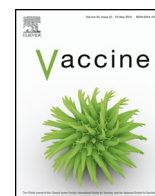


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Vaccine

journal homepage: www.elsevier.com/locate/vaccineStrategies for addressing vaccine hesitancy – A systematic review[☆]

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ABSTRACT

The purpose of this systematic review is to identify, describe and assess the potential effectiveness of strategies to respond to issues of vaccine hesitancy that have been implemented and evaluated across diverse global contexts.

Methods: A systematic review of peer reviewed (January 2007–October 2013) and grey literature (up to October 2013) was conducted using a broad search strategy, built to capture multiple dimensions of public trust, confidence and hesitancy concerning vaccines. This search strategy was applied and adapted across several databases and organizational websites. Descriptive analyses were undertaken for 166 (peer reviewed) and 15 (grey literature) evaluation studies. In addition, the quality of evidence relating to a series of PICO (population, intervention, comparison/control, outcomes) questions defined by the SAGE Working Group on Vaccine Hesitancy (WG) was assessed using Grading of Recommendations Assessment, Development and Evaluation (GRADE) criteria; data were analyzed using Review Manager.

Results: Across the literature, few strategies to address vaccine hesitancy were found to have been evaluated for impact on either vaccination uptake and/or changes in knowledge, awareness or attitude (only 14% of peer reviewed and 25% of grey literature). The majority of evaluation studies were based in the Americas and primarily focused on influenza, human papillomavirus (HPV) and childhood vaccines. In low- and middle-income regions, the focus was on diphtheria, tetanus and pertussis, and polio. Across all regions, most interventions were multi-component and the majority of strategies focused on raising knowledge and awareness. Thirteen relevant studies were used for the GRADE assessment that indicated evidence of moderate quality for the use of social mobilization, mass media, communication tool-based training for health-care workers, non-financial incentives and reminder/recall-based interventions.

Overall, our results showed that multicomponent and dialogue-based interventions were most effective. However, given the complexity of vaccine hesitancy and the limited evidence available on how it can be addressed, identified strategies should be carefully tailored according to the target population, their reasons for hesitancy, and the specific context.

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1. Introduction

20
21 **Q2** The dynamic and challenging period of indecision around
22 accepting a vaccination – often referred to as “vaccine
23 hesitancy”³ – is being increasingly studied. Given the growing

24 concern in many countries about vaccine hesitancy, the Strategic
25 Advisory Group of Experts (SAGE) Working Group (WG) on Vaccine
26 Hesitancy⁴ asked that a review focused on strategies to address
27 hesitancy be undertaken.

28 The purpose of this systematic review was to identify strategies
29 that have been implemented and evaluated across diverse
30 global contexts in an effort to respond to, and manage, issues
31 of vaccine hesitancy. This review was conducted to inform the

[☆] Some of the authors are World Health Organization staff members. The opinions expressed in this article are those of the authors and do not necessarily represent the decisions, official policy or opinions of the World Health Organization.

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² Members of SAGE Working Group on Vaccine Hesitancy are listed in [Appendix](#).

³ Vaccine hesitancy “refers to delay in acceptance or refusal of vaccines despite availability of vaccination services. Vaccine hesitancy is complex and context

specific varying across time, place and vaccines. It includes factors such as complacency, convenience and confidence” (WHO SAGE meeting, October 2014).

⁴ http://www.who.int/immunization/sage/sage_wg_vaccine_hesitancy_apr12/en/ [accessed 02.02.15].

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recommendations of the SAGE WG, building on the previous review of determinants of vaccine hesitancy [1].

2. Methods

2.1. Search strategy

For the peer-reviewed literature, the following databases were searched for the period of January 2007–October 2013: Medline, Embase, PsychInfo, Cochrane, CINAHL Plus, Web of Science, LILACS, Africa-Wide Information (for these, the search range was 2007 to 9 October 2013); IBSS (2007 to 19th July 2013) and IMEMR (2007 to 10 October 2013). The applied search strategy was kept deliberately broad to try to capture the multiple facets of vaccine hesitancy and incorporated MeSH or equivalent terms [Appendix 1]. References in relevant papers were searched for further relevant studies.

For grey literature, an open-dated search ending, in October 2013, was conducted across several databases and organizational websites, which included: OpenGrey, New York Academy of Medicine, Global Health, National Institute for Health and Care Excellence (NICE), Department for International Development (DFID), the Communication Initiative Network and the Polio Communication Initiative Network [see search terms in Appendix 2]. Direct email requests were sent to individuals/organizations identified by the SAGE WG.

2.2. Study selection – Part A (Identification, scope of literature and effect of evaluated interventions)

For peer-reviewed literature, studies were included against the following criteria: (i) contained research on vaccine hesitancy; (ii) included any of the keywords in the title or abstract: “strateg*”, “intervent*”, “campaign”, “evaluation”, “approach” or “program*”; (iii) described or evaluated an intervention addressing hesitancy and reported a measure of the primary outcome, i.e. indicating a change in vaccination uptake or the secondary outcome, i.e. indicating a change in knowledge/awareness and/or attitudes; (iv) published between January 2007 and October 2013; (v) pertaining to any vaccines and vaccination programmes; (vi) published in any of the six official UN languages (Arabic, Chinese, English, French, Russian and Spanish).

Grey literature was selected based on the following inclusion criteria: (i) contained any of the keywords

“immunisation/immunization”, “vaccine”, “vaccination”, “strategy”, “intervention”, “evaluation”, “hesitancy”, “refusal”, “trust”, “confidence”, “acceptance”, “engagement”, “anxiety”, “concern”, “distrust”, “barrier”, “rejection”, “fear”; (ii) published anytime up to October 2013; (iii) English only. Literature was excluded if it was: (i) about non-human vaccines or vaccines not currently available (e.g. HIV); (ii) related to research and development of vaccines (e.g. efficacy trials) unless explicitly about public trust, confidence, concern or hesitancy.

The screening of titles and abstracts was shared between at least two authors; a sample of studies was independently coded by authors to ensure consistency.

2.3. Data extraction

2.3.1. Part A

A data extraction form was developed by the authors and reviewed by the SAGE WG. For evaluation studies, information extracted included details about the specific hesitancy issue; type of intervention (dialogue-based, incentive-based, reminder–recall

based or multi-component), the type of participants, setting and target vaccine; and the findings related to the outcomes of interest.

2.3.2. Part B (PICO & GRADE) – Study selection, risk of bias & analysis

The SAGE WG identified 15 PICO (Population, Intervention, Comparator, Outcome) questions [2] [Appendix 3] *a priori*, to examine population features likely to influence the effect of different interventions and to assess the quality of evidence for each PICO question using GRADE (Grading of Recommendations, Assessment, Development, and Evaluation) [3]. The primary outcome of interest was defined as the uptake of all vaccines included in routinely recommended immunization.

The 15 PICO questions were developed under three intervention themes: (1) Dialogue-based, (2) incentive-based (non-financial), and (3) reminder–recall. Following an extensive discussion by the WG at the December 2013 meeting, it was decided to focus on the impact of single component approaches and exclude multi-component approaches. However, data were included where a multi-component intervention provided suitable data to assess the effect of its individual component parts.

Theme categories for PICO questions:

- i) **Dialogue-based**, including the involvement of religious or traditional leaders, social mobilization, social media, mass media, and communication or information-based tools for health-care workers (HCW);
- ii) **Incentive-based (non-financial)**, including the provision of food or other goods to encourage vaccination, and;
- iii) **Reminder/recall-based**, including telephone call/letter to remind the target population about vaccination.

Evaluated primary studies identified earlier (Part A) were included if they provided direct evidence relevant to one or more PICO questions and reported data for comparison groups. Reasons for excluding studies are presented in *Characteristics of excluded studies* [4].

2.3.3. Assessment of risk of bias

The Effective Public Health Practice Project (EPHPP) quality assessment tool for quantitative studies [5] was applied to determine the risk of bias of all eligible studies. Two reviewers independently conducted the risk of bias assessment and data extraction; disagreements were settled through discussion.

2.3.4. Data analysis

For studies which included pre- and post-control and intervention groups, only post-data were used to more accurately represent the effect of the intervention. Outcomes reported varied between studies, so available data were entered into *Review Manager* software as individual studies. The fixed-effects model was used for analysis and results reported as risk ratios between intervention and control groups.

3. Results

3.1. Part A – Identification, scope of literature and effect of evaluated interventions

The search of peer reviewed publications identified 33023 peer reviewed articles. After removing duplicates and screening for inclusion criteria, 1149 articles were included by full-text. Of these, 166 [6–172] evaluated and 983 described, but did not evaluate, an intervention. Among the evaluated studies included from the peer reviewed literature, 115 related to Outcome 1, 37 to Outcome 2, and 14 to both [Fig. 1].

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