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Review Article

Interventions to improve the uptake of cervical cancer screening among lower socioeconomic groups: A systematic review

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ABSTRACT

Cervical cancer is the fourth most common cancer in women worldwide. Screening can reduce both the incidence and mortality of the disease but is often not utilized by lower socioeconomic groups. A systematic review, including studies of interventions to improve breast and cervical cancer screening uptake, up to 2006, found targeted interventions could be effective. A formal update has been conducted on the effectiveness of interventions to improve the uptake of cervical cancer screening among lower socioeconomic groups.

A systematic computerized literature search was undertaken in June 2016 for relevant papers published since 2006. Data was extracted on study participants, setting, intervention and control using a predefined extraction tool and a full quality assessment was undertaken using the Cochrane risk of bias tool.

This update yielded 16 studies of mixed quality, in addition to the 13 studies from the original review. The interventions were categorized into local interventions including HPV self-testing, lay health advisors, inreach, outreach and mixed, and strategies enhancing attendance within an organized program. This review has found two large, randomized controlled trials for the use of HPV self-testing to increase cervical screening uptake. Both reviews have found varying success using lay health advisors, with the majority of included papers reporting a statistically significant increase in screening uptake.

HPV self-testing can improve uptake of cervical cancer screening among lower socioeconomic groups. This is a relatively new method of cervical screening that was not included in the earlier review. The findings of this updated review largely support that of the 2006 review for the use of lay health advisors.

1. Introduction

Cervical cancer is the fourth most common cancer in women worldwide, with an estimated 528,000 cases diagnosed in 2012. Around 85% of all diagnoses and 90% of all deaths from cervical cancer occur in less developed regions (World Health Organisation, 2016). It is potentially one of the most preventable cancers due to its simple detection by smear and prolonged pre-malignant stage. Screening with Papanicolaou cytology (Pap-smear) is used worldwide and aims to detect and treat pre-cancerous dysplasia before progression to invasive carcinoma (Everett et al., 2011). Screening has markedly decreased cervical cancer rates in high-income countries, particularly when nationwide screening is implemented (Sancho-Garnier et al., 2013; van der Aa et al., 2008; Raffle et al., 2003). It is widely accepted that cervical cancer screening is the most important public health intervention to reduce both the incidence and mortality of the disease (Peirson et al., 2013).

While rates of screening have increased in recent years, there is a marked disparity in the uptake of screening between different socioeconomic groups (Spadea et al., 2010). In countries where coverage and quality of screening are poor, the incidence of cervical cancer is stable or even increasing (Vaccarella et al., 2013). In countries with established screening programs, lower socioeconomic groups have a much lower screening uptake than the national average, even when screening is provided free of charge (Akinlotan et al., 2017). Such groups include ethnic minorities, those living in rural areas and women on low income (Limmer et al., 2014). Barriers to screening in these groups can be divided into personal and structural impediments. Personal barriers include cultural beliefs, reluctance to undergo a clinical gynecological examination and recent immigration status (Sancho-Garnier et al., 2013; Spadea et al., 2010; Fang et al., 2007). Structural barriers include perceived cost, taking time off work, lack of transport and difficulty navigating healthcare systems (Agurto et al., 2004).

A systematic review by Spadea and colleagues of interventions to improve cervical and breast cancer screening among lower socioeconomic groups found that population-screening programs are

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unlikely to have a major impact on reducing socioeconomic inequalities in uptake, although better than spontaneous testing or no intervention. The review highlighted the great potential of targeted interventions in increasing screening uptake among lower socioeconomic groups. It concluded that such interventions were more effective when based on theoretical models combined with in-depth knowledge of the targeted population. It suggested that any financial or geographical barriers should be addressed; that in organized population programs, physicians should play a key role in promoting cervical cancer awareness; and that use of a complex invitation letter should be avoided, as this was likely to attract those from higher social classes and discourage those from lower classes (Spadea et al., 2010).

Despite the important findings, the review by Spadea and colleagues only included studies up to 2006; and it synthesized evidence pertinent to both cervical and breast cancer screening. As such, this review, building on Spadea and colleagues' work, aims to provide up-to-date evidence on effective interventions to improve uptake of cervical cancer screening specifically among lower socioeconomic groups.

2. Methods

2.1. Overview

The original review evaluated programs, strategies and interventions to improve both cervical and breast cancer screening uptake. It included RCTs, quasi-RCTs and longitudinal observational studies, which were categorized as follows:

I. Implementation of organized population programs, where studies included data on effects on various socioeconomic groups.
II. Different strategies of enhancing attendance within an organized program, where subgroup analysis included lower socioeconomic groups.
III. Local interventions targeted at lower socioeconomic groups.

This updated review focuses exclusively on evidence pertinent to cervical cancer screening uptake. It restricts study types to RCTs and quasi-RCTs in order to provide a robust assessment of specific interventions. It includes only studies in categories II and III as defined above in the original review. Data from both reviews will be combined together in analysis and synthesized to generate new findings.

A protocol was developed and registered in the PROSPERO register of systematic reviews (Jones et al., 2016). The reporting of this systematic review follows the recommendations of the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) statement (Moher et al., 2009).

2.2. Literature search strategy

A search was undertaken using MEDLINE, CINAHL, EMBASE and the Cochrane Register of Controlled Trials (CENTRAL) using a similar search strategy to the original review. The search was checked and amended by the University of Hull library services (Box 1). Each database was searched from January 2006 to June 2016. Grey literature was searched using the OpenGrey database. Citations of all potentially relevant reviews and research papers were hand-searched. No language restrictions were applied to the database searches.

2.3. Eligibility criteria

Studies had to meet three inclusion criteria: studies should be RCTs or quasi-RCTs; include women eligible to participate in a cervical cancer screening program; targeted at women of lower socioeconomic status, based on race, ethnicity, income and/or geographical area. For studies conducted in high-income countries, as defined by the World Bank (World Bank Group T, 2017), the paper had to state that the targeted population were considered to be of lower socioeconomic status. Studies conducted in upper-middle-income countries were only excluded if the intervention was targeted at a population deemed to be of a higher socioeconomic status. All studies conducted in lower-middle-income countries or below were eligible and did not need to state that the intervention was targeted at a specific group. The comparator or control in the studies included another intervention or a non-exposed control group. The primary outcome was the rate of uptake or non-uptake of cervical screening. Secondary outcomes included sustainability and cost-effectiveness of these approaches.

2.4. Study selection

Two reviewers (IR and DJ) independently screened the title and abstract of all articles identified by the search to determine eligibility. Full texts were obtained for all potentially relevant articles and were independently assessed by each author to determine eligibility. Final inclusion was determined by agreement between both reviewers. If no consensus was reached, a third author was consulted (HC).

2.5. Data extraction

Two reviewers (IR and DJ) independently extracted data from included articles using a predefined data extraction form. Data were extracted on study participants (age, reason for being included in study and setting), study inclusion and exclusion criteria, intervention and control, and study outcomes.

2.6. Quality assessment

A full quality assessment of the included studies was undertaken using the Cochrane's risk of bias tool detailed in the Cochrane handbook (Higgins & Green, 2011) (Table 2).

3. Results

3.1. Literature search results

A total of 500 papers were screened from the initial search and a further 12 studies identified through citation searching. Following removal of duplicates, and title and abstract screening, 54 full text articles were reviewed by the first two authors, of which 16 studies met the inclusion criteria and were included in the final analysis (Fig. 1).

The sample size of the studies ranged in size from 102 to 25,061 participants. Studies were conducted in two high-income countries (US and France) and three upper-middle-income countries (Mexico, US Territory of American Samoa and Thailand).

In the original review three studies were classified under Category II – strategies of enhancing attendance within an organized program. This review did not yield any studies relevant to this category. The original review also yielded 10 relevant studies to Category III – local interventions targeted at lower socioeconomic groups – and divided them into four subgroups: (a) in-reach strategies, including interventions directed at healthcare providers or patients belonging to a healthcare provider; (b) outreach strategies, involving only mailed information and/or telephone calls; (c) interventions led by lay health advisors (LHAs), with a focus on community-based education; (d) mixed strategies, a combination or comparison of the above. The studies in this review have been categorized using the same subgroups (Table 1). Two studies did not fit into any of the four subgroups, so a new subgroup has been created with the title ‘HPV self-testing’.

Due to the differing nature of the populations, interventions and contexts, it was not possible to undertake any meta-analyses, so a narrative synthesis approach was taken. Overall the risk of bias is mixed with most studies including some areas at high risk of bias, see Table 2.