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Community, parental and adolescent awareness and knowledge of meningococcal disease

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ABSTRACT

Objective: To assess knowledge of invasive meningococcal disease (IMD) and concern about the disease in the South Australian Community including adolescents, adults, parents and non-parents.
Methods: This cross-sectional study was conducted by face to face interviews in South Australia in 2012. Participants were scored on their knowledge and concern about IMD. Univariate and multivariate regression analyses were performed with the survey data weighted by age and gender in accordance with 2011 Census data.
Results: Of 5200 households randomly selected and stratified by metropolitan or rural location, 3055 participants were interviewed with a response rate of 60.3%. The majority were Australian born (74.2%, $n = 2267$) with 31.8% ($n = 972$) of those interviewed being parents, and 15.9% ($n = 487$) adolescents (15–24 years). Almost a quarter of participants (23.5%, $n = 717$) do not know what meningococcal disease is, with 9.1% ($n = 278$) believing incorrectly that IMD is a viral infection. 36.6% ($n = 1114$) had low overall knowledge of IMD. Adolescents ($p < 0.050$), non-Australian born ($p < 0.001$), low educational attainment ($p = 0.019$), low household income ($p = 0.011$), low/medium socio-economic status ($p < 0.050$) or living in a metropolitan area ($p = 0.006$) were more likely to have lower overall knowledge of IMD. Participants who were not parents ($p < 0.001$), male gender ($p < 0.001$), single ($p < 0.001$), highly educated ($p = 0.022$) or had high household income ($p = 0.015$), had lower concern about IMD.
Conclusion: Large community knowledge gaps for IMD were observed, particularly amongst adolescents and adults with low educational attainment and low socio-economic status. Improving community knowledge of IMD could help ensure optimal uptake of a new meningococcal vaccine. Our study results can help guide development of community tailored immunisation education programs.

1. Introduction

Invasive meningococcal disease (IMD) is characterised by its rapid onset, high case fatality, high rate of incapacitating long-term sequelae, and is a leading infectious cause of death in childhood in industrialised countries [1]. The highest disease incidence occurs in children < 5 years and adolescents 15–24 years of age [2]. Clinical disease such as meningitis and septicaemia are caused by six of thirteen *Neisseria meningitidis* subgroups (A, B, C, W135, X and Y). Meningococcal vaccines are currently available in Australia to protect against meningococcal serogroups A, C, W135 and Y [3]. However, approximately 85% of serogroup-confirmed meningococcal cases are now caused by serogroup B, as the number of cases of other serogroups, particularly serogroup C, has declined since the implementation of universal meningococcal C childhood vaccination [4,5]. A new meningococcal B (MenB) vaccine, Bexsero®, has recently been approved in the EU and Australia for use in individuals from two months of age. In its meeting in November 2013, the Pharmaceutical Benefits Advisory Committee (PBAC) in Australia did not recommend the inclusion of the multicomponent

Abbreviations: IMD, Invasive meningococcal disease; MenB, Meningococcal B; PBAC, Pharmaceutical Benefits Advisory Committee; SEIFA, Socio Economic Index for Areas.

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meningococcal B vaccine on the National Immunisation Program Schedule mainly because of its unfavourable cost-effective estimate and uncertain assumptions about vaccine effectiveness and large vaccination coverage required [6]. A resubmission is planned to address issues raised by the PBAC [7].

Awareness and attitudinal research can not only give us in-depth insights into the general public's knowledge about IMD but can also provide useful information to regulatory authorities when considering funding and introduction of a new vaccination program. Such research enables us to understand motivations, barriers, and other influential factors affecting vaccine implementation and also allow us to recognise the needs of different population groups [8]. Finding out public perception of the seriousness of the disease to be prevented by a new vaccine and addressing inaccuracies through targeted education and promotion, are imperative to achieving high coverage of a new vaccine [9], with consequential impact on its cost-effectiveness analysis. Surveys to evaluate the views of stakeholders and target groups are valuable for identifying challenges and opportunities prior to implementing a vaccination program [10]. Previous studies have indicated that public recognition of disease severity could play an important role in parental acceptance of a relevant vaccine [11]. Conversely, lack of disease specific knowledge could lead to poor compliance with new vaccines [12,13]. The assessment of community knowledge and awareness of IMD is required to understand the general public's view of the disease in order to help decision makers and immunisation educators to develop community tailored educational programs targeted to specific groups to maximise vaccine coverage. High uptake of a vaccine with potential herd immunity benefits can affect cost-effectiveness results [14], and hence would be an important consideration in vaccine funding decision-making.

There is currently limited information regarding community, parental and adolescent knowledge and awareness of IMD. An online survey was conducted in seven countries including Australia, to investigate health care providers' and parents' knowledge and attitudes towards vaccine-preventable disease and introduction of new vaccines in infants [15]. The new MenB vaccine was used as an example to detect factors impacting vaccine decisions. It was concluded that improving awareness of the vaccine-preventable disease would be essential for a high vaccine uptake. As an online survey, study results were subject to selection bias with limited generalisability of the study results.

Two other studies in the Netherlands and Auckland have also assessed parental awareness of IMD and suggested that the vast majority of parents were aware of the severity of IMD and that perceived vulnerability was associated with a more positive attitude towards vaccination, however these studies are both limited by selection bias and may not be generalisable to the population [16–18].

This current, large population study aimed to assess knowledge and concern about IMD and perception of disease severity, incidence and susceptibility in the South Australian community and determine factors associated with lower or higher knowledge and concern prior to the introduction of the new MenB vaccine.

2. Methods

This cross-sectional study was conducted by face to face interviews in South Australia. 5200 households were randomly selected according to the collectors' districts used by the Australian Bureau of Statistics in the 2006 Census and stratified by metropolitan or rural location [19]. The person in the household, who most recently celebrated their birthday and was 15 years or older, was interviewed (one interview per household).

General Understanding of invasive meningococcal disease

- What do you understand by the term 'meningococcal disease'? (open-ended question)

Understanding of severity of invasive meningococcal disease

- Which do you believe best describe your understanding of meningococcal disease in terms of severity?
  1. Mild disease
  2. Moderately Severe (may require hospitalisation)
  3. Severe (requires hospitalisation)
  4. Very Severe (may be life threatening or fatal)
  5. Don't know/Unsure

Understanding of incidence of invasive meningococcal disease

- Which do you believe best describe your understanding of meningococcal disease in terms of incidence?
  1. Rare (affects less than 1/1000 people)
  2. Uncommon (affects less than 1/100 people)
  3. Common (affects more than 1/100 people)
  4. Very common (affects more than 1/10 people)
  5. Don't know/Unsure

Understanding of susceptibility to invasive meningococcal disease

- Which do you believe best describe your understanding of meningococcal disease in terms of people affected?
  1. Mostly children
  2. Mostly adolescents
  3. Mostly children or adolescent
  4. Mostly elderly
  5. Mostly people with other medical conditions
  6. Any age equally
  7. Don't know/Unsure

Overall concern about invasive meningococcal disease

- On a scale of 0 – 10 where 0 means you are not concerned at all and 10 means you are extremely concerned, how concerned are you about meningococcal disease?

Enter number 0 – 10 ☐☐ or R for "Refused"

Fig. 1. Interview questions on understanding and concern about invasive meningococcal disease.

Questions were asked to assess general understanding and perception of severity, incidence and susceptibility to IMD, and concerns about IMD (Fig. 1). Detailed demographic details were collected including age, gender, country of birth, marital status, family composition, educational attainment, work status and household income.

Statistical analyses were performed using Stata, version 11 (StataCorp) with the survey data weighted in accordance with 2011 Census figures to provide a demographic description of the South Australian population by age and gender. The weighting process ensured our findings were representative of the South Australian population as a whole. Descriptive results were reported for demographic data. An open ended question was used to gauge the general understanding of IMD in the community.

The outcome measures included an overall score of knowledge of IMD and concern about the disease. Answers to three questions on knowledge of severity, incidence and susceptibility to IMD were dichotomised as "correct" or "incorrect". When the participant chose a correct answer to one question, one score was given to the participant. The overall score was calculated as the total scores of these three questions. Participants who answered at least two of these three questions correctly were considered to have a higher overall score (2–3). An overall score less than two was categorised as a lower overall score (0–1). The participants were asked to assess their concern about IMD on a scale of 0 to 10 with an opt-out option "refused" or "don't know". A level of 6–10 was classified as "higher concern" and a level of 0–5 was classified as "lower concern".

The predictor variables were comprised of country of birth, marital status, educational attainment, work status, household income,