Etiologies of CABM and AMR patterns in Africa over the last 30 years: Systematic review

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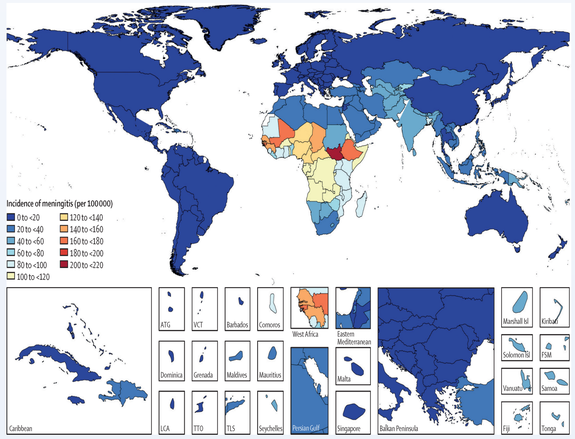
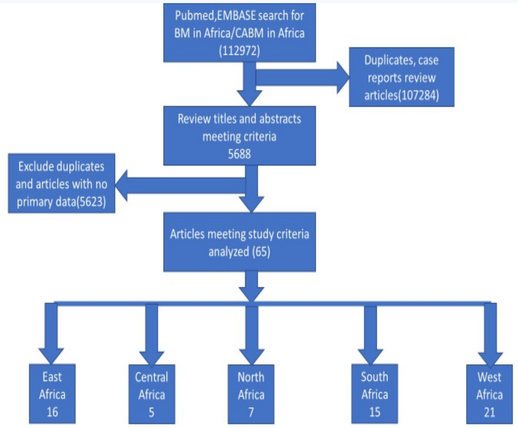
Introduction

- Over 2.8 million people suffer form Bacterial Meningitis annually. Africa contributes 6/10 of the countries with the highest burden of disease.
- The burden of disease varies widely even in Africa with the meningitis belt having the highest burden and children are more disproportionally affected than adults.
- Streptoccocus Pneumoniae, Heamophilus Influenza and Neisseria Meningitidis are the leading cause of BM worldwide.
- Vaccination, improved diagnosis and treatment have led to marked reduction of incidence, mortality and morbidity of CABM globally.
- slow advancement of the above efforts, emergence of other strains of bacteria and an increase in antimicrobial resistance have contributed to the continued high burden of disease in Africa.
- This study sought to provide a snap-shot of how the etiologies of CABM have changed over the years, variation of etiology by regions of Africa, how vaccination has affected these etiologies and distribution of antimicrobial resistance in the regions.



Materials and Methods

- Using PRISMA guidelines of systematic reviews we searched pubmed and EMBASE using key terms bacterial meningitis in Africa.
- Inclusion criteria: Articles in English or French (1990-2019), Reported primary data on etiology of Bacterial meningitis, Case controls, cohort studies and cross-sectional studies.

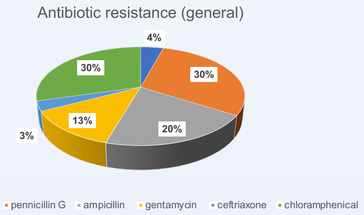


- We excluded Expert opinions, letters to editor, editorials, narratives and case reports. Articles on mycobacteria tuberculosis and cryptococcal meningitis, Studies reporting only a single etiology, Nosocomial bacterial meningitis
- Data on study design, location, participant demographics, vaccination status if mentioned in the study or documented country status of vaccination at time of study, period of study , diagnostics used to confirm BM and any antimicrobial resistance information was collected.

Results

- 112972 articles of which 64 studies were analyzed, representing 43% of African countries [56-65].
- 118,716 people with suspected BM were assessed across the studies, with an organism identified in 34,593 (29%)..
- In 53 studies with data on age, children made up 9506 (83%) of cases .
- Spn, Nmn and Hib were the reported leading causes of CABM. The prevalence varied by region, with Spn being the most prevalent . An increased prevalence of Salmonella.
- Resistance was found to be highest against ampicillin 2.7% (CI 2.1%-3.3%) and gentamycin with a prevalence of 2.7% (CI 2.1%-3.4%)

Study period	1990-1999 Prevalence (C.I) %	2000-2020 Prevalence (C.I) %	p value
Spn	12.58 (8.47-16.70)	10.81 (9.42-12.21)	0.43
Nmn	16.03 (0.00-33.15)	7.62 (6.38-8.85)	0.34
Hib	14.61 (10.11-19.12)	2.50 (2.16-2.83)	<0.0001
Salmonella	0.66 (0.05-1.28)	0.31 (0.16-0.47)	0.28
Listeria	0.03 (0.00-0.15)	0.00 (0.00-0.02)	0.55
E. coli	0.40 (0.03-0.77)	0.11 (0.03-0.19)	0.14
Klebsiella	0.10 (0.00-0.26)	0.11 (0.03-0.17)	0.97
Other strep	0.47 (0.03-0.91)	0.76 (0.56-0.97)	0.24
Others	2.53 (1.50-3.55)	0.14 (0.09-0.18)	<0.0001



CONCLUSIONS

- Spn , Nmn, Hib are the leading causes of CABM in Africa. As in other continents the prevalence of Hib has reduced by over 50%.
- Over 86% of the burden of CABM is in children.
- There was widespread resistance to ampicillin and gentamycin.
- There remains a paucity of information on the true burden of CABM in Africa. It is imperative that we work to improve the diagnostic capabilities in Africa.
- There is a great need to regionally address antimicrobial resistance and treatment guidelines, in hopes of better outcomes and less health disparities

Acknowledgments

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Conflict of interest

- None declared.