

Health Care Worker's HIV Stigma Reduction Interventions: A Systematic Review

by

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Abstract

Introduction

HIV/AIDS has been still epidemic across the world although the treatment and prevention strategy have enormously been developing so that the people living HIV/AIDS (PLWHA) can receive a quality and sustainable medical care, who would have otherwise struggled with their life. Stigma that is described as the experience of moving through life with an attribute that is deeply discrediting, and HIV-related stigma in health care settings can prevent PLWHA from getting access to medical care in a number of negative ways. Therefore, reducing the health care workers' stigma is an urgent mission across the world. Even though there have been more and more interventions to reduce health care workers' stigma toward PLWHA, it is required for the future study to identify theoretically successful and effective interventions for reducing the stigma as well as the powerful insights and technical brief obtained from them.

Objectives

The goals of this study are to systematically review as many related the peer-reviewed articles and grey literature to grasp a whole picture of the current progress of stigma-reduction interventions targeting health care workers and, based on those findings, to develop technical briefs that provide guidance and recommendations for the future research.

Methods

I conducted a systematic review of studies and reports that evaluated the effectiveness of HIV-related stigma-reduction interventions for health care workers, which is published in English from January 1, 1985 through June 1, 2017. For searching peer-reviewed articles, Scopus, PubMed, PsychINFO were utilized and grey literature was obtained from Global Health,

OpenGrey, ProQuest, The New York Academy of Medicine, Web of Science, UNAIDS, and WHO. I also conducted ancestry search for peer-reviewed articles and grey literature included during this review to maximize a capacity to capture as many pertinent studies. Study designs were only randomized control trial and quasi-experimental (one, only a study population, or two groups that include a control population, with pre- and/or post-intervention evaluation of stigma-level), and the primary or secondary objective was to reduce HIV-related stigma generated health care workers. Lastly, each of study quality was comprehensively assessed with a toolkit developed by the Effective Public Health Practice Project Quality (EPHPP) to evaluate the reliability and usefulness of those findings.

Results

Amongst 5167 peer-reviewed articles and grey literature identified through a systematic search, 30 articles were identified, which met my inclusion criteria. Those research were conducted in a total of 20 countries across the world, and the target population was a variety types of health care workers, mostly nurses and physicians. Many of them incorporated multiple strategies into the programs to reduce HIV-related stigma and measured multiple types of stigma (i.e., perceived, enacted, and/or internalized stigma) as the outcome variables. Some research targeted multiple socio-ecological factors, most frequently individual and organizational level. Almost of all of the studies reported that the intervention was effective for health care worker's HIV stigma reduction at all or to some extent. However, measures of stigma widely varied in studies and many of them lacked validity so that it was difficult to compare the effectiveness and identify the unbiased findings. Also, few studies employed objective data collection manners other than self-administered survey distributed to the participants and none evaluated their behavioral change and biomedical outcomes, as a measure of consequences of stigma-reduction. Study quality

evaluation also showed there were still various risks of biases across the studies and assigned most (23 studies) “weak,” while only six studies and one study were “moderate” and “strong,” respectively, which is mainly due to lack of randomization, blinding, and validated and/or reliable stigma scales.

Conclusion

This review focused on the interventions for health care worker’s HIV-related stigma-reduction and identified significant characteristics of each study. Even though I compared the effectiveness for reducing stigma and revealed considerable amounts of those findings, there have been still enormous challenges to identify promising and effective HIV-related stigma-reduction strategies that can be implemented in a larger scale for the future. Developing standardized measures of stigma and the consistent use is one of the critical next steps for the future research in this field. Studies with quality and robust designs that include objective data collection method and health care workers’ behavioral changes and biomedical outcomes of PLWHA as consequences of the stigma-reduction are also urgently required to enhance the ultimate goal of PLWHA’s health and life quality.

Introduction

“The human immunodeficiency virus” (HIV) infection, which can cause “acquired immunodeficiency syndrome” (AIDS), has been still epidemic across the globe today. It results in AIDS-related deaths of millions of people and a large amount of expenditure for health care and disease control. HIV-related stigma and discrimination, principal drivers of the global epidemic, continue to hinder efforts to prevent new infections and engage people in HIV testing, treatment, and management of the care. Additionally, HIV-related stigma interacts with other types of stigma against persons at substantial risk of HIV acquisition, so called “key populations,” such as men who have sex with men, sex workers, drug users, and transgender people, which make the stigma toward people living with HIV/AIDS (PLWHA) even more complex. Since a condition with HIV/AIDS is seen more negatively than many other stigmatized ones, such as tuberculosis, mental illness, and physical disabilities, a number of studies have explored the linkages between the stigma and the consequences. They have revealed substantially negative correlations between the two in various ways; it can be a barrier to disclosure and lead to negative health outcomes by influencing HIV preventive behaviors (Sengupta, Strauss et al. 2010), care seeking behaviors (Peitzmeier 2015), adherence for care (Vanable, Carey et al. 2006), mental health (Prachakul, Grant et al. 2007). Considered these undesirable associations, all governments are seeking for effective stigma and discrimination reduction strategies against PLWHA and key populations as a prioritized target for making HIV/AIDS epidemic under control. To respond the world’ needs, a number of types of interventions targeting various populations who potentially may stigmatize and discriminate, even including PLWHA themselves, have been conducted across the world (Kuhn 1994, Apinundecha 2007, Shah 2014) and those findings have been making substantial progresses

toward zero-stigma generation.

Stigma classification and terminology

Stigma was originally characterized by a sociologist Erving Goffman in 1986 as “a dynamic process of devaluation that ‘significantly discredits’ an individual in the eyes of others (Goffman 1986).” After the Goffman’s work, further research have been conducted to explore negative social attitudes (perceived stigma), and discriminatory behaviors (enacted stigma) toward stigmatized individuals (Corrigan 1999, Pryor 2004). Furthermore, internalized stigma (or self-stigma) that generated by the devalued persons’ fear of enacted stigma has also been inspected (Rüsch N. 2005). The internalized stigma contribute to hiding their testing uptake and access to medical care, socially isolating themselves from others, and feeling ashamed of having a particular disease and condition.

A framework especially focused on HIV/AIDS breaks the stigma into several constituent domains, each of which can be addressed by programmatic efforts (Stangl, 2010) (Figure 1). They are, from the bottom of the structure, 1) actionable drivers and facilitators, 2) intersecting stigma, 3) stigma manifestations, 4) stigma outcomes, and 5) stigma impacts. Drivers are individual-level factors that negatively influence the stigmatization process such as lack of knowledge and stereotypes regarding PLWHA. Facilitators are societal-level factors that positively or negatively influence the process, including protective or punitive laws and cultural norms toward PLWHA and key populations. These drivers and facilitators are factors that generate HIV-stigma. The reason why they are described as “actionable” is that they could shift as an outcome of interventions, and thus, these are most likely targets of stigma-reduction

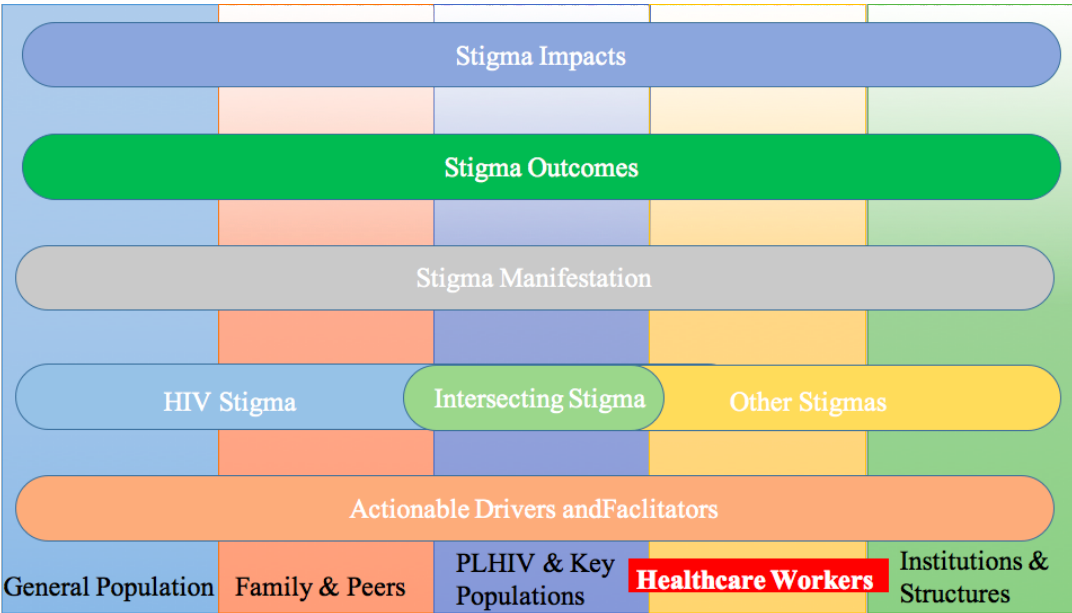


Figure 1. Stigma conceptual model^a

^aAdapted from “A framework for programme implementation and measurement (Stangl A. 2010, Stangl A. 2012, STRIVE 2013)

strategies. It is widely known that such stigma derived from the initial two components often interact and mixed with other types of stigma, such as related to sexual orientation, gender, drug use, which leads to even more complex prejudiced perspectives, called intersecting stigma. Drivers and facilitators lead to a number of manifestations of the intersecting stigma that fuels the outcomes and impacts of stigma in a given context. In the present study, this framework was not applied because almost all the stigma domains the studies included in this review combated were only either driver or facilitator, as indicated in previous studies. Thus, it was not very useful to depict the characteristics in terms of HIV stigma reduction.

A socio-ecological framework, which recognizes that societal norms and structures influence individual attitudes and behaviors, helps identifying key levels at which stigma-reduction activities can be targeted: individual (e.g., knowledge, attitudes), interpersonal (e.g., family, friends), organizational (e.g., workplaces, social institutions), community and public policy.

Interventions for reducing Health care workers' HIV-related stigma

Since stigma and discrimination toward PLWHA and at-risk population exist not only amongst the populations themselves, families (Bogart, Cowgill et al. 2008), and community (Sengupta, Strauss et al. 2010), but also health care workers, which became global phenomena today's health care settings (Li 2007, Hassan 2011, Mill 2013). Evidence suggests that stigma can be manifested in two primary ways among health care providers. One is an exaggerated fear of contracting the HIV virus, which has been associated with discrimination in some studies (Ledda 2017). A provider's personal judgments of and attitudes toward the populations living with and being susceptible to HIV, can also result in the stigma and/or discrimination. This can contribute to tremendously negative impacts on their HIV-related knowledge and HIV-related populations' HIV-test uptake and result-disclosure, physical and mental health, and antiretroviral treatment adherence. Therefore, working with health providers to reduce stigma, a process of devaluation, and discrimination, actions manifested in stigmatized manners (also known as enacted stigma) in the health care setting is one strategy to improve service utilization and quality of care.

Previous reviews

Although there have been no systematic reviews of HIV stigma reduction interventions that only focused on health care workers as the study population, three studies that systematically reviewed stigma-reduction interventions that targeted various populations, including PLWHA and key populations, families, communities and health care workers (Brown 2003, Sengupta 2011, Stangl 2013). Brown published the first review in 2003 and finally included 22 studies in his review (Brown 2003). He categorized them into four types of interventions based on psychosocial conceptualizations of the stigmatization process that could be applied to the current study. The types are:

- 1) information-based approaches (e.g., written in a brochure),
- 2) skills building (e.g., participatory learning sessions to reduce negative attitudes),
- 3) counselling/support (e.g., support groups for PLHIV), and
- 4) contact with affected groups (e.g., interactions between PLHIV and the general public).

Most of the 22 studies reviewed attempted to increase the general public's tolerance or health care providers' willingness to treat PLWHA by changing individual-level fears, attitudes of behaviors. Two studies sought to improve coping strategies among PLWHA or key populations. The authors concluded that some stigma-reduction interventions appeared to work in the short term, but that more research was needed to understand the effectiveness of various intervention components, and the scale and length of interventions required.

The second review was published in 2011 by Sengupta (Sengupta, 2011). It examined 19 interventions that measured HIV-stigma in pre- and post-intervention time points. The review found that information-based, skills-building, counseling and PLWHA testimonials were associated with less stigmatizing attitudes among the participants. The authors suggested several gaps in for the quality interventions, including the poor quality of the majority of studies reviewed and the lack of standardized measurement.

The last review by Stangl in 2013 identified 48 studies in 28 countries. They added two intervention categories to the ones Brown initially developed. The additional categories were:

- 5) structural approaches (e.g., hospital policy reforms)
- 6) biomedical approaches (e.g., enhancing HIV-testing uptake).

Through the review, a total 48 studies were included. They found that the majority of them utilized two or more strategies to reduce stigma, and ten included structural or biomedical

strategies added in this study. Moreover, most intervention, they noted, targeted a single socio-ecological level and a single domain of stigma. They also concluded that the development, validation, and consistent use of relevant scales of stigma and discrimination are a critical next step for advancing the field of research in the area.

Current review

Because these past systematic reviews included in their study stigma-reduction interventions targeting various target populations, I attempted to only focus on a specific population, health care workers, as the target population, to get a better understanding of the current progress of stigma-reduction activities and aware of the findings in relation to the critical population. This is basically because specific population is inclined to have different level of knowledge and perception about HIV/AIDS , PLWHA, and key populations, each of which could differently impact structures and mechanisms linking HIV-related stigma (Turan 2017), as well as the effectiveness of the stigma-reduction studies.

Additionally, among the various populations, recently substantial attentions have been paid to reduce health care provider's stigma against PLWHA (Stewart 1999, Wu 2008, Tucker 2016), in order to help the devastated population reach appropriate health care settings, receive HIV-testing, and start and sustain the treatment in a timely manner. Hence, my goal in the current systematic review is to assess the effectiveness of and characteristics of the interventions for health care workers' HIV-related stigma-reduction by comparing HIV/AIDS stigma measured by specific tools in pre- and post-intervention. This got us a better understanding of which type and characteristics of interventions aimed at reducing health care workers' stigma and discrimination could be potentially effective.

Specific Aims

The specific aims of this study are to:

1. To review the HIV-related stigma-reduction interventions for health care workers, and to analyze and synthesize the findings acquired through the reviewing so that important characteristics of each intervention could be described as well as potential rationale and principles shared among successful interventions.
2. Based on the analysis and synthesis, to identify and recommend the most theoretically promising and effective HIV-related stigma-reduction interventions for health care workers for the future programs.

Methods

Search Strategy and Data Sources

I followed Population Intervention Comparison Outcome (PICO) search strategy so that I was able to construct an appropriate research question and to review the literature identified by applying the question to inclusion and exclusion criteria (Santos, Pimenta et al. 2007). My research question is “do health care providers who join an HIV-related stigma intervention is less stigmatized against PLWHA and the key populations at post-intervention evaluation, compared to pre-intervention evaluation?” To answer this question, I used a combination of keywords, MeSH and/or subject terms to capture as many relevant articles, such as “health care workers,” “HIV,” “AIDS,” “stigma,” “discrimination,” “key populations,” “sex workers,” “men who have sex with men,” “drug users,” “transgender,” and “interventions.” Databases employed for searching maximal peer-reviewed articles were Scopus, PubMed, PsychINFO. Gray literature

was searched in Global Health, OpenGrey, ProQuest, The New York Academy of Medicine, Web of Science, UNAIDS, and WHO. Ancestry searches of 107 articles included in the review were also conducted.

Inclusion criteria included studies and reports for HIV-related stigma-reduction with pre- and post-intervention data measuring stigma levels of participants, clear descriptions of the intervention and sampling methods, including health care workers as the study population, and published between January 1, 1985 and June 1, 2017 in English.

Study Selection

Article references were organized by a reference manager program, Endnote X8. The author, title, publication data, journal, and abstract were exported to Endnote X8 and Covidence, an online primary screening and data extraction tool for systematic reviews. During the initial search, I reviewed the titles and abstracts of studies to determine if each of them is accepted or rejected for a next selection step, full text review, with both inclusion and exclusion criteria. Abstracts were accepted (1) if the studies had interventions that were HIV-related, (2) participants that included more than one health care workers, (3) at least one quantitative HIV/AIDS stigma levels and the statistical analysis, and (4) a study design that only included randomized control trial and quasi-experimental (nonrandomized control) study with pre- and post-intervention data related to HIV/AIDS stigma. After studies that are accepted at the title and abstract selection, I did an ancestry search, using their references to identify other pertinent studies (Conn, Isaramalai et al. 2003).

Full Text Review and Data Extraction

I reviewed the full texts of the studies passed through the initial selection to determine if they could be processed for data extraction. Data was extracted from those studies into an excel spreadsheet with study characteristics, including the authors, publication date, title, study objectives, study location, study population and the size, intervention approaches, study design, stigma measure and the validity, measured types of stigma, and the findings.

Data Synthesis

Since lack of standardized reporting of stigma outcomes throughout the studies, which was based on preliminary hand-searching I had conducted in a database, Scopus, with a combination of related keywords and other three systematic reviews described above, I did not employ meta-analysis for this review (Brown, 2003. Sengupta. 2011, Stangl. 2013). For classification of intervention strategies, I utilized Brown's scheme (Brown, Macintyre et al. 2003), in order to categorize them into next four types: (1) information-based approaches, (2) skill building, (3) counseling approaches , and (4) contact/interaction with PLWHA. Besides, referred to Stangl's review that have also classified HIV/AIDS stigma interventions with the above four and other two additional packets categories: (5) structural approaches and (6) biomedical, this strategy was followed in this study.

Internal Validity and Quality Assessment

Preferred to Reporting Items for Systematic reviews and Meta-Analyses (PRISMA) guidelines suggest that research quality or internal validity should be evaluated for each intervention study by assessing the risk of bias at the study design and result levels (Liberati 2009). Thus, I made use of a checklist developed by the Effective Public Health Practice Project Quality (EPHPP), to assess the study's internal validity and overall research quality (Armijo-Olivo 2012). The

checklist consisted of 22 items representing eight sub-scales: (1) selection bias, (2) study design, (3) confoundings, (4) blinding, (5) data collection method, and (6) withdrawals and dropouts. Using the EPHPP guideline, qualitative ratings of “strong,” “moderate,” or “weak” were assigned each of the internal validity indicators to indicate the magnitude of risk of bias, as well as overall research quality.

Types of stigma assessed were: perceived stigma, enacted stigma, and internalized stigma. Socio-ecological levels classified were: individual, interpersonal, organizational, community, and public policy level.

Results

The search criteria identified 5167 potentially relevant articles and reports (Figure 2). After removing 911 duplicates, 4256 peer-reviewed articles and grey literature were included in the title and abstract review phase. A total of 30, all of which were peer-reviewed articles, were included for further analysis.

Study and intervention characteristics

Recently, the interventions have been conducted more and more frequently. While there were only seven studies from January 1, 1985 through January 1, 2001, for the next two decades, grown recognition of HIV-stigma as a huge barrier of PLWHA’s care have encouraged more researchers to conduct 23 studies totally. The studies were derived from a large geographical area in a total of 20 countries. Fourteen studies were conducted in Asia and Pacific region, and twelve and eight were conducted in Africa and North America, respectively. Two were done in South American and Caribbean region and one study was conducted in Europe. The most

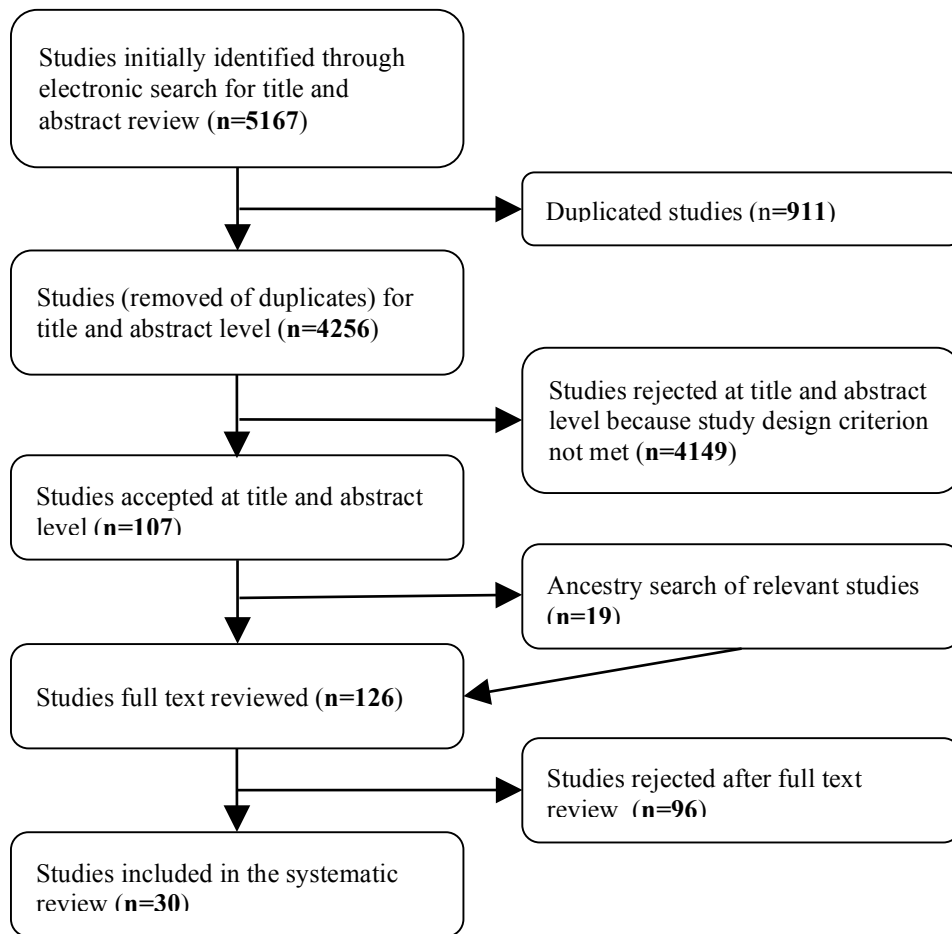


Figure 2. Selection process for studies included in systematic review

represented countries were USA (7 studies), China (7 studies), India (3 studies), and Malawi (3 studies). Two studies were conducted in multi-countries, comparing the effectiveness of each country's outcomes (Table 1). The interventions targeted a wide variety of jobs within health care settings. The most common target populations were nurses (22 studies), physicians (18 studies), and lab technicians (8 studies).

Three studies included PLWHA and/or key populations as their participants (Batey 2016, Geibel 2017, Uys 2009), all of which were tested recently. The interventions typically included two or

more types of strategies developed by the previous systematic reviews to reduce HIV-related stigma and discrimination. Forty percent used two approaches, 43 % used three approaches and 6.7% used four approaches, while only three studies employed a single approach (Table 1). Information-based approach was the most common (30 studies), followed by skills-building (27 studies) and contact strategies (12 studies). No counselling/support and biomedical component were employed. All of the studies incorporating a skill-building, contact, or structural approach combined it with one or more other intervention strategies, mainly information-based.

Most studies (73.3%) targeted two or three types of stigma, while approximately one fourth (23.3%) targeted single domain, mainly perceived stigma. Two studies explored the health care workers' internalized stigma, such as a fear of being stigmatized by the peer-workers toward the participants who cares patients with HIV/AIDS. In one study, the targeted domain could not be identified since the no details of measures used were described Twenty-six studies (86.7%) explored at a single socio-ecological level intervention. Individual-level interventions were targeted in all the studies, followed by organizational (4 studies) and policy level (1 studies). Four studies targeted multiple levels. The most common combination of the levels were individual and organizational level (4 studies), that is, these tend to provide education program through didactic sessions and/or group-discussions with organizational level activities, such as hospital policy reforms.

Study design and measures

Quasi-experimental study was most common type of research (23 studies), especially without control group (17 studies), which is supposed to be the least quality study design among the ones included in this review.

Table 1. Study and intervention characteristics of the 30 studies

1st author, publication date	Study population^b	Size	PLWHA^c	Strategies^d	Key population^e	Stigma domains^h	Measure Validity^j	Stigma Results^k
Country, study design^a				Duration^{e, f/u}		Socio-ecological levelⁱ	# of items	
Batey, 2016	NS	17	Yes	I, C, SB	MSM, TG	ES, PS	Validated	Some decreased
USA, QE/NC				1.5-day, no		Individual	38	
Buskin, 2002	Dr	15	No	I	NS	ES	NS	Some decreased
China, QE/NC				1-day, no		Individual	NS	
Edwards, 2016	Mid, Ns	813	No	I, SB, ST	NS	ES, IS, PS	Validated	Some decreased
Four countries, QE/C ^l				3-year, no		Individual, organizational, policy	19	
Ezedinaci, 2002	Dr, Lab, Ns	1552	No	I, SB	NS	PS	Unvalidated	All decreased
Nigeria, RCT				2-day, 1-year		Individual	5	
Flaskerud, 1989	Ns	125	No	I, SB	NS	ES, PS	Unvalidated	All decreased
USA, QE/NC				1-day, 3-month		Individual	13	
Geibel, 2017	Dr, Lab, Ns	300	Yes	I, SB	MSM, SW, TG	ES, PS	NS	Some decreased
Bangladesh, QE/NC				3-day, 1-year		Individual	26	
Gerbert, 1988	Dentists	99	No	I, SB	NS	ES, PS	Unvalidated	All decreased
USA, RCT				6-month, 6-month		Individual	11	
Hoang, 2016	Ns	22	No	I	MSM	PS	Validated	No change
Canada, QE/NC				45-min, no		Individual	20	
Hsiung, 2006	Dr	25	No	I, SB, C	NS	ES, PS	Validated	Some decreased
Taiwan, QE/NC				1-month, no		Individual	21	
Kaponda, 2009	Hospital workers	927	No	I, SB	MSM, TG	PS	NS	All decreased
Malawi, QE/NC				10-month, no		Individual	3	
Kemppainen, 1996	Ns	36	No	I, SB, C	NS	ES	Validated	No change
USA, RCT				1-month, 6-month		Individual	13	
Li, 2013 ^m	Dr, Lab, Ns	1754	No	I, SB, ST	NS	ES, PS	Unvalidated	All decreased
China, RCT				1-year, 1-year		Individual, organizational	16	
Li, 2013 ^m	Dr, others	430	No	I, SB, ST	NS	ES, PS	Unvalidated	All decreased
China, RCT				1-year, 1-year		Individual	16	
Lohiniva, 2016	Dr, Ns	347	No	I, SB, C	NS	ES, PS	Validated	All decreased
Egypt, QE/C				4-month, 3-month		Individual	21	

1st author, publication date	Study population^b	Size	PLWHA^c	Strategies^d	Key population^e	Stigma domains^b	Measure Validity^j	Stigma Results^k
Country, study design^a				Duration^{e, f/u}		Socio-ecological levelⁱ	# of Items	
Lueveswanji, 2000	Dentist, Ns	139	No	I, SB, C	NS	ES, PS	Unvalidated	Some decreased
Thailand, QE/C				3-day, 3-month		Individual	8	
Mahendra, 2006	Dr, Ns, clean-staff	884	No	I, SB, ST, C	NS	ES, PS	NS	Some decreased
India, QE/NC				1-year, 8-month		Individual, organizational	21	
Mbeba, 2011,	Hospital worker	192	No	I, SB	NS	PS	Validated	Some decreased
Malawi, QE/C				2-weeks, 30-month		Individual	3	
Misra, 2012	Dr	184	No	I, SB, C	NS	ES, PS	NS	All decreased
India, QE/NC				4-day, 6-month		Individual	11	
Norr, 2012	Clinical worker	555	No	I, SB	DU, MSM, TG	ES, PS	Unvalidated	All decreased
Chile, QE/C				3-month, no		Individual	6	
Pisal, 2007	Ns	371	No	I, SB, C, CS	NS	ES, PS	NS	Some decreased
India, QE/NC				4-day, no		Individual	15	
Pulerwitz, 2015	Hospital worker	795	No	I, SB, ST	NS	ES, PS	Unvalidated	All decreased
Vietnam, QE/NC				6-month, no		Individual, organizational	12	
Rastegar, 2004	Dr	31	No	I, SB, C	DU, MSM	PS	NS	All decreased
USA, QE/NC				1-month, no		Individual	3	
Sowell, 1998	Ns	90	No	I, SB	DU, MSM, TG	ES, PS	Unvalidated	All decreased
USA, QE/NC				1-month, no		Individual	12	
Stewart, 1999	Ns	72	No	I, SB	NS	NS	Validated	Some decreased
UK, RCT				90-min, 8-week		individual	10	
Uys, 2009	Ns	177	Yes	I, SB, C,	NS	ES, IS, PS	Validated	No change
Five African countries ⁿ , QE/NC				5-day, 1month		Individual	19	
Wang, 2009	Dr	68	No	I, SB	NS	ES, PS	NS	All decreased
China, QE/NC				10-day, 6-month		Individual	NS	
Wertz, 1987	Dr, Lab, Ns, others	1247	No	I, C	NS	ES, PS	NS	Some decreased
USA, QE/NC				90-min, 1-month		Individual	8	
Williams, 2006	Ns	187	No	I, SB	DU, MSM, TG	ES, PS	validated	All decreased
China, QE/NC				5-day, no		Individual	34	
Wu, 2008	Dr, Lab, Ns	138	No	I, SB, C	NS	ES, PS	Unvalidated	Some decreased
China, RCT				4-hour, 6-month		Individual	3	

1st author, publication date	Study population ^b	Size	PLWHA ^c	Strategies ^d	Key population ^e	Stigma domains ^h	Measure Validity ^j	Stigma Results ^k
Country, study design ^a				Duration ^e , f/u ^f		Socio-ecological level ⁱ	# of Items	
Wu, 2002	Health worker	296	No	I, SB	NS	ES, PS	NS	All decreased
China, QE/C				21-month, 18-month		Individual	5	

^aStudy design abbreviations: QE/NC = quasi-experimental with no control group; QE/C = quasi experimental with a control group; RCT = randomized controlled trial; ^bStudy population abbreviation: Dr = physicians, Lab = lab technicians, Ns = nurses; ^cPLWHA (people living with HIV/AIDS) participants: Yes = included as participants in the study, No = not included as participants in the study; ^dIntervention strategy abbreviations: I = information-based; SB = skill-building; C = contact; ST = structural; ^eIntervention duration period; ^fFollow-up period after finishing the intervention; ^gKey population contents within the intervention study with the abbreviation: MSM = men who have sex with men; SW = sex workers; TG = transgenders; NS = not specified; ^hMeasured stigma types abbreviations: EM = enacted stigma; IM = internalized stigma, PS = perceived stigma; ⁱTargeted socio-ecological level abbreviation; ^jValidity of utilized stigma measurement; ^kStigma results: All decreased = all stigma outcomes measured were decreased, some stigma outcomes measured were decreased; No change = no stigma outcomes measured were decreased; ^lFour countries included: Jamaica, Kenya, South Africa and Uganda; ^mThe same interventions focusing two different study populations, ⁿFive African countries included Lesotho, Malawi, South Africa, Swaziland and Tanzania;

Intervention duration widely varied in the intervention strategies employed. The shortest intervention was a single, 45-minute lecture for nurses in Canada that employed information-based strategies (Hoang, 2016). Contrastly, an intervention in four countries, Jamaica, Kenya, South Africa, and Uganda, used mixed strategies, as included information-base, skill-building, and structural components, which took three years to complete the whole study. Similarly, to ensure sustainable effectiveness of those interventions, 19 studies (63.3%) conducted follow-up survey as well as pre- and post-test, which also spanned a long range of period from one-month (Uys 2009, Wertz 1987) to thirty-month (Mbeba, 2011).

In regard to stigma measures utilized, only one-third (33%) selected validated ones whilst, in the rest of interventions, un-validated or not-specified stigma scales were exercised, some of which were developed originally within the study.

Stigma reduction

Sixteen studies (53.3%) reviewed reported statistically significant reductions of stigma in all the measure-items used in the intervention, and eleven (36.7%) observed the reduction in some items but not others. Three studies reported no change in stigma levels.

Quality assessment

Only quantitative studies were included in this systematic review and were assessed with a checklist developed by EPHPP. Based on this measurement, most of the studies were assessed “weak,” with 23 studies (76.7%), while six studies (20.0%) and one study (3.3%) were assigned “strong” and “moderate,” respectively (Table 2). There were no studies that adopted double-blinding method and many applied un-validated or not-specified stigma scales they used during the intervention, which can lead to lower rates in the subscales of “Blinding” and “Data collection methods” in this toolkit. Additionally, lacking randomization in quasi-experimental research (23 studies) influenced negatively the study quality assessment.

Discussion

This systematic review revealed considerable progress in the stigma-reduction field for health care workers over the last three decades. However, significant challenges and gaps to be addressed remain, which are hindering us from identifying effective stigma-reduction strategies in a larger scale for the future work.

Achievement in the current study

For a socio-ecological perspective, while individual-level interventions remained the most common, several organizational and policy level efforts have been tested recently. The stigma categories targeted have been expanding from single to multiple stigmas, perceived, enacted and internalized stigma, so that the stigma could be addressed more comprehensively. Especially, studies targeting enacted stigma (76.7%) have increased since the last systematic reviews. Also,

Table 2. Quality assessment of the 30 studies

1st author, published date	Selection Bias	Study Design	Confounders	Blinding	Data collection methods	withdrawals and dropouts	Total
RCTs							
Significant							
Gerbert, 1988	weak	strong	weak	moderate	weak	strong	weak
Li, 2013a	strong	strong	strong	weak	strong	strong	moderate
Li, 2013b	strong	strong	strong	weak	strong	strong	moderate
Ezedinaci, 2002	moderate	strong	weak	moderate	weak	moderate	weak
Not significant							
Kemppainen, 1996	weak	strong	strong	moderate	weak	moderate	weak
Steward, 1999	weak	strong	weak	moderate	moderate	strong	weak
Wu, 2008	weak	strong	strong	weak	weak	strong	weak
Not-randomized control group (all significant)							
Significant							
Edwards, 2002	moderate	moderate	weak	moderate	strong	moderate	moderate
Lohiniva, 2016	weak	moderate	weak	moderate	weak	moderate	weak
Lueveswanji, 2000	moderate	moderate	weak	weak	weak	strong	weak
Mbeba, 2011	strong	moderate	strong	weak	moderate	weak	weak
Wu, 2002	moderate	moderate	weak	moderate	weak	weak	weak
Without control group							
Significant							
Batey, 2016	Weak	moderate	NA	moderate	weak	strong	weak
Buskin, 2002	weak	moderate	NA	moderate	weak	strong	weak
Flaskerud, 1989	weak	moderate	NA	weak	weak	strong	weak
Geibel, 2017	weak	moderate	NA	moderate	weak	moderate	weak
Hsiung, 2016	moderate	moderate	NA	moderate	strong	moderate	strong
Kaponda, 2009	moderate	moderate	NA	weak	weak	weak	weak
Mahendra, 2006	moderate	moderate	NA	weak	weak	weak	weak
Misra, 2012	weak	moderate	NA	moderate	weak	weak	weak
Norr, 2012	moderate	moderate	NA	weak	moderate	moderate	moderate
Pisal, 2007	weak	moderate	NA	weak	weak	moderate	weak
Rastegar, 2004	moderate	moderate	NA	moderate	weak	strong	moderate

1st author, published date	Selection Bias	Study Design	Confounders	Blinding	Data collection methods	withdrawals and dropouts	Total
Pulerwitz, 2015	moderate	moderate	NA	weak	weak	moderate	weak
Sowell, 1998	weak	moderate	NA	moderate	weak	weak	weak
Wang, 2009	weak	moderate	NA	weak	weak	strong	weak
Wertz, 1987	weak	moderate	NA	moderate	weak	strong	weak
Williams, 2006	moderate	moderate	NA	moderate	strong	weak	moderate
Not significant							
Hoang, 2016	weak	moderate	NA	weak	strong	weak	weak
Uys, 2009	weak	moderate	NA	moderate	strong	weak	weak

a few studies (6.7%) have explored recently internalized stigma for health care workers who take care of patients with HIV/AIDS, which were stigmatized by peer-workers with a validated tool.

Besides, one study employed a way to measure stigmatized and discriminated attitudes by health care workers toward HIV/AIDS patients and/or key populations by employing the actual patients as the outcome assessor with a self-administered survey, which could allow the researchers to evaluate the effectiveness more objectively.

Challenges and gaps

Intervention and methodology

Despite these progresses, there are still challenges that should be overcome for future studies in terms of intervention characteristics. First, most of the 30 studies targeted a single individual level in socio-ecological model, though multi-level interventions are considered to more effectual theoretically. In addition, none adequately assessed influence of stigma-reduction interventions on key behavioral change and biomedical outcomes, such as actual attitudes of the participants toward to PLWHA, uptake of HIV-testing and retention on ART and drug regimen

for prevention of the stigmatized populations. Considered emerging challenges with adherence to ART and drug-based prevention among PLWHA and the key populations, such outcomes need to be measured as one of the significant outcomes of stigma-reduction interventions.

Since detailed contents of the interventions could not be described, I could identify few interventions that also provide education about key populations. Such strategies will be important for maximizing the effectiveness of the interventions so that intersecting stigma that especially such key populations often face could be addressed sufficiently. More information is needed on successful strategies to reduce intersecting stigma in settings where epidemics are concentrated in key populations.

Lastly, regarding the data collection method, even though just one study included PLWHA and key populations as an assessor of the outcomes after the interventions, all the studies reviewed mainly relied on self-administered survey completed by the participants of health care workers. This may be problematic since such surveys could be by and large biased especially in unblinded studies that were most of them included in this review. To conduct more persuasive studies, multilevel assessors should be included to obtain pre- and post-intervention data measured objectively.

Measurement

Measurement issues continue to exist and remain challenging in the field. The lack of standardized outcome measures for stigma and discrimination substantially limited collective ability to determine which strategies work the best for addressing the various stigmas or targeting different socio-ecological levels. While some validated scales have been developed for specific

types of stigma, populations and contexts, few scales demonstrating validity across multiple populations are available.

A priority for the future studies is to develop validated measures assessing each type of stigma through programmatic efforts and further interventions. While some aspects of stigma may be culturally and geographically specific, key underlying structures are shared across contexts, which could enhance the development of validated measurements as an initial step for the development.

Limitation

Assessing study quality using the EPHPP checklist was challenging due to the nature of most stigma-reduction interventions, not performing typical trial manner such as blinding and randomization. Also, some studies set too complex study designs for selecting target regions and samples to be classified appropriately with the criteria in this tool. Such challenges influenced the result of quality assessment on the studies and most of the studies that showed reductions in stigma were low quality with the tool.

A meta-analysis could not be conducted due to the significant heterogeneity of interventions and outcomes limiting the assessment of effectiveness of interventions at reducing HIV-related stigma. Generalizability of the findings of these interventions is restricted as most have been tested only in specific regions or counties, which would have unique characteristics and cultures that influence stigma and discrimination process. For instance, in the regions where specific behaviors associated with HIV, such as homosexuality, drug use, sex work or infidelity, are considered a culturally and politically taboo, stigma and discrimination toward PLWHA could be

even more enhanced than others. Assessment of causality of these interventions was also limited since more than half (53.3%) of the studies did not include a control group.

Regarding stigma measure validity, some studies used unvalidated scales or did not list the measurements used, which can lead to uncertainties in the reliability and validity of their measurements. Even with the inclusion criteria for this study and these limitations, this review holds strength from utilizing 30 studies focused on HIV-related stigma-reduction representing various types of health care workers. This is because the 30 studies in this review were identified with a consistent use of inclusion and exclusion criteria targeting as many related-studies over the past three decades, while each of the past three systematic reviews looked at a shorter period and had different criteria than others, which made us difficult to learn and compare those findings across the reviews. Therefore, the current study could be significant to allow us to analyze and synthesize the findings in included studies selected by a consistent manner over the long period.

Lastly, because the studies included in this review were limited to ones published in English from January 1, 1985 through June 1, 2017, there would be possible to some extent to exist published peer-reviewed articles and grey literature published in other languages than English and ones published before the period of the inclusion criteria.

Recommendation

First of all, multiple strategy-approaches in the stigma-reduction programs need to be employed for ensuring and sustaining the effectiveness, as reported in recent studies increasingly. Addressing and measuring comprehensively the multifaceted stigma aspects composed of perceived, enacted, and internalized stigma, is also significant.

Quality study design is also strongly recommended for making the findings unbiased and reliable. To obtain objectively measured outcomes, the future studies might want to exercise not only self-administered survey to the participants but also the other data collection methods to be developed by utilizing other assessors, such as PLWHA and/or patients who take care in a health care setting where the intervention were conducted. Typical trial manner such as blinding and randomization would be also required to make the study robust. Finally, development and consistent use of the standardized outcome measures for HIV-stigma is still required as a critical next step for the future projects.

Conclusions

The field has progressed remarkably in the last decades, though a variety of challenging issues remain to be addressed to conduct the most promising and effectual integrations of stigma-reduction in a larger scale. The field of HIV-related stigma-reduction research must be more persuasive and evidence-based in the study quality and standardized measurement for intervention effectiveness. Also, interventions that target multiple stigma aspects at multiple socio-ecological levels with various strategies are required to reduce HIV-stigma efficiently and effectively in health care settings. Furthermore, multi-faceted stigma-reduction interventions that assess the health care worker's behavioral changes and biomedical outcomes of PLWHA are also recommended for the future study so that we could address this extremely complicated issue more comprehensively and sustainably toward zero stigma and discrimination generation.

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