Commentary

A response to Fu et al.’s “Educational interventions to increase HPV vaccination acceptance”

Gilla K. Shapiro a, b, *, Keven Joyal-Desmarais b, Samara Perez a, b, Zeev Rosberger a, b

a Department of Psychology, McGill University, 1205 Dr. Penfield Avenue, Montreal, Quebec H3A 1B1, Canada
b Lady Davis Institute for Medical Research, Jewish General Hospital, 4333 Côte St-Catherine Road, Montreal, Quebec H3T 1E4, Canada

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A B S T R A C T

This commentary is a response to a systematic review, recently published in Vaccine, which investigates the effectiveness of educational interventions in increasing uptake of the human papillomavirus vaccine. The systematic review by Fu et al. (2014) enhances the field’s understanding of human papillomavirus vaccine interventions; however, their review contains a number of conceptual and methodological limitations. This commentary begins by addressing these limitations. We then address the importance of studying human papillomavirus vaccine interventions in diverse populations, and conclude by making recommendations for future research.

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1. Introduction

In an attempt to better understand the effectiveness of educational interventions in increasing human papillomavirus (HPV) vaccine uptake, Fu and colleagues (2014) conducted a systematic review of the literature [1]. Their paper usefully synthesizes the literature and illuminates the state of research in the field. However, Fu et al.’s (2014) systematic review contains a number of limitations and research gaps that we would like to address. We also suggest directions for future research.

2. Methodological considerations

Fu et al.’s (2014) search did not capture a number of studies that are within their stated scope. For example, one study by Marek et al. (2012) [2] evaluated changes in attitudes towards vaccination as a result of an in-school education intervention among Hungarian male and female students. Another study by Gerend et al. (2013) [3], investigated changes in vaccination intentions among young American women as a result of receiving a tailored message about HPV vaccination. The inclusion of these studies would have made their review more complete. Systematic reviews aim to reduce all potential bias that could influence what we glean from the extant literature about health interventions as well as the recommendations we make for future research. For example, a central conclusion from Fu and colleagues study is that future studies “should focus on culturally-competent interventions to reach a more diverse population” (p.1918) [1]. However, if a number of culturally diverse studies were excluded, like that of Marek et al.’s (2012) study in Hungary, perhaps this is not as central a concern as Fu and colleagues report.

Further, the dates of Fu et al.’s (2014) search span from 1946 to (August) 2013. We question the merit of including interventions that were evaluated pre-licensure of the vaccine (e.g. pre-2006 among American women). Before the vaccine was licensed, ‘uptake’ was not a possible outcome, and pre-licensure ‘intentions’ or ‘attitudes’ were unlikely a valid proxy of implementation since getting vaccinated was not a realistic possibility. Approximately one third of studies included in Fu et al.’s (2014) [1] review were conducted pre-licensure, and this may confuse rather than elucidate current knowledge in the field. Although Fu and colleagues usefully established priority levels for their outcome measures when studies reported multiple outcomes (i.e. uptake was preferred to intentions which was preferred to attitudes), it is not clear in their paper that this factor was considered when they assessed the quality of included studies (Table 1) [1]. Furthermore, we feel that the issue of pre-licensure is an important limitation that could have been beneficially addressed in the discussion of their results.

* Corresponding author at: Institute of Community and Family Psychiatry (ICFP), Jewish General Hospital, 4333 Côte St-Catherine Road, Montreal, Quebec H3T 1E4, Canada. Tel.: +1 514 340 8222x3978.
E-mail address: gilla.shapiro@mail.mcgill.ca (G.K. Shapiro).

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Fu et al. (2014) investigated three possible outcomes: uptake, intention to vaccinate, and attitudes. In the HPV vaccine literature, as in Fu et al. (2014), the term ‘attitude’ is rarely defined or discriminated from other overlapping concepts (e.g. beliefs). As such, the term may represent multiple different constructs. Some of these, such as the perceived need for getting the vaccine, have frequently been identified as predictors of vaccine acceptance [4]; while others, such as fears of one’s child being more promiscuous after receiving the vaccine, have resulted in mixed findings [5]. It would have been useful for Fu and colleagues to operationalize this outcome variable rather than combining potentially diverse factors under the umbrella term of ‘attitudes’.

We also question Fu and colleagues’ organization of their results into three categories: (1) parental education, (2) adolescent/young adult education, and (3) comparative message persuasiveness. These categories, which mix populations and messaging, are not mutually exclusive and occasionally lead to a counterintuitive classification of studies. For example, the study by Krawczyk et al. (2012) is reported in category (2) rather than (3) even though they examine the efficacy of two educational interventions (i.e. HPV video and written HPV pamphlet) and they compare the written pamphlet about HPV and the vaccine to a more general (control) pamphlet about cancer prevention strategies [6]. Fu and colleagues do explain that in cases where studies fall in both category (2) and (3), as in the case Krawczyk et al. (2012), that these studies would be categorized by group (i.e. category 1 or 2) rather than message persuasiveness (i.e. category 3). The study by Krawczyk et al. (2012) was therefore categorized correctly according to Fu and colleagues’ own criteria. However, we believe that Fu and colleagues’ categorization system becomes problematic when a study’s focus was to examine message persuasiveness (as was the case in Krawczyk et al., 2012), but because this study is categorized elsewhere, the study’s results on message persuasiveness are not adequately considered alongside other studies. Future reviews may wish to include overlapping studies in all relevant categories in order to reduce the risk of being ‘out of sight and out of mind’. Alternatively, future systematic reviews may choose to narrow down their research question so to avoid substantial overlapping of their categories.

An important aspect of a systematic review is appraising the quality of studies that are included in the review. It is unclear from the review by Fu et al. (2014) which studies were classified as containing a ‘low risk of bias’. In addition, Fu and colleagues did not evaluate the funding of studies or include this in their quality appraisal, which is an important source of bias, especially in research concerning pharmaceutical agents such as vaccines [7].

Finally, systematic reviews have become increasingly important in health care. To maximize their utility, the Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA) formed guidelines to improve the quality of reviews [8]. Though many authors conducting systematic reviewers do not use the PRISMA guidelines, it is considered good practice for researchers to make their protocol publicly accessible to promote transparency and prevent duplication of resources [8]. Fu and colleagues usefully include a number of components of the guidelines; however, it would have also been helpful for Fu and colleagues to register their protocol and incorporate other helpful components of the PRISMA guidelines.

3. Extending the discussion to diverse populations

In the literature on HPV vaccine education interventions, population diversity is often neglected. Fu and colleagues particularly recognize one excluded population: the less educated. They explain that “[m]ost studies [included in their review] involved populations with higher educational attainment and most interventions required participants to be literate” (p.1901) [1]. This is an insightful disclosure on educational level and social economic status; however, we feel that Fu et al. (2014) should have gone further and discussed other groups that are also overlooked in this literature.

Fu and colleagues do not adequately consider gender differences in their review. For example, they incorrectly label Lloyd et al.’s (2009) study as conducted among boys and girls (Table 3), whereas their study was only conducted among girls [9]. Furthermore, in Table 4, they (confusingly) label Cox et al.’s (2010) study population as “mothers of children” rather than “mothers of girls” [10], leading them to incorrectly classify this study (in section 3.5) as one of two studies that included “parents of boys and girls”. In fact, from Fu and colleagues’ analysis (Tables 2–4) it is apparent that at least three studies in the literature targeted parents of both girls and boys [11–13]. Nevertheless, it is evident that few studies address gender differences. Future research should examine the impact of interventions that target boys and parents of boys (including fathers in addition to mothers) [14], and consider subgroup differences that are particular to this population (e.g. interventions targeting men who have sex with men) [15].

Vaccine uptake also differs by race and ethnicity [16]. However, in the literature (and Fu and colleagues’ analysis), racial and ethnic data were not reported consistently, which makes it difficult to analyze and comment upon. For example, both Dempsey et al. (2006) [12] and Kennedy et al. (2011) [17] provide information on the racial composition of their studies, but Fu and colleagues only report race for Dempsey et al. (2006) (Table 2). Furthermore, in the aforementioned example, Kennedy et al. (2011) provide the breakdown of their ‘non-white’ category (see Table 1 of their paper) [17], but they explain that they are not able to report differences in HPV vaccination outcomes between the intervention and control groups by race due to ‘small cell sizes’, and it is therefore possible that Black, Asian and Hispanic individuals differ in meaningful ways. Indeed, studies and reviews must set out to evaluate and clearly report information on race and ethnicity.

In their review, Fu and colleagues usefully explain that intervention evaluations have predominantly occurred within the U.S. population. However, though understandable, it merits acknowledging that the exclusion of non-English studies is a barrier to understanding successful interventions in other countries (e.g. see work published in Korean by Lee and Kim, 2011) [18].

4. Recommendations for future research

Although Fu et al. (2014) provide some useful criticisms of the literature they reviewed, they did not specify a comprehensive direction for future research. Firstly, future research must address the methodological shortcomings that are currently pervasive in the literature. For example, studies often used a short time-frame design. We would instead recommend that future research investigate the longitudinal effect of educational interventions on direct behavioural outcomes (i.e. vaccine uptake and completion rather than attitudes and intentions). It is also important to utilize sample sizes that are large enough to ensure adequate statistical power to test the effect of the intervention. Problematically, many intervention evaluations also did not include a control group. Furthermore, future studies should also report the components of their intervention more comprehensively. Indeed, due to insufficient details it would be difficult to replicate many of the evaluated interventions.

It would also be useful for future research to use theoretical frameworks to guide the development and evaluation of their intervention. In addition, it would be beneficial to replicate studies to confirm effectiveness of an intervention in multiple populations.

Future research must also expand the scope of interest. The field, including Fu et al.’s (2014) review, has generally overlooked vaccine completion as an outcome variable. As the HPV vaccine requires multiple doses, and this is pertinent for effectiveness [19].
it becomes important to evaluate interventions that promote completion (e.g. see Kharbanda et al., 2011) [20], as well as initial uptake. In addition, similar to Fu and colleagues, we call for future studies to determine the effectiveness of interventions on samples that are representative of the general public. This notably includes investigating samples outside the university setting; but it also includes diverse populations spanning both developed and developing countries. Furthermore, evaluated interventions that exclusively target adolescent boys or parents of boys are scarce. In addition, despite the acknowledgement that healthcare providers influence vaccine uptake outcomes, there is a paucity of evaluations of interventions that target physicians [21,22], and fewer still that compare the effectiveness of clinician-focused interventions to family-focused interventions [23].

It is also important to improve our understanding of the critical ingredients of HPV vaccine interventions. For example, it would be helpful to understand what factors (such as social norms, financial incentives, perceived harms, or perceived benefits) mediate the effects of an intervention on uptake. It would also be helpful to compare educational formats and foci in order to improve interventions in the future and ensure that interventions do not inadvertently increase misperceptions or reduce uptake [24].

Lastly, the systematic review of Fu et al. (2014) terminated on August 20, 2013. As this field is rapidly expanding, we believe regular updates of the literature and a systematic review that incorporates recent high-quality publications is merited.

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