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Attitudes, knowledge and perceptions towards whooping cough and pertussis vaccine in hospitalized adults

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ABSTRACT

Whooping cough or pertussis is a major cause of morbidity and mortality for adults and children around the world. There has been a rise in pertussis-related deaths in the elderly; pertussis vaccination is not currently routinely recommended in adults, excepting new parents and other adults household members including grandparents and care-givers of young children. Currently, there is lack of clear vaccine recommendations after the age of 50 years. Given the increase in adult pertussis, adult vaccine recommendations are a policy consideration.

The study surveyed a convenience sample of patients previously recruited in a case control study designed to examine the burden of influenza with and without AMI in adults aged ≥40 years.

Our findings showed that only 9.6% had received the pertussis vaccination within the past five years and 79.4% of participants had no knowledge of the pertussis adult booster vaccine, and 30.7% of participants who had regular contact with children under the age of two years in the past 12 months.

The results showed that even though there is general acceptance of prevention by vaccines, there is low awareness about pertussis vaccination. This lack of knowledge presents a barrier against pertussis vaccination thus it is imperative that any future adult immunisation policy recommendations around pertussis vaccine include awareness programs in the target population.

1. Background

Whooping cough or pertussis is a major cause of morbidity and mortality for adults and children around the world and is caused by the gram negative coccobacillus, *Bordetella pertussis* [1]. Undiagnosed adult pertussis can be a major source of infection for vulnerable infants [2]. Infants younger than 6 months of age are too young to be protected by current vaccination schedules [2]. Protection against pertussis is not maximised until the primary three dose vaccination series is complete at approximately 6 months of age [3]. During this time, adults and adolescents in close contact with infants are a potential transmission source. Additionally, infection of older adults can be difficult to diagnose and may lead to serious outcomes if appropriate treatment is not offered early in the course of infection. Furthermore, there has been a rise in pertussis-related deaths in the elderly, when previously it was thought that pertussis deaths occurred mainly in infants. In Australia there has been seven cases of pertussis related mortality in adults between 1967 and 2010 [4,5], two of the three deaths reported due to pertussis between 2005 and 2006 were in individuals older than 60 years [6].

In Australia, pertussis vaccine is available for children aged 2, 4, 6 months and 4 years on the National Immunisation Programme (NIP). A booster dose is available for adolescent aged 12–17 years. The vaccine is also recommended for adults who wish to reduce the likelihood of becoming ill with pertussis and for those who are in contact with young children [7].

Recent research has helped identify and describe barriers to adolescent and adult immunisation. These include: lack of access to healthcare services, missed vaccination opportunities during preventive visits, lack of population based immunisation registries, low public awareness of vaccination recommendations, limited healthcare provider endorsements, misperceptions regarding vaccine safety and a lack of knowledge about the importance of immunisations and their health benefits [8,9]. It is critical to address key issues such as vaccine safety by educating providers and the public on the vaccines benefits and develop a safety monitoring systems to answer patient concerns when they arise [10]. Problems associated with introduction of a new vaccination program, such as an adult pertussis program, can generate negative publicity and result in a rapid fall in immunisation rates [11].

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Australia has a unique epidemiology of pertussis, with the overwhelming burden now in adults, and a significant burden in the elderly. The last decade has seen a continuous increase in the incidence of pertussis among adults in Australia. The notification rates in those aged 60 years and over have risen to a record high of 62 notifications per 100,000 population. The proportion of notifications in these groups has also been increasing, from 35% to 45% between 1993 and 1998 to 83% in 2005 [12,13].

In 2006–2007 alone, pertussis notifications (4310) were 57.5% of all disease notifications, indicating an undercurrent of persistent pertussis infection among the adolescents, adults and elderly population in Australia [14].

Pertussis vaccination has been shown to be an effective preventative measure with studies supporting high rates of seroprotection and sero-positivity for pertussis antigens in adults [15,16]. Although common belief is that routine booster doses of pertussis vaccine in both adolescents and adults would significantly reduce the disease burden, concern over how it would be administered to the adult population and cost-benefit issues are still being debated [17,18].

Given the increase in adult pertussis in Australia, evidence that longer periods of hospitalization are seen in older individuals, limited physician awareness of pertussis and under-estimation of the true burden of adult pertussis, pertussis vaccination of the elderly is a policy question. While morbidity and mortality from pertussis have dramatically declined since the pre-vaccine era, the level of morbidity and mortality from pertussis remain unacceptably high for a vaccine preventable disease. In addition, there is lack of clear vaccine recommendations after the age of 50 years [5]. This study was conducted in the context of informing potential adult vaccination strategies for prevention of pertussis.

To inform policy, it is important to identify attitudes about vaccination within older adults aged 65 years.

2. Aim

To examine the attitudes, knowledge and perception of pertussis and pertussis vaccine in a hospital population of adults aged ≥40 years.

3. Methods

3.1. Study participants

An exploratory study was undertaken with the objective to investigating the role of influenza in acute myocardial infarction (AMI) at a tertiary hospital in Sydney's western suburbs [19]. The study surveyed a convenience sample of patients aged 40 years and older previously recruited in a case control study designed to examine the burden of influenza with and without AMI [20].

This study was conducted opportunistically because infections other than influenza have been associated with AMI [21]. The study design allowed us to examine pertussis as a potential predictor of AMI, given that the burden of pertussis in adults is increasing. As part of this study, all contactable participants were invited to participate in this survey to provide information about their attitudes and knowledge of pertussis.

3.2. Study survey

Between the 3rd of January 2011 and the 31st of May 2011, a survey was conducted by telephone interviews with patients. A structured questionnaire was used to gather information on patients' personal information, their perception, attitude, and knowledge towards whooping cough and pertussis vaccination.

Table 1
Frequency distribution of the characteristics of participants (n = 218).

Characteristic	Frequency (%)	
Age group	<75	151 (69.3)
	≥75	67 (30.7)
		Range 40–86 years, mean = 67.3, median = 67.9, S.D. = 11
Gender	Female	81 (37.2)
	Male	137 (62.8)
Received pertussis vaccine in past 5 years	Yes	21 (9.6)
	No	197 (90.4)
Knowledge of pertussis adult booster	Yes	45 (20.6)
	No	173 (79.4)
Children contact in the past 12 months	Yes	67 (30.7)
	No	151 (69.3)
Living arrangement	Live alone	63 (28.9)
	Other living arrangement	155 (71.1)
Education	<High school	87 (39.9)
	High school	98 (45)
	Post-secondary	33 (15.1)
Ethnicity	Caucasian	164 (75.2)
	Other	54 (24.8)
Employment status	Currently work	55 (25.2)
	Retired/not employed	163 (74.8)

The survey questionnaire was designed to examine patients' attitudes and perceptions about diseases severity and safety of pertussis vaccine and to assess patients' general knowledge of the availability as well as the recommendation of vaccination to older adults.

The questionnaire was constructed as five-point Likert scales with a minimum score of 1 and a maximum of 5 [22] and took seven minutes to complete.

3.3. Data analysis

The data was compiled into an excel spread sheet. Analysis was performed using SPSS V19 statistical software (SPSS, Chicago, IL, USA) [23]. Data were analysed descriptively. The cut-off point was selected based on life expectancy in Australia and the median age to create a dichotomous variable for age.

All participants responses were grouped; there were <20% for "unsure" and >50% for "agree", therefore responses were dichotomised as two categories: agree and other (disagree and unsure) to make comparison more reasonable. The p-value was applied to examine the association between categorical variables.

3.4. Ethic approval

The study was approved by the Sydney West Area Health Service ethics committee (Protocol number: HREC2007/2/4.8 (2533)).

4. Results

Of the 506 subjects included in the case control study, 43% (218/506) agreed to participate in this survey. Various reasons for not being able to include other individuals were: refusal without a reason 50.6% (146/288), did not respond 26% (75/288), asked to be withdrawn 12.5% (36/288), lost to follow up 7.9% (23/288) and deceased 2.7% (8/288).

4.1. Demographics and other characteristics

General characteristics of the study population are shown in Table 1. Of all participants, more than half were male, 62.8% (137/218). The age ranged from 40 to 87 years (mean = 67.3, SD = 11); 58.2% (127/218) of participants were older than 75 years.