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Review

Lower vaccine uptake amongst older individuals living alone: A systematic review and meta-analysis of social determinants of vaccine uptake

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ABSTRACT

Introduction: Vaccination is a key intervention to reduce infectious disease mortality and morbidity amongst older individuals. Identifying social factors for vaccine uptake enables targeted interventions to reduce health inequalities.
Objective: To systematically appraise and quantify social factors associated with vaccine uptake amongst individuals aged ≥60 years from Europe.
Methods: We searched Medline and Embase from inception to 24/02/2016. The association of vaccine uptake was examined for social factors relevant at an individual level, to provide insight into individuals' environment and enable development of targeted interventions by healthcare providers to deliver equitable healthcare. Factors included: living alone, marital status, education, income, vaccination costs, area-level deprivation, social class, urban versus rural residence, immigration status and religion. Between-study heterogeneity for each factor was identified using I^2-statistics and Q-statistics, and investigated by stratification and meta-regression analysis. Meta-analysis was conducted, when appropriate, using fixed- or random-effects models.
Results: From 11,754 titles, 35 eligible studies were identified (uptake of: seasonal influenza vaccine (SIV) only (n = 27) or including pneumococcal vaccine (PV) (n = 5); herpes zoster vaccine (n = 1); pandemic influenza vaccine (n = 1); PV only (n = 1)). Higher SIV uptake was reported for individuals not living alone (summary odds ratios (OR) = 1.39 (95% confidence interval (CI): 1.16–1.68). Lower SIV uptake was observed in immigrants and in more deprived areas: summary OR = 0.57 (95%CI: 0.47–0.68) and risk ratio = 0.93 (95%CI: 0.92–0.94) respectively. Higher SIV uptake was associated with higher income (OR = 1.26 (95%CI: 1.08–1.47)) and higher education (OR = 1.05 (95%CI: 1–1.11)) in adequately adjusted studies. Between-study heterogeneity did not appear to result from variation in categorisation of social factors, but for education was partly explained by varying vaccination costs (meta-regression analysis p = <0.0001); individuals with higher education had higher vaccine uptake in countries without free vaccination.
Conclusions: Quantification of associations between social factors and lower vaccine uptake, and notably living alone (an overlooked factor in vaccination programmes), should enable health professionals target specific social groups to tackle vaccine-related inequalities.

Contents

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1. Introduction

Vaccination is an important intervention to prevent infections amongst older individuals, who have increased susceptibility to infections and often experience more severe outcomes [1–3]. A successful vaccination programme depends not only on vaccine effectiveness and well-organized programme delivery but also on high vaccination uptake [3]. Inequalities in vaccine uptake amongst older individuals could be related to social factors: the social circumstances of living and working [4–6]. Determining the association between social factors and vaccine uptake helps to quantify any vaccination inequalities in specific population groups and assists health care providers in planning targeted interventions and making any necessary changes to vaccination programmes. The social factors affecting vaccine uptake may vary with age and with the type of vaccine [4–7]. A 2011 systematic review summarised the association of social determinants of health with uptake of a single vaccine (seasonal influenza (SIV)) for older individuals (aged ≥65 years), without quantitative synthesis [6]. This previous study found conflicting associations of factors such as education, marital status, ethnicity, socio-economic level and place of residence, without undertaking a comprehensive assessment of between-study heterogeneity [6].

The social factors associated with SIV uptake may be different from other vaccines used for older adults such as pneumococcal and herpes zoster vaccines that are not administered annually. The objective of this review was to systematically appraise and quantify the association of social factors with uptake of vaccines amongst individuals aged ≥60 years from Europe including a detailed between-study heterogeneity assessment when necessary. It was anticipated that the studies from the European region may be more homogenous compared to those from low-income settings, making data synthesis more feasible.

2. Methods

2.1. Search strategy

This review formed part of a larger search for studies exploring social determinants of vaccine uptake in Europe for all age groups. The wider search ensured that studies spanning different age groups, including subgroups of older individuals, were not potentially missed. The data sources comprised Medline and Embase, searched from inception to 24/02/2016. Search terms (text words and subject headings) were drawn up for four search concepts: social factors, the European region [8], vaccination and uptake. The search included articles, letters and conference abstracts published in English. Additionally, reviews of vaccine uptake (worldwide from the last five years) were searched to identify further European studies. The detailed search strategy is provided in Appendix-1. Reference lists of all eligible studies and reviews were also searched.

To identify social factors associated with vaccine uptake, we adapted the conceptual framework developed by the World Health Organisation's Commission on Social Determinants of Health (Appendix-2) [7] for tackling health inequalities globally. This framework provides a comprehensive approach for identifying complex relationships between social factors and inequality, and how to plan and implement interventions. We sought evidence for social factors relevant at an individual level or provided insight into individuals' environment that could assist healthcare providers to target specific social groups for equitable healthcare delivery. The following factors were identified as possible determinants of vaccine uptake: country of birth, religion, urban/rural residence, marital status, living arrangements (living with others versus living alone), and socio-economic position (education, income (individual or household), type of health insurance, area-level socio-economic status (SES), social class/occupation). For the purposes of this review, we did not examine factors that were possible mediators of the main factors of interest: knowledge, attitude and beliefs, access to healthcare and health status/co-morbidities (Appendix-2).

The titles and abstracts of the records retrieved were screened for full text assessment based on *a priori* inclusion criteria (Appendix 3). Studies reporting the effect of one or more social factor of interest on vaccine uptake amongst individuals aged ≥60 years from Europe [8] were potentially eligible. The outcome was any routine vaccination programme and/or one-off vaccination such as pandemic mass vaccinations or catch-up vaccinations; travel or occupational health vaccinations were excluded. Eligible study designs comprised cross-sectional, ecological, case-control or cohort studies. We further restricted to studies that quantified the relationship between social factors of interest with vaccine uptake by either reporting relative risks or providing raw data

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