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BEHAVIORAL-BIO-MEDICAL INTERFACE (RJ DICLEMENTE AND JL BROWN, SECTION EDITORS)

Peer Approaches to Improve HIV Care Cascade Outcomes: a Scoping Review Focused on Peer Behavioral Mechanisms

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Abstract

Purpose of Review There are three main components of peer-based approaches regardless of type: education, social support, and social norms. The purpose of this scoping review was to examine evidence in the literature among peer-based interventions and programs of components and behavioral mechanisms utilized to improve HIV care cascade outcomes.

Recent Findings Of 522 articles found, 40 studies were included for data abstraction. The study outcomes represented the entire HIV care cascade from HIV testing to viral suppression. Most were patient navigator models and 8 of the studies included all three components. Social support was the most prevalent component. Role modeling of behaviors was less commonly described.

Summary This review highlighted the peer behavioral mechanisms that operate in various types of peer approaches to improve HIV care and outcomes in numerous settings and among diverse populations. The peer-based approach is flexible and commonly used, particularly in resource-poor settings.

Keywords HIV care cascade · Peer · Social network · Social norms · Social influence

Introduction

Globally, the prevalence of HIV is 37.7 million individuals, with the highest burden in sub-Sharan Africa [1]. Additionally, 1.5 million individuals are newly infected with HIV, and 680,000 individuals die of acquired immunodeficiency syndrome (AIDS)-related illnesses annually. As of 2020, 84% of individuals living with HIV knew of their HIV status, with 87% of those individuals accessing treatment, and 90% of those on treatment being virally suppressed. However, there is a need to improve the percentage of individuals who are aware of their HIV status and those living with HIV accessing treatment in order to reach the 90–90-90 goals [1]. Furthermore, a recent UNAIDS reports set 95–95-95 targets by 2025 to reduce the number of new HIV infection and those dying of AIDS-related illnesses [2]. To reach these goals, it is important to consider priority populations where disparities persist among the HIV care cascade, including inequalities in HIV prevention resources and treatment access. Specifically, sex workers and their clients, gay and other men who have sex with men, people who inject drugs, and transgender persons account for 65% of HIV infections globally [2]. In the USA, additional disparities exist by sex and race: the lifetime risk of HIV infection was 1 in 76 for males and 1 in 309 for females. However, Black (1 in 27), Hispanic (1 in 50), and Native American (1 in 116) males, and Black (1 in 75) and Hispanic (1 in 287) women had elevated lifetime risks [3].

Peer-based approaches have demonstrated success in reaching stigmatized, vulnerable, and hard-to-access populations with behavioral and health interventions. While the

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definitions of "peer" varies, what is common across numerous published studies and reviews is that a peer is an individual that shares a characteristic with a target audience (e.g., demographics, cultural characteristics, health outcomes or diagnoses, or specific behaviors, such as injection practices). Persons living with HIV (PLWH) need to navigate a complicated health care system, with a myriad of HIV providers who can include medical doctors, nurses, case managers, counselors, social workers, and pharmacists, which can increase the barriers to care among patients who have had limited prior care, have low healthcare literacy, and/or have negative perspectives and mistrust of the healthcare system. Peer-based approaches can be an effective means of improving HIV care cascade outcomes for people at risk for HIV and PLWH.

Types of Peer Approaches

Peer-based approaches exist along a continuum that ranges from natural helpers to paraprofessionals [4]. The natural leader model is one in which peers are engaged in helping others within their personal social networks and/or community. The natural leader model [5] is based on the premise that individuals exist within personal social networks comprised of various individuals such as kin, friends, sex partners, or among whom a set of characteristics is shared [6]. Individuals within these networks are seen as familiar and credible and therefore can diffuse information and resources and influence behaviors of others in these networks. Related to the natural leader model is the popular opinion leader (POL) model, in which the peer is an individual who is nominated based upon their popularity within a social network. Their position in the network is based on centrality or betweenness that allows their influence to diffuse through the social network and therefore this individual has an ability to influence others. Accordingly, a POL can be trained to provide information and education to network members and to endorse health promoting behaviors and social norms [7–9]. In paraprofessional peer-based approaches, peers hold a more formalized role, often as a health educator or member of the medical team. Examples of paraprofessional peer-based approaches include the peer navigator and community health worker models, both of which assume that sharing lived experiences based on a characteristic (e.g., person living with HIV) enables the peer to establish trust and support [10–12]. In these models, the peer is often more formally hired and sometimes paid for their work.

Peer-based approaches are informed by numerous social influence theories, including social learning theory [13], social cognitive theory [13], and social comparison theory [14]. Social learning theory posits that individuals learn behaviors by watching others. Self-efficacy is an important component of the social cognitive theory and refers to a person's confidence in their ability to perform a behavior, which increases with practice and feedback from others. Finally, social comparison theory posits that individuals compare themselves with different groups or social identities and align their behavior to match the reference group. This theory underscores the role of social norms in behavior change.

Components of Peer-Based Approaches and Associated Mechanisms of Action

There are three main components of peer-based approaches regardless of type: education, social support, and social norms (see Fig. 1) [15–18]. These components operate through peer-based behavioral mechanisms to impact health outcomes. The education component entails the peer providing information and instructions to the target audience to increase knowledge about risk, prevention, and treatment of a condition. Education

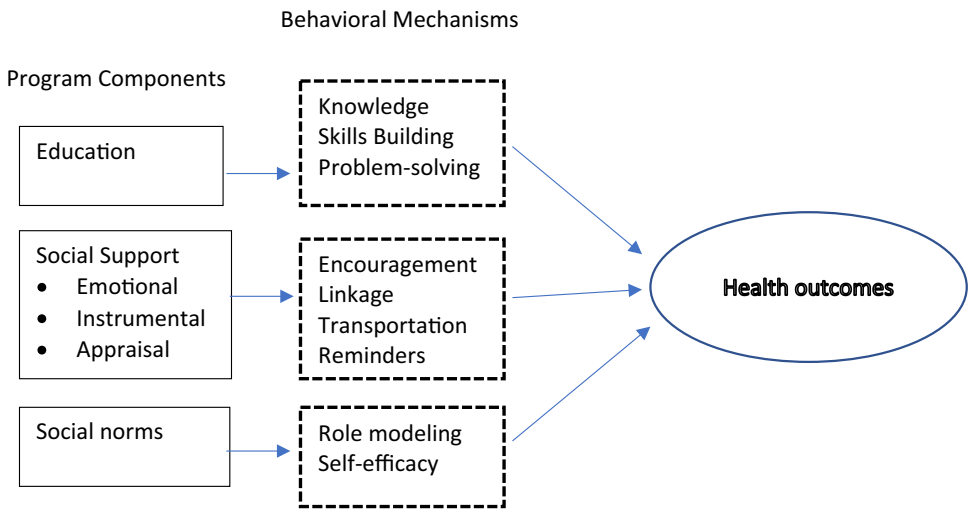

Fig. 1 Components and mechanisms of peer-based approaches

often involves skills, building (e.g., strategies for medication adherence) and problem-solving skills. The social support component includes emotional (caring, empathy), instrumental (assisting in tangible needs such as transportation), and appraisal support (assisting in decision making and providing feedback) [19]. These different types of social support enable the peer to engage in a range of behaviors such as encouragement, offering suggestions and options, linkage and transportation to services, and appointment and medication reminders, among others [20–22]. Finally, peers can introduce or change social norms (the perceptions of others' behaviors) to align with the health outcome goals of the program [23–25]. For example, by role modeling ART adherence or HIV testing behaviors, the peer can influence the individual's self-efficacy to adopt this target behavior [26].

Many systematic reviews have been conducted in the last decade exploring the impact of peer-based interventions on HIV outcomes. One 2011 systematic review found that peer interventions for PLWH were efficacious in improving HIV care cascade outcomes but required further study and more rigorous study designs [27]. Genberg et al. [28] found mixed findings on the impact of peers on HIV care cascade outcomes and mortality [28]. A scoping review restricted to people with substance use disorders found that peer-based social network interventions improved retention in HIV care and ART adherence [26]. Berg et al. [29] conducted a systematic review and meta-analysis showing modest but superior retention in HIV care, ART adherence, and viral load suppression among individuals engaged in peer support interventions [29]. Another systematic review showed improvements in the HIV care cascade among participants of peer and community-led programs [30]. Together, these studies show the potential for peer support interventions to improve outcomes along the HIV care cascade among diverse populations. However, no review to date has examined the behavioral mechanisms in peer support interventions or their role in impacting HIV care cascade outcomes.

Despite extensive literature on the efficacy and promise of peer-based approaches to impact HIV care outcomes, there remain several gaps in understanding specific component and behavioral mechanisms utilized or how these contribute to the outcomes of interest. For example, the topics of education and the types of support provided (e.g., instrumental, emotional) are often under-described. Another frequent gap in literature on this subject is a lack of detail about the characteristics of peers included in interventions, as well as the elements of their training and monitoring. Often, peers do not have specialized training in HIV clinical care or counseling yet are relied upon to provide a high level of support and information in HIV settings. It is therefore important to understand the types and duration of training these peers receive. Finally, many peer-specific HIV interventions do not include data on the impact of the approach on the peers' own HIV prevention or adherence behavior. Without these details, replication and implementation of these interventions is hindered. The purpose of this scoping review was to examine evidence in the literature among peer-based interventions and programs of components and behavioral mechanisms utilized to improve HIV care cascade outcomes.

Methods

This scoping review was conducted in accordance with the 2018 PRISMA Extension for Scoping Reviews checklist [31].

Inclusion Criteria

This scoping review examined the theoretical and behavioral mechanisms of peer-based approaches to address HIV outcomes. Peers were defined as individuals who (1) shared at least one key characteristic with the target population (e.g., race, sex, sexual orientation, HIV status, drug use status); (2) engaged in communication with target participants to provide education; (3) provided emotional and informational and/or appraisal support, and (4) role modeled behaviors to achieve the HIV care cascade outcome of interest. Articles were only included if they measured one or more outcomes along the HIV care cascade, including (1) HIV testing or knowledge of HIV status; (2) linkage or retention in care; (3) ART prescription or adherence; or (4) viral load suppression [32]. Articles were excluded if (1) peers provided emotional support only — justified based on the importance of instrumental and appraisal support — or (2) an HIV care cascade outcome was not included or measured.

Search Strategy

Searches were conducted in PubMed, CINAHL, and PsycINFO using a combination of MeSH terms or CINAHL/PsycINFO equivalent in January 2022 (Supplementary Material 1). Search terms were for three broad concepts: (1) peer support, (2) HIV, and (3) HIV care cascade outcomes, which included knowledge of HIV status, linkage to care, prescription of ART, and HIV viral load suppression. A filter was applied to limit the search to published articles from the last 5 years based on the parameters outlined by the Journal. Reference lists from studies that met inclusion criteria were also reviewed for additional relevant studies. All publications were exported to Endnote and duplicates removed.

Study Selection

Screening was conducted in two stages. Two reviewers independently screened all articles identified from the initial

search in a two-stage process, which increased scrutiny of all records based on the inclusion criteria. First, two reviewers independently screened each title and abstract for relevance based on the inclusion criteria. Next, the same two reviewers independently reviewed each of the full texts for article inclusion in the data extraction phase. In both stages, any disagreements were adjudicated by a third reviewer. Throughout the process of screening titles/abstracts and full-texts, reviewers were not blinded to the authors, funding, or other information regarding publication.

Data Extraction

Two reviewers extracted data including details of peers, settings, target sample, measurement of outcomes, and main findings. Details of peers included the type of peer, type of peer program, identified theory, peer characteristics, role, skills and behaviors, and compensation. Finally, components of the peer-approach included (1) education; (2) social support: emotional, instrumental, and appraisal; and (3) social norms. We further coded approaches based on the behavioral mechanisms associated with the program components: (education) (a) knowledge, (b) skills building and problem-solving; (social support): (a) encouragement, (b) linkage, (c) transportation, (d) reminders; and (social norms) (a) role modeling.

Results

Figure 1 displays the PRISMA consort diagram. A total of 522 articles were found using the search terms in PubMed, CINAHL, and PsycINFO, and 156 of which were duplicates. AW and SP independently screened 366 title and abstracts for relevance, and 176 of which were irrelevant. AW and SP independently reviewed 172 full texts for inclusion, with KT adjudicating any disagreements. Forty studies were included in this scoping review, with KT and OH conducting data extraction.

Study Characteristics

Table 1 displays study characteristics. Most of the included studies were conducted in Sub-Saharan Africa ($n=24$); there were $n=8$ studies conducted in the USA, $n=3$ in Central/South America, $n=3$ in Southeast Asia, and $n=1$ in Canada. The study outcomes represented the entire HIV care cascade from uptake of HIV testing to viral suppression (Table 1). Some articles included more than one outcome, such as linkage and viral load. Along the HIV care cascade, articles had a combination of the following outcomes: HIV testing ($n=7$), linkage to care ($n=10$), ART initiation and/or adherence ($n=5$), retention to care ($n=7$), engagement in care ($n=5$), and viral load suppression ($n=8$). Other outcomes included accessing auxiliary services, internalized stigma, acceptability and feasibility of the peer-approach, and partner involvement. Only one of the studies included addressed the impact that the peer role had on the peer's own HIV care outcomes.

The target populations included general adult ($n=11$), youth and adolescent PLWH (ages 12–18) ($n=8$), including those who were newly diagnosed ($n=4$), individuals initiating ART ($n=1$), female sex workers ($n=5$), sexual and gender minority men ($n=10$), transgender women ($n=4$), pregnant women ($n=2$), and individuals with substance use disorder ($n=3$).

Different terminologies were used to describe and refer to the peers. Within those following a navigator model, peers were labeled as either peer navigator, patient navigator, peer educator, peer counselor, peer mentor, health navigator, or community-led peer. In those engaging a POL model, peers were described as treatment ambassadors or peer educators. In the natural leader model, the peers were described as peer mentors and community health support workers.

Types of Models

The majority of peer-approaches engaged the patient navigator approach ($n=30$). $n=8$ were popular opinion leader [34, 36, 45, 47, 52, 56, 57, 62], and $n=3$ were natural leader models [6, 37, 48]. In all studies except one, peers were selected based upon sharing the characteristic of HIV status. Some additionally matched peers on behavioral characteristics, such as female sex workers or individuals with a history of incarceration.

Most of the studies did not specify a theory used to inform the intervention or outline the training of the peers ($n=30$). The information-motivation-behavior theory was used in five studies [6, 44, 45, 62, 70]. Other theories mentioned were the theory of gender and power ($n=1$) [52], theory of gender affirmation ($n=1$) [52], strengths-based philosophy ($n=1$) [53], the unified theory of behavior ($n=1$) [54], community-based participatory ($n=1$) [34], social cognitive theory ($n=3$) [38, 43, 59], and theory of triadic influence [47].

Training of the Peers

While most articles did not describe any information about the training of their peers, some included specific details. Examples of training descriptions included "in-person group workshops, informal role-playing, standardized role playing, and then recertification with standardized patients. Mentors were recertified with standard patients every 6 months" (page 679, Giordano [44]) and "44 training hours in HIV communication, anti-oppression harm reduction and self care" (Eaton [42]). Two studies explicitly mentioned that training included self-care strategies.

Table 1 Details of forty-one studies that met inclusion criteria for the scoping review

Author	Location	Peer type	Theory	Peer characteristics	HIV care cascade outcome
Abubakari et al. 2021 [33]	Ghana	Navigator		Not detailed	Linkage to care
Audet et al. 2017 [34]	Mozambique	Popular opinion leader	Community-based participatory research	Not detailed	HIV testing and ART initiation
Aung et al. 2021 [35]	Myanmar	Navigator		PLWH	ART initiation
Cabral et al. 2018 [36]	USA	Popular opinion leader		PLWH, engaged in care, and comfortable sharing life experiences	Retention in care
Chanda et al. 2017 [37]	Zambia	Natural leader		18 years old and current or former female sex worker	HIV testing and linkage to care
Cunningham et al. 2018 [38]	Los Angeles, CA, USA	Navigator	Social cognitive theory	Black or Latino selected for having experiences common with incarcerated PLWH	Viral load suppression
Cuong et al. 2016 [39]	Vietnam	Navigator		PLWH, on ART with good adherence 6 months, high school graduate, passed test after training, nominated by clinic	Viral load suppression
Davis et al. 2017 [40]	Guatemala City, Guatemala	Navigator		Guatemalan men ages 20–29	Linkage and retention in care
Denison et al. 2020 [41]	Ndola, Zambia	Navigator		PLWH aged 21–26	ART adherence and viral load suppression
Eaton et al. 2019 [42]	Canada	Navigator		PLWH who has personal or relational experience with substance use	Linkage to care
Enriquez et al. 2019 [43]	Unspecified metropolitan city in the USA	Navigator	Social cognitive theory and readiness stage of wellness motivation theory	PLWH for at least 1 year, taking ART, suppressed viral load, 6 months experience with HIV education, complete training, participate in meetings, have access to transportation, and provide a letter of recommendation	Retention in care and viral load suppression
Giordano et al. 2016 [44]	Houston, TX, USA	Navigator		PLWH	Retention in care and viral load suppression
Graham et al. 2021 [45]	Kenya	Popular opinion leader		PLWH, taking ART, GBMSM nominated by staff or LGBT organization	Viral load suppression
Hacking et al. 2019 [46]	South Africa	Navigator		Young PLWH	Retention in care
Katz et al. 2021 [47]	South Africa	Popular opinion leader	Triadic influence	PLWH selected by study staff	ART initiation
Lifson et al. 2017 [48]	Rural Ethiopia	Natural leader		PLWH from same village, demonstrated understanding of training content, maturity and good communication skills, sensitivity, and commitment	Retention in care

Table 1 (continued)

Author	Location	Peer type	Theory	Peer characteristics	HIV care cascade outcome
MacKellar 2021 [49]	Eswatini, Tanzania	Navigator		PLWH, taking ART, expert-client counselors who received two weeks of training on HIV/AIDS and providing psychosocial support and ART adherence counseling	ART initiation
MacKellar et al. 2018 [50]	Bukoba, Tanzania	Navigator		PLWH, taking ART, expert-client counselors who received two weeks of training on HIV/AIDS and providing psychosocial support and ART adherence counseling	Linkage and retention in care
MacKellar et al. 2018 MMWR [51]	Eswatini, Tanzania	Navigator		PLWH, taking ART, expert-client counselors who received two weeks of training on HIV/AIDS and providing psychosocial support and ART adherence counseling	Linkage and retention in care
Maiorana et al. 2016 [52]	Callao/Lima, Peru	Natural leader and popular opinion leader	Theory of gender and power, and gender affirmation framework	MSM and TGW	HIV testing
Meyers et al. 2018 [53]	San Francisco, CA, USA	Navigator	Strengths based social work and harm reduction	PLWH and shared similar backgrounds with clinic patients, including past histories of incarceration and substance use disorders. In addition, all demonstrated consistent engagement with social and medical services and possessed good organizational and communications skills	Linkage to care
Ndhlovu et al. 2021 [54]	Harare, Zimbabwe	Navigator	Unified theory of behavior	1–24 years old PLWH living within same community	ART adherence
Nguyen et al. 2019 [55]	Vietnam	Navigator		MSM, PWID, and FSW without previous medical knowledge or experience testing	HIV testing and linkage to care
Okoboi et al. 2020 [56]	Entebbe and Masaka Uganda	Popular opinion leader		MSM identified with the support of staff members	HIV testing
Ortblad et al. 2017 [57]	Kampala, Uganda	Popular opinion leader		Affiliated with NGO clinics, trust and respect within the FSW community defined by FSW NGO leadership	HIV testing and linkage to care

Table 1 (continued)

Author	Location	Peer type	Theory	Peer characteristics	HIV care cascade outcome
Phiri et al. 2017 [58]	Malawi	Navigator		Women living with HIV, taking ART, and underwent PMTCT training	ART initiation and retention in care
Reback et al. 2021 [59]	USA	Navigator	Social cognitive theory	TGW of color living with HIV	Linkage to care, ART initiation, retention in care, and viral load suppression
Rocha-Jimenez et al. 2021 [60]	Tijuana	Navigator		PLWH with shared behavioral characteristics	Retention in care
Sam-Agudu et al. 2017 [61]	Nigeria	Navigator		Women living with HIV and PMTCT experience	Retention in care and viral load suppression
Senn et al. 2017 [62]	USA	Popular opinion leader	Information-motivation-behavior skills (IMB)	Black MSM living with HIV	ART adherence and retention in care
Shah et al. 2019 [63]	Eldoret, Kenya	Navigator		PLWH aged between 18 and 24 years, who had greater than 1 year of recent experience being street-connected	Linkage to care
Shahmanesh et al. 2021 [64]	KwaZulu-Natal, SA	Navigator		Male or female aged 18–30 who completed secondary school	Linkage to care
Steward et al. 2017 [65]	Moses Kotane SA	Navigator		PLWH receiving care at a local facility	ART adherence and retention in care
Steward et al. 2021 [66]	North West Province, South Africa	Navigator		PLHA receiving care at the local facility	ART adherence and retention in care
Taiwo et al. 2021 [67]	Nigeria	Navigator		PLWH selected from clinic, 18–30 years old, virally suppressed for 12 months, and matched by salient characteristics	ART adherence, retention in care, and viral load suppression
Tapera et al. 2019 [68]	Zimbabwe	Navigator		18–24 year old living with HIV trained and mentored by MOHCC	HIV testing, ART adherence, retention in care, and viral load suppression
Tobin et al. 2018 [6]	Baltimore MD, USA	Natural leader	Information-motivation-behavior skills (IMB)	Black MSM	HIV testing
Vu et al. 2017 [69]	Uganda	Navigator		Characteristics not specified	ART adherence
Westergaard et al. 2017 [70]	Baltimore MD, USA	Navigator	Information-motivation-behavior skills (IMB)	Familiar with Baltimore communities and experience assisting patient to access health care	ART adherence

Table 1 (continued)

Author	Location	Peer type	Theory	Peer characteristics	HIV care cascade outcome
Young et al. 2019 [71]	Miami-Dade and Broward, FL, USA	Navigator		Familiarity with cultural norms in the target areas, interest in HIV testing, and level of participation in community activities. All CHWs were either born and raised or currently reside in our target communities	HIV testing and linkage to care

Abbreviations PLWH: People living with HIV; ART: Antiretroviral therapy; MSM: Men who have sex with men; GBMSM: Gay/bisexual men who have sex with men; PWID: People who inject drugs; FSW: Female sex workers; TGW: Transgender women; PMTCT: Prevention of mother-to-child transmission

Compensation of the peers was mentioned in $n = 17$ of the studies, with varying details on the amounts and frequency (e.g., paid for every eligible participant recruited, hourly, specific amount of money per mention). In most of the studies, compensation was not mentioned at all.

Components and Mechanisms

As shown in Table 2, $n = 8$ of the studies included all three components (education, social support, and social norms [6, 38, 42–44, 47, 52, 62, 70]. Most studies included the education component, in which peers discussed or shared information (print and verbal) about various topics including HIV treatment knowledge, minimizing side effects, the importance of medication, HIV self-testing, adherence clubs, and other HIV care-related topics.

Social support was the most prevalent component. In addition to emotional support, peers provided instrumental support through linkage to clinicians and reminders about appointments and appraisal support through motivation to make decisions about keeping appointments and adherence. Role modeling of behaviors was less commonly described. When included, role modeling entailed demonstrating how to successfully manage HIV infection and HIV self-testing. Other examples included peers sharing personal stories related to their HIV diagnosis, challenges with addiction, personal barriers to care, successful adherence, disclosure, and overcoming substance use or incarceration.

Discussion

The purpose of this scoping review was to examine diverse peer-based intervention models to identify the peer components and behavioral mechanisms engaged to improve HIV care outcomes among participants. We found that only one-third of the studies described use of all three components (education, social support, and social norms) and associated behavioral mechanisms (knowledge and skills development, problem-solving, linkage and assistance with daily HIV care-related tasks, and role modeling of the skills). These findings expand upon current synthesis of literature, which has summarized the efficacy and effectiveness of peer-based HIV interventions [26–30], by focusing on the peer-behavioral mechanisms of action.

Providing social support was the most common component included in these interventions. There is a wealth of evidence that social support is associated with positive health outcomes. Indeed, social support is a necessary but insufficient approach to changing behaviors. We excluded studies in which the peer's role was only to provide emotional support for this reason. Training peers in skills for linkage and assessing needs for transportation or other

Table 2 Components and behavioral mechanisms of forty-one studies that met inclusion criteria for the scoping review

	Program components			Behavioral mechanisms							
	Education	Social support	Social norms	Knowledge	Skills building	Problem solving	Encouragement	Linkage	Transportation	Reminders	Role modeling	Self-efficacy
Abubakari et al 2021 (33)	■	■		■	■	■	■					
Audet et al 2017 (34)	■	■		■			■	■				
Aung et al 2021 (35)	■	■		■			■	■		■		
Cabral et al 2018 (36)	■	■		■	■	■	■	■	■	■		
Chanda et at 2017 (37)	■	■		■	■			■				
Cunningham et al 2018 (38)	■	■	■	■	■	■	■	■	■	■	■	■
Cuong et al 2016 (39)		■				■	■			■		
Davis et al 2017 (40)	■	■				■	■	■				
Denison et al 2020 (41)		■						■				
Eaton et al 2019 (42)	■	■	■			■	■	■			■	
Enriquez et al 2019 (43)	■	■	■	■	■	■	■	■			■	■
Giordano et al 2016 (44)	■	■	■	■		■	■				■	
Graham et a 2021 (45)	■	■		■		■	■	■		■		
Hacking et al 2019 (46)		■						■	■			
Katz et al 2021 (47)	■	■	■	■	■	■	■	■	■		■	■
Lifson et al 2017 (48)	■	■		■		■	■	■				
MacKellar 2021 (49)	■	■		■		■	■	■	■	■		
MacKellar et al 2018 (50)	■	■		■		■	■	■	■	■		
MacKellar et al 2018 MMWR (51)	■	■		■		■	■	■	■	■		
Maiorana et al 2016 (52)	■	■	■	■		■	■				■	■

Table 2 (continued)

Meyers et al 2018 (53)	■	■				■	■	■	■			
Ndhlovu et al 2021 (54)	■	■		■		■	■			■		
Nguyen et al 2019 (55)	■	■		■		■	■	■				
Okoboi et al 2020 (56)	■	■		■	■	■		■				
Ortblad et al 2017 (57)	■	■		■	■			■		■		
Phiri et al 2017 (58)	■	■		■			■			■		
Reback et al 2021 (59)	■	■		■		■	■	■	■	■		
Rocha-Jimenez et al 2021 (60)		■					■					
Sam-Agudu et al 2017 (61)		■								■		
Senn et al 2017 (62)	■	■	■	■	■	■	■				■	■
Shah et al 2019 (63)	■	■					■	■	■	■		
Shahmanesh et al 2021 (64)	■			■								
Steward et al 2017 (65)	■					■						
Steward et al 2021 (66)	■					■						
Taiwo et al 2021 (67)	■	■				■	■	■	■			
Tapera et al 2019 (68)		■					■	■	■			
Tobin et al 2018 (6)	■	■	■	■	■		■				■	■
Vu et al 2017 (69)	■	■		■	■	■	■	■				
Westergaard et al 2017 (70)	■	■	■	■	■	■	■	■		■		
Young et al 2019 (71)	■	■		■	■	■	■	■	■			

The grey indicates the presence of the component/mechanism reported

assistance and assisting with decision making enables the individual to identify and overcome barriers to care.

The least mentioned component identified in these interventions was peers introducing or changing social norms through role modeling and building individual's self-efficacy to adopt the behavior of interest. Social learning theory and social cognitive theory emphasize the importance of role modeling behaviors to increase self-efficacy to help

individuals sustain behavior changes. The premise of many studies was that sharing characteristics and familiarity of the community and context was a proxy for role modeling. This assumption may be one possible reason for the mixed results on the effectiveness of peer-based approaches and underscores the need for programs to explicitly train peers to demonstrate and provide feedback about behavior. One recommendation for the field is to document the extent to which the peers in the programs describing how frequently they role model or demonstrate behaviors and which behaviors/skills are the most commonly role modeled. This will inform the evaluation of the program and identify gaps in training of the peers.

Little detail was provided on the content or dose of peer communication with intervention participants: for example, whether conversations were typically about adherence or HIV care appointments or other non-HIV-related issues such as income, housing, childcare, or relationship matters were not specified. Programs should prepare peers to be able to discuss resources that may not be specific to HIV but could be important barriers to care engagement, such as food programs or childcare services. Furthermore, documenting examples of different questions and conversations that reflect the context where the study was conducted can inform evaluation of the components of the peer program and be used as future training materials.

There was heterogeneity in the descriptions of the training of peers. This may be in part due to more detailed explanations in protocol papers that were excluded from this review. Replication and dissemination of successful programs relies on details about the training content and length of time in which peers are trained to participate in interventions.

Very few studies included self-care as a training activity for the peers. However, several of the studies did include check-in training sessions to assess and boost peers' skills. As the peers are PLWH themselves and often shared other marginalized identities with target participants, self-care behaviors are important to reduce burnout and improve retention of the peers. Self-care can be structured as an activity to be conducted during supervision or on-going training activities. Self-care can also be role-modeled by the peers to other PLWH.

One of the promising aspects of peer approaches is its potential to offer a pathway for employment. Several studies did formally hire their peers, and others provided peers with monthly stipends. Economic insecurity is well established as a determinant of adverse HIV care outcomes, while employment can have a positive impact on PLWH peers [72]. Future peer-based interventions should seek to provide formalized employment opportunities and compensation to peers in order to promote positive outcomes among the peer participants. Additionally, it remains important to have continued training and monitoring of peers and other intervention-related staff by qualified supervisors. Lack of understanding about the peer role at clinical sites was cited as a common challenge and can lead to competition between staff, low trust, and misunderstandings about the role of peers [73, 74]. Recommendations for promoting peer-based programs and integration in the HIV healthcare workforce include establishing an infrastructure for training, education, and certification, as well as defining the professional identity of peers though core competencies and a common scope of practice as well as opportunities for advancement. There may be some peers who prove to be particularly effective in their roles, yet without systems in place to document the various elements of these programs, successes cannot be replicated. Furthermore, sustainable financing mechanisms to support successful integration of peers into a multi-disciplinary team should be established where feasible. When payment is not possible, systems that emphasize the intrinsic and extrinsic rewards of peers can be accomplished through acknowledgements or certificates of appreciation.

Limitations

A major limitation of this study was the often-limited availability of information in published literature regarding peer-based interventions. Articles were excluded if they did not discuss the components of their peer-based intervention or reviewers could not determine whether peers provided more than emotional support. There was heterogeneity in how studies reported peer-based interventions. This variability reduced the ability to properly assess the peer components and behavioral mechanisms, and to a larger extent, limited others in reproducing peer-based interventions which successfully improved HIV outcomes. Additionally, the review was limited to literature published in the last 5 years to synthesize the mechanisms from the latest interventions that impact HIV care cascade outcomes, as they address the latest priority areas which peers could address. This substantially limited the number of interventions included. Despite these limitations, we identified forty studies for inclusion and extraction of peer components and behavioral mechanisms.

Conclusion

This scoping review highlighted many of the peer behavioral mechanisms that operate in various types of peer approaches to improve HIV care and outcomes in numerous settings and among diverse populations. The peer-based approach is flexible and commonly used, particularly in resource-poor settings due to its low cost. Future studies should include more explicit details about the components and mechanisms that were used within peer-based interventions and explicitly evaluate the dose and impact on individual and peer health outcomes including changes in stigma. Additionally, future research should evaluate the inclusion/exclusion of specific mechanisms in the context of the interventions' efficacy.

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Declarations

Conflict of Interest Karin E. Tobin, Omeid Heidari, Abigail Winiker, Sarah Pollack, Melissa Davey-Rothwell, Kamila Alexander, Jill Owczarzak, and Carl Latkin declare that they have no conflict of interest.

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