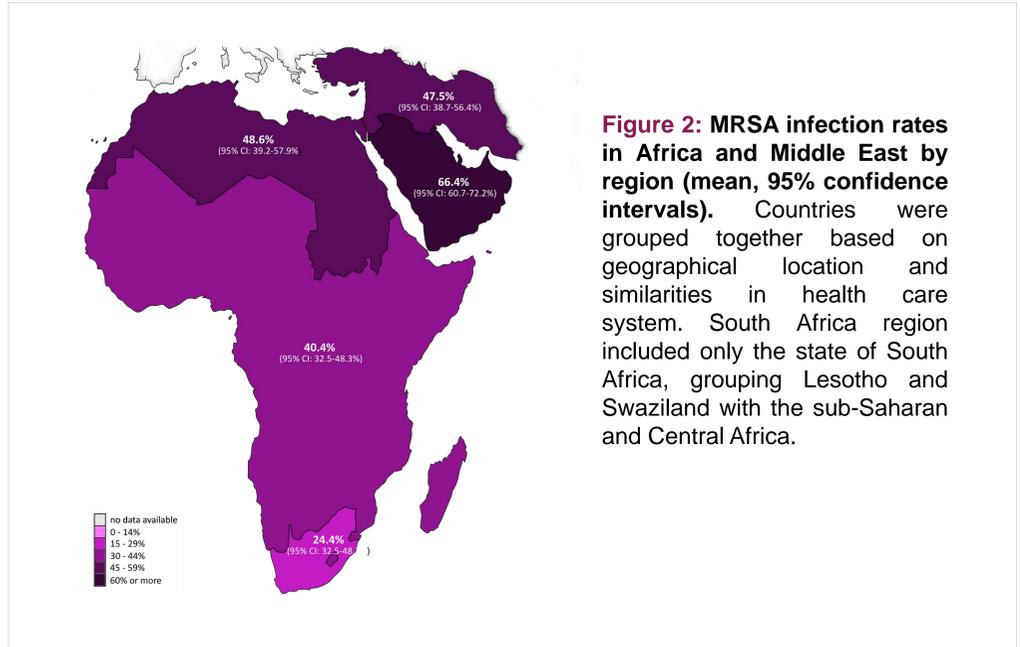
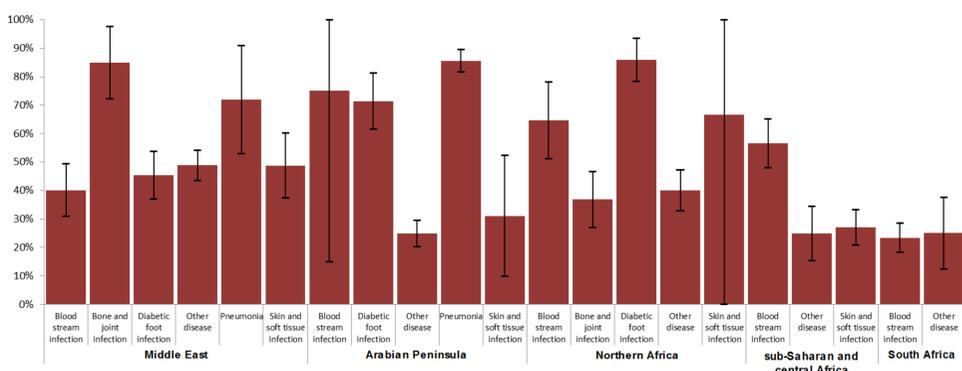


Figure 2: MRSA infection rates in Africa and Middle East by region (mean, 95% confidence intervals). Countries were grouped together based on geographical location and similarities in health care system. South Africa region included only the state of South Africa, grouping Lesotho and Swaziland with the sub-Saharan and Central Africa.

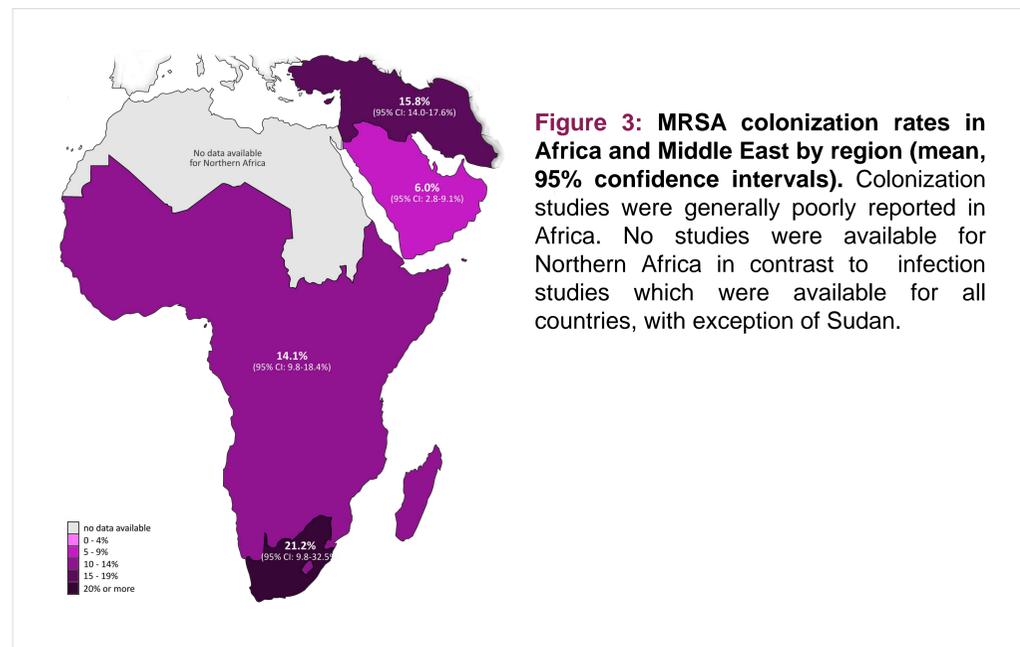


Figure 3: MRSA colonization rates in Africa and Middle East by region (mean, 95% confidence intervals). Colonization studies were generally poorly reported in Africa. No studies were available for Northern Africa in contrast to infection studies which were available for all countries, with exception of Sudan.

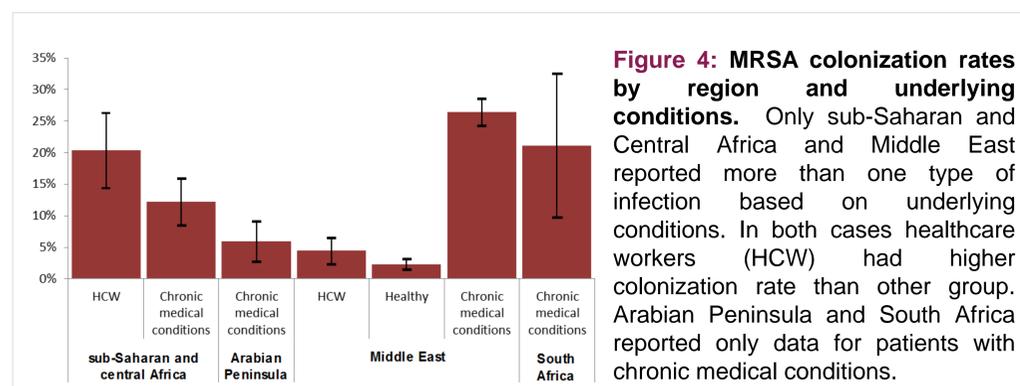
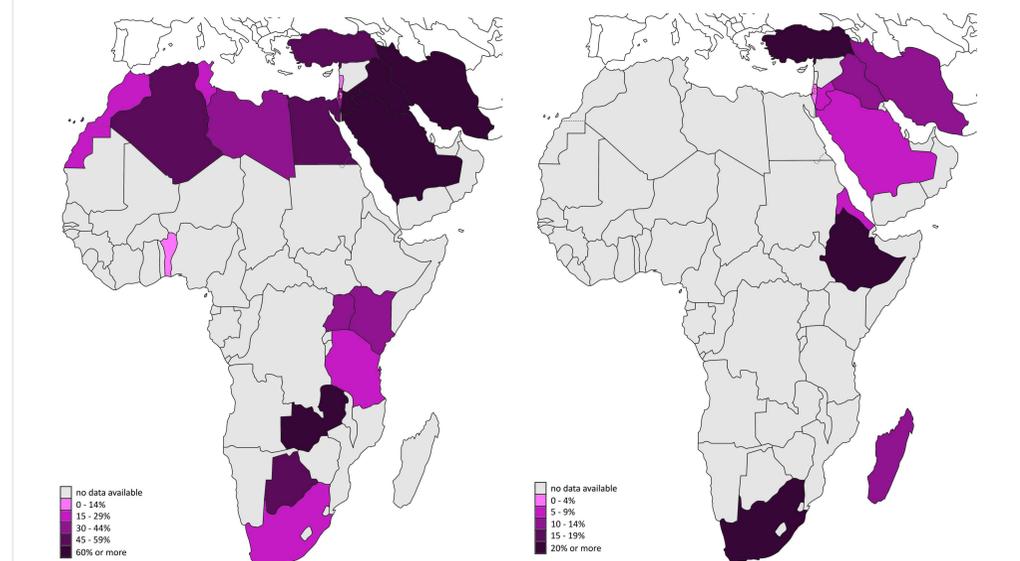


Figure 4: MRSA colonization rates by region and underlying conditions. Only sub-Saharan and Central Africa and Middle East reported more than one type of infection based on underlying conditions. In both cases healthcare workers (HCW) had higher colonization rate than other group. Arabian Peninsula and South Africa reported only data for patients with chronic medical conditions.

Figure 5: MRSA infection and colonization rates in Africa and Middle East by country. Since maximal infection and colonization rates values varied significantly, two different shade scales had to be used.



Conclusions

- MRSA infection and colonization rates are moderate to high in AFME region, with remarkable variations from one area to another.
- These data have direct treatment and infection control implications.