PNEUMOCOCCAL MENINGITIS INCIDENCE AND CASES IN CHILDREN >5 YEARS AND ADULTS BY GEOGRAPHIC REGION: THE AGEDD STUDY
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INTRODUCTION

The global burden of pneumococcal disease has been established in children <5 years of age but not in those ≥5 years. These data are essential to project the potential impact of pneumococcal conjugate vaccines (PCV) through direct & indirect effects of vaccination. This analysis aims to estimate one component, pneumococcal meningitis cases and deaths, globally & regionally in adults and children ≥5 years of age prior to the introduction of PCV vaccines.

METHODS

DATA

We systematically searched 16 databases to identify studies conducted 1980 – 2010 reporting SP meningitis cases, incidence and case fatality ratios (CFR) for cases ≥5 years. Additionally, we abstracted data from national surveillance reports from Australia, Canada, New Zealand, South Africa, United States, and several European countries not identified in the literature search.

Analysis

We estimated incidence, CFR, cases and deaths due to SP meningitis. Incidence: Meta-analysis: for regions whose majority of studies reported std. errors. Median of incidence: used otherwise (only in Africa).

RESULTS

SP Meningitis Incidence:

• 21 studies from 17 countries had meningitis incidence data (Table 1).
• 2 studies, both in Africa, were assessed as poor quality (due to insufficient access to care). These are included but removing them did not change results.
• Meta-estimates of incidence were based on meta analysis in all regions except Africa where median of reported values was used (meta-analysis of Africa studies with SE produced similar result: median=4.9, meta-analysis=4.1 for ≥5 years of age).

SP Meningitis CFR

• 21 studies from 15 countries had SP meningitis CFR data (Table 2)
• African and Asia had the greatest number of studies and countries represented

Regional Burden

Meningitis incidence, CFR and numbers of cases and deaths were highest in Africa and Asia (Figures 1-3 and Table 2).

Incidence was highest in 65+ age group in all regions, but number of cases and deaths was largest in the 20-64 year age group, except in Africa where the largest burden was in children 5-19 years (Figures 2 and 3).

CONCLUSIONS

Adult pneumococcal meningitis incidence data were sparse in all regions except North America; Asia will have to be estimated using other methods, e.g., interpolation as we did here, or potentially more reliable estimation based on the proportion of bacterial meningitis or invasive pneumococcal disease due to pneumococcal meningitis.

• Globally, SP meningitis causes 200,000 cases (95% CI: 124,000-289,000) and 66,000 deaths (95% CI: 39,000-92,000) each year.

Available data suggest the largest meningitis disease burden is in Africa (possibly also Asia).

While the highest incidence was among adults over age 65+ years in all regions, most cases and deaths were among those 5-64 years of age due to larger population size.

Incidence estimates for each age stratum among persons ≥5 years were lower than the incidence in children <5 years estimated previously, except adults >65 years in Asia which was similar to <5 incidence. The total number of cases and deaths were lower in persons ≥5 years compared to children <5 years in all regions except Africa (cases) and Asia (cases & deaths).

We expect our results to under-estimate the true burden of pneumococcal meningitis due to limitations in access to care and surveillance methodology (insensitive diagnostics).