

# Revisiting the use of condoms in Brazil

## *Revisitando o uso do preservativo no Brasil*

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**ABSTRACT: Introduction:** It is known that a single prevention strategy is not enough to control multiple HIV epidemics around the world and in Brazil. However, it is not only necessary to recognize the importance of condoms as part of the policy of HIV/AIDS prevention but also discuss its limits. In this article, we aim to investigate the use of condoms in Brazil, draw critical reflections, and understand how they can once again be highlighted in Brazil's prevention strategy going forward. **Methods:** A narrative review of literature was conducted using keywords in PubMed. Reports from national surveys that guide the epidemiological and behavioral surveillance of the Brazilian Ministry of Health were also included. **Results:** A total of 40 articles and 3 reports were included in the review and 11 intervention studies to promote the condom use; the main findings were as follows: 1) Despite the increase in national studies on sexual behavior, little attention is given to the role of condom use; 2) There are few studies examining the factors associated with condom use among key populations such as men who have sex with men (MSM), female sex workers (FSW), drug users (DU), and transvestites and transsexuals (TT), while substantial studies focus on adolescents and women; 3) Evidence suggests that a combination of interventions is more effective. **Discussion:** new prevention technologies must not lose sight of the critical importance of condoms, and efforts to reintroduce them should focus on the role of pleasure in addition to their potential to minimize the risk of HIV.

**Keywords:** Condoms. HIV. Acquired Immunodeficiency Syndrome. Disease Prevention. Prevalence. Brazil.

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**Conflict of interests:** nothing to declare – **Financial support:** none.

**RESUMO: Introdução:** No âmbito da atual política de prevenção do HIV/AIDS é necessário reconhecer a importância do preservativo masculino e discutir seus limites. Esse artigo objetivou investigar o uso do preservativo masculino no Brasil e elaborar reflexões críticas sobre o papel do mesmo no novo contexto da prevenção do HIV/AIDS. **Métodos:** Revisão narrativa sobre o uso do preservativo masculino no Brasil em diferentes grupos populacionais e fatores associados ao uso, por meio de buscas realizadas entre março e abril de 2013, utilizando-se descritores em inglês categorizados na base *PubMed*. Incluíram-se também documentos provenientes de inquéritos nacionais que orientam a vigilância epidemiológica e comportamental do Ministério da Saúde. **Resultados:** Incluí-se 40 artigos e 3 relatórios para caracterizar a produção de conhecimentos e outros 11 estudos de intervenção para promoção do uso de preservativos. Observou-se que: 1) apesar do aumento de estudos nacionais, estes apresentam baixa regularidade; 2) há poucos estudos sobre fatores associados ao uso de preservativo entre os grupos nos quais a epidemia se concentra, como homens que fazem sexo com homens (HSH), trabalhadoras sexuais (TS), usuários de drogas (UD) e travestis e transexuais (TT), e concentração entre adolescentes e mulheres; 3) combinação de intervenções mostrou-se mais efetiva do que uma só. **Discussão:** A reflexão e discussão do uso do preservativo no âmbito das novas tecnologias de prevenção devem não só enfatizar a importância do mesmo, mas também considerar o papel do prazer e do sexo nas intervenções combinadas, além do potencial de redução do risco de infecção por HIV.

**Palavras-chave:** Preservativos. HIV. Síndrome de Imunodeficiência Adquirida. Prevenção de doenças. Prevalência. Brasil.

## INTRODUCTION

The male condom has played a key role in the fight against HIV/AIDS around the world and in Brazil<sup>1</sup>. Early in the epidemics, these used to be distributed at certain moments of the year such as Carnival and the “World Day Against AIDS” or through research projects. In 1994, the wide and systematic distribution started, in addition to the purchase of the most male condoms and lubricant gels by the Brazilian National Health System<sup>2,3</sup>, coordinated by the National STD/AIDS Program, currently Department of STD/AIDS/HIV and Viral Hepatitis (DDAHV) of the Ministry of Health.

Over the past 35 years, the field of HIV prevention has undergone several transformations. Today, it is argued that effective HIV prevention requires a combination of behavioral, biomedical, and structural intervention strategies. It is known that a single prevention strategy is not enough to control multiple HIV epidemics around the world and in Brazil. To the global extent, there are high expectations on the so-called “new prevention technologies” or “biomedical prevention technologies” (circumcision, microbicides, postexposure prophylaxis – PEP, and preexposure prophylaxis – PrEP), in addition to behavioral strategies (such as sero-positioning, sero-adaptation, and other forms of agreement between sexual partners)<sup>4-7</sup>.

At the same time, the country is experiencing an increasing HIV prevalence among young people, especially men who have sex with men (MSM)<sup>8</sup>; high prevalence of HIV

is also noted in some population groups in vulnerable contexts (MSM, sex workers – SW, drug users – DU, and transvestites and transsexuals – TT)<sup>9-12</sup>, currently referred to as key populations<sup>13</sup>, in addition to downward trend in the consistent use of condoms<sup>14</sup>. It is, thus, necessary to recognize the importance of condoms as part of the HIV/AIDS prevention policy and to discuss its limits.

This article aimed to investigate the use of condoms in Brazil and to make critical reflections on their role in the new context of HIV/AIDS prevention.

## METHODS

We conducted a literature review<sup>15,16</sup> aiming at the use of condoms in Brazil as a strategy for HIV/AIDS prevention in different population groups, the factors associated with its use, and the actions taken to promote the use of male condoms. To draw up a more organized search of documents, guaranteeing sensitivity (including the largest number of documents) and specificity (excluding documents not related to the study purposes), we used descriptors in English previously defined and categorized in PubMed database (MeSH Terms) and keywords used by authors in publications identified in the exploratory readings on the theme (Chart 1). Titles and abstracts were read when addressing condom use as the main outcome variable. Searches were carried out between March

Chart 1. Words and keywords related to use of male condom in Brazil at Pubmed, 2000 – 2013.

Descriptor	Pubmed Search Term
Brazil	Brazil OR <i>Brasil</i>
condom use (male or female)	“Condoms/supply and distribution”[Mesh] OR “Condoms/trends”[Mesh] OR “Condoms/utilization”[Mesh] OR condom [tiab]
condom use (female)	“Condoms, Female/supply and distribution”[Mesh] OR “Condoms, Female/trends”[Mesh] OR “Condoms, Female/utilization”[Mesh]
HIV/AIDS	“HIV Infections”[Mesh] OR HIV OR aids OR Acquired Immunodeficiency Syndrome
Sex workers	“sex worker” [MeSH] OR “sex worker” OR prostitute*
Drug users	(“substance-related disorders”[MeSH Terms] OR “injection drug use”)
Men who have sex with men	(“men who have sex with men” OR “males who have sex with males” OR MSM OR homosexual* OR bisexuality OR homosexuality male)
Transgender individuals	(“transsexualism”[MeSH Terms] OR “transsexualism”[All Fields] OR “transgender”[All Fields])
Adolescents	(“adolescent”[MeSH Terms] OR “adolescent”[All Fields] OR “youth”[All Fields] OR “young men” OR “young women”)

and April 2013, and articles with full-text available were kept in the sample, all of them published between 2000 and 2013.

We also included documents from national surveys that guide the epidemiological and behavioral surveillance of the DDAHV, and included condom use as one of the main outcomes, such as in the “Sexual Behavior and Perceptions of the Brazilian Population on HIV/AIDS” survey conducted in 1998 and 2005, in a representative sample of the population aged 16 – 65 years, by the Brazilian Center for Analysis and Planning (CEBRAP)<sup>17</sup>; and in on the knowledge, attitudes, and practices related to STD and AIDS (PCAP), household survey undertaken in 2004 and 2008 among a representative sample of the population aged 15–64 years<sup>14,18,19</sup>, surveys among conscripts of the Brazilian Army<sup>8,20</sup>, and behavioral surveillance surveys among key populations<sup>9,12,21,22</sup>.

Information about the characteristics of the scientific literature on the use of male condoms was organized in Table 1. Factors associated with condom use were organized by population group and sexual practice in Table 2. Tables 3 and 4 summed up data on the effects of combined and single interventions to promote condom use. Exclusion criteria were:

1. studies that did not report the proportion of condom use (even if changes in attitudes and knowledge had been reported) and
2. if no intervention component had been performed in Brazil.

## RESULTS

A total of 40 papers<sup>8,9,11,17-21,23-54</sup> (Table 1) and 3 DDAHV reports were included in this article to describe the production of knowledge about the use of condoms in Brazil and associated factors. The reports were not included in Table 1, but condom use information from the PCAP report<sup>14</sup>, the national study of crack users<sup>12</sup>, and the RDS-TS study<sup>22</sup> were described. Studies addressing the type of intervention to encourage condom use were also identified: combined interventions- five studies<sup>29,55-58</sup> (Table 3) and only one intervention-eight studies<sup>53,57,59-64</sup> (Table 4).

### FEATURES OF THE PRODUCTION OF KNOWLEDGE ABOUT THE USE OF CONDOMS

A critical reading of the production of knowledge about condom use in Brazil over the past 13 years leads us to the following summarization:

1. National studies showed substantial variation with respect to the measures taken to promote the condom use in the characterization of the different types of sexual partners (casual, occasional, fixed, stable, etc.); investigation of sexual practices (vaginal, anal, receptive, active, etc.); and intervals (last relationship, sexual practice in 3, 6, or 12 months before the survey, etc.). Some measures are investigated in specific groups only, which makes it difficult to compare with the results of different studies.

Table 1. Features of the production of knowledge related to male condom use in Brazil, 2000 – 2013.

Number Reference	Study design/ methodology*	Study range±	Goals	Study population**	Measures used for condom use	Condom use	Associated factors identified	Year of Study realization
1 Berquó et al., 2008 <sup>17</sup>	CS	n = 2,578 (1998); n = 3,960 (2005); Brazil	To analyze the levels, trends, and sociodemographic differentials of condom use	GP (16 – 65a)	Frequency of condom use	Increased condom use, 12 months and at the last sexual intercourse. Young people (16 – 24 years) are more protected, especially with casual partners	There was no regional difference in consistent condom use. In stable relationships, Pentecostals reveal the least protection on sex; schooling was proven an important differential factor as to condom use in 1998	1998; 2005
2 Bertoni et al., 2011 <sup>11</sup>	CS	n = 295; RJ/RJ	To analyze trends and sociodemographic differentials of condom use	DU	Frequency of condom use	40% never used condoms; 60% did not use under the influence of substances	Being under the influence of drugs	2006-7
3 Calazans et al., 2005 <sup>23</sup>	CS	n = 681; SP/SP	To investigate condom use among teenagers	Teens	No condom use among young people in the last sexual intercourse with fixed or casual partners	Overall level of condom use at the last sexual intercourse: 60% in stable relationships: 49%; in casual relationships: 80%	Condom use more common in casual relationships (p = 0.0001); cohabitation is associated with nonuse with casual and fixed partners. Female, less educated, not working, and family per capita income higher than the minimum wage are associated with not using condoms with fixed partners. Alcohol use in life, first intercourse between 9 and 16 years, poor knowledge about the treatment of AIDS, and mourning for violent causes associated with lower use among casual partners	2003

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Table 1. Continuation.

Number Reference	Study design/ methodology*	Study range±	Goals	Study population**	Measures used for condom use	Condom use	Associated factors identified	Year of Study realization
4 Cerqueira-Santos et al., 2008 <sup>24</sup>	CS	n = 1,013; POA/LOL	To investigate the relationship between the use of condoms and other contraceptive methods and religiosity/spirituality among young people of low socioeconomic status.	Teens	Frequency of use to prevent HIV/AIDS and as contraception	> 80% of the sample reported using condoms	Boys reported more frequently the use of condoms for both contraceptive purposes and prevention HIV/AIDS transmission of (p < 0.001); older age at first sexual intercourse was a positive predictor of condom use; no significant differences were found for groups of different religions	2005
5 Dal Pogetto et al., 2012 <sup>25</sup>	CS	n = 102; SP/SP	To describe sociodemographic characteristics, gynecological history, and behavioral aspects of prostitutes and to verify associations with STD	F-SW	Condom use (yes, no)	99% used condoms with clients; 26.3% used condoms with a stable partner	26.3% reported condom use with fixed partners, compared with 99% using it in commercial sex	2008-9
6 Damascena et al., 2011 <sup>26</sup>	CS	n = 2,523; 10 Brazilian cities	To investigate factors associated with the prevalence of HIV	F-SW	-	-	Not using a condom in negotiation with clients as an important risk factor for HIV	2009-10
7 Darden 2003 <sup>26</sup>	CS	n = 2,000; SP/SP, RJ/RJ, BH/MG Porto Alegre/RS	To introduce a type of condom in Brazil and to research condom use	M-Straight; Homo M; M-Bi	-	58% reported always or usually using condoms in a study that compared those who identified themselves as homosexuals or bisexuals (85%)	-	2000

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Table 1. Continuation.

Number Reference	Study design/ methodology*	Study range±	Goals	Study population**	Measures used for condom use	Condom use	Associated factors identified	Year of Study realization
8 de Azevedo et al., 2007 <sup>27</sup>	CS	n = 252; Campinas/ SP	To assess sexual behavior, risk for HIV infection, and serum prevalence of HIV	DU-crack	Condom use (always, occasionally, or never)	Injecting cocaine users: 25% always, 75% occasionally, and 0% never; crack users: 13% always, 61% sometimes, and 25% never	-	2006
9 Doreto et al., 2007 <sup>29</sup>	CS	n = 90; Ribeirão Preto/SP	To analyze the knowledge of teens about STDs and transmission, condom use, and health care	Teens F-	Condom use (always, sometimes, or never)	35.2% of the sample reported always using condoms; 25.9% reported never using it, and 38.9% reported using it sometimes	Drop in condom use by comparing the first versus the most recent sexual intercourse (71.1% to 37.1%)	2005
10 Driemeier et al., 2012 <sup>30</sup>	CS	n = 329; Campo Grande/ MS	To assess vulnerability to AIDS among individuals who attend community centers for seniors	Id	Condom use in the last year; condom use with a partner with multiple partners	14% of the sample reported using condoms	-	2009
11 Fernandes et al., 2000 <sup>31</sup>	CS	n = 249; Campinas/ SP	To assess knowledge, attitudes, and practices of women for the prevention of STDs in primary health care	F	Frequency of condom use	10% reported condom use and 7.6% consistent use	-	1996-7
12 Ferreira et al., 2006 <sup>32</sup>	CS	n = 709; Six Brazilian cities	To describe the profile of MSM-DUs and compare with other male DUs	MSM-DU	Condom use in the previous 6 months (always/ sometimes/ never); unspecified sexual practice	36.4% reported always using condoms	34.9% of MSM-DU reported always using condoms versus 25.2% of DU (OR = 1.6; 95%CI 1.0 – 2.6; p = 0.075)	2000-1

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Table 1. Continuation.

Number Reference	Study design/ methodology*	Study range±	Goals	Study population**	Measures used for condom use	Condom use	Associated factors identified	Year of Study realization
13 Fialho et al., 2008 <sup>33</sup>	CS	n = 300; SALT/BA	To assess the prevalence of STDs and blood-borne infections among adolescents deprived of freedom	Teens-Depr.Fred	Condom use (always, sometimes, and never)	27% never used	Those who reported using condoms were significantly less likely to report a previous STD (OR = 0.06, 95%CI 0.01 – 0.61; p < 0.01)	2004-5
14 Filipe et al., 2005 <sup>34</sup>	CS	n = 250; SP/SP	To describe the risk perception and behavior of HIV-+ve men who had sex with women before knowing they had HIV	M-HIV +	Consistent condom use	Condom with women before diagnosis: 22.6% among heterosexual men; 34.7% among bisexual men	Consistent use reported by 23% of heterosexuals and 35% of bisexual men (p < 0.05)	2001-2002
15 Greco et al., 2007 <sup>35</sup>	CS	n = 1,025; BH/MG	To describe bisexual men's behavior and sexual identity, condom use, frequency of sexual intercourse, and types of partners and to determine inconsistent condom use rates according to the partner's sex	M-Bi	Inconsistent rate of condom use during active and receptive anal sex	35% of inconsistent condom use for active anal sex with a fixed male partner; around 60% reported condom use with stable partner; between 68 and 86% reported condom use with casual partners; 55% of inconsistent condom use in receptive anal sex with fixed male partner	Active anal sex associated with lower rates of inconsistent condom use	1994-2005
16 Harrison et al., 1999 <sup>36</sup>	CHS	n = 753 followed up for 1.5 years; RJ/RJ	To evaluate the incidence of HIV in a cohort of adult MSM	MSM	Rate of use in receptive anal sex	59.6% and 43.6% among serum positive and serum negative, respectively, who practiced unprotected receptive anal sex	-	1995-7

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Table 1. Continuation.

Number Reference	Study design/ methodology*	Study range±	Goals	Study population**	Measures used for condom use	Condom use	Associated factors identified	Year of Study realization
17 Juarez & Le Grand, 2005 <sup>38</sup>	CS	-; Recife/PE	To study condom use among boys at first intercourse	M-Teens living in slums	Age at first intercourse and factors associated with not using condoms	-	Highest SSE was positively associated with condom use among male adolescents	-
18 Kerr et al., 2012 <sup>9</sup>	CS	n = 3,859; 10 Brazilian cities	Conducting national survey of behavioral surveillance of HIV among adult MSM in Brazil	MSM	Unspecified type of sexual practice. Condom use with all partners, condom use with casual or commercial partners in the previous 6 months; and condom use at the last sexual intercourse with a man or woman	Proportion of protected sex with all partners ranged from 30.1% in Manaus to 55.3% in Santos; Proportion of protected sex between casual partners ranged from 50.0% in Curitiba to 77.7% in Campo Grande	-	2009
19 Lazzarotto et al., 2008 <sup>37</sup>	CS	n = 510; Vale dos Sinos/RS	To evaluate the knowledge about HIV/AIDS in community groups	Elderly	Knowledge about condoms and condom use	86.3% did not use condoms, but it is unclear if this was because of sexual inactivity	-	2005
20 Martins et al., 2006 <sup>38</sup>	CS	n = 1,594; SP/SP	To compare knowledge about STD/AIDS and to identify factors associated with adequate knowledge and consistent use of male condoms in teenagers from public and private schools	Teens	Condom use (always, most often, occasionally, and never)	Consistent condom use was 60% in private schools and 57.1% in public schools	Consistent condom use associated with male gender and lower socioeconomic status; consistent use was higher in private schools (p < 0.05)	-

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Table 1. Continuation.

Number Reference	Study design/ methodology*	Study range±	Goals	Study population **	Measures used for condom use	Condom use	Associated factors identified	Year of Study realization
21 Miranda et al., 2004 <sup>39</sup>	CS	n = 122; Cariacica/ ES	To identify the sociodemographic and health conditions of inmates in a women prison	F-Depr. Fred	Frequency of condom use in life	Women: reported never or rarely having used condoms, either as contraception or for STD prevention, 78.5% of women	-	1997
22 Nicolau et al., 2012 <sup>40</sup>	CS	n = 155; Fortaleza/ EC	To evaluate the knowledge, attitude, and practice of female prisoners as to the use of male and female condoms	F-Depr. Fred	Percentage of knowledge, attitude, and practices in condom use	Women: 18.7 and 1.3% reported using male and female condoms, respectively, in all sexual relations	-	2010
23 Nunes et al., 2007 <sup>41</sup>	CS	n = 125; SAL/BA	To investigate sociodemographic and behavioral characteristics and infection rates among crack users in poor communities	F-DU	Condom use in the previous 30 days	58% DU did not use condoms in the last 30 days preceding the interview and 52% reported not keeping condoms at home in the same period	-	2001-2
24 Paiva et al., 2008 <sup>42</sup>	CS	n = 670; SP/SP	To analyze age and condom use at first intercourse among Brazilian adolescents at two periods: 1998 and 2005	Teens	Condom use at first intercourse	Condom use at first sex with stable partners in 1998: 48.5% in 2005: 67.7%; condom use at first intercourse with casual partners in 1998: 47.2% and 2005: 62.6%	Gender, skin color, and schooling	1998, 2005

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Table 1. Continuation.

Number Reference	Study design/ methodology*	Study range±	Goals	Study population**	Measures used for condom use	Condom use	Associated factors identified	Year of Study realization
25 Paiva et al., 2011 <sup>43</sup>	CS and FG	n = 250; SP/SP	To investigate the disclosure of positive HIV status to sexual partners among men hetero and bisexual attended in centers for the treatment of HIV/AIDS	M-HIV +	Use of condoms (always, often, sometimes, or never) and anal and vaginal sex rates	Straight and bisexual: 83.1% reported always using condoms with partners in vaginal sex, 42% reported always using condoms with partners in anal sex. For all partners, 42.2% reported always using in anal sex; 3.1% sometimes, 9.4% never, and 45.3% reported no anal intercourse; in vaginal sex: 83.1% always, 9.7% sometimes, 7.1% never. Among the ones who did not show their HIV status for the partner, 1.9% and 7.7% never used condoms in anal and vaginal sex, respectively, compared with 12.3% and 7.0% of those who revealed their HIV status	Unprotected sex with HIV-positive partners more often. 83.1% reported always using condoms with their main partner for vaginal sex and 42% for anal sex	
26, 27 Pascom et al., 2010, 2011 <sup>18,19</sup>	CS	n = 8,000; Brazil	To present results of a national study on knowledge, attitudes and practices (PCAP-2008)	GP (16 – 64a)	Use at first intercourse for young people aged 15–24 years; the last relationship (any kind of partnership and casual partner); regular use (use in all relations in the previous 12 months)	Almost 61% of the sexually active Brazilian population aged 15 to 24 years reported having used a condom at first intercourse. 59% at the last sex with casual partners; one-fourth of them reported regular use regardless of the partner, being 19.4% with fixed partners and 45.7% with casual partners	59% reported condom use at the last sex with casual partners	2008

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Table 1. Continuation.

Number Reference	Study design/ methodology*	Study range±	Goals	Study population**	Measures used for condom use	Condom use	Associated factors identified	Year of Study realization
28 Peres et al., 2002 <sup>44</sup>	CS	n = 275; SP/SP	To investigate knowledge, attitudes, and practices related to AIDS among adolescent male prisoners and to develop an AIDS prevention intervention	Teens–Depr.Fred	Consistency of use; condom use in life; and use at the last intercourse before prison	Male adolescents: 9% consistent use; 35% used at the last sex before prison	Predictors of condom use included have a condom and the statement “I would use condoms with my girlfriend”	1998
29 Pinto et al., 2005 <sup>45</sup>	CS	n = 145; SP/SP	To analyze the epidemiology of STDs among women who have sex with women in São Paulo	WSW	Condom use in the last 3 months	Among women who have sex with women: 54.5% used condoms when sharing sex toys	–	2002-3
30 Rocha et al., 2007 <sup>46</sup>	CS	n = 960; Pelotas/RS	To evaluate the prevalence of contraceptive use among adolescents	Teens	Use of contraception, including condoms	88% reported using no contraceptive. Male condom method was the most used (63.2%)	Low education of adolescents associated with increased risk of nonuse; more frequent use of condoms among boys whose mothers had 9 or more years of schooling, and those reporting sexual partners in the last year	2002

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Table 1. Continuation.

Number Reference	Study design/ methodology*	Study range±	Goals	Study population**	Measures used for condom use	Condom use	Associated factors identified	Year of Study realization
31 Rocha et al., 2013 <sup>21</sup>	CS	n = 3,449; 10 Brazilian cities	To investigate factors associated with unprotected sex among MSM	MSM	Factors associated with unprotected sex	47% of unprotected anal sex story	Association between unprotected receptive anal sex in the 6 months before the study; living with a male partner; using illicit drugs; having stable partners or having stable and casual trading partners; sex only with male partners; reporting that no or few friends encouraged condom use; homosexual/gay/MSM identity; and being considered at high or moderate risk for HIV infection	2009-10
32 Silva et al., 2002 <sup>47</sup>	IS	n = 25; Campinas/ SP	To develop a STD/AIDS prevention program among professional soccer players	Teens	Consistent condom use with casual partners compared with fixed partners	73% of young athletes consistently used condoms with casual partners	-	1998/1999
33,34 Szwarcwald et al., 2005, 2007 <sup>8,20</sup>	CS	1997-2002: n = 30,970; 2007: n = 35,432; Brazil	To assess sexual behavior of young Brazilian boys aged 17 - 20 years	Conscripts; (17 - 20 years)	Using condoms during sexual intercourse	-	Decreased regular use of condoms in relations with fixed and casual partners compared with the study of 1999 - 2002	1997-2002 E 2007

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Table 1. Continuation.

Number Reference	Study design/ methodology*	Study range±	Goals	Study population**	Measures used for condom use	Condom use	Associated factors identified	Year of Study realization
35 Taquette et al., 2005 <sup>49</sup>	CS	n = 251; RJ/RJ	To evaluate social and behavioral characteristics in adolescents with sexually transmitted diseases compared with those who have sexually transmitted diseases and to identify risk factors related to STD	Teens F-	Use of condoms (always, often, sometimes, or never)	80.3% of girls with STDs reported not using condoms during sexual intercourse compared with 59% of those without STD	Those who reported not using condoms were more likely to report having an STD (p < 0.05)	2001-3
36 Trevisol et al., 2005 <sup>50</sup>	CS	n = 90; Imituba/ SC	To examine the prevalence of HIV and potential risk factors among sex workers	F-SW	Use of condoms (always, often, sometimes, or never)	Always: 16.7%; sometimes: 77.8%; never: 5.6%	Not using condoms correlated with HIV infection	2003-4
37 Tun et al., 2008 <sup>51</sup>	CS	n = 658; Campinas/ SP	To compare population estimates of risky sexual behavior and HIV prevalence among male sex workers who have sex with men and nonsex workers	MSM; M-SW	Condom use in active and receptive anal intercourse and vaginal sex	5.0% reported condom use with active anal sex; with receptive anal intercourse, 4.6% reported using a condom, 30% among those who reported unprotected anal sex with at least one partner in the last 2 months (CI: 26 – 35%); 7% among those who reported unprotected anal sex with ≥ 2 partners in the last 2 months (CI: 4 – 10%); 20.5% of condom use in active anal sex; in receptive anal sex: 22.4%; and vaginal sex: 22.7%	Male sex workers were more likely to practice receptive anal sex and unprotected active anal sex with ≥ 2 male partners and have unprotected vaginal sex with women	2005-6

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Table 1. Continuation.

Number Reference	Study design/ methodology*	Study range±	Goals	Study population**	Measures used for condom use	Condom use	Associated factors identified	Year of Study realization
38 Viana et al., 2007 <sup>52</sup>	CS	n = 600; BH/MG	To assess the factors associated with safe sex among sexually active public school students	Teens	Consistent condom use with casual and fixed partner	51–54% reported always using condoms with regular or fixed partners; 57–61% reported always using condoms with casual partners	Being a male, attended by health professionals in school activities, and mother's education > 8 years was positively associated with consistent condom use with casual or fixed partner. Secondary education (versus fundamental) and older age were inversely associated with consistent condom use with casual and fixed partners, respectively	2000
39 Villarinho et al., 2002 <sup>53</sup>	CS and equalizer	n = 279; Santos/ SP	To describe the vulnerability of sexual transmission of HIV/ AIDS among truck drivers	M-Straight truck	Consistency of condom use by sex and type of partner: fixed, frequent, or casual	Condom use reported with key partners (6.0%) (regardless of the type of intercourse). With regular partners: 56.6% in vaginal sex, 45.0% in anal sex and 6.4% in oral sex; with casual partners: 67% in vaginal sex, 54% in anal sex and 46% in oral sex	–	1998
Intervention assessment								
40 Diaz et al., 2005 <sup>28</sup>	CS	n = 763; RJ/RJ; n = 819; BH/MG; n = 714, SAL/BA	To compare opinions and sexual practices among students in schools with and without sex education programs	Teens	Current condom use	Between 41.0% and 57.0% of sexually active adolescents reported condom use	Education on sexual physiology, contraception, sexuality, and gender roles. Adjusted OR of condom use among sex education groups compared with controls: RJ: OR = 1.07; 95%CI 0.64 – 1.77; BH: OR = 0.83; 95%CI 0.51 – 1.36; SSA: OR = 1.08; 95%CI 0.51 – 2.28	1997

CS: cross-sectional study; CHS: cohort study; IS: intervention study; FG: focus groups; equalizer: this qualitative study; SP: São Paulo; RJ: Rio de Janeiro; BH: Belo Horizonte; POA: Porto Alegre; SAL: Salvador; GP: general population; DU: drug users; SW: sex workers; H: men; M: women; Hetero: heterosexual; Homo: homosexuals; Bi: bisexual; MSM: men who have sex with men; WSW: women who have sex with women; Depr.Fred: deprived of freedom; HIV +: HIV-positive; Truck: truck drivers.

Table 2. Factors associated with condom use by different population groups.

Fatores	General Population	MSM	Sex workers	Drug users	Teens	Women	Indians	Seniors	Conscripts
Associated with increased condom use									
Male					X		X		
Younger ages	X				X	X			
Higher education						X			
Multiple partners in the recent past		X			X	X	X		
Single	X					X			
With casual partners (vs. fixed or regular partners)					X				
Mother's education > 8 years					X				
Having or buying condoms			X		X				
Already took condoms for free	X								
Associated with decreased condom use									
Married or in a stable relationship	X				X				
Initiation of sexual activity before 14 years					X				X
Not informed about HIV/AIDS		X							
Negative attitudes toward condom		X							
Not knowing someone with AIDS and not engaging in gay NGOs		X							
Being MSM									X
Contradictory results									
Years of schooling					X				
Religion					X				
Socioeconomic status					X				
Other factors relevant to the groups, but no quantification of the effect on condom use									
Incorrect beliefs about the use of condoms and STDs				X				X	
Condom use as contraceptive						X			
Gender relations					X	X			
Situations of violence			X						

X: indicates association with the specific category; MSM: men who have sex with men.



Table 3. Effect of two interventions to promote condom use.

Type	Population	Effect size	Reference
Availability of condoms	MSM	Sexo anal desprotegido diminuiu 18% ( $p < 0,001$ )	Sampaio et al., 2002 <sup>57</sup>
Sex education program in schools in and out of classrooms	Teens	Condom use with casual partners has doubled; use of other contraceptive methods in the last sexual intercourse increased by 68% ( $p = 0.033$ )	Andrade et al., 2009 <sup>59</sup>
		Contraceptive use in the intervention vs. control group (OR): <ul style="list-style-type: none"> <li>• The first sexual relationship: 3.2% higher comparing men: 1.06 (CI 0.75 – 1.49); and women: 0.79 (CI 0.51 – 1.24)</li> <li>• In the most recent sexual intercourse: 2.7% higher, comparing men: 1.03 (CI 0.62 – 1.73); 1.14 and women (CI 0.59 – 2.18)</li> <li>• Condom use at the last sexual intercourse: OR among men: 1.00 (0.60 – 1.66); among women: 0.95 (0.56 – 1.59)</li> </ul>	Magnani et al., 2001 <sup>60</sup>
		Consistent use (always) of condom with casual or fixed partners at least 3% higher among those who received sex education, but it was not statistically significant	Viana et al., 2007 <sup>53</sup>
Workshops on the female condom, STD/HIV	Women	Condom use at the last sexual intercourse (male or female condom) increased by 4% ( $p < 0.000$ )	Barbosa et al., 2007 <sup>61</sup>
Sex education by peers	Sex workers	Condom use in the previous week increased by 36% ( $p < 0.001$ )	Benzaken et al., 2007 <sup>62</sup>
		Condom use with all clients in the last four months increased by 1.4% ( $p = 0.287$ ) Condom use with all partners (customers or not) last week decreased by 1.6% ( $p = 0.808$ )	Kerrigan et al., 2008 <sup>63</sup>
Structured discussion on condom use	MSM	Unprotected anal intercourse decreased ( $p = 0.029$ )	Colosio et al., 2007 <sup>64</sup>

MSM: men who have sex with men.

Table 4. Effect of one intervention to promote condom use.

Type	Population	Effect size	Reference
<p>Group conversations about sex work, discrimination, human rights, and STD/HIV in a social living space;</p> <p>Workshops on sex education carried out by peers at the time of study and visits at 3, 6, 9, and 12 months of follow-up</p>	Sex workers (women, (men and transvestites)	<p>Incidence of unprotected sex in the last week comparing the effect of interventions between:</p> <ul style="list-style-type: none"> <li>• Women: 1.10 (0.90; 1.30);</li> <li>• Men: 0.15 (0.03; 0.68);</li> <li>• Transsexuals: 0.40 (0.05; 2.90)</li> </ul>	Lippman et al., 2010 <sup>55</sup>
<p>Sex education by peers</p> <p>Talking about condom use</p>	Teens	<p>Odds ratio adjusted for sex education:</p> <ul style="list-style-type: none"> <li>• Rio: 1.07 (CI 0.64 – 1.77);</li> <li>• Belo Horizonte: 0.83 (CI 0.51 – 1.36);</li> <li>• Salvador: 1.08 (CI 0.51 – 2.28)</li> </ul>	Diaz et al., 2005 <sup>29</sup>
<p>Sex education by peers</p> <p>Structured discussion (workshops) about condom use and safe sex</p>	Young adults (18–25 years)	Effect of workshops on safe sex was statistically significant for girls; after the intervention, lower frequency of unprotected sex with casual partners, with partners that they thought that were not monogamous and anal sex with regular partners ( $p \leq 0.05$ )	Antunes et al., 2002 <sup>56</sup>
	MSM	Unprotected anal sex decreased by 18% ( $p < 0.001$ )	Sampaio et al., 2002 <sup>57</sup>
	DU	29% increase in condom use with vaginal sex ( $p = 0.02$ )	Pechansky et al., 2007 <sup>58</sup>

MSM: men who have sex with men; DU: drug users.

2. Studies on factors associated with condom use among population groups in which the epidemics is concentrated in Brazil, such as MSM, DU, and TT, date back to 2009.
3. There is a concentration of studies among adolescents.
4. Effective interventions to encourage the use of condoms indicated that, combination of interventions was more effective than the concentration in a specific practice; there is a need, however, for further studies to understand and produce evidence on how to effectively handle these interventions to increase the use and adherence to condom (Tables 3 and 4).
5. National surveys investigating the general population (CEBRAP and PCAP) were carried out in 1998, 2004, 2005, and 2008; conscripts surveys took place from 1997 – 2000, 2002, and the last one in 2007. Studies on specific populations (MSM, SW, and DU) were a survey for each population between 2008 and 2009. In the last 4 years, there were virtually no studies on the use of condoms promoted and/or financed by DDAHV.

## WHAT IS KNOWN ABOUT THE USE OF CONDOMS AND ASSOCIATED FACTORS?

Condom use rates differ substantially between the national surveys. Those conducted by CEBRAP indicated: an increase of 19.1% (1998) to 33.1% (2005) in the proportion of the use in sex encounters with steady partners in the 12 months preceding the interview; lower condom use rate among individuals with higher education in contrast to the use rate among those with secondary education; association between sexual debut of those aged between 15 and 16 years and decreased use of condoms, especially among those who initiated sex before 14 years of age; and increased use of condoms in sexual debut among those aged 16 – 19 years, comparing with the data collected in 1998 and 2005<sup>17</sup>.

Data from PCAP showed a downward trend in condom use at the last sexual intercourse in the 12 months before the survey comparing the years of the study (38.4% versus 36.8%), despite the fact that knowledge about the use of condoms has remained high in 2004 and 2008; higher proportions of use among young people; and an increased use among them at first intercourse, when comparing the different versions of PCAP (53.2% versus 60.9%)<sup>14</sup>.

These studies highlight a diverse set of factors associated with the use of condoms among different groups. With regard to the general population, data from PCAP indicated associations between regular condom use (in all sexual relations in the 12 months before the survey) and: being a man; aged 15 – 24 years; having received condoms for free; and not living with a partner<sup>14,18,19</sup>. Importantly, studies show a greater difficulty in keeping condom use in the context of relationships considered stable by the parties involved<sup>23,65,66</sup>.

There is controversy, however, regarding the associations between condom use and socioeconomic status (SES). While Martins et al.<sup>40</sup> found an association between condom

use with lower SES, Juarez et al.<sup>38</sup> indicated that higher SES was positively associated with condom use among male adolescents. With regard to religion, Berquó et al.<sup>17</sup> found greater adherence to condom use among Brazilians who reported no religion, while Viana et al.<sup>53</sup> reported greater adherence, although not significantly higher, among Catholic students compared with students who identified themselves as evangelicals or linked to other or no religion (Table 2).

When considering the groups in which the epidemics is concentrated, MSM use condoms more often when compared with heterosexuals<sup>14</sup>. Recently, monitoring and surveillance studies in key populations, with sampling technique directed by the participant [the respondent-driven sampling (RDS)], were used to obtain more detailed information about HIV / AIDS among MSM, with 47% of them reporting unprotected anal sex, and associations between unprotected receptive anal sex in the 6 months before the study and: living with a male partner; using illicit drugs; having stable partners or having stable and casual trading partners; having sex only with male partners; no or few friends encouraging condom use; homosexual / gay / MSM identity; and being considered at high or moderate risk for HIV infection<sup>21</sup>.

In the report of FSW study with RDS, the proportion of regular use (in all sexual relations) of condoms with steady partners in the practice of vaginal and anal sex was 21.4% and 29.4%, respectively. The use with clients in during vaginal and anal sex was 69.7% and 64%, respectively<sup>22</sup>.

Studies about SW are concentrated in women, and few identify factors associated with condom use. Most of them describe the proportion of use in different situations or refer to not using condoms as a risk factor for HIV infection. The RDS study indicated nonuse of condoms when negotiating with clients as an important risk factor for HIV<sup>25,26,51</sup>.

With respect to drug users, about 40% of them reported never using condoms, with an increase to 60% when under influence of psychoactive substances<sup>11</sup>. But, there are no recent publications on injecting drug users (IDUs) — at least indexed studies. The most recent survey funded by the National Secretariat of Policies for Drugs (SENAD) of the Ministry of Justice among crack and/or similar drug users in 26 Brazilian capitals and the Federal District was conducted between 2011 and 2013. In this study, more than one-third (39.5%) of crack/similar drug users in Brazil reported not having used a condom in vaginal intercourses in the previous month before the interview<sup>12</sup>.

Finally, considering the studies conducted with adolescents, there is an increase in the rate of condom use when comparing 1998 with 2005<sup>44</sup> and more frequent reports of condom use during sex intercourse with casual partners (80%) when compared with steady partners (40%)<sup>23</sup>. The most recent article on young conscripts of the Brazilian Army in 2007 indicated regular condom use with steady and casual partners around 40% and 50% in 1999, 2000, 2002, and 2007, respectively. Some concerns have arisen owing to the decrease in regular use of condoms in sexual relations with steady and casual partners between 2002 (48.5%) and 2007 (43.1%), especially among those with

lower educational levels; the increase in the composite risk behavior (average number of partners in the previous year, weighted by the proportion of nonuse of condoms in accordance with the type of relationships participants maintain); and the lower proportion of condom use among young MSM<sup>8</sup>.

## KEY FINDINGS FROM INTERVENTION STUDIES: WHAT WORKS TO PROMOTE CONDOM USE?

We identified proposals of intervention that have been proven effective to encourage condom use (Tables 3 and 4)<sup>29,53,55-58,60-64</sup>. These include a combination of interventions to improve the adherence to condoms and to support groups to discuss their use and negotiation. A combination of interventions was more effective than focusing on a specific practice (Table 3). Participating in support groups that discuss strategies to promote the use of condom and mobilize the negotiation has been signaled as an important factor to increase the acceptability and confidence of women in bringing condom into their relationships. However, there is little evidence of how effective these interventions are to increase the adherence to condom.

## DISCUSSION

Before presenting the main considerations on the literature reviewed, we emphasize that our intention was not to exhaust the production of knowledge about condom use in Brazil. There are also limitations, such as the time frame in the selection of articles, the selection criteria chosen, and the limited number of intervention studies found.

Examination of articles identified here allows highlighting three key points about the use of condoms as part of HIV/AIDS prevention policy for the reflection about and the improvement of HIV prevention in Brazil:

1. Whatever be the prevention model of STD/HIV/AIDS that Brazil adopts in the near future, a greater regularity in national studies to evaluate prevention indicators including the use of condoms is necessary. Moreover, a joint effort between the government, the academy, and civil society to ensure the regularity needed in the development of these studies, aiming at the establishment of a monitoring policy for these indicators, and the standardization of measures adopted in studies to ensure comparability are also required. As pointed out earlier, in a systematic review of studies that have estimated the prevalence of HIV in FSW, DU, and MSM in Brazil, commissioned by the former PN in 2008<sup>67,68</sup>, the nonstandardization of male condom use indicators among different studies made it difficult to effectively compare them. In addition, in these documents and according to the UNAIDS report's recommendations on the UNGASS indicators<sup>69</sup>, it is recommended that "further studies and, especially, national

behavioral surveillance surveys among FSW, MSM and IDUs incorporate at least UNGASS indicators of use of male condoms in order to enable consistent monitoring of risky sexual behaviors in these populations and the effectiveness of prevention when adopting safer behaviors.”

2. In the same effort, it must be ensured that, from all studies conducted within the HIV/AIDS prevention policy in Brazil, analyzes are carried out and published addressing factors associated with the use of condoms both in the general population and among the groups in which the epidemics is concentrated in Brazil.
3. The prevention policy based on the promotion of use of condoms should be based on a combination of interventions, including participation in support groups to discuss strategies to promote use and mobilize negotiation. However, the development of studies contributing to understand and produce evidence on how to effectively operate these interventions to increase the use and adherence to condom is very important. We set forth below some additional points for consideration of new perspectives in the national policy of HIV prevention and promotion of condom use.

Other points to think about the future of HIV/AIDS prevention in Brazil should take into account that the data showing reduction or eventual stabilization in the use of condoms bring a variety of issues to the national prevention policy. Would it be possible to obtain a higher proportion of male condom use? The literature and the international media have been mentioning, since the late 1990s, the so-called “condom fatigue” or “prevention fatigue”<sup>70-72</sup> and the lack of contact of the youngest with AIDS, the reduction of intervention programs, and changes in the way of finding partners (online networks) as explanatory causes of the increase of AIDS cases in cities and countries where the epidemics had previously declined or stabilized.

The emergence of new biotechnologies for prevention (circumcision, microbicides, PEP, and PrEP), in addition to behavioral strategies (such as sero-positioning, sero-adaptation, and other forms of agreement between sexual partners) calls into question whether the condom will be, for all and in all cases, the most appropriate method of prevention. Also important is the measurement of consistent or regular condom use, characterized by the use with all types of partners, fixed, casual, or occasional, in all sexual relations over the last 3, 6, and 12 months, which has been used in surveillance behavioral studies and is shown as the most appropriate method to refer to safe or appropriate prevention practices. However, people could report not using a condom in a particular sexual relationship, and not being exposed to the virus, once other methods of prevention have been adopted. There is a need for further studies to seek new ways to measure the adoption of a combination of prevention strategies, including condom use and assessment of how appropriate this method is.

The combination strategies of condom use motivation, that articulates reflections and the possibility of appropriation, by the subjects, of social conditions of prevention methods appears to be more effective. Thus, new approaches to recognize such social constraints associated with a measure of prevention that focuses on sexual practices should bring the issue of sex and pleasure to the scope of adherence to condoms, in the context of affective heterosexual or homosexual relationships, where the values assigned to trust, faithfulness, and love contrast with the risk of a disease being prevented, or in the context of heterosexual relationships in which there are expectations for reproduction, as highlighted in the study by Villela and Barbosa<sup>73</sup> and by Everett et al.<sup>74</sup>; or in the context of homosexual relationships, in which attention is given to the contact with the partner's sperm and fluids, as sign of acceptance and intimacy, as highlighted in the article by Terto Jr<sup>75</sup>. It is mandatory to recognize various affective-normative explanations that imply barriers to the adoption of condoms as a regular method of prevention.

Regarding the difficulty in maintaining the use of condoms in the context of relationships considered stable by partners involved, some prevention strategies recently adopted, biomedical or behavioral, aim to overcome such challenge. That is the case with "treatment as prevention"<sup>76</sup>, in which serodiscordant couples abandon condom use with a view to the protection conferred by antiretroviral treatment or even of sero-adaptation strategies<sup>77</sup> that have been adopted by the international gay communities as an alternative to reduce the risk of infection. It all leads us to believe that one should consider the limitations of expanding the proportion of people who use condoms regularly. For some people and some relationship contexts, it is possible that other prevention strategies prove more appropriate and, thus, more effective.

## ACKNOWLEDGEMENTS

The authors thank the Department of Preventive Medicine, Medical School of Universidade de São Paulo (FMUSP) (Alexandre Grangeiro), Institute for Health of The State of São Paulo (SES/SP) (Project CTA Mais) and the National Department of STD, AIDS and Viral Hepatitis of the Ministry of Health, along with the Center for Training in STD and AIDS of SES/SP, Medical School of Santa Casa de São Paulo and Fiocruz-Brasília (Dulce Ferraz). Sarah MacCarthy participated in this study supported by the Project "HIV and Other Infectious Consequences of Substance Abuse" (T32DA13911-12), by Lifespan/Tufts/Brown Center for AIDS Research (P30AI042853) and National Institute for Allergy and Infectious Diseases (NIAID/EUA).

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Received on: 01/30/2014

Final version presented on: 01/07/2015

Accepted on: 01/27/2015