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Disclosure of Homosexual Behaviors to Healthcare Providers and Uptake of HIV Testing for Men Who Have Sex With Men: A Systematic Review.

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Disclosure of Same-Sex Behaviors to Health-care Providers and Uptake of HIV Testing for Men Who Have Sex With Men: A Systematic Review

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Abstract

To promote HIV-testing and offer optimal care for men who have sex with men (MSM), health-care providers (HCPs) must first be aware of their patients' sexual behaviors. Otherwise, HCPs may overlook MSM's risks for HIV infection and their special health-care needs. For MSM, reporting their same-sex behaviors to HCPs (disclosure to HCPs) may promote their linkage to HIV prevention and treatment cascade and improve their health outcomes. No literature review has been conducted to examine the relationship between disclosure to HCPs and uptake of HIV-testing among MSM. The current study reviewed and synthesized findings from 29 empirical studies published in English by 2016. We summarized the rates of MSM's disclosure to HCPs, investigated the association between disclosure and HIV-testing among MSM, identified potential facilitators and barriers for disclosure, and discussed the implications of our findings in research and clinical practices. The disclosure rates varied across subgroups and study settings, ranging from 16% to 90% with a median of 61%. Disclosure to HCPs was positively associated with uptake of HIV-testing. African American MSM were less likely to disclose to HCPs. MSM who lived in urban settings with higher education attainment and higher income were more likely to disclose. MSM tended to perceive younger or gay-friendly doctors as safer targets of disclosure. Clinics with LGBT-friendly signs were viewed as safer contexts for disclosure. Having previous communications about substance use, sex, and HIV with HCPs could also facilitate disclosure. The main reasons for nondisclosure included lack of probing from HCPs, concerns on confidentiality breach and stigma, and perceived irrelevance with services. Providing appropriate trainings for HCPs and creating gay-friendly clinical settings can be effective strategies to facilitate disclosures of same-sex behaviors among MSM and meet their specific medical needs. Interventions to promote disclosure should give priorities to MSM from the most marginalized subgroups (e.g., MSM in rural areas, MSM of ethnic minorities).

Keywords

MSM, disclosure of same-sex behavior, disclosure to HCPs, HIV-testing, literature review

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Since HIV and AIDS was first described in men who have sex with men (MSM) in Los Angeles in 1981 (Centers for Disease Control and Prevention [CDC], 1981), high HIV prevalence and incidence rates have continuously been reported among MSM in most countries (Beyrer et al., 2012). In low-and middle-income countries including many in Africa, Asia, and Latin America, MSM have the highest rates of HIV infection among all at-risk groups (Beyrer et al., 2012). In several high-income countries, for example, France, the Netherlands, the United Kingdom, and the United States, HIV infections have been on the increase among MSM since early 2000s although the overall trends of HIV infections in these countries are in

decline (Beyrer et al., 2013). In the United States, MSM account for 56% of the 1.1 million people living with HIV

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and more than two-thirds of all new infections in 2014 (CDC, 2017). The disproportionate burden of HIV infections in MSM, demands more vigorous responses to control and reduce viral transmission in MSM communities.

Awareness of HIV infection could result in reducing risk behaviors and thus decrease the likelihood of HIV transmission to others (Hall, Holtgrave, & Maulsby, 2012; Marks, Crepaz, & Janssen, 2006). HIV testing, at least annually recommended by the CDC for sexually active MSM, is also the first step to link HIV-infected MSM into HIV treatment cascade and other medical services (Cooley et al., 2014). Although home-based rapid HIV testing kits have been approved for self-testing since 2012, health-care providers (HCPs) still play a critical role for MSM's uptake of HIV-testing and counseling service (Lorenc et al., 2011). A recent national HIV-testing behavioral surveillance among MSM in 20 U.S. cities suggested that 53% of MSM who had been screened for HIV within past 12 months reported their most recent test was performed in a clinical setting (CDC, 2016).

To ensure optimal care and provide necessary sexually transmitted infections (STI) screening and HIV diagnosis for MSM, HCPs must first be aware of their patients' same-sex behaviors. Otherwise, HCPs may overlook MSM's special health-care needs and fail to recommend appropriate preventive strategy. For example, pre-exposure prophylaxis (PrEP) as an effective way to prevent HIV infection is still in low uptake among MSM (McCormack et al., 2016). HCPs' awareness of their patients' sexual orientation or same-sex behavior is critical for evaluating PrEP as a biomedical approach for HIV prevention. Studies have reported that HCPs, who are aware of a patient's same-sex behavior, are more likely to make recommendations for routine HIV and STI testing and hepatitis A or B vaccination (Ng et al., 2014). For MSM, disclosure to HCPs about their same-sex behaviors or homosexual orientation could be an entry point for their linkage to HIV prevention and treatment cascade.

Disclosure to HCPs is a challenge for MSM given the stigmatized and even illegal nature of same-sex behaviors in many settings. Previous studies reported various rates of disclosing to HCPs among MSM with a range from 49% to 70% in the United States (Petroll & Mosack, 2011), 16% in China (Tang et al., 2017), and probably lower in Africa. The rates of disclosures to HCPs vary by sociodemographic characteristics of MSM. Empirical studies suggest that race/ethnicity, age, income and education level may be associated with disclosing to HCPs among MSM (Magnus et al., 2010; Ng et al., 2014; Petroll & Mitchell, 2015; Wall, Khosropour, & Sullivan, 2010). Disclosure to HCPs may be affected by MSM's sexual identity. One study, conducted in New York City with 396 self-identified LGB, reported bisexually identified individuals less likely than gay-identified individuals

to disclose their sexual orientation to a HCP (Durso & Meyer, 2013). MSM's disclosures to HCPs may also be affected by perceived societal norms and attitudes of HCPs toward gay men. The concerns of confidentiality breach, the worries about denial of medical services, and the fears of stigma from HCPs or from broader sociocultural context impede the openness between MSM and their physicians (Adams, McCreanor, & Braun, 2008; Fay et al., 2011; Malebranche, Peterson, Fullilove, & Stackhouse, 2004).

Existing literature on disclosure issues in MSM have explored disclosure of HIV serostatus to sexual partners and its impacts on reduction of risk behaviors. Some studies focused on disclosure of same-sex behaviors to parents and other family members, and whether these disclosures affect their psychological well-being (Lin et al., 2016; Qiao, Li, & Stanton, 2014). Some research examined the association between nondisclosure of sexual orientation and high risk sexual behaviors (CDC, 2003; Zhao et al., 2016). Although increasing studies investigate MSM's disclosure to HCPs, no literature review has been conducted to synthesize the findings regarding the relationship between disclosure of same-sex behaviors in clinical settings and uptake of HIV-testing among MSM. The current systematic review of global literature aims to: (a) describe the rates of disclosure to HCPs; (b) report published associations between disclosure and utilization of HIV-testing service and other medical services; and (c) identify the factors affecting the decision-making and practices regarding disclosure to HCPs.

Method

Data Source and Searching Algorithm

An extensive search of four databases including PubMed, Web of Science, CINAHL, and PsycINFO was conducted for peer-reviewed journal articles published by November 2016. Searching terms included MSM, same-sex behaviors, and same-sex disclosure to a health-care professional or in health-care settings. The search algorithm was the combination of the following terms (a) MSM OR homosex* OR sexual minority OR gay (b) disclos* OR out* OR aware* (c) same-sex OR male-male sex OR sexual orientation (d) health-care provider OR primary care provider OR general practitioner OR physicians OR clinician OR doctors. Moreover, related papers from references of included studies were also hand-searched and experts in the field of HIV disclosure were consulted with for additional references.

Definitions and Inclusion Criteria

The commonly accepted term 'men who have sex with men' (MSM) was used in this review, which included

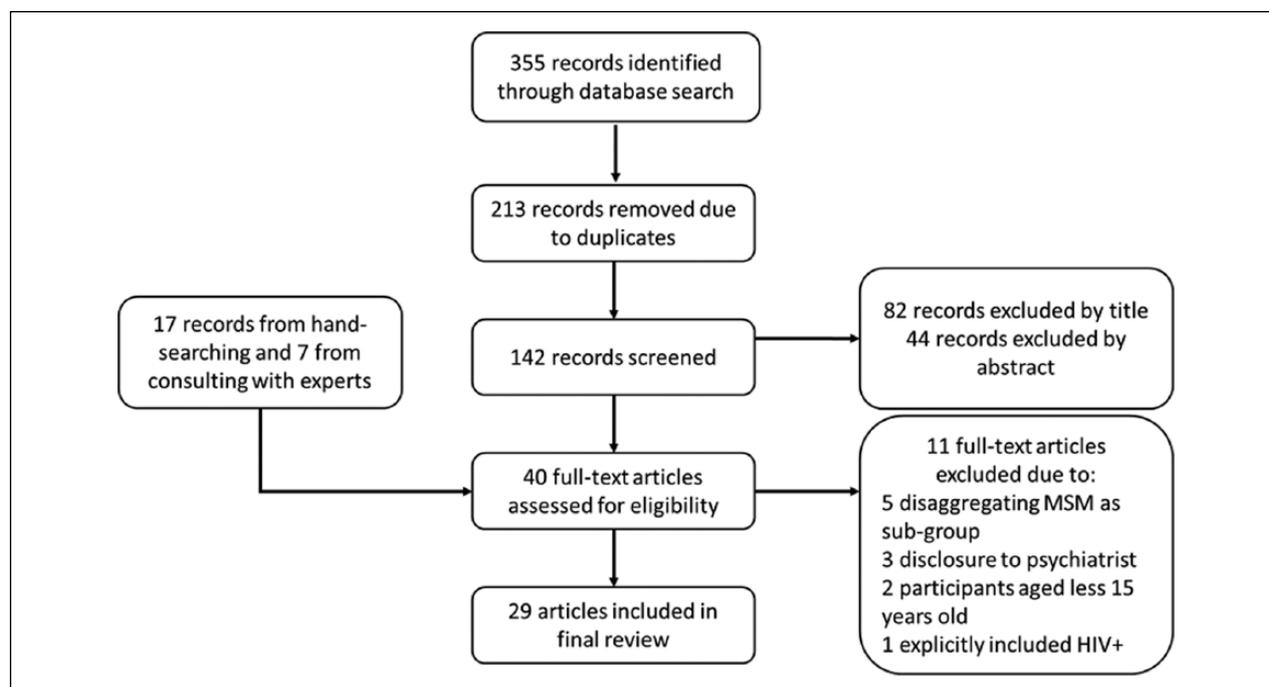


Figure 1. PRISMA search flowchart for the reviewed studies.

men self-identified as gay or bisexual and men who had experience of same-sex behavior. Although same-sex behavior and homosexuality were often used interchangeably in the literature, empirical studies have revealed discordance between self-reported sexual identity and sexual behaviors (Savin-Williams, 2006). For example, some men engage in same-sex behaviors, but they do not necessarily identify themselves as gay (Dharma & Bauer, 2017). The same-sex behavior of the MSM population was the main interest in this review to cover both homosexual and nonhomosexual orientations mainly because of its broader behavioral implication in the context of HIV infection and transmission.

Accordingly, “disclosure to HCPs” was defined as the MSM patients’ disclosing to their HCPs either same-sex behavior or homosexual orientation in clinical settings. The review mainly focused on disclosure of same-sex behaviors that can help HCPs capture actual sexual behavior to better estimate the scope of HIV risk of the patients. Studies using terms of disclosing homosexual orientation were also included because disclosing homosexual orientation is more inclusive term including the domain of disclosing same-sex behavior. In addition, “health-care provider” was referred to trained health-care professionals including primary care providers, clinicians, and other medical personnel who assumed the responsibilities to take care of patients for their physical health.

Inclusion criteria for reviewed papers included: (a) being published in peer-reviewed journals in English

between 1981 and 2016; (b) being empirical studies (qualitative, quantitative or mixed studies) among HIV negative MSM participants aged 15 years or above; and (c) including measures on disclosure of same-sex behaviors to health-care providers. Studies on LGBT populations without segregating MSM as subgroup were not included in the final review. The studies among HIV negative MSM were only chosen because our main interest was to examine the same-sex behavior disclosure and HIV testing which might not be a meaningful issue among HIV positive MSM.

Screening and Data Extraction

Initially, 355 articles were retrieved through searching the four electronic databases. After removing 213 duplicated records, 142 articles were screened based on their titles and abstracts. Then 82 articles were further excluded by title screening and 44 articles by abstract screening which resulted in 16 articles for full-text screening. An additional 17 articles were retrieved through manual search and 7 articles were obtained through consultation with experts in the field, which results in a total of 40 articles for full-text screening (Figure 1). Eleven full-text articles were excluded due to not segregating MSM as subgroup ($n = 5$), focusing on disclosure to psychiatrist ($n = 3$), recruiting participants less than 15 years of age ($n = 2$), and targeting MSM living with HIV ($n = 1$). Finally, 29 studies were included in the final reviews.

Data were extracted and coded using structured tables to incorporate the study characteristics, sample characteristics, and disclosure characteristics. The study characteristics included authorship, study site, years of data collection, and study design. The sample characteristics included sample size, age, ethnicity, residence, and inclusion criteria. The disclosure characteristics summarized information on type of health-care providers, measures of disclosure, the rate of disclosure, association between disclosure and HIV-testing and other health outcomes, and the factors influencing disclosure. The structured tables and coding instructions were pilot tested with a few articles before the formal data extraction.

Two researchers conducted data extraction using protocol suggested by Higgins and Green (2011). They worked independently to extract data from each article. Kappa scores were calculated to assess inter-rater variability. Values of Kappa above 0.75 reflect excellent agreement (Orwin, Cooper, & Hedges, 1994). The Kappa score was 0.92 for quantitative studies and .85 for qualitative studies. The disagreements in the data extraction were resolved by discussions between the two researchers.

Assessment of Study Quality

The quality criteria proposed by Kmet et al. (2004) were used to assess methodological quality of the reviewed studies in terms of research design, measurement, data collection and analysis, and finding reports. Ten criteria were used for qualitative studies and 14 criteria were used for quantitative studies. There are three responses for each assessment criteria: yes (2 points), partial (1 point), and no (0 points). The final score for study quality was a percentage of the sum score of all the applied criteria divided by possible maximum sum score with a range from 0% (no criteria met) to 100% (all criteria met) for each study. Quality assessment was conducted independently by two researchers and all the disagreement were discussed and resolved. The score of quality ranged from 60% to 100% for qualitative studies with a mean of 79% and from 60% to 100% with mean of 90% for quantitative studies (see Appendix 1).

Results

Study Characteristics

The basic characteristics and the main findings of the reviewed studies were summarized in Table 1. Majority of the studies were conducted in high-income countries, including the United States ($n = 18$), Canada ($n = 1$), Germany ($n = 2$), New Zealand ($n = 3$), and UK ($n = 3$). Two studies were conducted in China (upper-middle

income country). No studies explored disclosure to HCPs among MSM in African or Latin American countries.

In terms of study design, quantitative design accounted for 79% ($n = 23$) of the total studies ($n = 29$). There were five qualitative studies and one quantitative study with open-ended questions in the survey. Internet technologies were widely applied in participants' recruitment and data collection. Audio computer-assisted interviewing, online sampling (via Facebook profiles), and online survey (via websites or email list of MSM/LGBT organizations) have been employed in some quantitative ($n = 14$) and qualitative ($n = 1$) studies.

Sample Characteristics

Given the various inclusion and exclusion criteria for participant recruitment in the reviewed studies, the MSM participants in these studies were diverse in terms of age, race/ethnicity, and residence. In most of the studies, they were young and lived in or migrated into big cities. Several of studies conducted in the United States focused on ethnic minorities including African American (Arrington-Sanders et al., 2016) and Hispanic/Latino populations (Joseph et al., 2014; Oster et al., 2013).

Disclosure Characteristics

Target and measurement. In most of the studies, the target of disclosure was generally referred as health-care providers. Some studies used the term "doctors" and "physicians" (Koch et al., 2016; Petroll & Mosack, 2011), some used the term "(regular) doctor, nurse, or healthcare providers" (Ramirez-Valles et al., 2014; Wall et al., 2010), or "health-care professional" (Ng et al., 2014; Tang et al., 2017; Wilkerson et al., 2010) or "medical provider" (Arrington-Sanders et al., 2016). Some studies explicitly focused on general practitioners (GPs) (Fitzpatrick et al., 1994; Ludlam et al., 2015; Metcalfe et al., 2015) and primary health-care provider (Marcus et al., 2015; Petroll & Mitchell, 2015). In a study on MSM's disclosure of sexual behaviors, Guo and colleagues asked the participants to identify all the individuals who knew their same-sex behaviors, including doctors (Guo et al., 2014).

It is notable that the measurements of disclosure to HCPs were not consistent across the studies. Generally, there were four types of questions used to investigate disclosure in clinical setting: (a) the questions asking MSM whether or not they had discussed or told sexual orientation/sexuality with their HCPs (Arrington-Sanders et al., 2016); (b) the questions asking MSM if they had told any HCPs that they were attracted to or have sex with men or have male sexual partners (Bernstein et al., 2008; Chapin-Bardales et al., 2016; Joseph et al., 2014; Lo et al., 2012; Magnus et al., 2010; Ng et al., 2014; Oster et al., 2013;

Table 1. Characteristics of Reviewed Studies.

Author	Country	Year	Research design & data collection	Sample characteristics	HCPs type	Disclosure measure	Proportion	Association with HIV testing
Arrington-Sanders et al. (2016)	United States	2014–2015	Quantitative design; Cross-sectional internet-based survey, recruitment in adolescent clinics, internet ads, venue-based outreach	147 YBMSM (age: M = 21.3 years old, SD = 2.1) Criteria: Aged 15–24 years old, self-identified Black male, prior anal sex with a male, U.S. resident	Regular medical provider	Have you disclosed your sexual orientation to your medical provider?	61.9%	N/R
Bernstein et al. (2008)	United States	2004–2005	Quantitative design; Cross-sectional survey by CDC staff with handheld computers (NHBS project)	452 MSM Criteria: at least 1 male sex partner in the past year	Health-care provider	Have you told any health-care providers that you are attracted to or have sex with other men?	61.3%	HIV test in the past year: aOR = 0.98, 95% CI [0.65, 1.48]
Chapin-Bardales et al. (2016)	United States	2011	Quantitative design; Cross-sectional survey with handheld computer via CDC staff (NHBS project)	353 MSM Criteria: > 18 years old, male, ever sex with male past 12 months	Health-care provider	Have you told your HCP that you are attracted to or have sex with men?	49%	HIV test in past 12 months was associated with disclosure: aOR = 1.4, 95% CI [1.1, 1.7]
Durso and Meyer (2013)	United States	2004–2005	Quantitative design; Cross-sectional survey by CDC staff with handheld computer (NHBS project)	198 GBM (age: M = 32.44 years old, SD = 8.88)	Health-care provider	Participants were asked to report the degree of disclosure of their sexual orientation to health-care providers using a scale from 1 ("out to none") to 4 ("out to all").	Out to health-care providers for gay men (90%) and for bisexual men (61%)	N/R
Fitzpatrick et al. (1994)	UK	1991–1992	Survey with some open-ended questions	677 gay men including 623 registered with GPs and 102 men (age: M = 32.6 years old, SD = 10.1) Criteria: men who have had sexual contact with men in the last 5 years	General practitioner	Did your general practitioner know that you are homosexual?	Of these registered GPs, 56% said that their GPs knew their sexuality	N/R
Guo, Li, Liu, Jiang, and Tu (2014)	China	2009	Quantitative design; Paper-based cross-sectional survey, sampling via peer outreach, informal social network, Internet, and venue-based	307 young migrant MSM (age: M = 23.73 years old, SD = 2.86) Criteria: 18–30 years old; ever had sex with men; migrant without a permanent Beijing local residency	Doctor	Participants were asked to identify all the individuals who knew about their same-sex behavior, including to doctors.	24%	Never had HIV test among open to doctors (18%) vs. no open to doctors (31%), $p < .05$
Joseph et al. (2014)	United States	2007–2008	Quantitative design; Cross-section survey, recruited in multiple venues and through referrals & advertisements	608 Hispanic/Latino MSM (age: M = 34.6 years old, SD = 9.45, range: 18–52) Criteria: 18–49 years old, sex with male partner in the past 3 months in addition to multiple sex partner	Health-care provider	Did you disclose your sex with male to HCP?	61.1%	Repeat/recent test: aOR = 1.97, 95% CI [1.30, 2.96]; Test avoiding (never testing or last test more than 5 years ago): aOR = 0.70 95% CI [0.46, 1.05]
Koch et al. (2016)	Germany	2013–2014	Quantitative design; Cross-sectional online survey	1429 MSM (median age: 40 years old, range: 16–78) Criteria: had no MenC vaccination	Physician	openness regarding sexual orientation toward their physician	55.3%	N/R
Lo, Turabelidze, Lin, and Friedberg (2012)	United States	2008	Quantitative design; Cross-sectional survey by CDC staff with handheld computer, venue-based, time-space sampling (NHBS project)	339 MSM (age: M = 35, range: 18–80) Criteria: > 18 years old; engaged in male-male sex during the previous year	Health-care provider	Have you ever disclosed same-sex attractions or male-male sex to health-care providers?	73%	HIV testing during previous 12 months: aOR = 1.6, 95% CI [1.2, 2.0]
Ludlam, Saxton, Dickson, and Hughes (2015)	New Zealand	2014	Quantitative design; Cross-sectional self-reported survey from both community and internet	3168 GBM Criteria: > 16 years old, male, have sex with a man in past 5 years	Usual general practitioner (GP, doctor)	Does your usual general practitioner (GP, doctor) know you are gay or bisexual or have sex with men?	50.5%	Ever had an HIV test: aOR = 6.6, 95% CI [5.2, 8.3]; Recent HIV testing: aOR = 3.3, 95% CI [2.7, 3.9]

(continued)

Table 1. (continued)

Author	Country	Year	Research design & data collection	Sample characteristics	HCPs type	Disclosure measure	Proportion	Association with HIV testing
Magnus et al. (2010)	United States	2008	Quantitative design; Cross-sectional survey by CDC staff with handheld computers (NHBS project)	500 MSM Criteria: self-identify as male, having had sex with another man in the last year, >18 years old, living in Washington DC, speaking English or Spanish	Health-care provider	Have you told any health-care providers that you are attracted to or have sex with other men?	80%	N/R
Marcus, Gassowski, Kruspe, and Drewes (2015)	Germany	2013–2014	Quantitative design; Online-survey cross-sectional by personalized invitation messages from MSM social networking and dating websites	15297 MSM Criteria: >16 years old	Primary health-care provider	Outness toward primary health-care provider about sexual orientation? (Responses: less than half know, half or more know, not applicable)	40.0%	Recently test vs. distant test aOR = 1.79, 95% CI [1.60, 2.00]; Recently tested vs. never test aOR = 4.54, 95% CI [4.02, 5.11]
Mercalfe, Laird, and Nandwani (2015)	UK	2011–2012	Quantitative design; Cross-sectional survey in electronic and paper formats	204 MSM Criteria: >16 years old	General practitioner	Whether your GP was aware of your sexual orientation?	40%	N/R
Metheny and Stephenson (2016)	United States	N/R	Quantitative design; Cross-sectional internet-based survey via Facebook	319 rural MSM (age: M = 30 years old, SD = 11.74)	Clinician	7-point Likert-type, "My primary care provider definitely does not know that I am a gay" to "definitely know that I am gay and we talk about it openly"	Mean 5.7, 95% CI [4.7, 5.7], range from 1 to 7. Recorded into 81.4%	"HIV test in past 12 months and received a single HAV and HBV vaccines" coded as 1. Disclosure was associated with HIV test and HAV/HBV vaccination: aOR = 1.26, 95% CI [1.08, 1.47]
Ng et al. (2014)	Canada	2008–2009	Quantitative design; Cross-sectional self-reported survey, venue-based time-space sampling recruitment method	925 MSM (median age: 30 years old for no disclosure group and 32 years old for disclosure group) Criteria: Identifying as men aged >19 years old, reported ever having sex with other men	Health-care professional	Have you told a health-care professional you have male sex partners?	23%	Ever been tested for HIV: disclosed group 91% (646/714) vs. not disclosed group 58% (122/209), $p < .001$; Have been tested for HIV in previous Year: 76% (526/694) vs. 42%, $p < .001$ (83/198)
Oster et al. (2013)	United States	2008	Quantitative design; Cross-sectional survey via Interview by CDC staff with handheld computer (NHBS project)	1734 Latino MSM (median age: 31 years old) Criteria: being male, >18 years old, U.S. resident, speaking English or Spanish, at least one sex partner during last year, had a negative or confirmed positive HIV test result, identified as Hispanic or Latino	Health-care provider	Have you ever told a health-care provider that you are attracted to or have sex with men?	66%	HIV test in past 12 months: aPR = 1.3, 95% CI [1.2, 1.3]
Petroll and Mitchell (2015)	United States	2011	Quantitative design; Cross-sectional survey via online sampling by Facebook profile	722 GBM representing both men of 361 male couples (age: M = 33.01 years old, SD = 10.79, range: 18–68) Criteria: male, >18 years old, living in United States; had a relationship status being "in a relationship, engaged, or married," had oral and/or anal sex previous 3 months	Primary care provider	Does your primary care doctor know that you have sex with men?	65.2%	N/R

(continued)

Table 1. (continued)

Author	Country	Year	Research design & data collection	Sample characteristics	HCPs type	Disclosure measure	Proportion	Association with HIV testing
Petroll and Mosack (2011)	United States	2007	Quantitative design; Self-administered, written cross-sectional survey	271 MSM invited at a Gay Pride festival (age: $M = 35$ years old, range: 18–74) Criteria: Reported having seen as PCP within the prior 5 years	primary physician, nurse practitioner, or physician assistant	Do you believe your doctor knows your sexual orientation?	71.4%	59% for HIV testing among disclosure group vs. 13% among not disclosure group
Ramirez-Valles, Dirkes, and Barrett (2014)	United States	2006	Quantitative design; Internet-based cross-sectional survey, sample recruited through various means, including social and health services agencies, snowballing, electronic lists	182 self-identified as gay or bisexual (age: $M = 66$ years old, $SD = 5.39$, range: 56–82)	Regular doctor, nurse or health-care provider	Do you think your regular provider knows your sexual orientation/gender identity?	71%	N/R
Tang et al. (2017)	China	2014	Quantitative design; Cross-sectional online survey via banner in three gay dating websites	1424 MSM Criteria: >16 years old, born male, ever having sex with a man	Health professional	Have ever disclosed sexual orientation to health-care professionals?	16%	The odds of disclosure were greater among MSM who had ever tested HIV aOR = 3.36, 95% CI [2.50, 4.51]
Wall et al. (2010)	United States	2009	Quantitative design; Online cross-sectional survey	4620 MSM Eligibility: > 18 years old, U.S. resident, at least one male sex partner in the last year visited a doctor, nurse, or other HCPs in the prior 12 months	Doctor, nurse, or health-care provider	When you visited a doctor, nurse, or health-care provider in the past 12 months, did you tell the HCP that you have sex with men?	44.5 %	Being offered with HIV testing: OR = 19.22, 95% CI [5.79, 23.41] for Age 20 group; OR = 14.45, 95% CI [11.46, 18.21] for Age 30; OR = 10.86, 95% CI [7.06, 16.70] for Age 40; OR = 8.16, 95% CI [4.22, 15.77] for Age 50
Whitehead, Shaver, and Stephenson (2016)	United States	2014	Quantitative design; Cross-sectional online survey via banner ads on Facebook	477 cisgender men (age: $M = 32.62$ years old, $SD = 13.42$) Criteria: > 18 years old, rural home zip code, self-identified LGBT,	Primary health-care provider	Outness to PCP (range 1–7)	4.52 (SD = 2.33). Recorded into 64.6%	Association between outness to PCP and health-care utilization: Regression coefficient = 0.119 (SD = 0.026, $p < .001$)
Wilkerson, Smolenski, Horvath, Danilenko, and Rosser (2010)	United States	2005	Quantitative design; Online cross-sectional survey	2577 MSM Criteria: male, > 18 years old, U.S. resident, have sex with men at least once during their lifetime	Doctor or health professional	Talked with a doctor or health professional about having sex with men.	62.1%	N/R
Author	Country	Conducted time	Design & data collection	Sample characteristics	Main findings			
Adams et al. (2008)	New Zealand	N/R	Qualitative design via focus groups	50 self-identified gay men	Disclosure was more likely to happen if gay men thought it was relevant to the issue they are seeing the doctor about. Because of potentially physically and emotionally risky, some gay men may hide or not reveal their sexuality to doctors.			
Adams, McCreanor, and Braun (2013)	New Zealand	N/R	Qualitative design with focus groups	45 gay men, age ranged from 24 to 64 years old	Perceptions of importance or necessary may influence gay men's disclosure decision. Some nondisclosure participants did not think disclosure as an important or significant issue. A minority of participants viewed disclosure of gay identity to doctor as needed.			

(continued)

Table 1. (continued)

Author	Country	Conducted time	Design & data collection	Sample characteristics	Main findings
Clover (2006)	UK	2002–2003	Qualitative design, based on semistructured interview with purposive sampling	10 gay men aged between 60 and 70 years old Criteria: >60 years old, living in London	Fears of a lack of understanding, discrimination, or poorer treatment led some men to choose not to disclose their sexuality to health-care providers. This choice was not related to being open about sexuality more generally; some men who were usually very open being reluctant to talk openly to health workers.
Fitzpatrick et al. (1994)	UK	1991–1992	Mixed methods; Survey with some opened questions	677 gay men including 623 registered with GPs and 102 men (age: $M = 32.6$ years old, $SD = 10.1$, range: 16–71) Criterion: men who have had sexual contact with men in the last 5 years	Men who viewed their GPs' practice as unsympathetic toward homosexual men were less likely to have informed their general practitioner of their sexual orientation.
Malebranche et al. (2004)	United States	2000–2001	Qualitative design with focus group	86 BMSM Criterion: being African American, >18 years old, English speaking, MSM	Racial and sexual stigma toward BMSM impacts how open BMSM are with health providers about their sexuality.
Martínez and Hosek (2005)	United States	2002–2003	Qualitative design semistructured interview with purposive sampling	6 young BMSM (age: $M = 21.5$ years old) Criterion: African American who engage in sex with other men but not identify as gay	Trusting relationship with health provider could facilitate communication on same-sexual behavior.
Underhill et al. (2015)	United States	2013–2014	Qualitative design with one-on-one interview	56 MSM (31 MSWs; median age = 27 years old, 25 MSM; median age = 39 years old) Criteria: English-speaking cisgender adult men of self-reported negative or unknown HIV status, reported condomless anal sex with a man in the past 6 months	MSM who did not report sex work described sex with men to clinicians more often. Medical barriers and perceived discrimination impede sexual behavior disclosure to clinicians.

Note. HCP = health-care provider; N/R = not reported; M = mean, SD = standard deviation; YBMSM = young black men who have sex with men; HIV+ = HIV seropositive; HIV- = HIV seronegative; NHBS = National HIV Behavioral Surveillance System; GBM = gay and bisexual men; GP = general practitioner; PCP = primary care provider; HAV = hepatitis A virus; HBV = hepatitis B virus; MSW = men who engage in sex work; OR = odds ratios; ^aOR = adjusted odds ratios; aPR = adjusted proportion ratios.

Petroll & Mitchell, 2015; Wall et al., 2010); (c) the questions asking MSM to estimate whether their doctor knew their sexual orientation (Ludlam et al., 2015; Metcalfe et al., 2015; Petroll & Mosack, 2011; Ramirez-Valles et al., 2014)); and (d) the questions asking MSM to assess the openness toward HCPs about sexual orientation (Koch et al., 2016; Marcus et al., 2015; Whitehead et al., 2016). The first three types of measurements typically yielded dichotomous or categorical variables while the fourth type of measurement produced continuous variables.

Disclosure/awareness rate. Depending on the types of disclosure measurement, some studies reported the proportion of MSM who had disclosed their same-sex behaviors to their HCPs, while some examined the proportion of HCPs who had known their patients' same-sex behaviors. Of the 15 studies that described MSM's disclosure to HCPs, the disclosure rates ranged from 16% in 1,424 MSM in China (Tang et al., 2017) to 90% in 198 gay men in New York City (Durso & Meyer, 2013), with a median of 61% (Joseph et al., 2014). Eight studies investigated HCPs' awareness of their patients' same-sex behaviors. The awareness rates ranged from 24% in 307 MSM in Beijing China (Guo et al., 2014) to 81% in 319 rural MSM in the United States (Metheny & Stephenson, 2016), with a median of 51% (Ludlam et al., 2015).

Disclosure rates among MSM and awareness rates among HCPs were relatively high in the United States, followed by other high-income countries including Germany (Koch et al., 2016; Marcus et al., 2015), New Zealand (Ludlam et al., 2015), the UK (Metcalfe et al., 2015), and Canada (Ng et al., 2014). The studies conducted in China reported two lowest disclosure rates (Guo et al., 2014; Tang et al., 2017). Of the studies conducted in the United States, two studies in Hispanic/Latino MSM reported a disclosure rate of 66% (Oster et al., 2013) and 61% (Joseph et al., 2014), respectively; and one study in young black MSM reported a disclosure rate of 62% (Arrington-Sanders et al., 2016).

Associations Between Disclosure and HIV Testing and Other Health Outcomes

Uptake of HIV testing is one of positive consequences of disclosure to HCPs. The majority of the quantitative studies examined the relationship between disclosure and various aspects of HIV testing among MSM. Disclosure to HCPs was linked to HCPs' recommendations of HIV testing (Bernstein et al., 2008; Petroll & Mosack, 2011; Wall et al., 2010). Disclosing same-sex behaviors to HCPs was also associated with MSM's ever having HIV testing (Bernstein et al., 2008; Guo et al., 2014; Ludlam et al., 2015; Ng et al., 2014) and with recent (e.g., in the

past 1 or 2 years) and repeated testing (Chapin-Bardales et al., 2016; Joseph et al., 2014; Lo et al., 2012; Marcus et al., 2015; Ng et al., 2014; Oster et al., 2013). However, one study reported no significant association between disclosure of same-sex behaviors to HCPs and uptake of HIV testing among MSM in New York City (Bernstein et al., 2008).

In addition to HIV testing, disclosure to HCPs might also be associated with further discussions of HIV risks between MSM and their doctors as well as uptake of STI testing and Hepatitis vaccinations. HCPs who were aware of their patients' same-sex behaviors were more likely to ask about the types of sexual behaviors that their patients had with male and female partners, about their risks for STI or HIV, and about sexual functioning (Petroll & Mosack, 2011). MSM who had disclosed their same-sex behavior to HCPs were more likely to have taken specific sexual health checks and appropriate STI tests (Ludlam et al., 2015; Ng et al., 2014). Disclosure to HCPs was also related to receiving hepatitis A and/or B vaccinations (Metheny & Stephenson, 2016; Petroll & Mosack, 2011).

Disclosure to HCPs was also related to health service utilization and general well-being among MSM. Whitehead and colleagues examined the association between disclosure and primary care utilization among the rural LGBT population in the United States (Whitehead et al., 2016). A "health score" was used to represent the percentage of health tasks (age- and anatomy-appropriate vaccinations and health screenings) each participant had obtained within a recommended time-period. The study indicated that openness to HCPs about sexual behaviors was significantly associated with higher health scores (Whitehead et al., 2016). Disclosure to HCPs might also contribute to better psychosocial well-being for MSM. For example, Ramirez-Valles and Dirkes reported that MSM who had disclosed to HCPs reported higher perceived health status and lower depression than their counterparts who had not disclosed (Ramirez-Valles et al., 2014).

Factors Influencing Disclosure

In Table 2, we presented main factors that might influence disclosure to HCPs. These factors identified by the reviewed studies were categorized into seven domains: demographic characteristics, socioeconomic characteristics, sexual identity, partner pattern and relationship, individual perceptions, HIV-related risk, and health-care facility characteristics.

Demographic characteristics. Most of studies have examined how the demographic factors may contribute to complicated practices of disclosure to HCPs. Race and ethnicities are key demographic factors investigated in

Table 2. Factors Influencing Disclosure of Same-Sex Behaviors to HCPs.

	Demographic characteristics			Socioeconomic characteristics			Sexual identity	Partner pattern & relations	MSM's perceptions			Health facility characteristics		
	Race /ethnics	Birth place	Age	Urban	Income	Edu	-	-	General openness	Perceived relevancy	Perceived risks	Gay/gay friendly doctors		
Adams et al. (2008)												Trusting relations		
Adams et al. (2013)														
Bernstein et al. (2008)	Y	Y	N		Y	N		Y			N			
Clover (2006)									Y					Y
Durso and Meyer (2013)	N	N	Y		N	N	Y	N	Y					
Fitzpatrick et al. (1994)										Y		Y		
Guo et al. (2014)			N	Y		N		Y	N		Y			
Joseph et al. (2014)														
Lo et al. (2012)										Y				
Ludlam et al. (2015)		Y				N	Y				Y			
Magnus et al. (2010)	Y													
Malebranche et al. (2004)														Y
Martinez and Hoeseck (2005)													Y	
Metcalfe et al. (2015)										Y		Y	Y	Y
Ng et al. (2014)			Y		Y	Y	Y	Y						
Oster et al. (2013)		Y												
Petroll and Mitchell (2015)	N		Y	Y	Y	Y	N	N						
Petroll and Mosack (2011)				Y	Y	N		Y					Y	
Tang et al. (2017)								Y						Y
Wall et al. (2010)	Y		Y											Y

Note. Y = investigated by researchers and found to be relevant to disclosure. N = investigated by researchers and found to be nonsignificant. HCPs = health-care providers; MSM = men who have sex with men.

studies among MSM in the United States. MSM of color were less likely to disclose their same-sex behaviors to HCPs (Bernstein et al., 2008). Some studies indicated that Black men were less likely to inform HCPs that they engaged in same-sex behaviors (Magnus et al., 2010), compared with White, Latino or Asian men (Petroll & Mosack, 2011). Wall and colleagues reported that Hispanics were more likely than white non-Hispanics to disclose same-sex behaviors to their HCPs; and black race was not associated with disclosure of same-sex behaviors to HCPs (Wall et al., 2010). Two recent studies suggested that race was not related to disclosure (Durso & Meyer, 2013; Petroll & Mitchell, 2015). Several studies investigated the link between place of birth and disclosure. One of the studies indicated that MSM born in the United States were 1.9 times more likely to disclose to HCPs (Bernstein et al., 2008). Oster and colleagues discovered that MSM born in Central America were less likely to report ever disclosing same-sex behavior to their HCPs (Oster et al., 2013). However, Durso and Meyer (2013) reported that being born outside of the United States was not a significant predictor for disclosure to HCPs about same-sex behaviors.

Age is another critical demographic factor that may be related to disclosure to HCPs. However, the findings are mixed in our review. Some studies indicated that younger MSM (i.e., <20 years of age) were more likely to disclose their same-sex behaviors to HCPs (Wall et al., 2010). Some studies suggested that older age (i.e., >34 years) was associated with disclosing to HCPs or reporting their HCPs awareness of their same-sex behavior (Durso & Meyer, 2013; Ludlam et al., 2015; Ng et al., 2014; Petroll & Mitchell, 2015). One study conducted in New York City reported no association between age and disclosure (Bernstein et al., 2008). Another study conducted among migrant MSM in China, reported a lower mean age of the participants who had disclosed to HCPs, but the association did not reach significance in multivariate logistic regression analysis (Guo et al., 2014).

Socioeconomic characteristics. Higher socioeconomic status was associated with a higher disclosure rate. MSM living in the urban settings, or being originally from urban areas were more likely to tell their HCPs about their sexual orientation or same-sex behaviors (Guo et al., 2014; Petroll & Mosack, 2011; Petroll & Mitchell, 2015). Higher income was a strong predictor for disclosure of same-sex behavior to HCPs (Bernstein et al., 2008; Ng et al., 2014; Petroll & Mosack, 2011; Petroll & Mitchell, 2015). The findings on the role of education level in disclosure were mixed. Several studies suggested that higher education attainment was a facilitator for disclosure to HCPs (Ng et al., 2014; Petroll & Mitchell, 2015), while some studies reported no significant association between

education and disclosure (Bernstein et al., 2008; Durso & Meyer, 2013; Guo et al., 2014; Ludlam et al., 2015; Petroll & Mosack, 2011).

Sexual identity. Existing literature has explored how sexual identity might influence disclosure of same-sex behaviors to HCPs among MSM. A study among MSM in Canada suggested that participants with self-reported sexual identity as bisexual, queer, two-spirit, or straight were less likely to tell their same-sex behaviors to HCPs compared to the ones self-identified as gay (Ng et al., 2014). One study among MSM in New Zealand indicated that bisexually identified MSM were less likely than their gay counterparts to make HCPs aware of their same-sex behavior (Ludlam et al., 2015). However, a study conducted in New York City suggested that sexual identity was not a significant predictor for disclosure. Petroll and Mitchell (2015) also reported that there was no significant difference between gay or bisexual men in terms of disclosure to HCPs.

Partner pattern and relationship. Researchers have investigated if partner pattern and relationship status might be associated with disclosure. MSM who had female partners in the past year were less likely to disclose their same-sex behavior to HCPs (Bernstein et al., 2008). A study conducted among MSM in China suggested that living with a male partner was associated with disclosure to HCPs (Guo et al., 2014). It was reported that having male sexual partners currently, or in the past 6 months, was associated with disclosure to HCPs (Ng et al., 2014; Tang et al., 2017). However, several studies suggested there was no significant association between disclosure and being in a stable relationship with a male partner (Durso & Meyer, 2013; Petroll & Mosack, 2011).

Individual perceptions. The decision to disclose to HCPs might be affected by MSM's individual perceptions and judgment of the benefits of the disclosure to HCPs (Durso & Meyer, 2013; Stein & Bonuck, 2001). The factors may include their openness about their sexual behaviors, perceived stigma and discrimination, and perceived relevancy between disclosure and service-seeking. Durso and Meyers (2013) explored the relationship between disclosure to friends and disclosure to HCPs, discovering that time since coming out to an LGB friend was positively associated with disclosure to HCPs. However, a qualitative study conducted in the UK suggested that openness about same-sex behaviors might be selective (Clover, 2006). Some men who were usually very open could be reluctant to talk openly to their HCPs and chose not to disclose to HCPs due to fears of discrimination or poorer treatment (Clover, 2006). Disclosing to family or friends

about same-sex behavior was not correlated with disclosure to HCPs (Guo et al., 2014).

Stigma and discrimination could be one of the main reasons for nondisclosure to HCPs. Internalized homophobia was a prominent reason of nondisclosure (Durso & Meyer, 2013). Intersecting stigma, multiple layered stigma that MSM simultaneously experience because of same-sex behavior and other aspects of their identities or behaviors, such as their race/ethnicity, drug use, and experience of commercial sex, impedes their disclosure of same-sex behavior to HCPs (Underhill et al., 2015). Racial and sexual discrimination toward Black MSM hindered them from disclosing to HCPs (Malebranche et al., 2004). In-depth interviews among MSM including male sex workers in a U.S.-based qualitative study suggested that male sex workers were less likely to discuss their same-sex behavior to clinicians (Underhill et al., 2015).

Another key reason for nondisclosure to HCPs among MSM is their perceived low relevancy between disclosure to HCPs and the health service they seek. Several qualitative studies reported that MSM did not tell their same-sex behaviors to doctors because they believed it was not important or relevant to their health care (Adams et al., 2008; Metcalfe et al., 2015). The final decision to disclose depended on the type of health issue the person was seeking treatment for (Adams et al., 2008; Lo et al., 2012). A quantitative study conducted in the UK suggested that the participants who felt that it was important for the doctor to know about their same-sex behaviors in clinical visits were more likely to make their HCPs aware than those who did not feel it was important (Fitzpatrick et al., 1994).

HIV-related risk. The perceived risks of HIV infections and other STIs may also affect the decision-making regarding disclosure to HCPs. For example, the MSM who suspected their partners having STIs and had a history of STIs themselves were more likely to tell their same-sex behaviors to HCPs (Guo et al., 2014). However, one study reported that self-assessed likelihood of acquiring HIV over one's lifetime was not significantly associated with disclosure to HCPs (Ng et al., 2014).

A number of studies investigated high-risk sexual behaviors among MSM as proxy measures of perceived risks of HIV infection. There is a lack of consistent findings regarding the relationship between disclosure and high-risk sexual behaviors. MSM who had disclosed to HCPs were more likely to report condomless anal intercourse in past 6 months (Ng et al., 2014). MSM were more likely to report their same-sex behavior to their practitioner if they had more than one recent male sexual partner (Ludlam et al., 2015). Participating in group sex in the past 12 months and using recreational drugs in the

past month were significantly related to disclosure to HCPs (Tang et al., 2017). MSM who had been engaged in sex trade or had experiences in seeking partners on the Internet were more likely to tell their same-sex behaviors to HCPs (Guo et al., 2014). However, some studies reported that disclosure was not significantly associated with unprotected anal intercourse (Bernstein et al., 2008; Tang et al., 2017).

The number of male sex partners might be related to disclosure; but the results were mixed. Some studies indicated that large numbers of male sex partners was associated with higher rate of disclosure to HCPs or HCPs' awareness of same-sex behaviors (Ludlam et al., 2015; Wall et al., 2010). Some studies reported no significant association between disclosure and having a large number of male partners in the past year or the past week (Bernstein et al., 2008; Guo et al., 2014).

Health-care facility characteristics. Disclosure to HCPs is complicated and challenging for MSM. The majority of such communications occurs in clinic settings and may be affected by features of the health-care facilities, including the characteristics of HCPs, relationships of MSM and their HCPs, and the MSM's past experiences with health-care facilities.

Gay or gay-friendly doctors were perceived as safer targets of disclosure. Petroll and Mosack (2011) reported that MSM were more likely to disclose to gay and younger HCPs. A qualitative study among HIV-positive MSM suggested that male doctors were more likely than female doctors to be informed about a patient's same-sex behaviors. In addition, MSM who viewed their doctors as unsympathetic toward MSM tended not to talk with their doctors about same-sex behaviors (Underhill et al., 2015). Clinics with LGBT signs and gender-neutral language were viewed as a safer context for disclosure (Metcalfe et al., 2015).

Trusting relationships with health-care providers could facilitate communication on accurate information about sexual behaviors (Martinez & Hosek, 2005). MSM who believed that they did not need support from HCPs might not discuss their same-sex behaviors with HCPs (Metcalfe et al., 2015). One of basic reasons for nondisclosure to HCPs was the concerns for confidentiality breach. Many MSM were reluctant in disclosing to HCPs because they did not want their same-sex behaviors being documented in their medical records.

Past communication patterns with doctors and previous experiences in health-care facilities might also affect disclosure practice. For example, some MSM attributed their nondisclosure to the ways in which HCPs communicated with them. MSM did not disclose because the HCPs never asked about sexual orientation or same-sex behaviors (Metcalfe et al., 2015). Likewise, some studies indicated

that having previous communications about substance use, sex, and HIV facilitated disclosure (Klitzman & Greenberg, 2002; Meckler, Elliott, Kanouse, Beals, & Schuster, 2006). Previous negative experiences affected MSM expectations for health-care services and further influenced their decision-making regarding disclosure. Experiences with societal and institutional racism influenced the openness of Black MSM to speak with HCPs about their sexuality. Black MSM did not openly talk about same-sex behaviors to their doctors due to fear of additional discrimination (Malebranche et al., 2004). Fear of discrimination or poor treatment has led some MSM to choose not to disclose to HCPs (Clover, 2006).

Discussion

Summary of Main Findings

This literature review synthesizes current findings regarding MSM's disclosure of same-sex behaviors or sex orientation to health-care providers, examines the relationship between disclosure to HCPs and HIV-testing, and elaborates the potential factors affecting disclosure to HCPs in clinic settings. In summary, the disclosure rates varied across subgroups and study settings, ranging from 16% to 90%, with a median as 61%. Studies on disclosure of same-sex behaviors to HCPs were limited in developing countries. Generally, disclosure to HCPs was positively associated with uptake of HIV-testing. Disclosed MSM also reported more health-care utilization, better perceived health status, and lower depression. MSMs in urban settings, with higher education levels and higher income, were more likely to disclose. Ethnic minority status was related to nondisclosure. Younger or gay-friendly doctors were perceived as safer targets of disclosure. Having previous communications about substance use, sex, and HIV facilitated disclosure. Clinics with LGBT signs and gender-neutral language were viewed as a safer context for disclosure. The main reasons for nondisclosure included HCPs never asking about same-sex behaviors and MSM worrying about confidentiality or perceiving irrelevance between disclosure and health-care seeking.

Our review suggests that MSM's disclosure to HCPs is a significant area in HIV prevention and treatment among MSM. Empirical studies confirm a positive link between sexual behavior/identity disclosure and engagement in HIV prevention. Awareness of patients' sexual behaviors can help HCPs realize individuals' needs for HIV prevention and care and thus provide tailored sexual health care, including routine screenings of HIV and STIs, hepatitis vaccinations, and other biomedical prevention methods (e.g., PrEP). Promoting disclosure to HCPs could be a promising strategy to increase MSM's linkage to HIV prevention and care.

The current review also identifies multiple layers of barriers for MSM's disclosure to HCPs, ranging from individual-level features (such as age, race, sexual identity, and perceptions of disclosure), characteristics of health-care facilities, and structural-level factors (stigma and discrimination, poverty, and low socioeconomic status). Social ecological model could facilitate understanding how these factors interplay together in impeding MSM's disclosure. Given the importance of health-care facilities in the decision-making and process of MSM's disclosure, creating a gay-friendly context and providing appropriate training for HCPs could be a promising strategy to promote disclosure and increase MSM's linkage to HIV-related service.

Knowledge Gaps

Caution is needed in understanding and interpreting the exploratory and mixed findings given the following limitations of the existing empirical studies. First, there is a lack of theoretical frameworks to guide existing studies. Without a solid theoretical ground, the majority of empirical studies on MSM's disclosure in clinical settings yield descriptive analysis or simple examinations of potential associations rather than systematical hypothesis-testing guided by a conceptual framework. The minority stress proposed by Meyer (2003) might be a potential framework that could be adapted for organizing and synthesizing empirical findings in the future.

Second, there is a prominent research gap between high-income countries and low- and middle-income countries, especially some sub-Saharan countries where cultural context, social norms, as well as policies and legislation have interwoven a net of stigma and discrimination against same-sex behaviors and/or MSM (Itaborahy, 2012; Risher et al., 2013; Wirtz et al., 2014; Wolf, Cheng, Kapesa, & Castor, 2013). As MSM have been strongly marginalized or criminalized in these societies, it is not surprising that research and intervention efforts for this group are also limited.

Third, existing literature might have methodological issues in terms of study design, sampling and recruitment strategies, and measurement. A dearth of longitudinal studies limits the ability to investigate the causal relationship between disclosure to HCPs and HIV-testing behavior. Without longitudinal studies, it is also hard to explore the dynamics of process in which potential factors affect the decision-making and practices regarding disclosure to HCPs.

It is notable that almost all the empirical studies in the current review, including qualitative studies, examined the disclosure issues only from the perspectives of MSM. The dearth of data collected from health-care providers prevents us from learning the perceptions and practices of

HCPs, thus we have fewer opportunities to obtain a more comprehensive picture of disclosure issues in health-care services. However, one study has identified that HCPs asking about sexual identity and behavior could help MSM disclose their same-sex behavior (Fitzpatrick et al., 1994). This study suggested the importance to comprehensively investigate the role of communication between HCPs and their patients in clinical settings.

Another trend in sample recruitment is that increasing number of studies have applied social media (e.g., Facebook, websites) as tools of recruiting MSM and collecting quantitative data. The different approaches in sampling and data collection may contribute to inconsistency of results. However, the representativeness and the validity of the data collected through this approach has been assessed and compared with the ones collected through other approach and venues, such as behavioral surveillance survey or gay bars, which suggested consistent findings by the two survey methods (Raymond et al., 2010).

The mixed results could be attributed to the diversity of measurement instruments for key variables used in the existing studies. For example, so far there was no standardized measure to assess the disclosure of same-sex behaviors to HCPs. Some examined disclosure of same-sex behaviors, some focused on sexual orientation, some asked about MSM's disclosure behaviors, while others asked MSM to report HCPs' awareness of same-sex behaviors. As for the measurement of HIV-testing, there were also different measures with various recall periods. The various measures largely impede us from comparing and synthesizing results across studies.

Limitations of the Current Review

The review is subject to the following limitations. First, the number of reviewed studies was limited by our research protocol. Although we used a search algorithm combing various key terms, we might not include all relevant keywords. The narrow scope of the search algorithm limits our reaching out full literature on the research topic. Second, only the peer-reviewed journal papers published in English were retrieved. Empirical studies published in other languages, in project reports, and other grey literature were not included in the current review. This limitation might contribute to the lack of studies on MSM in Africa and Latin America in our review. Third, a few studies on disclosure of sexual behaviors among LGBT were not included in the review. In these studies, MSM were usually part of the study sample. The findings for MSM subgroups were not explicitly reported in the original papers, and thus were not extracted and summarized in the current review. Fourth, we were not able to conduct a meta-analysis on the association between

disclosure of same-sex behavior in clinical setting and uptake of HIV-testing due to the diversity of measures for both variables. Finally, without the guidance of a theoretical framework, we did not investigate dynamics or mechanisms of how the various factors facilitate or impede the disclosure in clinical settings.

Implications to Research and Practice

In despite of these limitations, existing literature has demonstrated the importance of MSM's disclosure to their HCPs in terms of accessing HIV prevention and treatment as well as receiving higher quality of care service that meet their needs. The findings based on empirical evidence have the following implications for public health professionals and health-care practitioners. First, promoting disclosure of same-sex behavior to health-care providers should be incorporated into HIV prevention and routine health-care interventions for MSM. Awareness of same-sex behaviors and knowledge of sex history will assist HCPs to develop more individualized and effective care service and examinations including optimizing the benefits of biomedical prevention technologies such as PrEP (Underhill et al., 2015).

Second, future research and intervention efforts should be concentrated in the most vulnerable and marginalized MSM groups who are suffering from intersectional stigma and multiple layered health inequalities. Disclosure to HCPs is far from universal practice among MSM, even in the high-income countries. MSM (sexual minorities) who are African Americans (racial minorities) or rural residents (geographical minorities) face triple difficulties in disclosure practice and should be given priorities in future intervention efforts and resources distribution. In the regions where medical mistrust and concerns regarding disclosure are often compounded by health inequality and intersectional stigma, promotion of disclosure could be integrated into human rights advocacy for MSM as well as in stigma and health disparity reduction campaigns in medical institutions (Muzyamba, Broaddus, & Campbell, 2015).

Third, health-care providers play a critical role in initiating discussion about sexual behaviors. Many MSM have worried that disclosure might lead to discrimination and poor health-care service. Their concerns may come from fears of racial and sexual discrimination and are often exaggerated by their negative encounters and experiences within health-care facilities. Positive and gay-friendly attitudes of HCPs, trust relationship between HCPs and their patients, and effective confidentiality protection will facilitate disclosure. In addition, HCPs need advanced communication skills and experiences, especially in terms of probing and guiding discussions on

sensitive topic such as sexual orientation and behaviors. Literature on disclosure issues in clinical settings among LGBT suggested that this population expect their HCPs to initiate such discussion (McNair, Hegarty, & Taft, 2012; Pierre, 2012). Therefore, potential strategies for capacity building of health-care facilities in terms of disclosure promotion may include providing special sensitivity training and health communication workshops that focus on disclosure issues among HCPs, and remodeling the clinical environment to provide a gay-friendly context to facilitate disclosure.

Future Directions

Based on the synthesis of empirical evidence and analysis of limitations of existing literature, we propose several suggestions for future study in this topic. First, more theoretical studies are needed to develop solidly conceptual frameworks as blueprints for empirical studies and intervention. Recent literature review and theoretical studies on lesbians' disclosure of same-sex behaviors to HCPs could shed insights on disclosure issues among MSM. For example, an identified disclosure model developed by McNair and colleagues posited that disclosure patterns were mainly influenced by sexual identity experience, the risk of disclosure perceived, and the quality of the patient-provider relationship. They further explained how the three influences interact with each other (McNair et al., 2012).

Second, future studies also need to pay more attention to methodology issues. With the guidance of theoretical models, there can be more accurate and consistent measurement instruments developed and applied in empirical studies. Research is needed in psychometric evaluation of scales and measures and comparison of validity and reliability by different approach in sample recruitment and data collection.

Third, health education intervention for MSM and health communication training projects for HCPs are needed to promote disclosure of sexual behaviors in clinical settings. To the best of our knowledge, there have no health intervention projects with a focus on MSM's disclosure of sexual behaviors or orientation to HCPs. Some sensitization trainings among HCPs in Africa have shown the efforts in this direction with some preliminary efficacy (Elst et al., 2013).

In summary, disclosure to HCPs about same-sex behavior could promote uptake of HIV testing and other routine screenings among MSM, increase their health-care utilization, and improve their access to biomedical HIV prevention technologies. Disclosure issues among MSM in clinical settings are related to decision-making, health communication, patient-provider relationship, clinical training and guidelines, and stigma and discrimination in

health facilities and society. Research and intervention efforts need multidisciplinary perspectives and collaboration. Effective communication and early disclosure of same-sex behaviors will assist HCPs to provide more individualized and appropriate care services and will optimize the health-care benefits for MSM.

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Ethical Approval

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed Consent

Informed consent was obtained from all individual participants included in the study.

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