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REVIEW

Unsafe abortion in Brazil: a systematic review of the scientific production, 2008-2018

Aborto inseguro no Brasil: revisão sistemática da produção científica, 2008-2018

Aborto inseguro en Brasil: revisión sistemática de la producción científica, 2008-2018

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Abstract

This study sought to update knowledge on unsafe abortion in Brazil. We carried out a systematic review with study search and selection on MEDLINE and LILACS, with no language restriction, from 2008 to 2018. We evaluated article quality using the Joanna Briggs Institute instruments. We evaluated 50 articles. The prevalence of induced abortion in Brazil was estimated by a direct method to be 15% in 2010 and 13% in 2016. Higher prevalences were observed in more socially vulnerable populations. There was a decrease in the ratio of induced abortions by 1,000 women of reproductive age in the period 1995-2013, reaching 16 per 1,000 in 2013. Half of all women reported using medications for terminating pregnancies and the number of hospital admissions due to complications from abortion, especially severe complications, decreased from 1992 to 2009. Maternal morbimortality from abortion had a reduced frequency but reached high values in specific contexts. It is likely that maternal deaths from abortion are under-reported. Common mental disorders during pregnancy and postpartum depression were more frequent among women who unsuccessfully attempted to induce an abortion. Findings indicate that abortion is frequently used in Brazil, especially in less-developed regions and by more socially-vulnerable women. Access to safer methods probably contributed to the reduction in hospitalizations due to complications and to the reduction in morbimortality from abortion. However, half of all women still resort to other methods and the number of admissions due to complications from abortion is still high.

Induced Abortion; Systematic Review; Health Surveys

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Introduction

Abortions may be classified as safe, less safe or unsafe, depending on the method used to induce them and the professionals responsible for providing them [1]. Between 2010 and 2014, it is estimated that, globally, 35 unsafe abortions occurred per 1,000 women aged between 15 and 44 years [2] each year. According to another estimate, there were approximately 7 million hospital admissions due to complications from abortions in developing countries in 2012 [3]. With regard to the 1990-1994 period, there was an expressive, though unequal, decrease in unsafe abortions rates. There was a significant decrease from 46 to 27/1,000 in developed countries and a non-significant reduction of 39 to 37/1,000 in developing countries [2]. Latin America stands out as one of the regions with the highest frequency of unsafe abortions (44/1,000), despite restrictive legislation in most of its countries, with the exception of Uruguay, Colombia and Cuba. In Brazil, abortion is legally allowed in cases of risk to the woman's life, pregnancy resulting from rape and, since 2012, cases of fetal anencephaly.

In literature reviews of the subject in Brazil, in 2009 [4,5], findings already showed a reduction of abortions between 1991 and 1996, with stabilization until 2005. In 2005, based on hospitalizations recorded in the Brazilian Unified National Health System's Hospital Information System (SIH/SUS, in Portuguese), it was estimated that around 1 million abortions took place every year in the country, corresponding to a rate of 20.7/1,000 women of reproductive age. Women turned to abortion regardless of socioeconomic position, race/color, age and religion, but unsafe practices were more common among young women with low educational levels, without a partner, who were students or domestic workers [5]. Abortion was the cause of 11.4% of maternal deaths in the only available study, from 2002, conducted in state capitals and the Federal District [6]. Regional inequalities were found and black women from the less privileged classes who lived in the peripheries were the most affected [5]. Knowledge gaps identified at the time led to the recommendation of population studies, comparing different regions of the country, rural and urban areas, as well as the investigation of social determinants.

Though not all illegal abortions are unsafe, since they can be performed with adequate methods and by qualified professionals [7], the illegality and clandestine nature of these abortions increases the health risks associated with the procedure. For this reason, we will use the term unsafe abortion to designate abortions not permitted by law. This study seeks to carry out a systematic review of estimates, characteristics of the women associated with unsafe abortions and complications from this practice in Brazil.

Methods

This is a systematic review on legal abortion and unsafe abortion in Brazil. All review stages were independently carried out by two researchers (R. M. S. M. D. and S. C. F.) following the recommendations from the *Preferred Reporting Items for Systematic Reviews and Meta-Analyses* (PRISMA) [8] in their reporting. Results regarding legal abortions are presented in another article.

Eligibility criteria

We included original scientific articles published between 2008 and 2018 on legal abortion and unsafe abortion, which employed a quantitative methodology, with no restrictions regarding study design. The period was chosen based on the last published review of the subject, which included studies published up to December 2007. For unsafe abortions, we considered as eligible works that investigated estimates of its occurrence, characteristics of women associated with its occurrence and complications. For legal abortion, we considered as eligible all studies that investigated this subject.

We excluded studies that employed a qualitative methodology, non-systematic reviews, theoretical essays, research protocols, methodological articles, theses and dissertations, as well as studies that assessed diagnostic and therapeutic aspects of abortion.

Bibliographical search strategy

We consulted the electronic databases MEDLINE and LILACS. The keywords, which were used in combination, are described in Box 1. Additionally, we included references cited by the selected publications that met inclusion criteria. The electronic searches, with no language restrictions, were initiated in 10/Oct/2017, concluded in 06/Nov/2017 and later updated on 28/Feb/2019.

Study selection

After manual exclusion of duplicates, we carried out an initial triage based on titles, excluding all those not related to unsafe abortions or legal abortions in Brazil. After reading the abstracts, articles that did not meet eligibility criteria were excluded. Other articles were excluded after being read in full. The entire selection process was carried out independently by two researchers, with the few disagreements being resolved through consensus.

Study quality assessment

Article quality was assessed based on instruments validated in the scientific literature, formulated by the Joanna Briggs Institute [9], which contemplate the different types of studies included in this review. These instruments, while respecting the specificities of each epidemiological design, value inclusion criteria and population sampling, methods for measuring variables and statistical analysis. Different instruments were used to assess the quality of works that estimated prevalence and verified associated factors. Thus, a study that assessed these two aspects of unsafe abortions may have different limitations for each assessed aspect. We did not exclude works based on quality. We present the main limitations along with the results.

Presentation of results

For each included study, we extracted the following data: authors, year of publication and of study, study design, location, studied population, assessed outcome, methodological limitations and main results.

Box 1

Bibliographic search: descriptors and boolean operators.

	Search sintax
MEDLINE	("abortion, induced" [MeSH Terms] OR ("abortion" [All Fields] AND "induced" [All Fields]) OR "induced abortion" [All Fields] OR "abortion" [All Fields]) AND (safe [All Fields] OR unsafe [All Fields] OR legal [All Fields] OR illegal [All Fields] OR ("criminals" [MeSH Terms] OR "criminals" [All Fields] OR "criminal" [All Fields]) OR provoked [All Fields] OR induced [All Fields] OR ("rate" [All Fields]) OR rates [All Fields] OR trend [All Fields] OR ("trends" [Subheading] OR "trends" [All Fields])) AND ("brazil" [MeSH Terms] OR "brazil" [All Fields]) AND ("2008/01/01" [PDAT]: "2018/12/31" [PDAT]).
LILACS	Tw: (aborto AND (brasil OR brazil) AND (seguro OR inseguro OR legal OR ilegal OR pesquisa OR taxas OR tendências OR induzido OR provocado) AND (instance: "regional") AND (db: ("LILACS") AND year_cluster:("2008" OR "2009" OR "2010" OR "2011" OR "2012" OR "2013" OR "2014" OR "2015" OR "2016" OR "2017" OR "2018"))) AND (instance: "regional").
LILACS (according to Brazilian states)	Tw: (aborto AND (NOME DO ESTADO) AND (seguro OR inseguro OR legal OR ilegal OR pesquisa OR taxas OR tendências OR induzido OR provocado) AND (instance: "regional") AND (db: ("LILACS") AND year_cluster: ("2008" OR "2009" OR "2010" OR "2011" OR "2012" OR "2013" OR "2014" OR "2015" OR "2016" OR "2017" OR "2018"))) AND (instance: "regional").

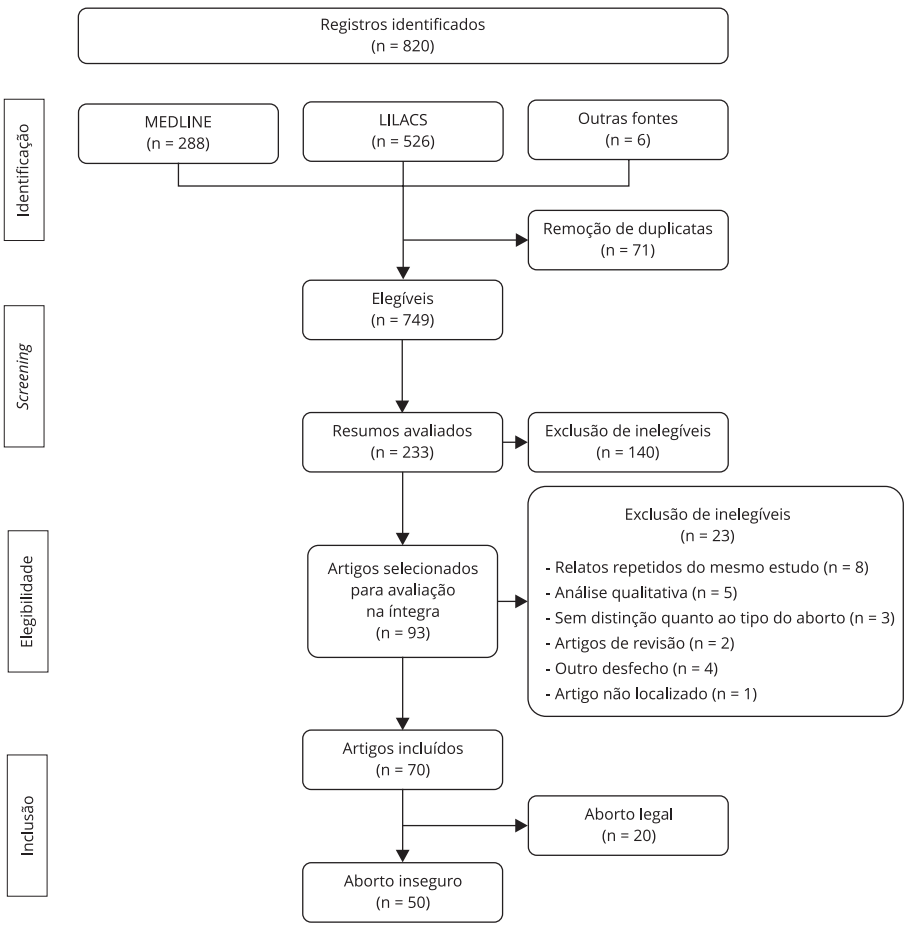
Results

We identified 749 texts and selected 233 abstracts. Of these, 140 were excluded because they were qualitative studies (30%), theoretical essays (22.1%), analyses of other aspects of abortion (18.6%), reviews (10%), other types of publication (editorial, letters, protocols, methodological articles, theses and dissertations – 19.3%). We then read the remaining 90 articles in full (we were unable to read on article on unsafe abortions) and, after applying the eligibility criteria, 50 studies on unsafe abortions were included in this analysis (Figure 1). Articles on legal abortion (n = 20) are discussed in another publication.

The 50 included articles presented results from 48 studies. In the analysis, we categorized the articles according to subject: unsafe abortions occurrence estimates; women's profile and associated factors; complications from unsafe abortions. Some studies discussed more than one subject and were therefore included in more than one Table.

Figure 1

Flowchart of the selection of articles included in the review of unsafe abortion in Brazil.



Prevalence and rates of induced abortion in Brazil

Twenty five articles presented data on abortion estimates (Table 1), eight of which had a national scope: two derived from the *Brazilian National Survey of Demography and Health* (PNDS, in Portuguese), from 1996 and 2006 [10,11]; two from the *Brazilian National Abortion Survey* (PNA, in Portuguese), conducted in 2010 and repeated in 2016 [12,13]; one from the *National Alcohol and Drugs Inquiry* (LENAD, in Portuguese) [14]; two used secondary data from the SIH-SUS [15,16]; and the remaining articles was a survey of maternity hospitals from 24 states [17].

Studies based on the 1996 [10] and 2006 [11] PNDS directly estimated – that is, based on interviews with women – a prevalence of induced abortion of 2.4% [10] and 2.3% [11], respectively. In both, the Northeastern and Northern regions had the highest values (3.1% and 2.3% in 1996; 3.5% and 4.3% in 2006 [11]) while the Southern region had the lowest prevalences (1.7% in 1996 [10]; 0.8% in 2006 [11]). In 1996, Rio de Janeiro stood out, with a prevalence of 6.5%, higher than the other states [10]. Comparing data from 1996 and 2006, we observed an increase in abortion occurrence in the North and a reduction in the South.

Table 1

Estimates of unsafe abortion prevalence/rates in Brazil, 1993-2016.

Reference	Location (year)/ period	Study design/ Base and estimate	Population	Methodological limitations	Results
Population base, national scope, direct estimate					
Cecatti et al. [10]	Brazil (1996).	Household population survey. Direct estimate. 1996 PNDS.	12,612 women aged 15-49 years.	Information on abortion obtain through direct interview, subject to under-reporting; Does not present CI of estimates; 85.5% response rate, with no information provided to evaluate whether refusals were selective.	Unsafe abortions prevalence: 2.4%. Regional inequalities: Northest (3.1%), North (2.3%), South (1.7%) and Central (1.3%). Rio de Janeiro (6.5%). Associated factors: - Age: growing prevalence from 15-19 years (0.5%) to > 40 years (4.5%); - Residence: urban > rural; - Non-religious > religious; - Higher educational level > lower educational level (3.7%).
Camargo et al. [11]	Brazil (2006).	Household population survey. Direct estimate. 2006 PNDS.	15,775 women aged 15-49 years, 4,340 of whom with children born alive in the past 5 years.	Information on abortion obtain through direct interview, subject to under-reporting; Does not present CI of estimates; 11% loss of eligible women in urban regions and 9.4% in rural regions, with no information provided to evaluate whether refusals were selective.	Unsafe abortions prevalence over reproductive life: 2.3% and among women with previous pregnancies: 3.3%; Regional inequalities: North (4.3%), Northeast (3.5%), Southeast (1.8%); Central (1.3%) and South (0.8%); unsafe abortions prevalence: 1.8% among women who had been pregnant in the previous 5 years.

(continues)

Table 1 (continued)

Reference	Location (year)/ period	Study design/ Base and estimate	Population	Methodological limitations	Results
Population base, national scope, direct estimate					
Diniz & Medeiros [12]	Brazil (2010).	Household population survey using ballot box technique. Direct estimate. 2010 PNA.	2,002 literate women residing in urban areas. Age: 18-39 years.	Does not inform all parameters used to calculate sample size (only error margin and estimate precision); does not include the entire reproductive period (only 18-39 years), or illiterate women or women from rural regions; does not inform if the design effect was incorporated into the analysis (cluster sampling); does not inform proportion of losses and refusals.	Induced abortion prevalence: 15%; By age group: smaller among women aged 18-19 years (6%) and increases to 22% in the 35-39 years; Among those who had abortions: peak 20-24 years; Among those with low educational levels: 23% and high educational levels: 14%; No differences according to religion; Half used medication and 55% needed hospitalization.
Diniz et al. [13]	Brazil (2016).	Household population survey using ballot box technique. Direct estimate. 2016 PNA.	2,002 literate women residing in urban areas. Age: 18-39 years.	Does not inform all parameters used to calculate sample size (only error margin and estimate precision); does not include the entire reproductive period (only 18-39 years), or illiterate women or women from rural regions; does not inform if the design effect was incorporated into the analysis (cluster sampling); does not inform proportion of losses and refusals.	Induced abortion prevalence: 13%; By age group: smaller among women aged 18-19 years (9%) and increases to 18% in the 35-39 years; Among those who had abortions: peak 20-24 years; Among those with low educational levels: 22% and high educational levels: 11%; No differences according to religion; According to race/color: black and brown (14 to 15%) and white (9%); Half used medication; 48% needed hospitalization (< than in 2010); Estimate of 503 thousand unsafe abortions in 2015.
Massaro et al. [14]	Brazil (2006 e 2012).	Household population survey. Direct estimate. LENAD 2012.	2,537 women aged ≥ 14 years.	Does not inform parameters used to calculate sample size; unsafe abortions measured by direct interview, subject to under-reporting; Does not describe characteristics of the studied sample; it is not possible to evaluate temporality between alcohol use and unsafe abortions.	Lifetime abortion prevalence – 26.3% (14.5-18.3) in the entire sample; 15% (13.2-17.0) among women with no binge drinking or AUD; 20.4% (15.3-26.7) among women with binge drinking, but without AUD; 24.9% (16.3-36.2) among women with binge drinking and AUD.

(continues)

Table 1 (continued)

Reference	Location (year)/ period	Study design/ Base and estimate	Population	Methodological limitations	Results
Population base, national scope, indirect estimate					
Martins-Melo et al. [15]	Brazil (1996-2012).	Ecological. Temporal and spacial dimension. Hospital study (SUS users). Indirect estimate.	Around 4 million hospitalizations from abortion in SIH/SUS (ICD-10 codes: O-00-O-08).	No limitations identified. One item (response rate) not applicable.	Estimate of 994 thousand unsafe abortions/year; Mean UA/WRA coefficient: 17/1,000. UA/LB ratio: 33/100 live birth; Higher elevated indicators in the Northeast (21/1,000 women of reproductive age and 40/100 live birth); Decline over time at the national level, with regional differences; For UA/WRA: constant decreasing trend in Northeast, Central and Southeast; stability in the South; non-constant growing trend in the North; For the UA/LB ratio: constant growing in the North, Central and S, decreasing in the Southeast and Northeast; For both indicators, differences were also found between states; Spatial distribution, clusters in North, Northeast and Southeast regions.
Monteiro et al. [16]	Brazil (1995-2013).	Time series. Hospital-based study (SUS users). Indirect estimate.	N ≥ 4 million hospitalizations. Age: 15-49 years.	Does not inform ICD-10 codes used for the indirect estimate of abortion cases; does not use statistical tests to assess time variations; One item (response rate) not applicable.	Maximum abortion estimate: 1,086,708 in 1995 and 865,160 in 2013. Minimum estimate: 864,628 and 697,347 in 2013; Global reduction of unsafe abortions/1,000 women of reproductive age: from 27-16. In regions: North (29-21); Northeast (38-18) and Southeast (25-14); stable South; Central unstable reduction. 27% reduction in the number of hospitalizations; greater for those aged 20-29 years (-38%) and 15-19 years (-35%). Reduction in the number of abortions/100 live birth: from 35/100 in 2004 to 30/100 live birth in the Northeast (38-28) and Southeast (25-14). Reduction of unsafe abortions/1,000 women of reproductive age: from 30 to 17 in the age group 15-19 years; from 43 to 22 (20-29 years); from 23 to 17 (30-39 years).

(continues)

Table 1 (continued)

Reference	Location (year)/ period	Study design/ Base and estimate	Population	Methodological limitations	Results
Hospital base, national scope, direct estimate					
Machado et al. [17]	Brazil (2006).	Multicenter cross-sectional study. Hospital-based (SUS reference maternities). Direct estimates.	1,838 puerperae with previous pregnancies (of 3,047).	Sample obtained from reference maternity hospitals in the national STI/AIDS program. It is not clear if this sample can be considered representative of women of reproductive age; Parameters used to calculate sample size related to prevalence of syphilis during pregnancy; sub-sample of women with previous pregnancies used to estimate frequency of unsafe abortions; Proportion of losses not reported, only proportion of refusals; Induced abortions estimated based on the difference between total losses and miscarriages, with the latter information obtained from direct interviews, subjected to under-reporting; Did not incorporate design effect into the analysis; did not present CI of obtained estimates.	Unsafe abortions prevalence: 9,7%.
Population base, local scope, indirect estimate					
Mello et al. [19]	Pernam-buco, Brazil (1996-2006).	Ecological. Temporal and spatial dimensions. Restricted to SUS users. Indirect estimate.	147,205 hospitalizations from abortion in SIH-SUS. (ICD-10 codes: O00 and O03 -O06)	Does not use all ICD-10 codes related to abortion and does not justify the criterion they used; One item (response rate) not applicable.	Estimates of 65,457 abortions/ year; Greater concentration in GERES I and IV. Higher indicator in GERES I and VIII, around 40/100 live birth; Unequal temporal decline, more intense in GERESI; GERES X and XI had an increase in the indicator; Decline in the total number of abortions in the state, last year of the series: 51,853 abortions.
Madeiro et al. [20]	Piauí, Brazil (2000-2010).	Ecological. Temporal and spatial dimensions. Restricted to SUS users. Indirect estimate.	55,678 hospitalizations from abortion in SIH-SUS. (ICD-10 codes: O03 -O07).	Does not justify ICD-10 codes used to identify hospitalizations from abortion; One item (response rate) not applicable.	Estimated number of unsafe abortions dropped from 10,362 (2000) to 6,738 (2010); UA/LB ratio for the state dropped from 17.6 to 13.5 with significant annual reduction of 2.2%. Region TD4 was the most responsible, with 40% population and reduction from 16.7 to 6.9; Other regions with increase or stability.

(continues)

Table 1 (continued)

Reference	Location (year)/ period	Study design/ Base and estimate	Population	Methodological limitations	Results
Population base, local scope, women of reproductive age, direct estimate					
Silva & Vieira [21]	São Paulo, Brazil (1993).	Household survey. Population base. Direct and RRT estimates.	1,749, age 15-49 years; Two sub-samples: one with measurement of unsafe abortions in the previous year by RRT (n = 876) and another with measurement by direct interview (n = 873); In both sub-samples, measurement of lifetime unsafe abortions through direct interview; Exclusion of 317 women who were separated, in consensual unions or widowed.	Non-probabilistic samples; Unclear parameters for calculating sample size and sampling procedure; Uninformed losses and refusals. Does not describe sample characteristics; Lifetime unsafe abortions measured through direct interviews, subjected to under-reporting; Does not present CI of unsafe abortions estimates.	Unsafe abortions prevalence in the previous year: Measurement through direct interview: 1 per 1,000; Measurement by RRT: 42 per 1,000; Prevalence of lifetime abortion (direct interview): 45 unsafe abortions per 1,000 women, 4.4% of pregnancies ended in unsafe abortions; Among married women (n = 764): 45 unsafe abortions per 1,000, 90% of women with previous pregnancy, 2% ended in unsafe abortions; Among single women (n = 658): 49 unsafe abortions per 1,000, 16% of women with previous pregnancy, 18% ended in unsafe abortions.
Souza et al. [22]	São Paulo, Brazil (2008).	Household survey. Population base. Direct estimate.	683 women with previous pregnancies; age: 15-59 years.	Does not inform parameters used to calculate sample size; Apparent underestimation of young women, indicating probable failure in the sample selection; Information on abortion obtained through direct interview, subject to under-reporting; Does not inform proportions of loss and refusal; Does not present CI of estimates.	Unsafe abortions prevalence: 4.5%. Higher among single women (10.1%) in those with 5 or more live birth (14.3%) and the ones who use ineffective contraception (7.7%).
Fusco et al. [23]	Favela Inajar, São Paulo, Brazil (2005/2006).	Household survey. Population base. Direct estimate.	375 women, 278 with previous pregnancies; Age = 15-54 years.	Unsafe abortions measured through direct interviews, subjected to under-reporting. Does not present confidence intervals for the estimates.	Global unsafe abortions prevalence: 13.6%; Among black women and with low educational levels – 35.7%, black with low income – 40%; black and single – 36.7%; Prevalence among women with some pregnancy – 18.35.

(continues)

Table 1 (continued)

Reference	Location (year)/ period	Study design/ Base and estimate	Population	Methodological limitations	Results
Population base, local scope, women of reproductive age, direct estimate					
Santos et al. [24]	Favela México 70, São Vicente, São Paulo, Brazil (2008).	Household survey. Population base. Direct estimate.	735 women with previous pregnancies; Age: 15-49 years.	It is not clear if the method used for the selection of women may have generated some selection bias; Measurement of abortion through direct interviews, subjected to under-reporting; Does not inform the proportion of losses and refusals; Does not present a confidence interval of estimates.	Prevalence 6.9%. In the group 40 to 45 years: 12.9%; with low educational level: 11.4%; no children: 15.2% and with 6 or more children: 12.2%.
Population base, local or regional scope, young population, direct estimate					
Silva & Andreoni [25]	Freguesia do Ó community, São Paulo State, Brazil (2007).	Household survey. Population base. Direct estimate.	Sexually active youths: 102 men and 99 women; Age: 15-25 years.	Measurement of induced abortion through direct interviews, subjected to under-reported; Does not present confidence intervals for the estimates.	Unsafe abortions prevalence men (partners): 10.8%; Unsafe abortions prevalence among women: 6.1%
Silva & Fusco [26]	*Favela* México 70, São Vicente, São Paulo, Brazil (2013).	Household survey. Population base. Direct estimate.	Sexually active youths: 327 women and 253 men; Age: 15-24 years.	Measurement of induced abortion through direct interviews, subjected to under-reported; Does not present confidence intervals for the estimates.	Unsafe abortions prevalence men (partners): 2.8%; Unsafe abortions prevalence among women: 1.2%.
Pilecco et al. [27]	Rio de Janeiro, Porto Alegre (Rio Grande do Sul State) e Salvador (Bahia State), Brazil (2001-2002).	Household survey. GRAVAD study. Population base. Direct estimate.	870 young women (18-24 years) with previous pregnancies.	Does not inform parameters used when calculating the sample size; Measurement of induced abortion through direct interviews, subjected to under-reported; Does not present data that enabled an evaluation of whether losses (14.8%) were selective; Does not present confidence intervals for the estimates.	Prevalence: 21.5% among those who had become pregnant; Rio de Janeiro (52.8%), Salvador (42.1%), Porto Alegre (5.1%).

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Table 1 (continued)

Reference	Location (year)/ period	Study design/ Base and estimate	Population	Methodological limitations	Results
School base, local scope, young population, direct estimate					
Correia et al. [28]	Maceió, Alagoas, Brazil (2005).	Cross-sectional. Restricted to schools (public and private). Direct estimate, self-administered questionnaires, in the school environment.	Age: 12-19 years, 2,592 students. In this analysis, N = 559 (sexually active girls).	Only adolescent students; Unclear sampling procedure; Unsafe abortions measured through a self-administered questionnaire, in a school environment, with a possibility of under-reporting; No confidence interval for estimates; Does not incorporate design effect in the analyses; Did not inform losses and refusals.	Unsafe abortion prevalence: 26.7% for the total of sexually active girls and 81.9% among those who became pregnant.
Population or service base, local scope, specific populations, direct estimate					
Neiva-Silva et al. [29]	Porto Alegre e Rio Grande (Rio Grande do Sul), Brazil (2008).	Cross-sectional, RDS sampling.	307 homeless children, adolescents and youths of both sexes, aged 10-21 years. Two hundred and four in Porto Alegre, 103 in Rio Grande.	Abortion measured through direct interview. Abortion type (induced or miscarriage) asked only for the first abortion, with 32% reporting more than one abortion. Possibility of unsafe abortions under-reporting; CI of estimates not presented.	81,1% male sex, 93.8% between 12-21 years, 29.3% with experience with pregnancy, 26.7% of whom aged ≤ 14 years; 15.6% unsafe abortions prevalence among individuals with previous experience of pregnancy; Greater abortion experience (miscarriage or unsafe abortion) among girls than among boys (17.4% vs. 8.8%).
Barbosa et al. [30]	Thirteen Brazilian municipalities from the 5 macro-regions (2003-2004).	Cross-sectional. Self-administered questionnaire in HIV/AIDS reference services and in primary health units and women's health care services. Direct estimates.	Women aged 18-49 years, literate, sexually active; 1,777 WLHA; 2,045 WNLHA.	Convenience sample; Under-representation of WLHA in the North Region and over-representation in the Southeast Region; CI of estimates not presented.	Lifetime unsafe abortion prevalence: WLHA: 17.5%; WNLHA: 10.4%, $p < 0.001$; Non-significant differences after adjusting for age, marital state, number of children and lifetime sexual partners: WLHA 13,3% vs. WNLHA 11,0%; $p > 0,05$).
Pilecco et al. [31]	Porto Alegre, Rio Grande do Sul, Brasil (2011).	Transversal. Entrevistas em 7 serviços de referência em HIV/aids e 27 serviços da atenção básica. Estimativa direta.	Mulheres com gestação prévia; 18-49 anos; 625 MVHA; 498 MNVHA.	Procedimento de seleção das unidades de atenção básica pouco claro; aborto inseguro aferido por entrevista direta, estando sujeito a sub-registro; IC das estimativas não apresentado.	Prevalência de aborto inseguro na vida: MVHA: 13,0%; MNVHA: 4,9%; Gestações que resultaram em aborto inseguro: MVHA: 6,5% (7,7% antes do diagnóstico da infecção, 3,8% após diagnóstico da infecção, $p = 0,024$); MNVHA: 2,9%.

(continues)

Table 1 (continued)

Reference	Location (year)/ period	Study design/ Base and estimate	Population	Methodological limitations	Results
Population or service base, local scope, specific populations, direct estimate					
Pinho et al. [32]	São Paulo, Brazil (2013-2014).	Cross-sectional. Interviews in 18 HIV/AIDS reference services and 38 primary health services. Direct estimates.	Sexually active women; 18-49 years; 918 WLHA;1,003 (WNLHA).	High percentage of refusals (27% among WLHA, 26.5% among WNLHA); Characteristics not describe, uncertain selection bias; unsafe abortions measured through direct interviews, subject to under-reporting; CI of estimates not presented.	Lifetime unsafe abortions prevalence among women with previous pregnancies: WLHA: 14.1%; WNLHA: 3.02.
Friedman et al. [33]	Rio de Janeiro, Brazil (1996-2003).	Prospective cohort STI/AIDS reference center Direct estimate through interview	225 women living with HIV/ AIDS > 18 years.	Unsafe abortions measured through direct interview, subject to under-reporting.	Unsafe abortions incidence: 2.1% (95%CI: 1.2%-3.0%) women year; Of the 60 pregnancies that occurred during follow up, 31% resulted in unsafe abortions.
Madeiro e Rufino [34]	Teresina, Piauí, Brazil (2011).	Cross-sectional. Workplace interviews. Population. Direct estimate.	310 female sex workers; 18-39 years.	Non-probabilistic sample, not including the entire reproductive range, with the exclusion of illiterate women and majority inclusion of women working in brothels (under-representation of women working on the streets). Did not present CI of estimates.	52.6% prevalence. Age groups: 18-19 years: 27.1%; 35-39 years: 71.2%; 3 or more previous pregnancies: 94.7%; More than 10 years working in prostitution: 61.3%; Misoprostol used in over 70% of cases.
Diehl et al. [35]	São Paulo, Brazil (2009-2011).	Cross-sectional; Interviews 15 days after admission to a clinic specialized in addiction treatment.	Patients aged ≥ 18 years, with confirmed clinical diagnosis of addiction; Using DSM-IV-TR N = 616; 82.5% male sex.	Does not inform parameters used to calculate sample size; unsafe abortions measured through direct interviews, subject to under-reporting (in men, experience with induced abortion measured); Did not present CI of estimates.	26.8% prevalence; In men: 23.8%; In women: 40.7%

UA/WRA: ratio of unsafe abortions/1,000 women of reproductive age; UA/LB: ratio of unsafe abortions/100 live births; AUD: 2 or more criteria from the DSM-5 instrument in the past 12 months; binge drinking: consumption of 4 or more drinks in approximately 2 hours; ICD: International Classification of Diseases; DSM-IV-TR: Diagnostic and Statistical Manual of Mental Disorder IV, text revised; GERES: Regional Health Management; IC: intervalo de confiança; LENAD: National Alcohol and Drugs Inquiry; RDS: respondent-driven sample; RRT: randomized response technique; SIH: Brazilian Hospital Informations System; SUS: Brazilian Unified National Health System; WLHA: women living with HIV/AIDS; WNLHA: women not living with HIV/AIDS.

The 2010 [12] and 2016 [13] PNA produced direct estimates using the ballot box method. In this method, women deposit self-completed, unidentified questionnaires with questions on induced abortion into a ballot box, with the goal of increasing the confidentiality of the information. These surveys interviewed literate women aged between 18 and 39 years who lived in urban areas of the country [12,13]. The lifetime prevalence of abortion was of 15% in 2010 [12], and 13% in 2016 [13]; it was higher among women aged 35-39 years (22% in 2010 [12], 18% in 2016 [13]), women who lived in the North/Central regions (19% in 2010 [12], 15% in 2016 [13]) and in the Northeastern Region (20% in 2010 [12], 18% in 2016 [13]), who had low income (17% in 2010 [12] and 16% in 2016 [13] among women who earned up to the minimum wage) and low educational levels (23% in 2010 [12] and 22% in 2016 [13] among women with up to 5 years of schooling) and among those who self-declared as black (15%) and indigenous (24%) in 2016 [13] (this information was not recorded in 2010). When considering the information on the most recent abortion, and not any abortion over the woman's life, accounts were more frequent among younger women – 29% among those aged 12-19 years and 28% among those aged 20-24 years – when compared with those aged over 25 years (13%). There were no differences according to religion [13]. Use of medication was cited as the main abortive method by half of the women in both years [12,13]. In the 2016 PNA, researchers were able to estimate the occurrence of 503 thousand procedures in the previous year, that is, in 2015 [13]. Around half of the women reported being hospitalized after an abortion, with a reduction from 55% to 48% from the first to the second study [12,13].

The LENAD study, carried out in 2012 with women aged 14 years or older, measured lifetime abortion based on direct interviews. It found the occurrence of unsafe abortions among 16.3% (14.5%-18.3%) of women, and a dose-response effect according to alcohol use. Among women who did not binge drinking (BD), defined as consuming 4 or more drinks in approximately 2 hours, or who did not have an alcohol use disorder (AUD measured by the DSM-5 scale), unsafe abortions prevalence was of 15% (13.2%-17%), reaching 24.9% (16.3%-36.2%) among those with BD and AUD [14].

In the studies based on SIH-SUS data, indirect estimates used the Guttmacher Institute's (AGI) methodology [18]. For Brazil, the first study encompassed the years 1996-2012 [15] and analyzed the time trend of the induced abortions coefficient – unsafe abortions/1,000 women of reproductive age (UA/WRA) – and of the ratio of abortions/100 live births (UA/LB) [15]. It estimated an annual average of 994,465 induced abortions in Brazil, corresponding to a UA/WRA coefficient of 17/1,000 and a ratio of 33.2 induced abortions/100 live births. Researchers found a statistically significant decrease in the UA/WRA between 1996 and 2012 (R^2: 94%; $p < 0.001$) at a national level and in the regions Northeast, Southeast and Central, stability in the South and decrease in the North. The greatest reduction was observed in the Northeast, with an annual reduction of 0.63 unsafe abortions/1,000 women of reproductive age. As for the UA/LB ratio, only the more populated regions, the Northeast and the Southeast, experienced a reduction; in the other regions, there was a constant increase, with stability at the national level. Researchers also detected clusters of high abortion prevalence in the North, Northeast and Southeast [15]. In the second study [16], which analyzed a series from 1995 and 2013 [16], two correction factors were used and researchers also found a reduction in the annual occurrence of abortion in the period. The maximum estimate described a reduction from 1,086,708 annual abortions in 1995 to 865,160; and the minimum, from 864,628 in 1995 to 687,347 in 2013. There was also a reduction in the UA/WRA coefficient (from 27 to 16/1,000 women of reproductive age) in all regions, but it remained higher in the North and Northeast and among women aged 20-29 years (22/1,000 women of reproductive age). The ratio of unsafe aborions/100 live births was reduced from 35 to 30/100 live births, but rose in the Northern and Southern regions [16]. Lastly, a multi-centric, hospital-based study using a direct estimate based on interviews with women who had given birth in Brazilian maternity hospitals estimated 9.7% of induced abortions in previous pregnancies [17].

At a local level, Mello et al. [19] analyzed hospital admissions in Pernambuco from 1996 to 1006 and Madeiro et al. [20] carried out a similar analysis in Piauí for the 2000-2010 period. In Pernambuco, researchers found a high number of admissions due to abortion, with an estimated 621,022 unsafe abortions and a UA/LB ration of 36.1/100 live births [19]. Findings also showed differences between the state's health regions, both in the unsafe abortions frequency and in time trends. There was a 7.7% reduction in hospitalizations due to complications from abortion in the state in the period, with a statistically significant decline only in the Recife metropolitan region. The other regions had an increase in the number of unsafe abortions, with two regions more than doubling the number of

cases. The Piauí study identified 55,678 hospitalizations due to complications from abortion in the analyzed period, with a reduction of the UA/LB ratio in the state, from 17.6/100 to 13.5/100, with a statistically significant annual decrease of 2.2% [20].

Four household surveys in the state of São Paulo estimated the prevalence of abortion among women with a previous pregnancy, which varied between 4.4% [21] and 4.5% [22] among those who lived in the capital (in 1993 and 2008, respectively) and 6.9% and 18.3% in two favelas [23,24]. For the calculation, the studies used different definitions of reproductive age in the denominators. In the 1993 study, conducted in the state capital, authors used two different methods – direct interviews and randomized response technique (RRT) – to estimate the occurrence of unsafe abortions in the previous year, finding a much higher value when using RRT than when using interviews (42 vs. 1 per 1,000) [21].

Eleven studies focused on specific populations, using direct estimates, most through interviews. Five of these were conducted on young women and adolescents. In a favela in São Paulo, 6.1% of women and 10.8% of men (discussing their partners' pregnancies) aged between 15 and 25 years reported a previous experience of abortion [25]. In another favela in the same city, 1.2% of women and 2.8% men aged 15-24 years reported at least one previous abortion [26]. The GRAVAD study, a household survey in three Brazilian capitals, found, among young people aged 18-24 years who reported a pregnancy, a termination in 21.5% of cases. This was more frequent in Rio de Janeiro (52.8%) and in Salvador (42.1%), Bahia State, Brazil, than in Porto Alegre (5.1%), Rio Grande do Sul State, Brazil [27]. In a study of students from public and private schools in Maceió, Alagoas State, Brazil aged 12-19 years, using a self-administered questionnaire, 81.9% of students who had been pregnant reported a previous unsafe abortions [28]. In Porto Alegre and Rio Grande, in the state of Rio Grande do Sul, a study with homeless children, adolescents and youths aged 10-21 years identified a previous pregnancy among 29.3%, with a 15.6% prevalence of unsafe abortions among those with a previous pregnancy and greater experience of abortion (induced and/or miscarriages) among girls than among boys (17.4% vs. 8.8%) [29].

Four studies assessed the occurrence of unsafe abortions among women with HIV/AIDS. Three had a similar methodology, comparing women living with HIV/AIDS (WLHA) who received care at a reference service with women not living with HIV/AIDS (WNLHA) who received care at primary health care services. The first, conducted in 13 municipalities of the 5 Brazilian macrorregions, in 2003-2004, and which used the ballot box method, found a unsafe abortions prevalence of 17.5% among WLHA and of 10.4% among WNLHA ($p < 0.001$) [30]. Later, in 2011, in Rio Grande do Sul [31] and São Paulo [32], in 2013-2014, using direct interviews, researchers found, respectively, a lifetime unsafe abortions prevalence of 13% and 14.1% among WLHA and 4.9% and 3.2% among WNLHA. The fourth study, carried out in a reference center for WLHA in Rio de Janeiro found a unsafe abortions incidence of 2.1% (95% confidence interval – 95%CI: 1.2%-3.0%) per woman/year, from 1996 to 2003, with 31% of pregnancies resulting in unsafe abortions [33].

A study of sex workers in Teresina, Piauí, State, which used the ballot box method to provide a direct estimate, revealed a lifetime unsafe abortions prevalence of 52.6%, reaching 71.2% among women aged 35-39 years [34]. Lastly, in a cross-sectional study in São Paulo, with adults admitted to a clinic for addiction treatment, 40.7% of women and 23.8% of men reported unsafe abortions over their lives in a direct interview [35].

Women's profile and factors associated with induced abortion in Brazil

Twenty-two studies addressed the characteristics of women who have abortions and/or factors associated with unsafe abortions [10,11,14,17,21,22,23,24,25,27,28,30,31,34,35,36,37,38,39,40,41,42] (Table 2).

In population studies or in studies carried out in primary health care services, including women of different age groups, the following were found to be positively associated with unsafe abortions: increased age [10,22,24,30,31], non-white race/color [10,23,30,42], low income [24,42], living in rural areas [10] or being a migrant [42], having paid work [10], not being religious [10], being single/not living with a partner [21,22,31], early onset of sexual activity [23,30], have more than one or two partners in the last year [23], greater number of sexual partners in life [30,31], use of alcohol [14] and illicit drugs [30]. Two studies found an association between unsafe abortions and low educational level [23,42] and in Campinas, São Paulo State [41], São Paulo State, and in Rio Grande do Sul [31] researchers found a positive association between high educational levels and termination of unwanted pregnancies. The ratio number of children/

Table 2

Characteristics/factors associated with unsafe abortion in Brazil, 1996-2012.

Reference	Location (years)	Study design	Population	Methodological limitations	Results
Population studies, national scope					
Cecatti et al. [10]	Brazil (1996).	Household survey (PNDS, 1996).	12,612 women (15-49 years) from urban and rural areas.	Induced abortion measured through direct interview, subject to under-reporting; Analysis of factors associated with unsafe abortions in comparison with women who never had abortions or who had miscarriage; Inadequate comparison group.	Unsafe abortions over the course of reproductive life: Age (OR = 1.06/year), residing in urban areas (OR = 1.56), non-white race/color (OR = 1.41), working (OR = 1.41), number of children > 1 (OR = 2.22); being religious (OR = 0.59); ideal number of children > 1 (OR = 0.68); Educational level and marital status: no statistically significant association.
Camargo et al. [11]	Brazil (2006).	Household survey (PNDS, 2006).	4,340 of the 15,755 women (15-49) with children 5 years before the survey.	Induced abortion measured through direct interview, subject to under-reporting; Analysis of factors associated with unsafe abortions in comparison with women who never had abortions or who had miscarriage; Inadequate comparison group.	None of the assessed factors (age at time of interview, urban/rural residence, race/color, work, number of children, religion, planned pregnancy) was associated with unsafe abortions in the previous 5 years of life.
Massaro et al. [14]	Brazil (2006 and 2012).	Household population survey. Direct estimate. LENAD 2012.	2,537 women aged ≥ 14 years.	Induced abortion measured through direct interview, subject to under-reporting; Does not describe sample characteristics, only the prevalence of the analyzed outcomes according to women's characteristics.	Outcome = lifetime unsafe abortions. OR adjusted by age and educational level, reference category: women with no binge drinking or AUD: Women with binge drinking, but not AUD: 1.9 (95%CI: 1.3-2.8); Women with binge drinking and AUD: 2.5 (95%CI: 1.5-4.4); Lack of evidence of direct effect of alcohol use on unsafe abortions (direct effect 0.142, 95%CI: -0.103-0.386) when early pregnancy is excluded from analysis.

(continues)

Table 2 (continued)

Reference	Location (years)	Study design	Population	Methodological limitations	Results
Population studies, local scope					
Souza e Silva & Vieira [21]	São Paulo Brazil (1993).	Household population survey. Direct estimate.	1,749; Age 15-49 years; For this analysis, exclusion of 317 women who were separated, in a consensual union or widows.	Non-probabilistic sample; Unclear parameters used to calculate sample size and sampling procedure; Sample characteristics not informed; lifetime unsafe abortions measured through direct interviews, subjected to under-reporting; Exposure variables measured at the time of the interview, not at the time of the Unsafe abortions; Only non-adjusted analysis.	Associated factors: Among single women: greater proportion of unsafe abortions/ pregnancies among those who did not reach the desired number of children (29.5%) with regard to those who did (4.3%) and in women aged 15-19 years (60%); Non-significant differences according to contraception used; Among married women, greater proportion also among younger women, but in lower proportions (4.3% among women aged 15-19 years) and among women who used effective contraception methods (2.7%).
Souza et al. [22]	São Paulo, Brazil (2008).	Household survey	683 women with previous pregnancies. Age: 15-49 years.	Induced abortion measured through direct interview, subject to under-reporting; Variables used in the multivariate model were measured at the time of the interview, not at the time when unsafe abortions occurred, generating incoherent results.	Factors associated with unsafe abortions at the time of the interview: age 40-44 years (PR = 2.76); being single (PR = 2.79); ≥ 5 live birth children (PR = 3.97); use of pill or IUD (PR = 2.70), low-efficacy method (PR = 4.18) compared with permanent sterilization.
Fusco et al. [23]	*Favela* Inajar, São Paulo, Brazil (2005).	Household survey.	375 women; 278 with previous pregnancies; Age: 15-49 years.	Study subjects and context not adequately described; Induced abortion measured through direct interview, subjected to under-reporting; Some variables used in the multivariate model measured at the moment of the interview and not when the unsafe abortions occurred.	Factors associated with UA among women with reported pregnancy: age at sexual initiation < 16 years (OR = 3.91); number of partners in the last year ≥ 2 (OR = 3.30); black race/color (OR = 2.27); low educational level (OR = 2.85); and accepting abortions for economic reasons (OR = 3.35); Not associated: being single at the time of abortion, religion, work, income, contraception use, being a migrant; For the entire sample, the same factors were associated, in addition to number of children > ideal (OR = 3.08).
Santos et al. [24]	*Favela* México 70, São Vicente, São Paulo, Brazil (2008).	Household survey.	735 women with previous pregnancies; Age: 15-49 years.	Induced abortion measured through direct interviews, subject to under-reporting; Variables used in the multivariate model measured at the moment of the interview and not at the time when the abortion occurred, generating incoherent results.	Associated factors: low income (OR = 1.76); live birth = 0 (OR = 12.2)/2 to 5 (OR = 4.5)/6 or + (OR = 5.2); acceptance of abortion (OR = 5.7) and age (OR = 1.04/ year); Not associated: Paid activity, educational level, marital status, contraception.

(continues)

Table 2 (continued)

Reference	Location (years)	Study design	Population	Methodological limitations	Results
Population studies restricted to youths/ adolescents					
Correia et al. [28]	Maceió, Alagoas, Brazil (2005).	Cross-sectional, 10 public and private schools. Self-administered questionnaire.	2,592 students of both sexes aged 12-19 years. Analysis restricted to 559 sexually active students (12-19 years old) of both public and private schools.	Schools and students included in the study not adequately described; Although the questionnaire is self-administered, the authors themselves admit the possibility of unsafe abortions under-reporting; Only non-adjusted analysis.	Non-adjusted analysis of associated factors among sexually active female students: Public school (OR = 1.41); Age 12-14 (OR = 0.22); Marital union (OR = 3.31); Other factors not tested.
Silva & Andreoni [25]	*Favela* Inajar, São Paulo, Brazil (2007).	Household survey.	102 men and 99 women (aged 14-25) who were sexually active.	Some exposure variables measured in a non-validated manner; Induced abortion measured through direct interviews, subject to under-reporting; Variables used in the multivariate model measured at the time of the interview and not at the time of the unsafe abortions.	Associated factors: Model without the variable "current partner": being male (OR = 9.12) and number of pregnancies (at each new pregnancy, OR = 7.29, 95%CI: 3.33-15.98); Model with the variable "current partner": being male (OR = 13.9), higher number of pregnancies (OR = 7.30), living alone (OR = 4.32) and increased age (OR = 0.73 per year).
Pilecco et al. [27]	Rio de Janeiro, Porto Alegre (Rio Grande do Sul State) and Salvador (Bahia State), Brazil (2001-2002).	Multi-center household survey.	870 women (18-24 years) with accounts of pregnancy, participants of the GRAVAD study.	Unsafe abortions assessed through direct interviews, subject to under-reporting.	Associated factors: sexual coercion (PR = 1.60); living in Rio de Janeiro (PR = 2.16) or Salvador (PR = 2.75); having obtained information on sexual relations from people other than parents (PR = 1.9); number of partners: 2-4 (PR = 2.21) and > 5 (PR = 2.66); education (the higher the education, the higher the PR - higher education – PR = 6.47); number of pregnancies (PR = 1.65). The following were not associated: young woman's age, mother's educational level, remunerated occupation and characteristics of coercion, age and partner at sexual initiation and contraceptive use.

(continues)

Table 2 (continued)

Reference	Location (years)	Study design	Population	Methodological limitations	Results
Hospital/health service based studies					
Nader et al. [36]	Serra, Espírito Santos State, Brasil (2005-2006).	Case control. Classification of abortion according to WHO criteria.	21 women hospitalized for certainly induced abortions and 83 women with pregnancies carried to term.	Does not inform adequately case identification and inclusion process; Certainly induced abortion measured through direct interviews, with possibility of under-reporting and case misclassification; Variables included in the final model probably highly correlated.	Factors associated with certainly induced abortion: Being married: adjOR 0.= 241 (95%CI: 0.061-0.951); Wanted pregnancy: adjOR = 0.168 (95%CI: 0.042-0.669).
Silva et al. [37]	Campinas, São Paulo State, Brazil (2008-2009).	Cross-sectional. Interviews and extraction of data from charts. Classification of abortion according to WHO criteria.	259 women hospitalized for abortion.	Possibility of unsafe abortions under-reporting with misclassification error; There was no control of confounding factors.	87.7% of certainly induced unsafe abortions, 4.3% probably induced and 10% possibly induced; No differences for the types of abortion regarding age, educational level, number of pregnancies and live-born children. Probably/certainly induced abortion more frequent among women without a stable union than those with a fixed partner (21.8% vs. 9.5%, p = 0.010).
Ramos et al. [38]	Recife, Pernambuco State, Brazil (2005-2006).	Cross-sectional. Classification of abortion according to WHO criteria.	160 women hospitalized for abortion. IMIP Hospital.	It is not clear if there were losses and refusals; There was no control of confounding factors.	Hospitalizations for abortion: 3.1% of all obstetric hospitalizations; 14.3% induced abortions and 56.3% possibly induced; Association between higher number of children (p<0.001) and lack of partner (p=0.008) and type of abortion (induced vs. miscarriage).
Chaves et al. [39]	Maceió, Alagoas, Brazil (March 2008/April 2009).	Cross-sectional. Classification of abortion according to WHO criteria.	201 adolescents with incomplete abortions admitted to a SUS hospital for curettage.	It is not clear whether all adolescents admitted in the period were considered eligible for the study; There was no control of confounding factors.	81.5% certainly induced abortions, 9.9% probably induced and 6.4% possibly induced; predominance of young people aged 15-19 years and the brown race/color. Most frequent age at first induced abortion = 16 years; No differences between types of abortion regarding ethnicity, marital status, sexual initiation, number of partners, contraception.

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Table 2 (continued)

Reference	Location (years)	Study design	Population	Methodological limitations	Results
Hospital/health service based studies					
Borsari et al. [40]	São Paulo, Brazil (2008-2010).	Case control.	33 patients (11 cases and 22 controls) from 2 public hospitals in the periphery.	Unclear sampling procedure; Identification of cases (unsafe abortions) and controls (miscarriage) through direct interviews, subject to misclassification; inadequate comparison group; There was no control of confounding factors.	Cases: induced abortion; Controls: miscarriage; No difference between groups regarding age, marital status and reproductive variables; Differences regarding educational level and income (lower among those with induced abortion) and religion (no evangelicals in the induced abortion group).
Machado et al. [17]	Brazil (1999-2000).	Cross-sectional Interviews in the puerperium.	Random sample of 1,838 puerperal women with previous pregnancies from 24 reference maternity hospitals.	Unsafe abortions measured by subtraction of reported miscarriages from total abortions, with the possibility of measurement bias; Does not report the inclusion of the design effect in the data analysis.	Associated factors: age 18-23 years (OR = 0.54); non-white race/color (OR = 1.68); age at 1st relationship < 16 (OR = 1.56) partners >1 (OR = 3.07); absence of prenatal care (OR = 1.97) and STI (OR = 2.25). Number of children: = 1 (0.07) and > 1 (0.08); Not associated: schooling, income, age 1st pregnancy, contraception, marital status.
Fusco et al. [42]	São Paulo State, Brazil (2005 and 2009-2012).	Cross-sectional. Interviews and extraction of data from medical charts.	153 women (51 from *Favela* Inajar, São Paulo, 2005, 51 from a public hospital that provides legal abortion and 51 from a private clinic).	Unclear sampling procedure; Different sources of information for the exposure variables used in the analysis; Proportion of incomplete variables not informed; Measurement of unsafe abortions in the community through direct interview, subject to under-reporting.	Compared to abortions performed in the private hospital, illegal and unsafe abortions (*Favela*) were associated with: lower income (OR = 49.26), lower educational level (15.64), black skin color (OR = 8.61), migrant status (OR = 19.16) and age (OR = 0.88); Legal and safe abortion (public hospital) also associated with lower income (OR = 31.16) and lower educational level (OR = 9.65) and being a migrant (OR = 5.18).

(continues)

Table 2 (continued)

Reference	Location (years)	Study design	Population	Methodological limitations	Results
Studies with specific populations					
Barbosa et al. [30]	Thirteen Brazi-lian municipa-lities from the 5 macro-regions (2003-2004).	Cross-sectional. Self-administered questionnaire in HIV/AIDS reference services and primary health units and women's health care services.	3,822 sexually active, literate women aged 18-49 years. 1,777 women living with HIV/AIDS; 2,045 users of primary care services.	Serological status of users of primary care units and women's health services measured through women's accounts; More than 50% of the women did not know their serological status with the possibility of classification error; Exposure variables measured at the time of the interview and not at the time the abortion occurred.	Factors associated with unsafe abortions among WLHA: Age: linear trend with increase in unsafe abortions as age increases. In women aged 40-49 years (OR = 3.20, 95%IC: 1.60-6.39); Region of residence: Northeast (OR = 2.07, 95%CI: 1.15-3.71), Southeast (OR = 2.38; 95%IC: 1.36-4.15), North (OR = 3,19; 95%IC: 1,39-7,35); Age in the first relationship: increase in OR with decrease in age; ≤ 15 years (OR = 1.80; 95%CI: 1.13-2.86); Number of sexual partners in life: increase in OR with the increase in the number of partners: 3 or + partners: OR = 6.38, 95%CI: 2.49-16.29; Drug use: OR = 1.84, 95%CI: 1.01-3.35; Previous diagnosis of STI: OR = 1.84, 95%CI: 1.31-2.62; Among WNLHA, the same factors as observed among WLHA, except absence of association in the Northeast and Southeast regions; Association with non-white race/color (OR = 1.79, 95%CI: 1.17-2.73) and occasional sexual partner (OR = 1.66, 95%CI: 1.05-2.63).
Pilecco et al. [31]	Porto Alegre, Rio Grande do Sul State, Brazil (2011).	Cross-sectional. Interviews in 7 HIV/AIDS reference services and 27 primary care services.	625 women living with HIV/AIDS (WLHA) and 498 women not living with HIV/AIDS (WNLHA). 18-49 years old, women with previous pregnancies.	Unclear procedure for selecting primary care units; unsafe abortions assessed through direct interview, subject to under reporting; Small number of abortions among WNLHA may have reduced the study's power to detect significant associations.	Factors associated with unsafe abortions: WLHA: Age at interview (OR = 3.44; 95%CI: 1.18-10.04); 12 or more years of schooling (OR = 3.29; 9%CI: 1.84-5.88); number of sexual partners in life ≥ 5 (OR = 2.34; 95%CI: 1.33-4.14), live children (OR = 3.42, 95%IC: 2.10-5.57), not living with sexual partner (OR = 5.00, 95%CI: 3.35-7.47); WNLHA: 12 or more years of schooling (OR = 8.69, 95%CI: 1.91-39.33), 5 or more sexual partners in life (OR = 3.85, 95%CI: 1.44-10.30).

(continues)

Table 2 (continued)

Reference	Location (years)	Study design	Population	Methodological limitations	Results
Studies with specific populations					
Madeiro & Rufino [34]	Teresina, Piauí State, Brazil (2011).	Cross-sectional. Interviews at participants' workplaces.	310 female sex workers (age: 18-39 years).	No limitations identified.	Only number of pregnancies had significant association: preg III (OR = 3.99) and preg > III. (OR = 27.0); Factors such as age, education, religion, marital status and income were investigated, but did not show statistically significant differences.
Dias et al. [41]	São Paulo, Brazil (2010).	Survey.	296 state public servants (both sexes), with reports of unwanted pregnancies.	Response rate of only 10%. It is not clear whether the sample is representative of the population of state public servants; It is not clear whether the variables used in the analysis model refer to the time of the interview or of the unsafe abortions.	Factors associated with unsafe abortions: high educational level only (PR = 1.56); The following factors were not associated: sex, age at the time of pregnancy, marital status, number of children.
Diehl et al. [35]	São Paulo, Brazil (2009-2011).	Cross-sectional, interviews 15 days after admission to a specialized clinic for addiction treatment.	616 patients, 82.5% male. Patients aged ≥ 18 years, with confirmed clinical diagnosis of addiction according to DSM-IV-TR.	Unsafe abortions assessed through direct interviews, subject to under-reporting (in men, measurement of experience of induced abortion); Exposure variables measured at the time of the interview and not at the time of the abortion; evaluation of temporality not possible.	In the adjusted analysis, induced abortion associated with: Female: OR = 2.9 (95%CI: 1.75-4.76); single OR = 1.8 (95%CI: 1.13-3.12); unemployment OR = 2.4 (95%CI: 1.46-3.82); tobacco use OR = 1.6 (95%CI: 1.03-2.49); sexual activity in the last 12 months OR = 2.0 (95%CI: 1.17-3.69), irregular condom use (never or occasionally) OR = 1.7 (95%CI: 1.09-2.75), history of STI OR = 2.0 (95%CI: 1.35-3.23), HIV testing OR = 2.2 (95%CI: 1.32-3.53), use of emergency contraception OR = 3.2 (95%CI: 1.29-5.73)

95%CI: 95% confidence interval; AdjOR: adjusted odds ratio; AUD: alcohol use disorders – 2 or more criteria from the DSM-5 instrument in the past 12 months; binge drinking: consumption of 4 or more drinks in approximately 2 hours; IUD: intrauterine device; CID: International Classification of Diseases; DSM-IV-TR: *Diagnostic and Statistical Manual of Mental Disorder* IV, text revised; IUD: intrauterine device; IMIP: The Professor Fernando Figueira Integral Medicine Institute; LENAD: *National Alcohol and Drugs Inquiry*; OR: odds ratio; Preg: number of pregnancies; PR: prevalence ratio; STI: sexually transmissible disease; WHO: World Health Organization; OR (odds ratio); WLHA: women living with HIV/AIDS; WNLHA: women not living with HIV/AIDS.

pregnancies had contradictory results: at times, lack of children [24], and at times a greater number of pregnancies/children [10,22,23,24,31,34] were associated with unsafe abortions. A study that assessed the occurrence of unsafe abortions according to the difference between the number of living children and that reported as ideal found higher proportions of unsafe abortions among women who did not yet have the desired number of children, with these values higher among single women (29.5%) than among those who were married (2.9%) [21]. Other factors, such as the presence of a sexually transmissible infection [30] and a more accepting attitude toward abortion (for different reasons) [23,24] were positively associated with the termination of pregnancy (Table 2).

Three studies interviewed young women and found a positive association between abortion and number of partners [27], greater number of pregnancies/children [25,27], sexual coercion [27], living in Rio de Janeiro or in Salvador [27] and having obtained information on sex from people other than the parents [27]. A study with students of Maceió schools found a higher frequency of abortion among adolescents who were in a conjugal union [28]. In the GRAVAD survey, educational level had a positive gradient with induced abortion among young people [27]. In Maceió, in turn, researchers found a positive association between studying in a public school and having an abortion [28]. In the São Paulo periphery, abortion was more frequently reported by men (talking about their partners) and among people who lived alone (Table 2) [25].

Hospital studies in the public network described the characteristics of women admitted due to abortion, with samples varying between 104 and 1,838 users. A study at a maternity hospital that is an HIV reference center for the entire country found an association with young age at first sexual relation, non-white race/color, smaller number of children, sexually transmissible infections, absence of prenatal care for that pregnancy and greater number of partners [17]. Four studies [36,37,38,39] used criteria from the World Health Organization (WHO) to classify abortions [43] and considered most as certainly or probably induced. They found an association between inducing an abortion and a larger number of children [38], lack of a partner [36,37,38] and unwanted pregnancy [36]. Another study compared unsafe and safe abortions, noting higher frequency of unsafe abortions among wqomen with lower income, educations, with black race/color and migrants [42]. A study conducted at an addiction treatment clinic, with 616 users, 82.5% of whom were men, found an association between unsafe abortions and female sex, being single, unemployment, tobacco use, sexual activity in the previous 12 months, irregular condom use, STI history, testing for HIV and emergency contraception use [35] (Table 2).

Complications associated with induced abortion

Twenty-two studies assessed complications from unsafe abortions (Table 3). Four assessed hospitalizations due to complications, two of which had a national scope – one for the period 1992-2009 [44], the other referring to 2006 [45] –, while two were local investigations, in Paraná [46] and Santa Catarina [47]. All used SIH/SUS data and showed a reduction in hospitalizations due to abortion. The rate of hospitalization due to abortion in Brazil reached 3.1/1,000 women in 2009, a 57% reduction from 1992 [44]. A sharper drop (69%) was found for more severe complications, when compared with less severe ones (52%), especially infection and hemorrhage. All studies showed differences between regions and states. Higher rates were observed in the North and Northeast, while lower rates were observed in the South [44,45]. In 2006, Roraima and Amapá stood out due to the higher rates (101 and 94 per 1,000, respectively) and of the 50 municipalities with the highest values, 17 were located in Bahia [45]. Many municipalities did not record hospitalizations due to abortion in 2006, probably due to under-reporting [45]. In Paraná, hospitalizations due to abortions corresponded to 24.1% of obstetric hospitalizations (ratio 9.1/100 deliveries), with higher values among women aged 35-49 years, respectively, 36.9% and 20.2 abortions/100 deliveries [46]. In Santa Catarina, there was a reduction in the hospitalization rate from 1999 to 2010, with an average of 2.1/1,000 [47].

Six studies assessed complications from abortions. In Maranhão, a case series in two maternity hospitals in São Luís identified 17.5% of unsafe abortions among hospitalizations due to abortions, with 65% of women having used misoprostol, either on its own or in combination with another substance. Complications were mild, especially cramps and bleeding, with an average hospitalization time of 2.5 days [48]. In Maceió, a study with 2,592 students revealed 16.1% of complications and 10.1% of hospitalizations following 149 unsafe abortions [49]. In Campinas [37], infectious (10%) and hemorrhagic complications (13%) were significantly more frequent among certainly induced abortions. There was no association between misoprostol use and lower occurrence of complications. Also in Maceió [39], 81.5% of certainly induced abortions were identified among 201 hospitalized adolescents, 77.4% of whom used misoprostol. There were three cases of uterine perforation and eight blood transfusions, all for certainly or probably induced abortions [39]. In 2010, a study on public servants in the State of São Paulo found that abortion was the outcome of 55.7% of unplanned pregnancies. Most abortions were performed by doctors, and this was associated with fewer complications and hospitalizations [41]. Gomperts et al. [50], in an analysis of the complete records of 307 women who had medication

Table 3

Complications associated with unsafe abortion in Brazil, 1992-2013.

Reference	Location (years)	Study design	Population	Methodological limitations	Results
Hospitalizations					
Singh et al. [44]	Brazil (1992-2009).	Trend study using data on abortion from SIH/SUS (ICD 10 O00-O08); Adjustments made (changes in ICD in the period: ICD-9 1992-1997, ICD-10 from 1998 to 2009) and separate analysis of abnormal cases (ectopic pregnancies, hydatidiform mole, other abnormal products from conception)	Hospitalizations from abortions in public hospitals – women aged 15-44 years.	No limitations identified.	Reduction of complications from abortion (41%) and in hospitalization rate (57%). Rates in 2009: 3.1/1,000; Sharper decline among more severe complications (69%) than among less severe complications (52%), especially from infection and hemorrhage; Sustained reduction from 1992 to 1997, fluctuating rate from 1998 to 2005 and new, less sharp reduction from 2005 to 2008; Regions N and NE have higher rates of hospitalization from complications, while S region has the lowest.
Mariutti et al. [45]	Brazil (2006).	Cross-sectional study using data from SIH-SUS; Does not inform ICD-10 codes used.	Hospitalizations from abortion in public hospitals – women aged 10-49 years.	Unclear method used to identify abortion cases (does not inform which ICD codes were selected for identifying abortion cases).	Rate of 3.81 abortions/1,000 women in the country, higher in North and Northeast regions, lower in South region; States with the highest hospitalization rates: Roraima State and Amapá State; Of the 50 municipalities with the highest rates, 17 located in Bahia State; Several municipalities with no recorded hospitalization due to abortion.
Veras et al. [46]	Paraná State, Brazil (2010).	Cross-sectional study using SIH-SUS data; Cases identified using the main diagnosis of hospitalization, type of discharge, procedures, secondary diagnosis and Intensive Care Unit stay.	Obstetric hospitalizations of women aged 10-49 years in public hospitals of the State of Paraná.	No limitations identified.	Hospitalizations from abortion: 24.1% of hospitalization diagnosis; Ratio of 9.1/100 deliveries; Increase in rate of hospitalization for obstetric complications along with increase in woman's age; Among women aged 35 to 49 years: 36.9% of hospitalizations for abortion; rate of 20.2/100 deliveries; 3.6% of deaths that occurred in the hospitalizations had abortion as the main hospitalization diagnosis.

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Table 3 (continued)

Reference	Location (years)	Study design	Population	Methodological limitations	Results
Hospitalizations					
Bonassa et al. [47]	Santa Catarina State, Brazil (1999-2010).	Ecological study, using data from SIH-SUS (ICD-10 codes O03, O04 and O05).	Hospitalizations for abortion of women aged 15-49 years in public hospitals in Santa Catarina.	Did not include all ICD codes related to abortion; Time series with no statistical tests to evaluate trends.	Reduction in the abortion rate in the period; mean rate 2.1/1,000; Lower rate in 2007 (1.7/1,000); Higher among women aged 20-29 years and those who had "other pregnancies ending in abortion"; Regional differences found.
Complications from abortion					
Araújo & Mochel [48]	São Luiz, Maranhão State, Brazil (2006).	Case series in 2 public maternity hospitals; Interviews + chart data.	80 unsafe abortions cases	Unsafe abortions measured through direct interview, subject to under-reporting; It is unclear if complications were obtained from interviews or charts; Data presented jointly, with no characterization of the services; Only descriptive case analysis.	17.5% of unsafe abortions in 456 hospitalizations for complications from abortion; 56.25% used misoprostol alone and 8.75% used misoprostol in combination with other method; 41.25% with complaints of cramps and bleeding, 27.5% only bleeding, 25% only cramps, 2.5% fever; 46.25% with hospitalization of only 1 day. Mean hospitalization duration of 2.5 days.
Correia et al. [49]	Maceió, Alagoas, Brazil (2005).	Cross-sectional; 10 public and private schools; Self-administered questionnaire.	2,592 students of both sexes, 12-19 years old; This analysis only included reported cases of unsafe abortions (N = 149).	Inadequate description of schools and students; Possibility of unsafe abortions under-reporting; Complications and hospitalizations measured through interviews with students, subject to information bias.	149 abortions reported, 16.1% with reports of complications and 10.1% with hospitalization.

(continues)

Table 3 (continued)

Reference	Location (years)	Study design	Population	Methodological limitations	Results
Complications from abortion					
Silva et al. [37]	Campinas, São Paulo State, Brazil (2008-2009).	Cross-sectional, hospital-based study; Abortion classified according to WHO criteria.	538 women hospitalized due to abortion; Emphasis on 259 women with induced abortions or abortions suspected of being induced.	Likely classification error of certainly induced cases of abortion (under-estimation due to women's low accounts); Analysis of association between misoprostol use and complications limited by the small number of women who reported inducing the abortion; Analysis limited by lack of identification and adjustment by confounding variables; Limitation in the measurement of the outcome variable (complications), no specification if occurrence was before or after the abortion.	48% of women with induced abortion or abortion suspected of being induced (85.7% possibly induced, 4.3% probably induced, 10% certainly induced); Complications from abortion: infectious 10% and hemorrhagic 13%; Significantly higher prevalence of hemorrhagic (24.0% vs. 8.5%, p = 0.027) and infectious (32.0% vs 11.5%, p = 0.010) complications among women with certainly induced abortions; Use of misoprostol: 36% of certainly induced abortions, 3.5% of total suspected of being induced; Misoprostol use not associated with lower occurrence of infectious (22% vs. 38%, NS) and hemorrhagic complications (11% vs. 31%, NS).
Chaves et al. [39]	Maceió, Alagoas, Brasil (2008-2009).	Cross-sectional, hospital-based; Abortion classified according to WHO criteria.	221 pregnant adolescents hospitalized with an abortion diagnosis who underwent uterine curettage; 9.9% of loss.	It is unclear if all women hospitalized in the study period were considered eligible, nor if there were losses and refusals; Authors compared type of abortion and complications without identification and adjustment of confounding factors; Complications measured using woman's account, without consulting chart data, subject to information bias; Small number of outcomes limited statistical analyses.	81.5% of certainly induced abortions and 9.9% of probably induced abortions; Misoprostol use: 77.4% in certainly induced abortions; Complications: 1.5% uterine perforation, 4.4% blood transfusions; All cases of uterine perforation and blood transfusion happened to women with certainly or probably induced abortions.

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Table 3 (continued)

Reference	Location (years)	Study design	Population	Methodological limitations	Results
Complications from abortion					
Dias et al. [41]	Campinas, São Paulo State, Brazil (2010).	Cross-sectional study, restricted base; Non-probabilistic sample of public servants; Self-administered questionnaire.	1660 public servants (1,240 women, 444 men); Response rate of 10%.	Sample of 10% of public servants, unclear if it is representative of the study universe. General characteristics of the sample not described, only that of women with unplanned pregnancies and induced abortion; characteristics of women with terminations performed by doctors or another person not described, preventing the identification of potential confounding variables; outcome variable (complications) measured only through woman's account; theoretical model for choice of analysis variables not explained.	17.8% reported unplanned pregnancies, of which 55.7% resulted in abortion, 70% of which before 1990; 62% of abortions performed by doctors; 22.9% of women with induced abortions required medical care and 16.6% were hospitalized; Abortion performed by a doctor associated with fewer complications (11.8% vs. 40.0%, $p < 0.001$) and hospitalizations (7.5% vs. 29.7%, $p < 0.002$).
Gomperts et al. [50]	Brazil (2011).	Case series; Restricted base; Information provided by women.	370 women who had a medical abortion provided by Women on Web; Information on outcome available for 307 women; 17% loss.	27.6% loss to follow-up of women who registered and received guidance and medication for terminating pregnancy; Information on gestational age at termination and occurrence of complications provided only by the woman, subjected to information bias;	67.1% without children, 66.1% sought a health service due to method failure; Outcome: 2.3% remained pregnant, 76.9% had complete abortions, 20.9% underwent surgical procedures (only 12.5% with symptoms compatible with procedure recommendations); Greater proportion of procedures among women who had medical abortions at 13 weeks of gestation or more.

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Table 3 (continued)

Reference	Location (years)	Study design	Population	Methodological limitations	Results
Severe maternal morbidity, maternal near miss and maternal mortality					
Camargo et al. [11]	Brazil (2006).	Cross sectional study (PNDS 2006); population base, national scope, urban and rural area; Maternal morbidity measured through interviews with women.	15,575 women aged 15-49 years.	Complications from miscarriages and induced abortions analyzed jointly, which may have underestimated the frequency of complications among induced abortions. Analysis without adjustment for confounding variables.	Greater occurrence of complications among women who had an abortion as the outcome of the pregnancy when compared with those who had a delivery as the outcome: hemorrhage (PR = 2.54, 95%CI: 1.85-3.49), infection (PR = 2.89, 95%CI: 1.34-6.24), any complication defined as severe maternal morbidity (PR = 2.29, 95%CI: 1.73-3.04).
Santana et al. [51]	Brazil (2009-2010).	Cross-sectional, hospital-based study; 27 reference hospitals located in all regions of the country; Data from hospital charts.	9555 women hospitalized with obstetric complications.	Authors did not inform the criteria used for classification of miscarriages and induced abortions; Theoretical model used for the selection of confounding variables not explained; Adjustment made for a large number of variables, which may have limited the statistical analysis.	2.5% of cases of severe maternal morbidity, maternal near miss and maternal death related to abortion; Abortion cases with a higher proportion of maternal near miss than other complications (PR = 1.93, 95%CI: 1.12-3.31); Mortality rate in cases of abortion higher (16.3%) than in other complications (11.6% ectopic pregnancy, 15.3% other causes); Higher prevalence of infection among unsafe abortions than among safe abortions (42.9% x 3.3%, $p < 0.002$); Factors associated with greater severity of complications in women who had abortions: preexisting diseases (sickle cell anemia and thalassemia, PR = 4.78, 95%CI: 2.85-8.01), low maternal weight (PR = 18.78 95% CI 5.44-64.81), pre-existing conditions (neoplasms, PR = 2.33; 95%CI: 1.37-3.94), access to services (transfer or referral, PR = 2.53, 95%CI: 1.39-4.62), previous uterine scarring (PR = 2.07, 95%CI: 1.08-3.97) and any delay in receiving adequate attention (PR = 2.80, 95%CI: 1.09-7.16).

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Table 3 (continued)

Reference	Location (years)	Study design	Population	Methodological limitations	Results
Severe maternal morbidity, maternal near miss and maternal mortality					
Souza et al. [52]	Paraná State, Brazil (2003-2005).	Cross-sectional study; Maternal deaths assessed by the state committee for the prevention of maternal mortality; MMR (total and abortion-specific) in the trienniums 1997-1999, 2000-2002, 2003- 2005 and analysis of the deaths from abortion in the triennium 2003-2005.	306 maternal deaths from 1997 to 2005 and 17 maternal deaths from abortion from 2003 to 2005.	8% of deaths of women of reproductive age from 2003 to 2005 not investigated, possible under-reporting of maternal deaths; Descriptive analysis of the cases (proportional distribution without calculating MMR from abortion according to women's characteristics); Some variables with a high proportion of uninformed data.	MMR for abortion per 100,000 live birth: 1997-1999 = 3.7; 2000-2002 = 4,3; 2003-2005 = 3,6; Of the 17 deaths from abortion in 2003-2005, 43.7% aged 20-29 years, 75% white, 64.3% less than 8 years of schooling, 40% 2 to 4 children, 33% first pregnancy. 59% of deaths caused by infection.
Souza et al. [53]	Santa Catarina State, Brasil (1996-2005).	Cross-sectional study, SIM data; Maternal deaths from abortion excluding ectopic pregnancies, hydatidiform mole and other abnormal products of conception.	31 maternal deaths associated with abortion.	Does not provide data on the investigation of deaths of womens of reproductive age that would enable assessment of possibility of under-reporting of maternal deaths in general and from abortion specifically; Descriptive analysis with calculation of MMR from abortion only according to region of residence.	MMR for abortion: 1.5 per 100,000 live birth, ranging from 1.3 to 5.1 in the six regions of the state; 45.16% among women aged 20-29 years, 51.6% married women, 38.7% with 1 to 8 years of schooling.
Figueiredo et al. [54]	Governador Valadares, Minas Gerais State, Brasil (2002-2004).	Cross-sectional study, data from SIM, SINASC and reports from maternal mortality committees.	5 maternal deaths.	One item not applicable (response rate).	5 identified maternal deaths, 4 direct obstetric deaths, 3 from complications from abortions (2 infected abortions and 1 from hemorrhage); Abortion as the cause of 60% of maternal deaths and 75% of direct obstetric deaths in the three-year period.

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Table 3 (continued)

Reference	Location (years)	Study design	Population	Methodological limitations	Results
Severe maternal morbidity, maternal near miss and maternal mortality					
Martins et al. [55]	Minas Gerais, Brasil (2000-2011).	Ecological study, time series; data from the SIM, underlying and associated causes.	82,790 deaths of women of reproductive age (10-49 years), of which 1,219 were maternal deaths.	No limitations were identified; One item not applicable (response rate).	15% of maternal deaths caused by abortion (n = 183); RMM from abortion stable in the period; 70.5% of the deaths from abortion among black women, 72.7% among women 20 to 34 years, single (68%) and with low educational level (40% missing); Multiple causes/underlying cause ratio of 1.38: 38% increase of abortion-related deaths after inclusion of associated causes; Main basic causes: unspecified abortion (33.8%), tubal pregnancy (21.1%), attempt failure (16.5%); Among the deaths identified by associated causes, 44% were not declared as maternal deaths in the underlying cause; Most frequent diagnoses: genitourinary disorders (22.7%) and unspecified sepsis (18.2%).
Galvão et al. [56]	Sergipe, Brazil (2011-2012).	Cross-sectional nested case-control study. Hospital database, hospital chart data.	16,243 deliveries, 1,102 cases of severe maternal morbidity, 77 cases of maternal near miss and 17 maternal deaths. In the case-control study, 77 cases of maternal near miss and 151 controls.	Limitations in statistical analysis: theoretical model for selection of confounding variables not explained; some variables poorly defined (for example, complications in pregnancy; type of delivery, with no differentiation between antepartum and intrapartum cesarean sections); variable "degree of consciousness", used in adjustment, is one of the components of the analyzed outcome (maternal near miss).	Maternal near miss ratio 5.8/1,000, severe maternal morbidity/maternal near miss 72.6/1,000, maternal near miss/ maternal morbidity ratio 4.5/1, mortality rate 18%; Abortion as a cause of 11.8% of maternal deaths in the period; Previous abortion associated with maternal near miss in the current pregnancy.

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Table 3 (continued)

Reference	Location (years)	Study design	Population	Methodological limitations	Results
Severe maternal morbidity, maternal near miss and maternal mortality					
Madeiro et al. [57]	Teresina, Piauí Brazil, (2012-2013).	Cross-sectional with a nested case-control study. Hospital database, hospital chart data.	5,841 births, 343 cases of severe maternal morbidity, 56 cases of maternal near miss and 10 cases of maternal death.	Limitations related to the analysis of factors associated with outcomes: absence of a theoretical model, problems in variable selection and definition.	Maternal near miss ratio 9.6/1,000; MMR = 171.2/100,000; Ratio of severe outcomes 11.2/1,000; Abortion as a cause of 1.8% of maternal near miss cases and 0.3% of cases of severe maternal morbidity; Infected abortion as the most frequent single cause of maternal death (30%); Cesarean section in current pregnancy was the only factor associated with maternal near miss in the final model.
Kale et al. [58]	Rio de Janeiro, Niterói and São Paulo, Brazil (2011).	Cross-sectional hospital-based study (public hospitals: 4 in São Paulo, 1 in Niterói, 1 in Rio de Janeiro); Interviews with women, in addition to extraction of data from medical charts, prenatal card and SIM.	7,845 women.	Non-random sample of services; Type of participant selection in each service not informed. Abortion classification criteria not informed; Study design not suitable for rare events, resulting in only one identified maternal death.	One maternal death was identified (MMR 13.6 per 100,000 live birth), not associated with abortion; 498 abortions; Proportion of unsafe abortions: Rio de Janeiro:11.9%; São Paulo: 1%; Misoprostol as the most commonly reported method of termination.
Mental health outcomes					
Benute et al. [59]	Location not informed, (2001-2002).	Cross-sectional, hospital-based, interviews.	50 women with spontaneous abortion and 50 women with unsafe abortions admitted to the Emergency Room of a University Hospital. Interview 30 days after abortion.	No information on parameters for sample calculation, procedures for case identification and inclusion, number of losses and refusals, and technique used to measure unsafe abortions; Inadequate analysis model, with no strategies for controlling confounding.	Depression and anxiety scores measured through the Hospital Anxiety and Depression scale, higher in women with unsafe abortions than in women with miscarriage; Anxiety: 11.0 (presence of anxiety) x 8.7 (likely presence), $p < 0.05$; Depression: 8.3 (likely presence of depression) x 6.1 (absence of depression), $p < 0.05$.

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Table 3 (continued)

Reference	Location (years)	Study design	Population	Methodological limitations	Results
Mental health outcomes					
Ludermir et al. [60]	Recife, Pernambuco, Brazil (2005-2006).	Cross-sectional (prospective cohort baseline); Population base (low income, 15% of the Recife population); Interviews using SRQ-20 to measure CMD.	1,133 pregnant women aged 18 to 49 years in the third trimester of pregnancy; 1,104 with information for all variables.	It is unclear if measuring unsuccessful abortion attempts during pregnancy using direct interviews is a valid and reliable method.	13,7% of pregnant women attempted abortion; Prevalence of CMD: 43.1% (total sample), 63.6% (women who attempted abortion); Attempted abortion associated with common mental symptoms: score >7 (adjusted OR = 2.05, 95%CI: 1.3-3.1), score > 11 (adjusted OR = 1.73, 95%CI: 1.1-2.8).
Ludermir et al. [61]	Recife, Pernambuco State, Brazil (2005-2006).	Prospective cohort. Population base (low-income women, 15% of the Recife population); Interviews with women; Use of the SRQ-20 to measure CMD and the Edinburgh scale to measure postpartum depression.	1,057 pregnant women aged 18 to 49 years who completed the postnatal interview (94.3% of the baseline).	It is unclear if measuring unsuccessful abortion attempts during pregnancy using direct interviews is a valid and reliable method.	Prevalence of postpartum depression: women who did not consider abortion (22%); women who wanted an abortion but did not attempt one (32%); women who attempted abortion (41%); Attempted abortion associated with postpartum depression: adjOR 1.59 (95%CI: 1.0-2.5); Average score on the Edinburgh scale: women who did not consider abortion (7.25); women who wanted an abortion but did not attempt one (9.49); women who attempted abortion (10.66); Non-significant differences after adjusting for other variables (adjusted OR = 1.43, 95%CI: 0.4-2.4).

95%CI: 95% confidence interval; AdjOR: adjusted odds ratio; CMD: Common Mental Disorders; DSM-IV-TR: *Diagnostic and Statistical Manual of Mental Disorder* IV, *text revised*; ICD: International Classification of Diseases; MMR: maternal mortality ratio; NS: not significant; PNDS: *Brazilian National Demography and Health Survey*; PR: prevalence ratio; SIH: Brazilian Hospital Information System; SIM: Brazilian Mortality Information System; SINASC: Brazilian Live Births Information System; SRQ-20: *Self-Reporting Questionnaire*; WHO: World Health Organization.

abortions supported by the organization Women on Web in 2011 [50] showed that most (76.9%) evolved to a complete abortion; 20.9% of women later had to be submitted to a surgical procedure, and this was more common among pregnancies at 13 weeks or more.

Nine studies investigated severe maternal morbidity and maternal mortality associated with abortion [11,51,52,53,54,55,56,57,58], two of which had a national scope [11,51]. Data from the 2006 PNDS indicated an occurrence of complications (especially hemorrhagic and infectious) among women who had abortions two times higher than that among women who had had deliveries [11]. A study conducted in 27 reference hospitals [51] verified that, even though only 2.5% of cases of severe maternal morbidity, maternal near miss (a woman who almost died, but survived a severe complication during pregnancy, delivery or up to 42 days after delivery) and maternal death resulted from complications from abortions, when they were present, they were more severe, with a significantly higher proportion of maternal near miss relative to the other obstetric causes. Women's pre-existing conditions, low maternal weight, admission to the reference service or transferal from other units and any kind of delay in receiving adequate care were associated with maternal near miss in cases of abortion [51].

Two local population studies assessed maternal mortality using data from the Braziliam Mortality Information System (SIM). In Paraná, data from the State Committee to Prevent Maternal Mortality showed stability in the Maternal Mortality Ratio (MMR) for abortion/100,000 live birth in the triennium 1997-1999 (3.7), 2000-2002 (4.3) and 2003-2005 (3.6). In the last triennium, 59% of deaths from abortion were a result of infectious complications [52]. In Santa Catarina State, from 1996 to 2005, the MMR for abortion, according to SIM data (excluding cases of ectopic pregnancy, hydatidiform mole and other abnormal products of conception) was of 1.5 per 100,000 live births, with a variation from 1.3 to 5.1 in the six state regions. Researchers observed a greater proportion of deaths among women aged 20-29 years (45.2%) with 1-8 years of schooling (38.7%) and who were married (51.6%) [53]. In Governador Valadares, Minas Gerais State, only five maternal deaths were recorded in the triennium 2002-2004, three of which resulted from complications from abortion [54]. A time series of maternal mortality, from 2000 to 2001, in Minas Gerais State [55], identified a 38% increase in deaths from abortion, when associated causes – and not only the underlying cause of death – were included; 44% of new deaths identified in the study had not been classified as maternal in the underlying cause [55].

Three local, hospital-based studies assessed maternal morbimortality. In Sergipe State, researchers found that abortion was the cause of 11.8% of maternal deaths from 2011 to 2012 [56], and in Piauí an investigation carried out in 2012-2013 showed that infected abortion was the most frequent isolated cause of maternal death (30%) [57]. Both studies also assessed the occurrence of maternal near miss, with previous abortion being associated with maternal near miss for that pregnancy in Sergipe [56]. In the Piauí study, only cesarean delivery in the current pregnancy was associated with maternal near miss [57]. Lastly, a study conduced in hospitals in the municipalities of Rio de Janeiro, Niterói and São Paulo with 7,845 women identified only one maternal death, which was not associated with abortion [58].

We also identified studies that assessed mental health outcomes. One such study, which had many methodological limitations, assessed women's depression and anxiety scores 30 days after abortion, using the *Hospital Anxiety and Depression* scale. It found a significantly higher mean of depression (8.3 vs. 6.1, $p < 0.05$) and anxiety (11.0 vs. 8.7, $p < 0.05$) among women with unsafe abortions, when compared with those with miscarriages [59]. Two articles [60,61] from a longitudinal study assessed the mental health of women in Recife interviewed in the third trimester of pregnancy. In the baseline, the global prevalence of common mental disorders (CMD), assessed using the SRQ-20, was 43.1%, while among those who reported having attempted an abortion (13.7%), the occurrence was of 63.6% [60]. In the follow-up interviews, conducted, on average, 8.1 months after delivery, an abortion attempt was associated with postpartum depression, using the *Edinburgh Scale* [61].

Discussion

Approximately one fourth of the scientific production on unsafe abortions in the period was composed of quantitative studies that analyzed the three aspects addressed in this review. Direct estimates of usafe abortions prevalence in national-scope studies varied between 2.3% [11] and 16.3% [14]. In local studies, these estimates varied between 1.2% among women aged 15-24 years [26] and 81.9% among sexually active girls aged 12-19 years who had been pregnant [28]. The estimated occurrence varied between 865,000 [16] and 503,000 [13] abortions in the country from 2013 to 2015.

This large variation may be explained in large part by the different methodological approaches used and the different populations studied. Some works included the total of women of reproductive age (with different age limits) [10,11,12,13,14,15,16,19,20,21,23], and others focused only on young women [25,26,27,28], or women with a previous pregnancy [17,22,23,24], or a specific population group [29,30,31,32,33,34,35]. Studies with direct methods employed face-to-face interviews [10,11,14,17,21,22,23,24,25,26,27,29,31,32,33,35], self-administered questionnaires [28], ballot box method [12,13,30,34] or the RRT [21], the latter with lower possibility of under-reporting. Indirect estimates [15,16,19,20], in turn, used the AGI methodology, with parameters for the correction of miscarriages, abortions that do not result in hospitalization and abortions with hospitalization in the private sector, which are not captured by the SIH database, which is restricted to hospitalizations with public funding. These parameters are subject to imprecision and have been the object of debates. It is worth noting that, due to the illegality and the stigma surrounding abortion, imprecisions occur regardless of the chosen method and technique [62].

The rate of 16 unsafe abortions/1,000 women of reproductive age in 2013 [16], estimated using an indirect method, is inferior to global estimates for the 2010-2014 period, with a similar value to that observed in North America (17/1,000), Western European countries (18/1,000) and Oceania (19/1,000) [2]. The 2016 PNA estimate, of 503 thousand abortions in 2015, corresponding to approximately 17.5% of births in that year, is also inferior to global estimates of 25% of abortions among pregnancies from 2010 to 2014, and is similar to those of North America (17%), Oceania (16%) and countries from all regions of Africa [2]. However, there are persistent differences between the country's regions, states and municipalities [15,16]; social inequalities, with higher rates among black women [13,23] and among women with low income and educational levels [13,23,24]; and among specific populations, such as young people in the beginning of their reproductive lives [27,28]; children, adolescents and youths living on the street [29], sex workers [34], alcohol [14] and illicit drug [35] users and WLHA [30,31,32,33].

With regard to previous reviews [4,5], there was an increase in population studies and in studies in the Northeastern Region, investigating factors associated with unsafe abortions. The determinants of abortions should be cautiously interpreted due to the methodological limitations we identified, such as: broad use of the cross-sectional design, less appropriate for causal inferences; distinct ways of measuring unsafe abortions; lack of explicit theoretical models; and measuring variables and the moment of the interview and not at the time when the unsafe abortions occurred. Additionally, the use of selected populations and small samples reduces the potential for generalization of results. Taking these caveats into account, unsafe abortions was nonetheless associated with low income [24,42], non-white race/color [10,17,23,30,42] and being single [21,22,31,35,36,37,38], corroborating the vulnerability of segments of women who have unsafe abortions in Brazil, just as in other low- and middle-income countries [63,64]. Although the peak of having an abortion is situated between 20 and 29 years, in most studies, unsafe abortions occurrence increased with age [10,17,22,24,30,31], which can be explained by the longer time of exposure to unplanned pregnancies. Likewise, there was a positive association with a larger number of pregnancies and/or living children [10,22,24,27,31,34,38], suggesting the use of abortion as a way of regulating procreation, in the absence or failure of contraception [65,66]. Having a sufficient number of children was the main reason for having an unsafe abortions in a systematic review of the subject [64].

Sexuality and reproduction in adolescence involve complex, singular issues, dependent on socioeconomic context [67,68,69]. In this review, the analysis of young populations did not find consistent results regarding age and having an abortion [25,27,28]. A single study which assessed educational level in this population found a positive and growing association with the number of years of schooling [27]. Access to contraception is higher among those with higher income and educational levels, a segment in which an unplanned pregnancy competes with educational, professional and career projects, leading to its termination [69,70]. Additionally, it is likely that these adolescents have greater access to resources for terminating pregnancies in safe conditions, with a higher likelihood of surviving an abortion and, therefore, being able to report it.

The number of partners was also associated with abortion [17,23,27,30,31], probably because pregnancies occur in less-established relationships in which contraception may be less regular and in which the acceptance of a child project is less likely [71]. It is worth noting that men's role in trajectories leading up to abortion is a gap pointed out by previous reviews of the subject [4,5] and that persists in this review. Only three recent studies included men [25,26,29], all from adolescent and young populations, addressing only the account of the experience of abortion. In two of these [25,26], reports of abortions were more frequent among men than among women in the study population, which may be explained by lesser embarrassment in declaring it or the greater number of affective-sexual relationships susceptible to unwanted pregnancies.

Studies with specific populations, such as homeless children, adolescents and youths [29], patients undergoing addiction treatment [35] and WLHA [30,31,32] identified an increased vulnerability in these populations, with early sexual initiation [29,30,32,72], illicit drug use [32,35], greater number of sexual partners [29,30,31,32,35], sex in exchange for money [29,32], irregular condom use [35] and physical and/or sexual violence [32,73], resulting in early pregnancies [29,32] that are unplanned/unwanted [32] and more frequent unsafe abortions. A national survey also found a dose-response effect between alcohol use and unprotected sex, pregnancy before the age of 20 and having an unsafe abortion at some point in life [14].

A relevant finding that is consistent with previous reviews is the trend of a sharp reduction of hospitalizations from abortion between 1995 and 2013 [15,16,19,20,44,45,46,47], especially for severe

complications [44]. A 2012 estimate of hospitalizations due to complications from unsafe abortions among women aged 15-44 years in developing countries found rates varying between 2.4 to 14.6 per 1,000, with the lower rate observed in Brazil [3]. Regional inequalities, with higher values in the North and Northeast, however, remained both in direct [13,30] and indirect [15,16,45] estimates.

Since national studies with direct estimate did not show a reduction in unsafe abortions prevalence – 2.4% and 2.3% in the two PNDS, which were ten years apart [10,11], 15% and 13% in the 2010 and 2016 PNA [12,13] – a possible explanation for the reduction in hospitalizations is the lower occurrence of complications from unsafe abortions resulting from the use of safer methods, among which misoprostol [74]. In both PNA [12,13], approximately half of the women used medications to terminate pregnancy, a finding confirmed by local studies [34,39,48,58]. Medication abortion is a safe and efficient method when employed in the first gestational trimester [75]. In this review, in the only study that did not find an association between misoprostol and the reduction of complications, there seems to have been an under-reporting of the medication's use; in any case, women who used other abortive methods had higher proportions of hemorrhagic and infectious complications [37].

Despite the reduction in the hospitalization rate, the absolute number of hospitalizations from complications from usanfe abortions is high, estimated at approximately 110,000 in 2012, with costs for the health system [3]. Hypotheses for this high number include unmet contraceptive needs, especially among women with greater social and economic vulnerability [76]; still limited access to safe methods to terminate pregnancy [77,78,79], including inadequate use of misoprostoll [80,81,82]; and local health care practices of hospitalizing women before the abortion is completed. Studies on women's trajectories indicate that they are instructed to go to a hospital as soon as they start bleeding [80,81]. In the accounts from cases from the organization Women on Web, researchers also found a high proportion of curettages for finalizing abortion in Brazil, which may be related to local practices for managing abortion, since a small proportion of women had complications compatible with the use of this surgical procedure [50].

Despite the reduction of hospitalizations and severe complications, avoidable morbimortality persists in the country. The studies we analyzed show that abortion represents a small proportion of maternal near miss. However, women with severe maternal morbidity caused by abortion had a higher proportion of maternal near miss than those with severe maternal morbidity due to other pregnancy outcomes [51]. In the 2006 PNDS, pregnancies that ended in abortion had twice the complications of those that ended in deliveries [10]. Unsafe abortions, when compared with safe abortions, also had a significantly higher number of complications from infections in a national survey [51]. The proportion of maternal deaths from abortion and the rate of specific maternal mortality from abortion vary, reaching high values in specific locations, such as Governador Valadares [54]. Abortion as a cause of maternal morbimortality, both among adults and adolescents, has been reported in low- and middle-income countries [83,84,85]. The most recent estimate indicates abortion to be the cause of 9.9% (95%CI: 8.1%-13.0%) of maternal deaths in Latin America and the Caribbean [85], with the possibility of under-reporting [85,86]. In this review, a study showed a 38% increase of abortion as a cause of maternal mortality when the multiple causes criterion was used [55].

Delays in adequate obstetric care are associated with a higher occurrence of severe maternal outcomes [87]. Taking into consideration the illegality of abortion, one may assume that these delays occur either because women delay seeking services due to lack of social support [88], fear of admitting an illegal practice [82] or due to the stigma associated with abortion [88,89]; or because of the difficulty accessing health care services or a timely offer of care [88]. Studies conducted in the Northeast showed low quality of the care offered to women hospitalized due to complications from abortion, measured through an analysis of the service structure and of women's perception of the care they received [90,91,92]. The delay in seeking care and the occurrence of delayed complications from induced abortion increase the distance between the death and the abortion itself, which may contribute to its omission as an underlying cause in the death certificate, favoring its under-reporting as a cause of maternal death [55].

Lastly, negative mental health outcomes were found among women with unsuccessful termination attempts, even after adjusting for prior mental disorder [60,61]. A systematic review of the association between abortion and mental health outcomes, including studies published between 1995 and 2009, estimated that women who had induced abortions had an 81% higher risk of presenting negative outcomes of several types, including use of illegal drugs, suicidal behavior, alcohol use, depression

and anxiety [93]. However, recent prospective studies on the voluntary termination of pregnancy in the United States and Sweden did not show an association between depressive symptoms [94] or post-traumatic stress [95] and abortion of unwanted pregnancies. Women with post-induced abortion post-traumatic stress symptoms were, are a higher proportion, young, with low educational levels, higher levels of anxiety and depression and greater need for counseling than those who did not develop symptoms [95]. In the United States, women who were denied abortions had higher anxiety levels at the beginning of follow-up than those who had abortions [96]. In the Brazilian context, in which abortion is illegal and women who seek clandestine abortions are subjected to unsafe methods, it is to be expected that an unwanted pregnancy represents an even greater psychological and emotional stress, aggravated by the stigma surrounding abortion in health services.

Some limitations of the review must be addressed. The review protocol was not registered. There is a possibility of publication bias because there were no searches beyond those of the MEDLINE and LILACS databases, complemented by references cited in the articles. Although we used many combinations and keywords, related articles may have escaped the search. It is worth noting that the only article selected based on its abstract, but not included, estimated unsafe abortions prevalence among sex workers, a population addressed by another study included in the review. Another possible limit could be a consequence of the instrument we used to assess the articles' quality. The blind, independent assessment by two researchers, as well as the resolution of disagreements by consensus, sought to minimize classification bias.

Conclusions

Abortion is frequently used in Brazil, especially in less developed regions and by more socially vulnerable women. Access to safer methods for terminating pregnancy probably contributed to the reduction of complications, hospitalizations and morbimortality from abortion. However, the MMR from abortion, while potentially avoidable, remains high in specific contexts, and may be underestimated in the country due to under-reporting. Half of all women still resort to non-medication methods and the number of hospitalizations is high. The scientific production with quantitative data is small and lacks methodological adequacy. There are few studies conducted outside of capitals and large centers, in private clinics or out of the public network. Finally, the effects of stigma and racism in the increase of women's vulnerabilities to unsafe practices and lower quality of health care must be contemplated in future investigations.

Contributors

R. M. S. M. Domingues and S. C. Fonseca participated in study conception, data acquisition, analysis and interpretation, writing, critical review and approval of the final article version. M. C. Leal participated in the critical review and approval of the final article version. E. M. M. L. Aquino and G. M. S. Menezes participated in study conception, data interpretation, critical review and approval of the final article version.

Additional informations

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Resumo

O objetivo deste estudo é atualizar o conhecimento sobre o aborto inseguro no país. Foi realizada uma revisão sistemática com busca e seleção de estudos via MEDLINE e LILACS, sem restrição de idiomas, no período 2008 a 2018, com avaliação da qualidade dos artigos por meio dos instrumentos elaborados pelo Instituto Joanna Briggs. Foram avaliados 50 artigos. A prevalência de aborto induzido no Brasil foi estimada por método direto em 15% no ano de 2010 e 13% no ano de 2016. Prevalências mais elevadas foram observadas em populações socialmente mais vulneráveis. A razão de aborto induzido por 1.000 mulheres em idade fértil reduziu no período 1995-2013, sendo de 16 por 1.000 em 2013. Metade das mulheres referiu a utilização de medicamentos para a interrupção da gestação e o número de internações por complicações do aborto, principalmente complicações graves, reduziu no período 1992-2009. A morbimortalidade materna por aborto apresentou frequência reduzida, mas alcançou valores elevados em contextos específicos. Há um provável sub-registro de óbitos maternos por aborto. Transtornos mentais comuns na gestação e depressão pós-parto foram mais frequentes em mulheres que tentaram induzir um aborto sem sucesso. Os resultados encontrados indicam que o aborto é usado com frequência no Brasil, principalmente nas regiões menos desenvolvidas e por mulheres socialmente mais vulneráveis. O acesso a métodos mais seguros provavelmente contribuiu para a redução de internações por complicações e para a redução da morbimortalidade por aborto. Entretanto, metade das mulheres ainda recorre a outros métodos e o número de internações por complicações do aborto é ainda elevado.

Aborto Induzido; Revisão Sistemática; Inquéritos Epidemiológicos

Resumen

El objetivo de este estudio es actualizar el conocimiento sobre el aborto inseguro en el país. Se realizó una revisión sistemática con búsqueda y selección de estudios vía MEDLINE y LILACS, sin restricción de idiomas, durante el período de 2008 a 2018, con una evaluación de la calidad de los artículos mediante instrumentos elaborados por el Instituto Joanna Briggs Institute. Se evaluaron 50 artículos. La prevalencia de aborto inducido en Brasil se estimó por el método directo en un 15% durante el año 2010 y en un 13% durante el año 2016. Se observaron prevalencias más elevadas en poblaciones socialmente más vulnerables. La razón de aborto inducido por 1.000 mujeres en edad fértil se redujo durante el período de 1995-2013, siendo de 16 por 1.000 en 2013. La mitad de las mujeres informó sobre la utilización de medicamentos para la interrupción de la gestación y el número de internamientos por complicaciones del aborto, principalmente complicaciones graves, se redujo durante el período 1992-2009. La morbimortalidad materna por aborto presentó una frecuencia reducida, pero alcanzó valores elevados en contextos específicos. Existe un probable subregistro de óbitos maternos por aborto. Trastornos mentales comunes en la gestación y depresión posparto fueron más frecuentes en mujeres que intentaron inducir un aborto sin éxito. Los resultados encontrados indican que el aborto es usado con frecuencia en Brasil, principalmente en las regiones menos desarrolladas y por mujeres socialmente más vulnerables. El acceso a métodos más seguros probablemente contribuyó a la reducción de internamientos por complicaciones y a la reducción de la morbimortalidad por aborto. Sin embargo, la mitad de las mujeres todavía recurre a otros métodos y el número de internamientos por complicaciones del aborto es todavía elevado.

Aborto Inducido; Revisión Sistemática; Encuestas Epidemiológicas

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