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Review

Using behavior change frameworks to improve healthcare worker influenza vaccination rates: A systematic review

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ABSTRACT

Background: Influenza vaccination of healthcare workers (HCW) is important for protecting staff and patients, yet vaccine coverage among HCW remains below recommended targets. Psychological theories of behavior change may help guide interventions to improve vaccine uptake. Our objectives were to: (1) review the effectiveness of interventions based on psychological theories of behavior change to improve HCW influenza vaccination rates, and (2) determine which psychological theories have been used to predict HCW influenza vaccination uptake.
Methods: MEDLINE, EMBASE, CINAHL, PsycINFO, The Joanna Briggs Institute, SocINDEX, and Cochrane Database of Systematic Reviews were searched for studies that applied psychological theories of behavior change to improve and/or predict influenza vaccination uptake among HCW.
Results: The literature search yielded a total of 1810 publications; 10 articles met eligibility criteria. All studies used behavior change theories to predict HCW vaccination behavior; none evaluated interventions based on these theories. The Health Belief Model was the most frequently employed theory to predict influenza vaccination uptake among HCW. The remaining predictive studies employed the Theory of Planned Behavior, the Risk Perception Attitude, and the Triandis Model of Interpersonal Behavior. The behavior change framework constructs were successful in differentiating between vaccinated and non-vaccinated HCW. Key constructs identified included: attitudes regarding the efficacy and safety of influenza vaccination, perceptions of risk and benefit to self and others, self-efficacy, cues to action, and social-professional norms. The behavior change frameworks, along with sociodemographic variables, successfully predicted 85–95% of HCW influenza vaccination uptake.
Conclusion: Vaccination is a complex behavior. Our results suggest that psychological theories of behavior change are promising tools to increase HCW influenza vaccination uptake. Future studies are needed to develop and evaluate novel interventions based on behavior change theories, which may help achieve recommended HCW vaccination targets.

1. Introduction

Vaccination of healthcare workers (HCW) against influenza is an important patient safety initiative recommended by health authorities and national organizations [1]. Influenza vaccination protects both HCW and patients, and is a cost-effective preventative measure [2,3]. However, HCW influenza vaccination rates remain suboptimal despite aggressive campaigns incorporating numerous strategies. In the United States, 61.5–72.0% of HCW reported being vaccinated against influenza in the 2012–2013 season [1]. Similar

Abbreviations: HCW, Healthcare worker; HBM, Health Belief Model; TBP, Theory of Planned Behavior; RPA, Risk Perception Attitude Model; BIM, Behavioral Intention Model.

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trends have been observed in Canada, with 50% of hospital HCW and 74% of long-term care facility HCW receiving influenza vaccinations in the 2012–2013 season [4]. European Union data is also concerning with HCW vaccination rates ranging 6–54% [3]. The health and safety of patients and HCW remains at risk without effective interventions to increase HCW vaccination uptake.

Improvement of patient safety using behavior change theories as frameworks for designing interventions to increase HCW vaccination rates should be evaluated. Behavior change theories provide a framework to understand and influence specific health behaviors, including HCW influenza vaccination behavior. Numerous facilitating factors and barriers to HCW influenza vaccination have been identified [5–7]. However, there appears to have been relatively little emphasis on the use of behavioral psychology and health behavior change theories to inform interventions aimed at improving vaccine uptake. Healthcare institutions have relied on employing a variety of interventions to increase influenza vaccination such as reminders, education, incentives, promotion in the workplace, and easy access to free vaccination [8,9]. These initiatives have only resulted in small increases in HCW vaccination rates [10,11]. To date, the literature has not systematically examined whether interventions based on psychological theories can be an effective strategy to improve HCW vaccination rates.

The primary objective of this systematic review was to determine the effectiveness of interventions based on psychological frameworks of behavior change to improve HCW vaccination rates. The secondary objective was to determine which psychological frameworks have been used to predict HCW vaccination rates, including facilitators and barriers, as these may be used to develop and implement novel interventions in the future to improve vaccination rates.

2. Methods

2.1. Search strategy

Electronic databases were searched using a defined literature search strategy (Appendix A) developed by a team of experienced librarians. Relevant publications were obtained via searches of MEDLINE, EMBASE, CINAHL, PsycINFO, The Joanna Briggs Institute, SocINDEX, and Cochrane Database of Systematic Reviews from database inception to June 5th, 2014. Reference sections of included studies and relevant review papers were hand-searched for additional eligible studies.

2.2. Eligibility criteria

Randomized controlled trials, non-randomized controlled trials, time series, controlled before-after studies, quasi-experimental studies (including uncontrolled before-after), and qualitative or quantitative cross-sectional studies that applied a psychological theory of behavior change to improve and/or predict HCW influenza vaccination rates were considered for inclusion. Given the Medical Research Council's guidance that complex behavioral interventions should be based on theory [12], studies that did not explicitly name a psychological theory were excluded at the full text phase. When no theory was explicitly named in the title or abstract of an article, the article full text was retrieved and reviewed. The study population had to consist of HCW, but the HCW could be from any HCW group (e.g., physicians, nurses, allied health practitioners, technicians). Medical and nursing students were included in the definition of HCW. Studies conducted in any healthcare setting, including acute care and long-term care, were included. All studies had to include influenza vaccination rates as an outcome. Only published, peer-reviewed studies were included; studies published solely in abstract form were excluded. Studies were excluded if they were not published in English or if they did not provide primary data.

2.3. Data extraction and coding

All articles captured by the search protocol were screened to remove duplicate entries. Titles and abstracts of the remaining works were independently assessed for eligibility by two reviewers (D.H. and D.Y.). If the title/abstract were insufficient to determine eligibility, the full text was reviewed. Disagreements were resolved by consensus following a discussion with a third reviewer (K.C.).

A data extraction form was developed and piloted for use in this study. Using this form, two reviewers (D.H. and D.Y.) independently assessed each full-text article and extracted the relevant information, including study methodology, setting, participants, psychological theory, intervention, predictors of vaccination, and outcomes. Disagreements were resolved by a third reviewer (K.C.) if the two primary reviewers could not reach consensus.

2.4. Risk of bias assessment

Risk of bias for each included study was assessed independently by two investigators (K.C. and D.H.) using the Public Health Ontario Meta QAT tool to guide the critical appraisal process. Risk of bias for Corace et al. [13] was assessed separately by impartial reviewers (J.A.S. and D.H.).

3. Results

The literature search yielded a total of 1810 publications from all data sources; 10 articles met inclusion criteria (Fig. 1). All included studies used psychological frameworks to predict HCW vaccination behavior. None of the studies that met inclusion criteria evaluated interventions to increase HCW influenza vaccination rates based on a psychological theory of behavior change. It was not possible to perform meta-analysis due to heterogeneity in study design and outcomes.

3.1. Study characteristics

Ten peer-reviewed, primary data, studies were included in this review (Table 1). The locations in which the studies were completed were geographically diverse, with studies being conducted in Australia, Canada, Israel, Greece, the Netherlands, and the United States. The definition of HCW was found to be representative of staff in hospital care settings; however the majority of studies relied on HCW in nursing roles as participants. Two studies consisted solely of nursing students [14,15].

Self-reported influenza vaccination uptake was the primary outcome variable measured, although some studies also incorporated an objective measure of vaccination uptake in the form of hospital vaccination records [13,16]. The majority of studies examined HCW vaccination for seasonal influenza virus, although Corace et al. investigated pandemic (pH1N1) influenza vaccination [13]. The Health Belief Model (HBM) was the most common behavioral framework, applied in 60% of the studies identified [13,15,17–20]. Two studies used the Theory of Planned Behavior (TPB) [14,16] while the remaining used the Triandis Model of Interpersonal Behavior [21] and the Risk Perception Attitude framework (RPA) [22].

3.2. Health Belief Model

The Health Belief Model (HBM) [23] has been applied to a broad range of health behaviors. This framework has been used to

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