

# A Scoping Analysis of Peer-reviewed Literature about Effectiveness of HIV Intervention among MSM

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## Abstract

*Background: Based on the popular trend of the current global HIV prevention and control measures among MSM, with the increasing focus on MSM population in recent years, more and more studies on intervention among MSM intervention and its effect emerged. However, no long-term bibliometric studies have been conducted on intervention among MSM to date.*

*Objective: The purpose of this study is to conduct detailed and in-depth content analysis on literature analysis of the current worldwide research group that mainly adopt interventions, and to evaluate the effectiveness of the interventions, and to provide recommendations for the implementation of new interventions in future.*

*Methods: A bibliometric analysis and quantitative content analysis based on literature databases is conducted to study the documental information of research on intervention among MSM. For the included publications, the annual publication number, the distribution of countries, authors, languages, journals and annual distribution of highly frequent keywords were analyzed.*

*Results: A total of 77 published scientific papers are included. The output of research on intervention among MSM is gradually increasing. The authors of 37 included published scientific papers (50.8%) are from the United States.*

*All of the scientific papers were published in English. Among the included 77 studies, 43 studies show that the intervention among MSM is positive.*

*Conclusions: There is a trend that intervention methods are transforming from conventional ways such as publicity materials into effective electronic multimedia way. More studies on intervention among MSM will give some references for AIDS prevention and control.*

**Keywords:** MSM, HIV Intervention, Literature, Scoping Analysis.

## Introduction

According to the estimates by WHO and UNADIS, 35 million people were living with HIV globally in late 2013. Adults affected with HIV were 3.8 million, among which women accounted for 16 million and children (<15) for 3.2 million<sup>1</sup>. Because of the increasing focus on MSM population in recent years, more and more studies on intervention among MSM and its effect emerged<sup>2</sup>. A study proves that sexual risk in MSM can be reduced effectively by a brief web-based intervention offering cognitive behavioral skills training and motivational enhancement<sup>3</sup>. This proof-of-concept study demonstrated that important clinical outcomes for people living with HIV might be enhanced adherence and improved by using two-way text messaging to dynamically tailor adherence messages<sup>4</sup>.

Studies about the intervention method of publicity materials indicated that the way of intervention was low-cost and had the potential to significantly affect HIV epidemic<sup>5-6</sup>. In addition, some analysis about condom promotion and sites intervention shows that the interventions are effective in increasing condom use and HIV testing but not in reducing the number of sexual partners<sup>7-8</sup>.

However, various studies have shown that some intervention methods are effective while others are not<sup>9-11</sup>. Because there was no systematic literature analysis to summarize the researches in this field, it is not clear which kind of intervention measure is more effective among different MSM in different areas. And previous studies did not evaluate the effectiveness of the current widely-used intervention measure for MSM and failed to put forward more scientific advice.

Bibliometric method<sup>12</sup> is a method of quantitative analysis mainly concerned with the external characters of literatures. It can be used to deal with the quantitative relationship between different literatures by using the method of statistics, the results of which mainly depend on the rule of probability. Content analysis method is a method of qualitative analysis mainly concerned with content titles<sup>13</sup>.

And its main function is to deal with the qualitative and quantitative relationship between the internal symbols clusters among different literatures, and results of this method mainly depend on the logic rule. If we can design a new method system by considering these two methods as one body to do integrate research, we will be able to take advantages of both methods and break through parochialism of single research thinking.

Based on the above situation, the research team adopts a bibliometric method to trace the core production and to do an in-depth and comprehensive literature analysis of HIV intervention among MSM population from 2004 to 2013. The purpose of the research team was to provide comprehensive references for the future research of other scholars by analyzing time distribution of the study, the research authors and main research journal group based on the analysis of HIV intervention among MSM published in the past 10 years.

Through detailed and in-depth study of content of literature analysis, by analyzing interventions mainly adopted by current worldwide research group, the research team also aims at evaluating effectiveness of the intervention and providing recommendations for the implementation of new interventions.

### Research Methods and Data Sources

**Data collection and extraction:** Data from January 2004 to December 2013 was retrieved from Medline, PubMed, Web of Science for articles associated with the themes of MSM and HIV Intervention. The research team selected these databases because they provide broad coverage of the literatures on HIV.

Through reviewing literature and expert interviews, the team determined to retrieve the theme of this study by searching "Intervention and MSM" AND "2004-2013". The team used "MSM" and "Intervention" as subject heading or key words to search each database. All authors reviewed and refined the search results. Included records were downloaded into a reference management software (Noteexpress) and duplicates were deleted.

Inclusion criteria were as follows: English language; the records (title, abstracts, and keywords); the reviews and original research of MSM and Intervention. Titles and abstracts were examined by one author. Next, the remaining records were reviewed for inclusion by two authors. The team set up strict final inclusion criteria that the literature which was not included by one of the author would be deleted.

**Bibliometric Analysis:** Included articles were examined to create a database documenting (1) The distribution of published time of literature (Using the number of literature, composition ratio, calm base than development speed and calm base than growth speed to describe the time distribution of literature.) (2) The regional distribution of literature (Analyze region distribution of the first author of the literature. Area, amount of literature, constitute ratio and ranking the sequence distribution were used to describe the regional distribution of literature and make visualization analysis by using the Citespace II software, a JAVA application created by Drexel University that users can download to visualize and analyze trends in scientific literature<sup>24</sup>. (3) The journals and impact factors (Analyze the

name, the number of related articles as well as impact factor of journals that include no less than 3 related articles). The data was analyzed by software of NoteExpress and Ucinet.

### Co-word cluster analysis of highly-frequent keywords:

During the study, the research team extracted and analyzed the keywords of included publications. We counted the frequency of keywords and their co-occurrence frequency. The frequency of a keyword is times of occurrence of a keyword in all the included articles while the co-occurrence frequency is the frequency of a pair of keywords occurring simultaneously. Finally, the keywords occurring no less than 2 times were selected to form the keyword co-occurrence matrix (co-words matrix) by software of Ucinet 6.3 which is used for social network analysis<sup>14</sup>. And the keywords networks were displayed in the figure by NetDraw, the software for network visualization. What's more, the dendrogram was drawn for assessing the cohesiveness of the clusters formed and providing information about the appropriate numbers of clusters to keep by spss17.0.

**Qualitative content analysis:** The team reviewed and coded the included records (title, abstract, and keywords) to perform a qualitative content analysis to analyze the current intervention methods and the effectiveness recorded in scientific literature.

### Results

**Core countries, journals and authors:** The team obtained 554 records by screening keywords "among MSM" and "intervention". There were 478 records left after removal of the duplicates. After examination of titles and abstracts, 225 irrelevant literatures were removed and 193 records left. The team excluded 98 records (medical records, meta-analysis) after reading more about general contents. The final amount of English literature (77 records) was determined after the title and abstract were read again. And the literature inclusion process is described in figure 1.

From 2004 to 2013, the number of published periodical articles shows zigzag upward trend, where most remarkable increase occurs in the period from 2009 to 2010. (Table 1)

In this study, the source areas of the published are more than two English literatures concerning the study of interventions of the MSM group analyzed. It is found that this kind of English literatures mainly originated in the US.

The included articles were respectively from the United States and China centering two clustering cluster. From the posting frequency of each node, literatures of American contribute far more than the other countries, following by China, Australia, France and India. As a country with most paper production, the United States has research institutions mainly distributed in the university, such as University of Connecticut and Columbia University School of Social Work. The representative research institution is Chinese CDC.

The literature concerning the study of interventions of the MSM group is distributed in fourteen periodicals. There are totally fifty-sixth pieces of papers (68.83%). Among these fourteen periodicals, «AIDS Behavior», «AIDS Care» and «AIDS Educ Prev» all published 7 papers of this kind, the largest number of papers published by one periodical. the most of this kind of papers, each published 7 The detailed

distribution of papers concerning the research target published in various periodicals is unfolded in Table 2. Among the periodicals that published at least two pieces of papers, «AIDS» gains the highest impact factor of 6.407. (Table 2)

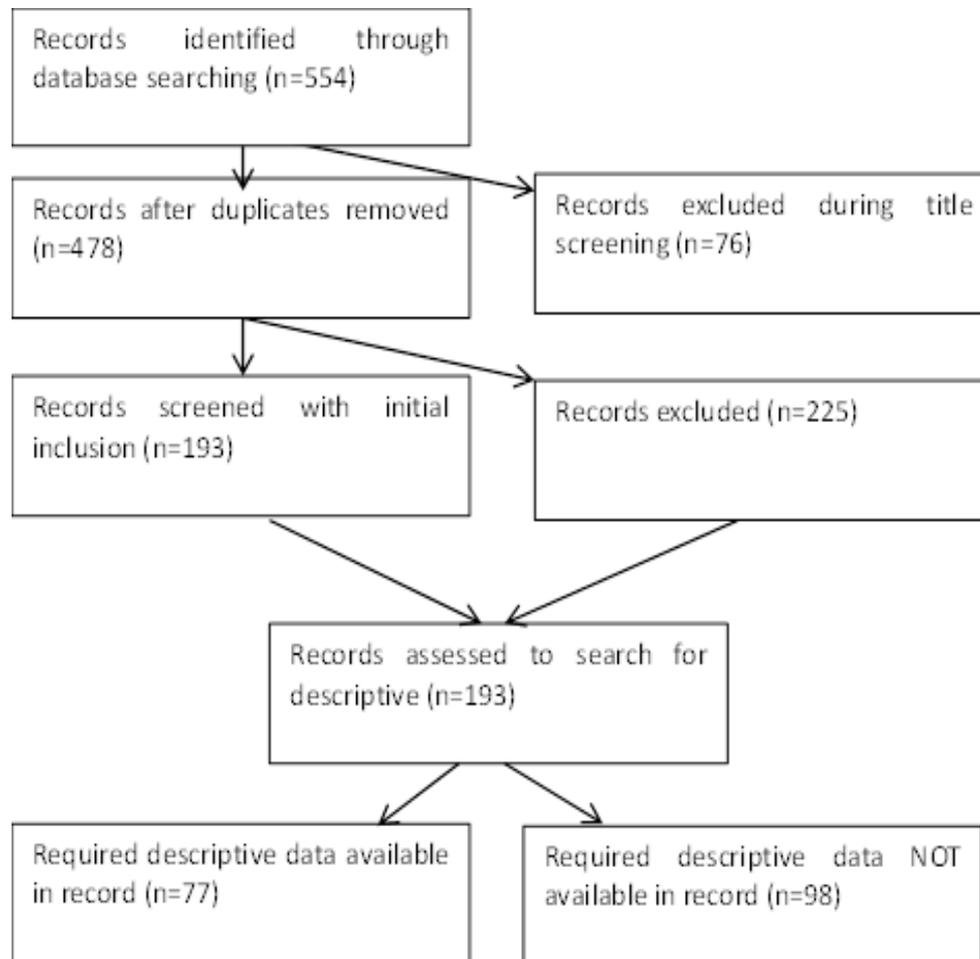


Figure 1: Literature search process

Table 1  
The number of published periodical articles in 2004-2013

Year	Amount of English literature	Constituent ratio (%)	Relative ratio with fixed base (%)	Link relative ratio (%)
2004	2	2.60	100.00	-
2005	1	1.30	50.00	-50.00
2006	1	1.30	50.00	-50.00
2007	5	6.49	250.00	150.00
2008	5	6.49	250.00	150.00
2009	5	6.49	250.00	150.00
2010	18	23.38	900.00	800.00
2011	10	12.99	500.00	400.00
2012	13	16.88	650.00	550.00
2013	17	22.08	850.00	750.00
Total	77	100		

Table 2

Distribution of periodicals including papers concerning the study of interventions of the MSM group and the impact factors of the involving periodicals

Name of periodical	Amount	Proportion (%)	Complex impact factor
AIDS Behav	7	9.09	2.979
AIDS Care	7	9.09	1.834
AIDS EducPrev	7	9.09	1.484
AIDS Patient Care STDS	6	7.79	3.09
J Acquir Immune DeficSyndr	4	5.20	4.653
PLoS One	4	5.20	3.73
AIDS	4	3.90	6.407
BMC Public Health	3	3.90	2.076
Am J Public Health	3	2.60	3.93
Cochrane Database Syst Rev	3	2.60	
Health Psychol	2	2.60	3.832
JMIR Res Protoc	2	2.60	
Open AIDS J	2	2.60	
Sex Transm Dis	2	2.60	2.594
Total	56	68.83	-

**Content analysis:** The current intervention measures among MSM mainly contained comprehensive methods of publicity materials, peer education, sites intervention, condom promotion, internet and new media counseling & testing service. And the study of intervention among MSM mainly involves assessment of effectiveness of 6 kinds of intervention methods, intervention strategy research and health economics analysis of intervention.

**Co-word cluster analysis of highly-frequent keywords:** The top 12 major keywords occurring more than 5 times in the papers were extracted from the included publications. From table 3 it is clear to find that the mainly high-frequency keywords are “HIV”, “msm”, “hiv prevention”, “intervention”, “testing”, “internet”, “counseling”, “condom use” and “video”.

From the multidimensional scale map (Figure 2) of high-frequency keywords conclusion can be made that the keywords of literature can be roughly divided into 3 aspects: (1) Interventions: including behavioral intervention, testing, condom use, education, video, Internet and so on. (2) Methods: including process analysis, randomized controlled trials, motivation and so on. (3) Risk factors: including substance use, adolescents, HIV infected men and so on.

Keywords in figure 4 show the knowledge structure of patient adherence in studies included in our study from 2004 to 2013. The co-occurrence network knowledge map shows the study of the internal relations of thematic structure. Figure 3 shows that HIV, MSM and Intervention in the research into the center of the high -frequency keywords co-occurrence network knowledge map are the core nodes in the

network. In figure 4, the nodes marked red are intervention methods, which clearly show the major keywords of intervention methods including counseling, testing, internet and video.

**The intervention model analysis:** Among the 77 records included in- depth literature methodology study, 65 texts are available online. The team analyzed the intervention measures of all the available literatures. According to the results, in the included literature, foreign scholars prefer Internet and social media as methods of intervention. The top 3 intervention ways are the Internet and new media mode, the mode of peer education and advisory service.

The result of intervention model analysis indicates that research scholars tend to use the web, social media, and new media in MSM behavior intervention. For example, a study published in "Health Psychol", a research journal, shows that two-way messaging intervention between doctors and patients can improve medication adherence<sup>15</sup>.

Another study shows that place where MSM often gather and hold activities can be used to have a conscious behavior intervention<sup>16,17</sup>. Most of the current studies show that intervention methods are developing from traditional print media to new electronic media. In addition, the highlight of intervention in the studies is interference detection mode, a comprehensive consulting detection mode setting hospital and VCT as a body.

Derived Stimulus Configuration

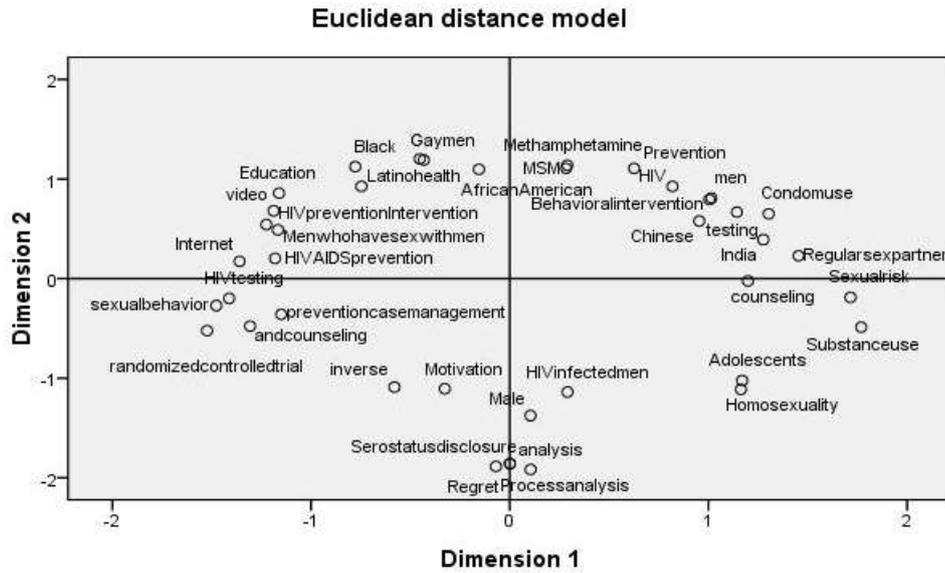


Figure 2: High-frequency keywords multidimensional scale map

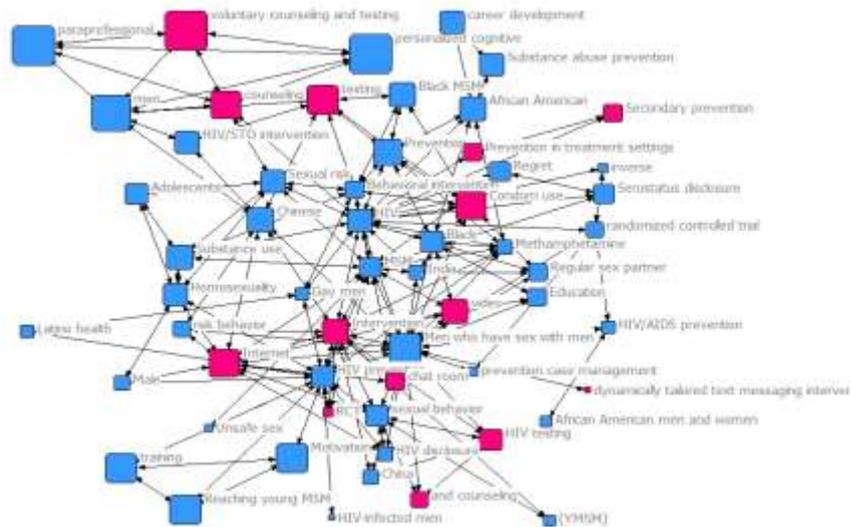


Figure 3: The high frequency keywords co-occurrence network knowledge map of included literature, 2004-2013

Table 3  
The major keywords Extracted from included publications

Keyword	Frequency of occurrence	Percentage (%)
HIV	47	22.38
Men who have sex with men	32	15.24
MSM	15	7.14
HIV prevention	21	10.00
Intervention	20	9.52
Behavioral intervention	19	9.05
testing	17	8.10
internet	15	7.14
counseling	10	4.76
Condom use	9	4.29
video	5	2.38

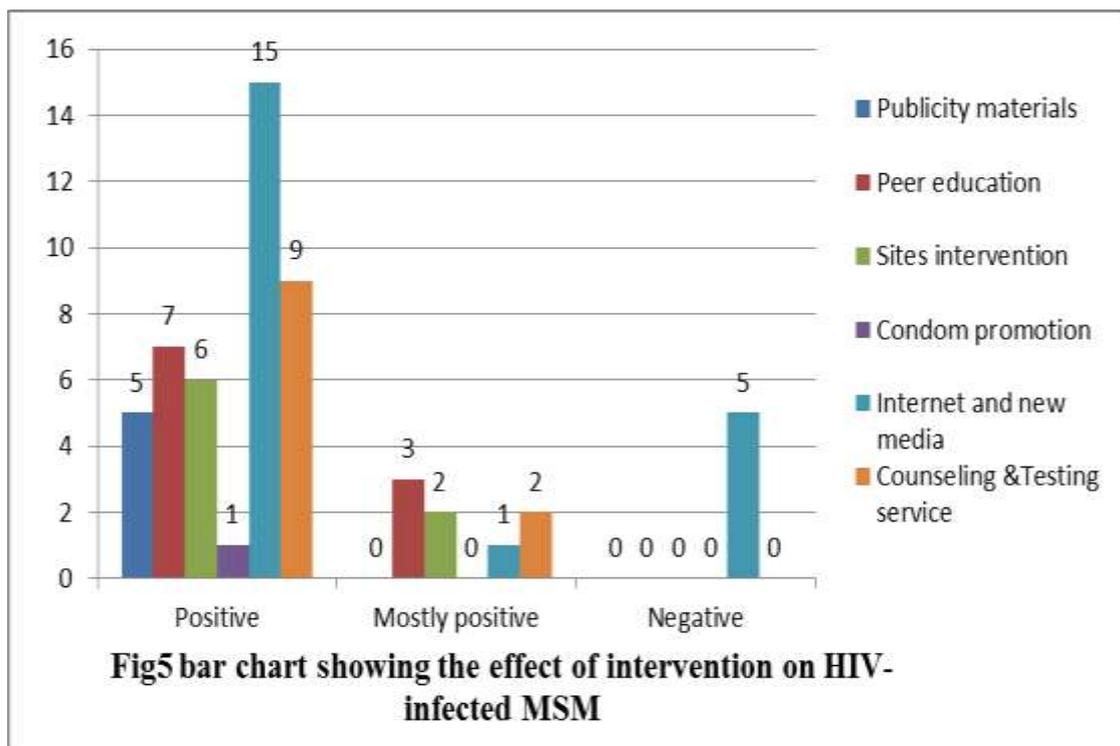


Figure 4: Bar chart showing the effect of intervention on HIV-infected MSM

**The intervention effect analysis:** The studies of the intervention effect of all included English literature indicate that the number of literature on internet and new media intervention is the largest in all of the literature with the positive effect of intervention models. (15) However, the number of literature with the negative result of internet and new media intervention is the maximum at the same time. (5) The reason of the negative result is that the scale of the sample is too small. For internet and new media intervention, it is easy to loss follow-up object thus resulting in follow-up bias. 7 studies show that peer education intervention is effective. However, quality control is inevitable in these researches. There are 5 reports on public materials intervention of all included literature, which all indicate that effect of this intervention method is positive. (Figure 4)

**Discussion**

The intervention methods among MSM are multiple and research designs and methods to assessing the intervention effect among MSM are variable and often incompletely described in the current research literature. Therefore, the team concludes that method such as meta-analysis is not suitable to be applied to analyze the current intervention methods among MSM as well as the effect of various measures comprehensively. In this thesis, an approach that included a rigorous literature search is adopted followed by bibliometric method and quantitative content analysis. The research of bibliometric method and Content analysis method is an important part of library science and informatics science.

Some findings achieved in this study should be highlighted. One is that at present the preventive intervention among MSM as an effective way to control HIV epidemic has drawn more and more attention from the field of current international public health in all nations.<sup>18,19</sup> In addition, the study shows that there is a trend that intervention methods are transforming from conventional ways such as publicity materials to effective electronic multimedia way along with the popularizing of information technology. Internet and new media intervention method such as the Internet, e-mail, and wireless media is sometimes considered to have a broader scope.<sup>20</sup> Digital media and Internet intervention method needn't have to conduct face-to-face communication and is not limited by time and place, which facilitates both interveners and MSM. Studies give evidence that a chat room based intervention among MSM is identified an effective method to make HIV testing population increasing<sup>21</sup>.

Some studies indicate that current community internet resources and social structures such as internet chat room, social networking software and mobile social Apps may have potential to improve health by reducing infection and re-infection and increasing testing rates as well as initiating early access to treatment for those with HIV<sup>22</sup>. However, internet models are also controversial. During the study, the intervention effect of Internet and new media intervention method turns out to be negative in 5 researches. A research suggests that MSM using chat rooms may be at greater risk. Many MSM reported that they use online chat room to find sexual partners. Three out of four chatters who completed the assessment confessed to have experiences of chatting

with a stranger and having sex with him, a fact that violated the original intention of placing intervention to reduce the risk of HIV infection.

Based on the analysis of the literature, the team found that more and more scholars began to study new methods of intervention among MSM, such as joint marketing principle<sup>23</sup> and STYLE (Strength Through Youth Living Empowered), a new effective intervention method increased HIV diagnoses, providing efficient and timely engagement in care for MSM<sup>24</sup>.

Prevention of HIV calls for joint effort. It is essential to combine several kinds of the intervention method to achieve successful prevention intervention. In addition, the study indicates that different kinds of intervention among MSM shall be applied in different color, race, age, or economic status based on actual conditions.

There exist certain shortcomings in the research, which is, by any means, inevitable. The research team summarized and analyzed the influence nearly a decade's intervention research methods and results among MSM, providing reliable basis for the scholars and relative authorities or organizations to develop and implement interventions among MSM.

## Conclusion

We conduct detailed and in-depth content analysis on literature analysis of the current worldwide research group that mainly adopt interventions. The top 3 intervention ways are the Internet and new media mode, the mode of peer education and advisory service. The research team provides reliable basis for the scholars and relative authorities or organizations to develop and implement interventions among MSM.

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