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SUBSTANTIVE REVIEW

Interventions for Increasing HIV Testing Uptake in Migrants: A Systematic Review of Evidence

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Abstract Migrants have been identified as being at greater risk for late HIV testing and diagnosis. Late diagnosis is of concern because timely diagnosis and initiation of treatment can both optimise health outcomes and reduce transmission. We reviewed and evaluated interventions that aimed to increase HIV testing uptake in migrant populations. Of 6511 papers retrieved, 10 met the inclusion criteria and were included in the review. Three types of interventions were identified (exposure to HIV prevention messages, HIV education programs, and direct offer of testing). All interventions were based on individual models of behaviour change targeting migrants or GPs. While important, interventions that also address broader health system and structural factors that contribute to late HIV-diagnosis in at-risk members of migrant populations are needed. Integrating PITC into existing primary healthcare settings shows promise of creating an enabling environment within patient-doctor relationships that can encourage HIV testing uptake among migrant populations.

Resumen Los inmigrantes tienen mayor riesgo de ser diagnosticados tardíamente con VIH. Esto preocupa ya que un diagnóstico y tratamiento oportunos permiten reducir la transmisión de la enfermedad y optimizar su manejo. Revisamos y evaluamos intervenciones encaminadas a aumentar el uso de las pruebas de detección del VIH en poblaciones de inmigrantes. De los 6511 artículos recuperados, 10 cumplieron los criterios de inclusión. Se identificaron tres tipos de intervenciones dirigidas a inmigrantes o Médicos Generales basadas en modelos individuales de cambio comportamental: exposición a mensajes de prevención, programas educativos y oferta de la prueba de detección. Es necesario intervenir factores estructurales y del sistema de salud que retrasan el diagnóstico del VIH en inmigrantes con riesgo. Integrar los servicios de detección y consejería (PITC en inglés) a los centros de atención primaria en salud es una forma propicia de fomentar la utilización de pruebas de detección en poblaciones de inmigrantes.

Keywords HIV/AIDS · HIV testing · Migrants · VCT · PITC · Prevention

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Introduction

The United Nations Population Fund reported that there are currently 244 million migrants living outside of their country of origin [1]. While not a new phenomenon, the processes of globalisation means that contemporary migration is happening at a faster speed and in greater numbers than previously, with migrants travelling with their cultural and epidemiological profiles [2]. Broadly speaking, migration can be categorised as internal and international. Our focus in this paper is international migration, and while there is no universally accepted definition for "migrant", the United Nations defines migrant as an individual who has resided in a foreign country for more than one year irrespective of the cause (voluntary or forced) or means (regular or illegal) for migration [3] and this is the definition we use in this paper. Many of these international migrants have moved countries for greater political and economic security,

and are often moving from lower and middle to higher income countries [2]. While often healthy when they first leave their country of origin, they are exposed to different vulnerabilities that affect their health and their access to healthcare throughout the migratory process, including in their country of destination [4, 5].

Research on international migrants conducted in the United States of America (USA), Australia, Europe and other high-income countries report higher rates of human immunodeficiency virus (HIV) among migrants from high HIV prevalence countries with generalised epidemics, compared to the general population of the host country. In Europe, while there has been significant decline in new infections diagnosed among migrants, migrant populations from countries with generalised endemics (mainly sub-Saharan Africa) have been recognised as one of the priority groups for HIV prevention and care, with heterosexual transmission as the predominant mode of HIV acquisition among this group [6, 7], compared to the host population where most HIV transmission is through men who have sex with men (MSM) [8]. In 2015, for example, 37% of new HIV diagnoses in the WHO European region were among migrants [8]. Of the HIV cases acquired through heterosexual contact, 37% were among people from sub-Saharan Africa countries [7]. In Belgium, sub-Saharan African migrants make up the second largest group affected by HIV and HIV prevalence was 6.1% among women and 3% among men of sub-Saharan African origin [9]. Importantly, there is evidence that a proportion of migrants, even those originating from high HIV prevalence areas, acquire HIV post-migration to European host countries which is indicative of their vulnerability from the moment of their arrival [8, 9]. In Australia, second only to MSM, people from migrant populations, principally from, or with sexual partners from, high HIV prevalence countries (above 1%) in South- and North-East Asia and Sub-Saharan Africa, are the most affected group, accounting for 36% of heterosexually transmitted diagnosed HIV cases in 2014 [10]. In the sub-Saharan African born population the rate of HIV notification has decreased by 50% since 2006, while the rate for those born in South-East Asia has fluctuated, with a sharp increase in 2014–2015 [10]. In 2015, the proportion of HIV notifications with late diagnosis was highest in those born in Sub-Saharan Africa (43%) and South-East Asia (40%) [10]. Approximately 60% of these had arrived in Australia within five years, suggesting HIV acquisition prior to arrival in Australia. HIV acquisition within Australia could, however, be underestimated, as migrants also travel back to their country of origin where they may be exposed to HIV (and other STIs) [10, 11].

Migrants living in low- and middle-income countries are also reported to have higher rates of HIV than their host counterparts. In South-East Asia, HIV prevalence among migrants in Thailand from Cambodia, Myanmar, southern China, and Vietnam is up to four times the HIV prevalence among the general population [12]. Of particular concern, is that migrant populations are also diagnosed late, partly due to sub-optimal testing practices [10, 13]. This is important because timely diagnosis and initiation of treatment can improve the quality of life and health outcomes for people living with HIV [14, 15]. At a population health level, earlier diagnosis may also translate to a reduced risk of transmission, both virally and behaviourally. An HIV positive individual on treatment will likely have a lower viral load, with reduced likelihood of further transmission of HIV. Those who are aware of their seropositive status may also be less likely to engage in high-risk sexual behaviour [16]. Late diagnosis also presents a challenge to the achievement of the 90–90–90 targets proposed by UNAIDS: by 2020, 90% of people with HIV should be aware of their infections, 90% of people diagnosed with HIV should be linked to antiretroviral treatment (ART), and 90% of those on ART should adhere and have undetectable levels of HIV in their blood [17].

A body of literature has shown that often migrants face significant challenges in accessing appropriate healthcare in their receiving countries [18–21]. These challenges relate to patient, doctor, health system and broader structural barriers that create inequalities in access to healthcare services and health outcomes. Such challenges include disparities in socio-economic status, linguistic and communication difficulties, lack of cultural sensitivity in the types of services provided, and social exclusion [22, 23]. In addition, concerns about the legal and administrative consequences of a positive diagnosis and the related stigma and discrimination can add another layer of difficulty in accessing HIV-related services, including testing [13, 15, 24, 25]. Depending on the policies and practices of the host country regarding migrants, this highly heterogeneous group may experience discrimination that puts them at heightened risk of adverse health outcomes [22]. Addressing these barriers is instrumental to all HIV prevention efforts. The purpose of this review was to identify interventions that aimed to increase HIV testing uptake in migrant populations and the extent to which they had been effective in different country settings. It builds on a similar review by Alvares-del Arco et al. [13], which analysed HIV testing and counselling strategies targeting migrants and ethnic minorities living in high-income countries and included a part on interventions to increase HIV testing uptake in migrants and ethnic minorities. Unlike the Alvares-del Arco et al. [13] review, this review includes more recent studies, examines a broader target group by looking at international migrants, not just those living in high-income countries, and specifically looks at the effectiveness of interventions that have aimed to increase HIV testing uptake within the migrant population.

Methods

This systematic review examined existing interventions for increasing HIV testing uptake in international migrants of age ≥15 years. For the purpose of defining an international migrant in this paper, we have used the definition set by the United Nations, described above [3]. Further, in the review, HIV testing refers to all types of HIV testing services that are currently available, including self-testing, rapid testing (also known as point-of-care test), client-initiated HIV voluntary counselling and testing (VCT), and provider-initiated VCT.

Search Strategy

In December 2015, the databases PubMed, Web of Science, Embase, CINAHL, and PsycInfo were searched for studies published between January 1985 and 31 December 2016. Studies or reports not in the English language were excluded due to logistical constraints and because to date there has been limited research on the reliability of freely available translation tools such as Google translate for systematic reviews [26]. PsycInfo was specifically chosen to include studies that focus on the behavioural factors associated with seeking HIV testing. Search terms used are outlined in Fig. 1. The search was limited to journal articles published from 1985, as this was when the first commercial HIV test was licensed for public use, and until 31 December 2016, as many studies have been reviewed, accepted and were awaiting publication throughout the year.

Google Advance Search and Google Scholar were also searched for grey literature. The search terms used were HIV OR "Human immunodeficiency virus" OR AIDS OR "Acquired immunodeficiency syndrome" AND "Ethnic group" OR Refugee OR Migrant OR Immigrant OR "Asylum seeker" AND Test OR Testing OR Counselling OR VCT AND Intervention OR Program. These terms were chosen for their direct relevance to the objectives of this systematic review and limited by the search engines' restrictions on the number of search terms input (32 terms in Google Scholar). The search terms were ran through *"all of these words"*, *"anywhere in the page"*, sorted by *"most relevant"* and further limited to publications from international institutions, such as the WHO and International Organisation for Migration, by filtering the results by site:.int. The first ten pages, with the setting set for ten results per page, of Google and Google Scholar were reviewed for selection of results. Search engines organise their searches in order of priority and relevance [27]. As such, items beyond the first ten pages were deemed not relevant enough to the search terms.

The program Endnote was used to manage the search results [28]. All identified articles from individual databases, Google, and Google Scholar (PubMed, $n = 1649$; Web of Science, $n = 968$; Embase, $n = 2067$; CINAHL, $n = 1189$; PsycInfo, $n = 633$; Google, $n = 5$ and Google Scholar, $n = 0$) were imported into an endnote file and de-duplicated, which left 4673 articles for further review.

Study Selection

To be eligible for inclusion, studies had to (1) be original research articles or program evaluations; (2) focus on participants aged ≥15 years; (3) clearly state the sample population as international migrants (or one of the key search terms for migrants). The majority (>55%) of the study subjects must have migrant status, as opposed to ethnic minority status, which does not fit the definition for "migrant" used in this review, e.g. African Americans

Fig. 1 Groups of terms searched across PubMed, Web of Science, Embase, CINAHL, and PsycInfo

HIV OR "Human immunodeficiency virus" OR AIDS OR "acquired immunodeficiency syndrome" OR "HIV infections"

•AND

"Ethnic group" OR "Ethnic groups" OR Refugee* OR Migrant* OR Immigrant* OR "Asylum seeker" OR "Asylum seekers" OR Emigrant* OR "Displaced people" OR "Displaced peoples" OR "Displaced persons" OR "Culturally and linguistically diverse" OR CALD OR Foreigner OR "Foreign-born" OR "Non-national"

•AND

Test OR Tests OR Testing OR Tested OR Diagnose OR Diagnosis OR Diagnoses OR Diagnosed OR Diagnosing OR Diagnostic OR Serodiagnosis OR Prevent* OR Screen* OR "Voluntary counseling" OR "Voluntary counselling" OR counseling OR counselling OR VCT

•AND

Intervention* OR Intervene OR Intervening OR Program* OR Campaign* OR "Health promotion" OR "Health education"

living in the United States; (4) report on interventions that aimed to increase HIV testing uptake as a primary outcome.

Studies were excluded if (1) interventions targeted subpopulations of migrants that were at increased risk of HIV acquisition, such as migrant MSM, migrant sex workers (SWs), and migrant injecting drug users (IDUs) [29, 30]. This was not to undermine the importance of these groups but there is growing evidence underlining the impact of structural, economic, and social vulnerabilities related to migration on HIV risk among the general population of migrants, especially those from high HIV prevalence countries [29]. Further, while heterosexual transmission remains the primary mode of HIV acquisition among migrants from countries with generalised HIV epidemics, their particular needs and vulnerabilities have often been overlooked, yet their needs are likely be different to well-documented high-risk groups such as MSM and IDUs; or (2) they only presented HIV testing as a key theme and did not report on interventions or outcomes of interventions; or (3) they were abstracts from conferences/meetings, media releases or newsletter articles, or poster presentations. These offer a summary of the article and do not allow researchers to fully analyse the information to make an evaluation of the quality of the research. They alone do not properly identify bias, evaluate methodology, or allow researchers to comprehend the outcomes in full detail. In keeping with a previous systematic review conducted by two of the authors, PhD theses were also excluded [15].

Data Extraction

The studies obtained from the database searches were reviewed independently by the primary investigator (EA). Inclusion of studies was based on relevance of (1) title, (2) abstract, or (3) full text against the study selection criteria. Key words that were searched for when screening studies titles were "HIV/AIDS", "prevention", "promotion", "testing", "education", "screening", and "program" against any related terms for "migrants". At each stage of screening (title, abstract, and full text), 10% of total studies were randomly selected and screened by a second investigator (SJB) to ensure less than 10% discrepancy in results. This was done to ensure replicability and limit any bias in our selection process. Any inconsistencies in results were resolved through discussion between the investigators, and arbitrated by a third investigator where necessary (JD).

Key data from included studies were extracted and tabulated independently by the primary investigator (EA), and checked by a second investigator (SJB). The following information were extracted from the studies and categorised accordingly: "author, year", "country", "migrant origin", "age, years", "sex", "sample size, n", "study design", "type of HIV testing", "type of intervention", and "testing rate/outcome" (see Tables 1, 3).

Risk Assessment

The quality of the included studies were evaluated independently by the primary investigator (EA) using the Hoy et al. tool for assessing risk of bias [31]. The tool included 10 items, including 4 measures of external validity and 6 measures of internal validity (rated as either 'yes—low risk' or 'no—high risk') and an overall assessment of risk of bias of the study (rated as low, moderate, or high risk).

Items 2, 9, and 10 from the risk of bias tool asked "had the study instrument that measured the parameter of interest (e.g. prevalence of low back pain) been tested for reliability and validity (if necessary)?", "was the length of the shortest prevalence period for the parameter of interest appropriate?", and "were the numerator(s) and denominator(s) for the parameter of interest appropriate?", respectively. These items were considered not applicable as the majority of studies did not provide the relevant information and, therefore, were omitted from our risk of bias assessment. The third item from the risk of bias tool examines whether the study was "a close representation of the national population". Migrant populations are highly heterogeneous so it is rare to find studies with samples that are a true representation of the whole target population. Further, obtaining precise information on the demographic of the migrant population is challenging, as, often, data is not always accurately recorded. Therefore, the third item was also omitted from our assessment, reducing the total number of items and highest possible score to 6.

Studies with scores of 5 or 6 (5 or 6 "yes" answers) were considered to have low risk of bias, studies with scores of 4 were considered to have moderate risk of bias, and studies with scores of 3 or less were considered to have high risk of bias (see Appendix 2 and 3 in Tables 5 and 6). If the study did not comment on the presence or absence of an item the answer was considered "no" [31–33].

Results

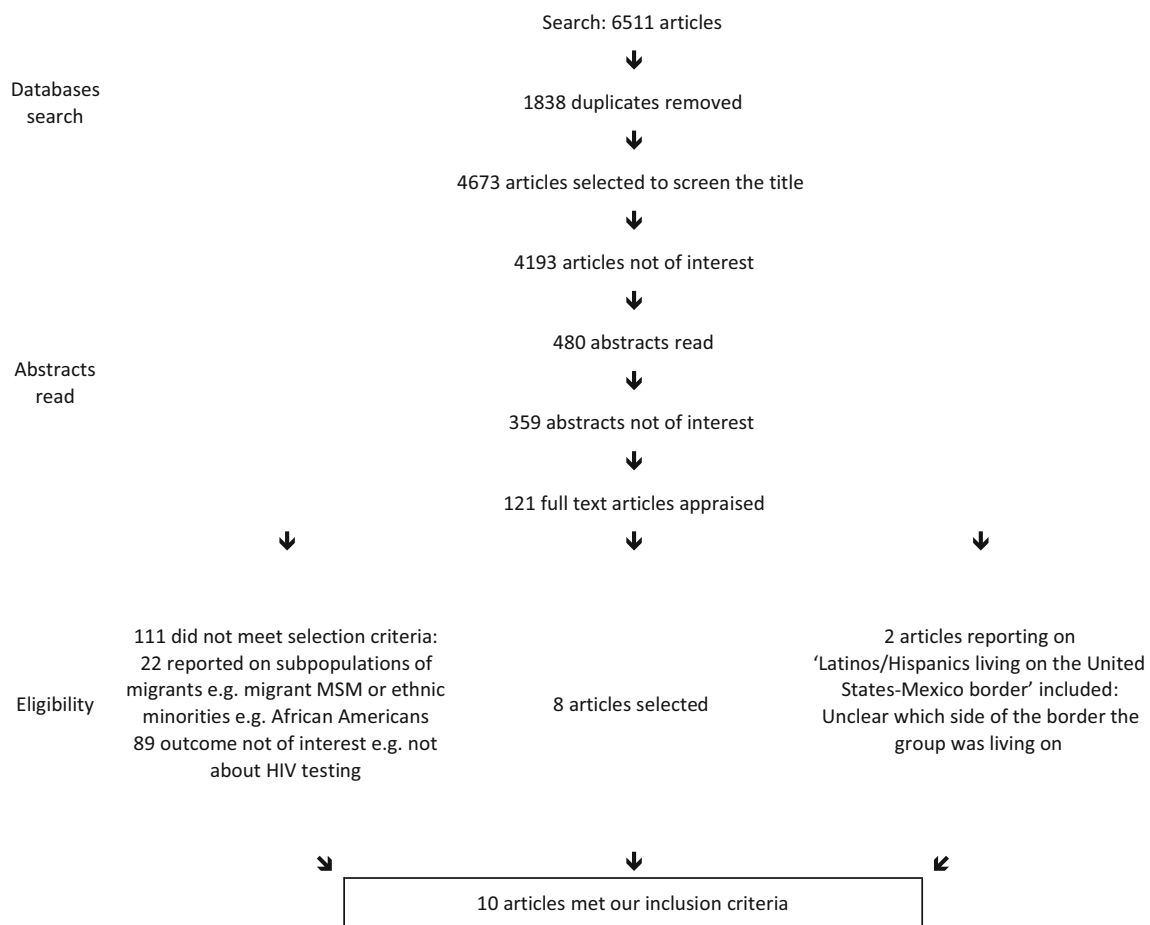#### Study Selection

A total of 6511 papers were found across the five databases and grey literature search, see Fig. 2. After duplicates were removed, 4673 articles remained for screening. Of these, 4552 articles were excluded based on title and abstract, as they were considered not relevant to the current review as determined by the inclusion and exclusion criteria (e.g.

Table 1 Study characteristics

Author (year)	Country	Migrant origin	Age (years)	Sex	Sample size (n)	Study design	Period
McMahon et al. [34]	Australia	Mixed	NA	Mixed	NA	NA	2 weeks
Olshefsky et al. [35]	United States-Mexico Border	Mexico	NA	Mixed	NA	NA	8 weeks
Martinez-Donate et al. [36]	United States	Mexico	NA	Female	3, 149	Retrospective cohort	12 months
Raj et al. [37]	United States	Dominican Republic	18–35	Female	162	Randomised controlled trials	12 weeks
Rhodes et al. [38]	United States	Mexico	18–71	Male	222	Non-randomised controlled trials	18 months
Rhodes et al. [39]	United States	Mexico	≥18	Male	142	Randomised controlled trail	2 days
Seña et al. [40]	United States	Mexico	18–65	Men	232	Cross-sectional	12 months
Loos et al. [41]	Belgium	Sub-Saharan Africa	NA	Mixed	65	Cross-sectional	12 weeks
O'Laughlin et al. [42]	Uganda	Mixed	NA	Mixed	NA	Non-randomised controlled trials	168 days
Ramos et al. [43]	United States-Mexico Border	Mexico	21–30	Female	722	Group comparison	24 months

Search: 6511 articles

⬇

Databases search

1838 duplicates removed

⬇

4673 articles selected to screen the title

⬇

4193 articles not of interest

⬇

480 abstracts read

Abstracts read

⬇

359 abstracts not of interest

⬇

121 full text articles appraised

⬇   ⬇   ⬇

111 did not meet selection criteria:
22 reported on subpopulations of migrants e.g. migrant MSM or ethnic minorities e.g. African Americans
89 outcome not of interest e.g. not about HIV testing

Eligibility

8 articles selected

2 articles reporting on 'Latinos/Hispanics living on the United States-Mexico border' included: Unclear which side of the border the group was living on

⬇   ⬇   ⬇

10 articles met our inclusion criteria

Fig. 2 Flow diagram of search strategy

"Priorities for screening and treatment of latent tuberculosis infection in the United States"). Full text of the remaining 121 articles were read and appraised against the selection criteria. The majority ($n = 111$) of articles were excluded due to 'inappropriate sample' ($n = 22$) or 'outcome not of interest' ($n = 89$) or both. 'Inappropriate sample' includes ethnic minorities, e.g. African Americans, and subpopulations of migrants, e.g. migrants MSM, sex workers, and IDUs (see inclusion criteria above). Of note, two studies that reported on 'Latinos/Hispanics living on the United States-Mexico border' were included in our review as it was (1) not clear which side of the border the group was living on, and (2) not clear whether the group was mobile across the border. Likewise, two studies that reported on 'Latinos/Hispanics living in the United States' were kept for review even though it was not explicitly stated that they were international migrants. Ten studies, therefore, met the inclusion criteria and are included in this review (see Appendix 1 in Table 4).

Study Characteristics

The ten studies included in this review were conducted predominantly in the USA ($n = 7$), with two of these along the U.S.-Mexico border. The remaining three was conducted in Australia, Belgium, and Uganda. Migrants originating from Mexico were the most studied population ($n = 6$), followed by the Dominican Republic ($n = 1$), Sub-Saharan Africa ($n = 1$), and mixed origin ($n = 2$). The studies utilised samples of mixed sex ($n = 4$), female only ($n = 3$), and male only ($n = 3$). Most interventions directly targeted migrants ($n = 9$), while one study targeted health professionals ($n = 1$). The studies used various research designs and intervention methods, but all reported on an intervention where an increase in HIV testing was the primary outcome.

Table 2 Risk of bias scores

Author (year)	Overall score
Martinez-Donate et al. [36]	3/6
Loos et al. [41]	2/6
McMahon et al. [34]	2/6
O'Laughlin et al. [42]	5/6
Olshefsky et al. [35]	2/6
Raj et al. [37]	3/6
Ramos et al. [43]	1/6
Rhodes et al. [38]	3/6
Rhodes et al. [39]	4/6
Seña et al. [40]	4/6

Risk of Bias

The risk of bias scores based on the risk of bias assessment tool for the studies included in this systematic review ranged from 2 to 5 out of 6 possible points (see Table 2).

Types of Interventions

The included studies implemented a range of different intervention methods that can be broadly grouped into three categories: (1) exposure to HIV prevention messages, (2) interactive HIV education programs, (3) and direct offer of HIV testing. The first category involved the distribution of key HIV prevention messages, such as the importance of condom use and getting tested, through a one-dimensional media platform. Similarly, the second category exposed individuals to prevention messages, but through a more interactive one-on-one or group program. The last category consisted of trained healthcare providers offering HIV testing and counselling services directly to individuals in clinic and home settings. One study implemented a package intervention that fits into each of the three categories. All studies reported varying degrees of increased testing rate.

Exposure to HIV Prevention Messages

In Australia, McMahon et al. [34] implemented a media campaign with the objectives of informing culturally and linguistically diverse (CALD) communities of the availability of free and anonymous HIV testing, the benefits of early diagnosis, and to promote access to treatment and care services for people living with HIV/AIDS. Key information and messages were distributed in a range of ethnic print and radio media in 14 target languages, for a period of two weeks. The outcome of interest was determined by comparing the number of HIV tests given at three local partner clinics across two cities (two in Sydney and one in Melbourne) pre- and post-campaign. McMahon et al. reported the number of HIV tests on patients from the target group increased from 66 in the pre-campaign to 122 in the post-campaign period. As a proportion of overall tests performed at the centre, this result was not statistically significant [34].

Olshefsky et al. [35] implemented a social marketing campaign aimed at increasing awareness of the risk of HIV/AIDS among Latinos in the United States of America, promoting HIV testing services, and assessing the appropriateness of the messages delivered. A 1-min radio ad and brochures, both in Spanish, at outreach events were used to deliver the key messages of the campaign, which ran for a period of eight weeks. The outcome of interest was determined by collecting data from one partner clinic (San

Ysidro Health Centre) that documented the number of HIV tests administered and asked patients if they could recall the intervention campaign or any exposure to HIV prevention messages. Olshefsky et al. reported that only 30% (127/429 participants) of those who came in for testing recalled seeing or hearing an advertisement about HIV testing. While the researchers gave a graphical indication that the number of HIV tests conducted increased during the last two quarters of their campaign, they did not report exact numbers of tests carried out. The researchers observed that yearly seasonal trends for testing among their partner clinics remained consistent even during their campaign, and concluded that they could not attribute the observed increase in testing behaviour to their campaign [35].

Martinez-Donate et al. [36] conducted a retrospective study where they traced the testing rate of participants and its association with the level of exposure to HIV prevention messages during five migration phases (pre-departure, transit, destination, detention/interception, and return) in the previous 12 months. The group used data from Project Migrante, a US-Mexico collaboration involving a series of population-based surveys of Mexican migrant flows conducted since 2007. Specifically, the group used data from the Project Migrante HIV Risk Survey, which focused on HIV infection and behavioural risk factors. Participants were recruited at sampling venues at major border crossing points already established by Project Migrante, and were asked to self-report their testing behaviours and exposure to HIV prevention messages by filling out questionnaires. HIV prevention messages included safe sex or use of a condom, testing for HIV/AIDS, being faithful to their sex partners, and reducing the number of sexual partners. Martinez-Donate et al. reported that last 12-month HIV testing rates prior to the intervention ranged from 13.9% for migrants in the transit phase to 24.5% for migrants at the interception phase. Further, they reported that return, destination, and interception migrants were more likely to be tested than their pre-departure peers. In turn, migrants in the transit phase were significantly less likely to be tested in the past 12 months compared to migrants at pre-departure. At three (pre-departure, destination, and interception) of the five phases, last 12-month exposure to HIV testing messages was positively associated with the odds of HIV testing [36].

Interactive HIV Education Program

Raj et al. [37] recruited 162 Hispanic women from low-income catchment areas of Boston for participation in four HIV-IP groups, four Women's Health Program (WHP) groups, and a control group. The HIV-IP was a 12-week intensive HIV prevention program that delivered

information on the transmission and prevention of HIV, sexual and reproductive health, as well as integrating HIV risk with substance abuse, partner violence and body image. The WHP focused on general women's health education that included sessions on HIV transmission and prevention, sexual and reproductive anatomy, condom practice and negotiation skills. Control group participants were not placed into a program. A self-administered survey was used to assess participants' HIV knowledge, attitudes and related behaviours at pre-test, post-test (12-weeks after pre-test) and three-month follow-up. In this study, the WHP (the comparison arm) group was statistically significantly more likely than the control group to report increased HIV testing at post-test (33% change; OR = 2.50). This effect was lost at three-month follow-up, where no significant change was observed between the HIV intervention group and the control group [37].

Rhodes et al. [38] recruited 30 Latino men's soccer teams in North Carolina to serve as intervention teams ($n = 15$) and control teams ($n = 15$). One teammate from each of the intervention teams were nominated and trained as lay health advisors (LHA) to make referrals to the rest of the team to increase knowledge about HIV, HIV testing, condom use skills, and to bolster positive and reframe negative sociocultural expectations about what it means to be a man. The LHA worked with their teammates for 18 months. Data was collected at baseline and at the end of the 18-month intervention period using an assessment tool that contained 192 items with predefined response categories. The group assessed for demographics, utilisation of testing services, knowledge of HIV transmission and prevention, sexual risk behaviours, and psychological and sociocultural factors. Rhodes et al. reported no significant statistical difference between conditions on baseline scores (9.0%), but observed a 64.4% score in the intervention group and 41.8% score in the control group at 18-months post LHA training. Participation in the intervention was associated with increased condom use, increased HIV testing, increased knowledge of transmission and prevention, and increased self-efficacy to use condoms [38].

The second study by Rhodes et al. [39] involved the recruitment of 142 heterosexually active Latino men into an HIV intervention group and a cancer education group. The intervention arm was delivered over four sessions, while the cancer group was delivered in a one 2-h session. Both interventions were delivered over a 2-day period. The objective of the intervention arm was to increase awareness of the magnitude of HIV among Latinos in the USA, provide information on the types of infection, modes of transmission, and local counselling, testing, care, and treatment options. The cancer education comparison intervention focused on prevention of cancers particularly relevant to men: prostate, lung, and colorectal cancers.

Native Spanish-speaking male team members collected data at baseline and at 3-months follow-up using the interviewer-administered assessment. Rhodes et al. reported no significant statistical difference between conditions on baseline scores but observed a 71.0% score in the HIV intervention group and 31.6% score in the cancer education group at 3-months follow-up. The group's analysis indicated that compared to their cancer education comparison arm, participants in the HIV prevention interventions were significantly more likely to report consistent condom use and HIV testing [39].

Direct Offer of HIV Test

Seña et al. [40] assessed a community-based strategy for rapid HIV testing by conducting "door-to-door" outreach in apartments with predominantly Latino immigrants in , North Carolina. Participants were asked to complete a survey and offered rapid HIV testing by *promotores* who were identified and trained from a local Latino community centre. The researchers reported that of the 228 Latino participants who were surveyed in their apartment and offered rapid HIV testing, 171 participants (75.4%) consented to being tested. Of the 228 participants, the majority (66.5%) reported no prior HIV testing with the main reasons for not testing being no self-perceived risk for HIV, worrying about the results, and not knowing where to get tested [40].

Over a 12-week period, Loos et al. [41] utilised 65 general practitioners (GPs) in Belgium as an entry point for provider-initiated HIV testing and counselling (PITC). GPs were asked to proactively offer HIV testing and counselling to patients from sub-Saharan Africa (SAM) and report on their experience with PITC, their patient's acceptance of PITC, the overall patients' reactions, and general feasibility of PITC. Loos et al. reported that adopting PITC in primary care settings tailored to the needs of SAM was both acceptable and feasible. Most GPs, for example, found PITC acceptable and commented that they experienced no refusals from SAM patients when proposing a test, but expressed discomfort when introducing as HIV test when there is no link with the patient's request. Routine implementation of PITC was reported to be problematic owing to persistent time pressures in general practices and the extensive length of time required for the pre- and post-test counselling steps [41].

O'Laughlin et al. [42] implemented a routine voluntary HIV testing intervention at an outpatient department (OPD) in Nakivale Refugee Settlement in Ugandan, where high volumes of refugees from neighbouring countries are received and settled. The group evaluated the current standard of care (SOC) for HIV testing in the OPD by prospectively tracking the number of client visits, the number of HIV tests performed, and the HIV test results over a period of 40 days. This was then compared to an intervention arm where study staff made HIV-related educational announcements in the OPD waiting area and invited clients to obtain a free rapid HIV test while waiting for their clinic visit. The authors reported that 25.4% of all comers of the OPD in the intervention period were tested for HIV. Compared with the 6.7% tested during the SOC period, the percentage of clients tested in the intervention period was significantly higher. Further, the mean number of HIV-infected clients identified per week increased from 0.9 in the SOC period to 5.6 in the intervention period [42].

Package Intervention

The final study included in this review conducted by Ramos et al. [43] along the US-Mexico border implemented a package intervention that integrated each of the aforementioned methods. This group employed trained promoters across a three phase program that, respectively, aimed to (1) raise awareness of HIV as a women's issue and provide effective prevention messages to promote behaviours that reduce the risk of HIV infection; (2) use social networks to increase knowledge and utilisation of existing health services, including confidential referrals to testing and counselling and; (3) to conduct rapid HIV testing and counselling and to deliver these services in community settings. The three phases were run in sequential six-month intervals. Phase 1 was used as a comparison group to evaluate the added benefits of the social network-inspired methods employed in Phase 2 and the combination of social network and community-based rapid testing employed in phase 3. Ramos et al. [43] reported that of the 184 participants recruited for phase 1, 22 followed up on testing (11.9%). A similar result was observed in phase 2, where 66 participants (26.3%) out of 251 recruited opted to get tested. Further, phase 3 had a demonstrably higher rate of HIV testing with 280 participants out of 561 (49.9%) agreeing to be tested [43].

Discussion

The purpose of this review was to identify interventions that aimed to increase HIV testing uptake in migrant populations and evaluate how effective they were at increasing testing rates. Three key types of interventions were identified (exposure to HIV prevention messages, intervention programs, and direct offer of HIV testing), with mixed reports of success in increasing HIV testing uptake. Of the 10 studies included in this review, seven evaluated their findings and five reported observing increased HIV testing uptake (see Table 3). Rhodes et al.

Table 3 Type of interventions and testing rate outcomes of studies

Author (year)	Country	Target population	Type of intervention	Period	Outcome	Testing rate
McMahon et al. [34]	Australia	CALD background	Media campaign	2 weeks	HIV test given pre-campaign ($n = 66$) to post-campaign ($n = 122$)	No significant increase, (P value not given)
Olshefsky et al. [35]	United States-Mexico Border	Mexican	Social marketing campaign	8 weeks	127/429 (30%) of testers could recall campaign	No significant increase (did not evaluate their findings)
Martinez-Donate et al. [36]	United States	Mexican	Exposure to HIV prevention messages at 5 migration phases (pre-departure, transit, destination, detention/interception, and return)	12 months	13.9% testing rate at transit phase; 24.5% at interception phase	Exposure positively associated with odds of HIV testing at 3 phases: pre-departure (AOR = 3.30), destination (AOR = 1.73, and interception (AOR = 1.62)
Raj et al. [37]	United States	Hispanic women	Intensive HIV intervention program (HIV-IP); Women's health promotion program (WHP), Control program	12 weeks	Initial: 33% increase in WHP compared to Control; Significant effect was lost at 3-month follow-up	No statistically significant increase, ($P = 0.42$)
Rhodes et al. [38]	United States	Latino men	Lay health advisors (LHA) trained to deliver HIV knowledge and preventions messages to their assigned local soccer league teams	18 months	22.6% increase in testing rate in intervention arm	Statistically significant increase, (AOR = 2.5)
Rhodes et al. [39]	United States	Latino men	HIV intervention program; Cancer education program	2 days	39.4% increase in testing rate in HIV intervention program	Statistically significant increase, ($P < 0.001$)
Seña et al. [40]	United States	Latino	"Door-to-door" outreach offer of rapid HIV testing	12 months	171/228 (75.4%) consented to being tested (142 male: 29 female)	Statistically significant increase, (OR: male = 1.6; female = 1)
Loos et al. [41]	Belgium	Sub-Saharan Africa	GPs proactively offered HIV PITC to patients	12 weeks	PITC generally accepted and feasible among GPs	General acceptance of offer by SAM patients (did not evaluate their findings)
O'Laughlin et al. [42]	Uganda	Mixed ethnic refugees	Patients in OPD offered rapid HIV testing	168 days	14.6% increase in testing rate in intervention	Statistically significant increase, ($P < 0.0001$)
Ramos et al. [43]	United States-Mexico Border	Latina women	Phase 1: raise awareness of HIV; Phase 2: social networks; Phase 3: HIV testing offered in community settings	24 months	Phase 1: 11.9% testing rate Phase 2: 26.3% testing rate Phase 3: 49.9% testing rate	Observed increase, (did not evaluate their findings)

[38, 39], who implemented HIV education programs targeting Latino men, observed statistically significant increases in HIV tests across their intervention arms in comparison to controls. A similar observation was made in the studies conducted by Seña et al. [40], who utilised "door-to-door" outreach programs, and O'Laughlin et al. [42], who offered rapid HIV testing to patients in a OPD. Ramos et al. [43] who implemented a three-phase program for Latina women also reported seeing increased testing uptake among their participants, though the statistical significance of this could not be determined, as they did not evaluate their findings. The remaining five studies did not report any increases in HIV testing.

While some reported observing positive change, all interventions were relatively limited in their scope. Six of the ten studies utilised media or social marketing campaigns and peer education programs to encourage individuals to seek HIV testing. This approach alone is likely to have limited sustainable impact on the uptake of HIV testing (as witnessed in the study by Raj et al.), especially where the reach is likely to be limited. In the study by Olshefsky et al. [35], for example, information was disseminated primarily through radio and brochures at outreach events by partner clinics, which is likely to mean that only select subsets of the target population who regularly listen to the radio or visit the clinics will benefit from the campaign. At a population health level, however, media campaigns are not resource intensive and provide a platform to reach a wide range of target populations [44] and have the potential to be scaled up. Information can be spread through a range of media outlets such as print, online, mobile phones, and television and distributed through major points of foot traffic, such as shopping centres and public transport stations to reach a larger audience. A major limitation of such campaigns, however, is that they are based on a narrow view of behaviour change and by primarily placing the onus of behaviour change on the individual do not create the enabling environment needed to facilitate HIV testing uptake, especially in migrant populations who may have multiple overlapping challenges in accessing HIV-testing services.

The provider initiated HIV testing and counselling (PITC) approach, utilised in three of the studies, shows some promise of effectively increasing HIV testing uptake, when certain logistical constraints are overcome. In the studies conducted by O'Laughlin et al. [42] and Seña et al. [40], for example, trained providers offered HIV testing in a refugee settlement health clinic and select apartment blocks in concentrated community settings. While these studies demonstrated increased testing uptake, and may reach people who would typically present late at a healthcare facility, at a population level, this approach is resource intensive and very challenging to implement on a larger scale, requiring a high level of political commitment. Also, in the Seña et al. [40] study, by targeting apartment complexes with large number Latino residents to offer HIV testing, there is the added risk of further stigmatising a vulnerable group that often already face stigmatisation and discrimination.

WHO [45] HIV Counselling and Testing policy framework recommends universal PITC in countries with concentrated epidemics and this has been found to be effective in increasing uptake of HIV testing [45]. This approach is also used in countries with non-generalised epidemics with most at risk groups such as MSM and sex workers and as the Loos et al. [41] demonstrated, has the potential to be extended to migrants from high HIV prevalence countries [46, 47]. Loos et al. [41] integrated the PITC approach into an existing primary healthcare system. While not quantitatively evaluated, their qualitative data suggested that adopting PITC in primary care settings was both acceptable and feasible for clients and GPs, when specific conditions were met. The majority of GPs found PITC acceptable because of public health arguments, but some expressed concerns about routine implementation of PITC relating to discomfort of introducing an HIV test with no link to the patients' request, worries about stigmatisation, and persistent time constraints within general practices. Study participants suggested the need for further investment in training of the PITC tool and to increase efforts to involve GPs in the broader HIV prevention strategies targeting SAM. Further research is needed to see the extent to which the approach can be scaled up with other at risk migrant groups. Furthermore, while the approach potentially mitigates some of the barriers that might stop individual clients from asking for a HIV test and can create an enabling environment, it does not address some of the barriers that prevent migrants from vulnerable groups accessing healthcare in the first place.

Nearly all of the intervention studies ($n = 7$) were conducted in the USA, which is of concern given that significant international migration does not occur exclusively in the USA. Approximately two-thirds of all international migrants live in Europe (76 million) or Asia (75 million), with Northern America hosting the third largest number of migrants yet, only one study was conducted in Belgium and no studies were reported from Asia [2]. Likewise, significant numbers of international migrants reside in Africa (21 million), Latin America and the Caribbean (9 million), and Oceania (8 million) but only two studies were reported in Uganda and Australia, respectively [2]. It is possible that other interventions are being conducted, but are not being reported on. In addition to this skewed geographical representation, there is also a disparity in the different migrant groups that have been focused on. The studies conducted in Belgium, Uganda and

Australia targeted SAM population, African refugees, and CALD communities, respectively, while the remaining USA studies focused on Hispanic/Latino migrants. This overrepresentation of Hispanic/Latino migrants is potentially misleading of the magnitude of the epidemic among this migrant population given that most countries in Latin America have relatively stable and low HIV prevalence among the general population, with the epidemic concentrated namely in MSM [48]. In 2013, Hispanics/Latinos in the USA accounted for 23% (10, 888) of the estimated 48, 145 new HIV diagnosis, of which 85% were in men. Gay, bisexual, and other MSM accounted for 81% (7527) of the HIV diagnosis among Hispanic/Latino men [49]. While Latino MSM do have relatively higher rates of HIV in the USA it is possible that the general Latino migrant group as a whole may not be a high-risk population. Further investigation into interventions that target more under-represented migrant groups, for example, those who have come high prevalence countries with generalised epidemic, such as SAM, is needed. Given the limited number of studies, the small number of migrant groups they looked at and the overall research design it is difficult to generalise results. Caution is needed when extrapolating results from one study to any other setting where there are different health systems, different migrant profiles, and different determinants of migrant health.

In conducting this review there are some key limitations that should be noted. First, the inclusion and exclusion criteria adopted in this review may have favoured peer-reviewed articles and resulted in the exclusion of grey literature. While this may create the incorrect perception that few interventions are being undertaken to increase HIV testing in migrant populations, our intent in this study was to review the available evidence of what has worked, rather than to identify the range of interventions that are being undertaken to increase HIV testing in migrant populations. It is likely that some HIV testing interventions were missed because it is not always reported in the literature. For example, interventions undertaken at the community and primary healthcare level often operate under budgetary constraints and can be underreported in the peer-reviewed and grey literature, making it difficult to comprehensively review all of the evidence. Second, the inclusion of studies that reported exclusively on international migrants meant that we might have missed interventions from studies that had a broader scope of subject groups such as ethnic minorities, e.g. African Americans subgroups in the USA that also included international migrants. It is likely that there is significant crossover between interventions for migrant HIV testing uptake and interventions for other ethnic minority groups. The authors also acknowledge that the Risk of Bias Tool used in this review did not easily accommodate for qualitative studies and was accordingly amended from the original tool developed by Hoy et al. [31]. Four of the ten items outlined in the original tool were omitted from the assessment and, therefore, reduced the highest possible score to six from ten. This may have skewed the assessment of each study's risk and misrepresented the quality of the studies under review.

Conclusion

Despite the recognition that early testing is likely to be key in decreasing HIV transmission, only a few interventions aiming to increase HIV testing uptake amongst international migrants were evaluated and readily available through a systematic search of the peer reviewed and grey literature. Based on the papers included, the review found that most of the interventions identified were based on individual models of behaviour change, which on their own may not significantly increase HIV testing in members of at-risk migrant groups. Most likely, the evaluated interventions in this review were part of a broader, multilevel intervention package but, due to word limitations, were not described in the articles. It is likely that broader intervention packages that address individual migrant and health care provider barriers, as well as wider health systems and social determinants of migrant health are operating at a national level but are underreported in the peer-reviewed literature. Most interventions are evaluated in the national language and published in grey reports. A more intense search of the grey literature, including for example, contacting relevant organisations working in the field, may offer more evidence of interventions that aim to increase HIV testing uptake among migrants. Further research from different settings and with different migrant groups drawing on approaches that extend beyond individual views, health seeking practices and service utilisation, to ones that include an examination of the various interactions between individual migrants, the nature of migration, health system determinants and the broader socio-cultural and economic enablers and barriers of HIV testing and healthcare use, is needed if late testing and late HIV diagnosis are going to be overcome in migrant population.

Appendix 1

See Table 4.

Table 4 Studies included in the review

Author (year)	Title	Journal
McMahon et al. [34]	Evaluation of an ethnic media campaign on patterns of HIV testing among people from culturally and linguistically diverse backgrounds in Australia	Sexual Health
Olshefsky et al. [35]	Promoting HIV risk awareness and testing in Latinos living on the U.S.-Mexico Border: the tú no me conoces social marketing campaign	AIDS Education and Prevention
Martinez-Donate et al. [36]	HIV Prevention Among Mexican Migrants at Different Migration Phases: Exposure to Prevention Messages and Association With Testing Behaviors	AIDS Education and Prevention
Raj et al. [37]	Is a general women's health promotion program as effective as an HIV-intensive prevention program in reducing HIV risk among Hispanic women?	Public Health Reports
Rhodes et al. [38]	Outcomes from a community-based, participatory lay health adviser HIV/STD prevention intervention for recently arrived immigrant Latino men in rural North Carolina	AIDS Education and Prevention
Rhodes et al. [39]	A randomized controlled trial of a culturally congruent intervention to increase condom use and HIV testing among heterosexually active immigrant Latino men	AIDS and Behaviour
Seña et al. [40]	Feasibility and Acceptability of Door-to-Door Rapid HIV Testing Among Latino Immigrants and Their HIV Risk Factors in North Carolina	AIDS Patient Care and STDS
Loos et al. [41]	HIV Testing in Primary Care: Feasibility and Acceptability of Provider Initiated HIV Testing and Counseling for Sub-Saharan African Migrants	AIDS Education and Prevention
O'Laughlin et al. [42]	Clinic-based routine voluntary HIV testing in a refugee settlement in Uganda	JAIDS Journal of Acquired Immune Deficiency Syndromes
Ramos et al. [43]	Pasa la voz (spread the word): using women's social networks for HIV education and testing	Public Health Report

Appendix 2

See Table 5. Amended from Risk of Bias Tool developed by Hoy et al. [31].

Table 5 Amended risk of bias tool

	1. Was an acceptable case definition used in the study?	2. Was the sampling frame a *true or close representation* of the target population?	3. Was some form of *random selection* used to select the sample, OR, was a census undertaken?	4. Was the likelihood of *non-response bias minimal?*	5. Were data collected *directly from the subjects* (as opposed to a proxy)?	6. Was the *same mode of data collection* used for all subjects?	Summary item on the overall risk of study bias
Martinez-Donate et al. [36]	Yes (LOW RISK)	No (HIGH RISK)	No (HIGH RISK)	Yes (LOW RISK)	Yes (LOW RISK)	Yes (LOW RISK)	Moderate risk
Loos et al. [41]	Yes (LOW RISK)	No (HIGH RISK)	No (HIGH RISK)	Yes (LOW RISK)	Yes (LOW RISK)	No (HIGH RISK)	High risk
McMahon et al. [34]	Yes (LOW RISK)	Yes (LOW RISK)	No (HIGH RISK)	No (HIGH RISK)	No (HIGH RISK)	No (HIGH RISK)	High risk
O'Laughlin et al. [42]	Yes (LOW RISK)	Yes (LOW RISK)	No (HIGH RISK)	Yes (LOW RISK)	Yes (LOW RISK)	Yes (LOW RISK)	Low risk
Olshefsky et al. [35]	Yes (LOW RISK)	No (HIGH RISK)	No (HIGH RISK)	No (HIGH RISK)	Yes (LOW RISK)	No (HIGH RISK)	High risk
Raj et al. [37]	Yes (LOW RISK)	No (HIGH RISK)	Yes (LOW RISK)	Yes (LOW RISK)	Yes (LOW RISK)	Yes (LOW RISK)	Low risk
Ramos et al. [43]	Yes (LOW RISK)	No (HIGH RISK)	No (HIGH RISK)	No (HIGH RISK)	No (HIGH RISK)	No (HIGH RISK)	High risk
Rhodes et al. [38]	Yes (LOW RISK)	No (HIGH RISK)	No (HIGH RISK)	No (HIGH RISK)	Yes (LOW RISK)	Yes (LOW RISK)	High risk

Table 5 continued

	1. Was an acceptable case definition used in the study?	2. Was the sampling frame a *true or close representation* of the target population?	3. Was some form of *random selection* used to select the sample, OR, was a census undertaken?	4. Was the likelihood of *non-response bias minimal?*	5. Were data collected *directly from the subjects* (as opposed to a proxy)?	6. Was the *same mode of data collection* used for all subjects?	Summary item on the overall risk of study bias
Rhodes et al. [39]	Yes (LOW RISK)	No (HIGH RISK)	Yes (LOW RISK)	No (HIGH RISK)	Yes (LOW RISK)	Yes (LOW RISK)	Moderate risk
Seña et al. [40]	Yes (LOW RISK)	No (HIGH RISK)	No (HIGH RISK)	Yes (LOW RISK)	Yes (LOW RISK)	Yes (LOW RISK)	Moderate risk

Appendix 3

See Table 6. Amended from Risk of Bias Tool developed by Hoy et al. [31].

Table 6 Amended risk of bias tool (with notes)

	1. Was an acceptable case definition used in the study?	2. Was the sampling frame a *true or close representation* of the target population?	3. Was some form of *random selection* used to select the sample, OR, was a census undertaken?	4. Was the likelihood of *non-response bias minimal?*	5. Were data collected *directly from the subjects* (as opposed to a proxy)?	6. Was the *same mode of data collection* used for all subjects?	Summary item on the overall risk of study bias
Martinez-Donate et al. [36]	Yes (LOW RISK)	No ("Mexican migrants in migration phases")	No ("Individuals crossing by the sampling points were consecutively approached by staff" pg. 550)	No (Unclear)	Yes ("participants complete an anonymous interviewer-administered questionnaire" pg. 551)	Yes ("We used data from the Project Migrante HIV risk survey" pg. 551)	High risk
Loos et al. [41]	Yes (LOW RISK)	No ("Sub-Saharan African migrants" pg. 81)	No ("We invited 252 GPs from 40 settings to participate" ph. 84)	No (Unclear)	Yes ("GPs participated in FGDs, eight in IDI and one sent feedback" pg. 85)	No ("FGDs, IDI, and email" pg. 85)	High risk
McMahon et al. [34]	Yes (LOW RISK)	Yes ("patterns of HIV testing among people from CALD backgrounds in Australia" pg. 92)	NA	NA	NA (*Data collected from clinic*)	NA (*Data collected from clinic*)	High risk
O'Laughlin et al. [42]	Yes (LOW RISK)	Yes ("Nakivale Refugee Settlement hosts approximately 64, 00 refugees from 12 countries of origin" pg. 409)	No ("Clients were invited to obtain a free rapid HIV test while waiting for their OPD clinic visit" pg. 410)	Yes (*Clients either accepted testing or declined*)	Yes (*Clients either accepted testing or declined*)	Yes (*Clients either accepted testing or declined*)	Low risk

Table 6 continued

	1. Was an acceptable case definition used in the study?	2. Was the sampling frame a *true or close representation* of the target population?	3. Was some form of *random selection* used to select the sample, OR, was a census undertaken?	4. Was the likelihood of *non-response bias minimal?*	5. Were data collected *directly from the subjects* (as opposed to a proxy)?	6. Was the *same mode of data collection* used for all subjects?	Summary item on the overall risk of study bias
Olshefsky et al. [35]	Yes (LOW RISK)	No ("Social marketing campaign targeting Latinos" pg. 424)	NA	No (Unclear)	Yes ("Media exposure surveys were completed by clinic staff" pg. 430)	No (*Call activity, website activity, and campaign recall were collected*)	High risk
Raj et al. [37]	Yes (LOW RISK)	No ("Promote sexual risk reduction among young, predominantly Hispanic women" pg. 600)	No ("Recruitment through community outreach at housing projects, community service programs and clinics" pg. 600)	No (Unclear)	Yes ("Self-administered survey was used to assess participants' HIV knowledge, attitudes…" pg. 601)	Yes ("Self-administered surveys" pg. 601)	High risk
Ramos et al. [43]	Yes (LOW RISK)	No ("We set out to evaluate the methodology in a Mexican context" pg. 528)	No (Unclear)	No (Unclear)	No ("The number of tests given by the promoters were recorded through the study" pg. 531)	No ("two sources were used to measure the number of HIV tests given during each phase" pg. 531)	High risk
Rhodes et al. [38]	Yes (LOW RISK)	No ("Determinants of prevention behaviours among sexually active heterosexual Latino men" pg. 104)	No (Unclear)	No (Unclear)	Yes ("Data was collected from…teammates from intervention and control teams" pg. 105)	Yes ("The assessment contained 192 items with predefined response categories" pg. 105)	High risk
Rhodes et al. [39]	Yes (LOW RISK)	No ("Our CBPR responded to the need and desire for HIV prevention intervention among Latino men" pg. 1766)	Yes ("Each participant was randomised by his selecting an envelope that contained an appointment card" pg. 1766)	No (Unclear)	Yes ("Data were collected privately in the homes of participants" pg. 1767)	Yes ("All data were collected using the interview-administered assessment" pg. 1767)	Moderate risk

Table 6 continued

	1. Was an acceptable case definition used in the study?	2. Was the sampling frame a *true or close representation* of the target population?	3. Was some form of *random selection* used to select the sample, OR, was a census undertaken?	4. Was the likelihood of *non-response bias minimal?*	5. Were data collected *directly from the subjects* (as opposed to a proxy)?	6. Was the *same mode of data collection* used for all subjects?	Summary item on the overall risk of study bias
Seña et al. [40]	Yes (LOW RISK)	No ("We identified apartment complexes with a large number of Latino residents in Durham County" pg. 166)	No ("Promoters knocked on apartment doors within the complexes to solicit participants" pg. 166)	Yes ("Participants interested in undergoing rapid HIV testing were asked for written consent" pg. 166)	Yes ("[Surveys] were administered by trained bilingual interviewers in the language of participants choice" pg. 166)	Yes ("After obtaining consent from participants trained staff administered the structured survey" pg. 166)	Moderate risk

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