

Effectiveness of Digital Brief Interventions in Reducing Alcohol Use Among Women: Systematic Review and Meta-Analyses

ANA VITORIA CORRÊA LIMA, JESSICA LIMA DE OLIVEIRA PINHEIRO GAIA, TALITA DUTRA PONCE, DIVANE DE VARGAS

Submitted to: Journal of Medical Internet Research
on: August 29, 2025

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ANA VITORIA CORRÊA LIMA¹; JESSICA LIMA DE OLIVEIRA PINHEIRO GAIA¹; TALITA DUTRA PONCE¹; DIVANE DE VARGAS¹

¹ SCHOOL OF NURSING OF UNIVERSITY OF SÃO PAULO SAO PAULO BR

Corresponding Author:

ANA VITORIA CORRÊA LIMA

SCHOOL OF NURSING OF UNIVERSITY OF SÃO PAULO

Av. Dr. Enéas Carvalho de Aguiar, 419 - Cerqueira César

SAO PAULO

BR

Abstract

Background: Alcohol consumption among women is rising globally, yet it remains underestimated and under-screened in healthcare. Women face greater health risks from alcohol use compared to men, even at lower levels of consumption. Digital Brief Interventions have emerged as a scalable strategy to reduce harmful drinking. Previous reviews often focus on pregnant women or feasibility studies. There is a need to synthesize evidence on the effectiveness of e-BI among women more broadly.

Objective: to analyze the effectiveness of digital Brief Intervention in reducing alcohol use among women with harmful alcohol patterns.

Methods: systematic review, which included experimental and quasi-experimental studies that evaluated the effectiveness of digital Brief Intervention for women of all ages, through information and communication technologies, published between 2003 and 2024. For the comparison group, any intervention other than that of interest or no intervention was considered. The databases searched included the Virtual Health Library (BVS Portal), Cumulative Index to Nursing & Allied Health Literature (Cinahl), PubMed, Web of Science, EMBASE, and Scopus.

Results: the sample consisted of eight studies, of which 62.5% involved pregnant or postpartum women. The most commonly used information and communication technologies for implementing digital Brief Intervention were tablets, computers, and smartphones. The control groups received different interventions, such as a questionnaire on personal tests in music and video clips, information on child nutrition, and counseling. Most of the studies were conducted in developed countries.

Conclusions: Conclusion: this review indicated that digital Brief Intervention was effective in reducing alcohol consumption among women. The scarcity of studies on the subject in low-income countries is noteworthy, as it points to a gap in knowledge and the need for research to be conducted outside high-income cultures. Clinical Trial: Trial Registration: PROSPERO CRD42024602967.

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(JMIR Preprints 29/08/2025:83245)

DOI: <https://doi.org/10.2196/preprints.83245>

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Original Manuscript

Effectiveness of digital Brief Interventions in reducing alcohol use among women: systematic review and meta-analyses

Abstract

Background: Alcohol consumption among women is rising globally, yet it remains underestimated and under-screened in healthcare. Women face greater health risks from alcohol use compared to men, even at lower levels of consumption. Digital Brief Interventions have emerged as a scalable strategy to reduce harmful drinking. Previous reviews often focus on pregnant women or feasibility studies. There is a need to synthesize evidence on the effectiveness of e-BI among women more broadly. **Objective:** to analyze the effectiveness of digital Brief Intervention in reducing alcohol use among women with harmful alcohol patterns. **Methods:** systematic review, which included experimental and quasi-experimental studies that evaluated the effectiveness of digital Brief Intervention for women of all ages, through information and communication technologies, published between 2003 and 2024. For the comparison group, any intervention other than that of interest or no intervention was considered. The databases searched included the Virtual Health Library (BVS Portal), Cumulative Index to Nursing & Allied Health Literature (Cinahl), PubMed, Web of Science, EMBASE, and Scopus. **Results:** the sample consisted of eight studies, of which 62.5% involved pregnant or postpartum women. The most commonly used information and communication technologies for implementing digital Brief Intervention were tablets, computers, and smartphones. The control groups received different interventions, such as a questionnaire on personal tests in music and video clips, information on child nutrition, and counseling. Most of the studies were conducted in developed countries. **Conclusion:** this review indicated that digital Brief Intervention was effective in reducing alcohol consumption among women. The scarcity of studies on the subject in low-income countries is noteworthy, as it points to a gap in knowledge and the need for research to be conducted outside high-income cultures.

Trial Registration: PROSPERO CRD42024602967.

Keywords: Digital health interventions; Alcohol consumption; Women's health; Brief Intervention.

INTRODUCTION

Globally, 46 million women experience problems related to alcohol consumption, with the highest prevalence in the American continent. In 2016, 42% of women over the age of 15 in the Americas consumed alcohol, whereas the global average for the same period was 32.3% [1]. While overall consumption remains high, recent data from 2019 highlight a marked gender difference in high-risk patterns: 10% of females compared to 24% of males engaged in age-standardized heavy episodic drinking [2]. Although historically alcohol consumption is often related to the male sex, it has been observed that the difference between the number of men and women who consume alcohol has been decreasing [3,4,5,6].

Women are more susceptible to the harmful effects of alcohol, even if they consume the same or smaller amounts than men, they are more likely to develop liver and cardiovascular problems, some types of cancers, such as breast cancer [7,8], and problems related to infectious diseases [9]. Women are also at greater risk of developing alcohol dependence sooner than men [10,8,11].

Alcohol consumption during pregnancy, even in small quantities, can result in adverse fetal outcomes, including intrauterine growth restriction, low birth weight, prematurity, congenital anomalies, and Fetal Alcohol Spectrum Disorders (FASD) [2]. Consequently, complete abstinence from alcohol is recommended throughout pregnancy [12,13,6]. Early identification and timely intervention are essential to reduce alcohol consumption among pregnant women and prevent associated health risks.

The consumption of alcohol by women underscores the heightened health risks inherent in this behavior. We can, therefore, assert the escalating necessity of effective strategies that facilitate access to information and direct preventative actions against alcohol use in women. Brief Intervention (BI) is an effective care strategy for reducing alcohol consumption and the harm caused by it in this population [14,15,16,17].

Brief intervention (BI) focuses on modifying patient behavior concerning alcohol consumption to mitigate alcohol-related harm and facilitates the identification of individuals engaged in risky or harmful alcohol use. Brief interventions can be administered either in-person or through information and communication technologies (ICTs) the latter approach, has consistently demonstrated equivalent effectiveness when compared to traditional in-person methods [18,19,20,21,22,23].

A systematic literature review identified that Brief Intervention yielded mostly positive results in reducing alcohol consumption among women, both in the number of days of consumption and in the number of doses [24]. Studies employing Brief Intervention in face-to-face or digital formats were included. Although the intervention demonstrates encouraging outcomes, there was a lack of in-depth analysis regarding variations across delivery formats. Furthermore, a review with similar objectives focusing on pregnant women [25] incorporated three studies employing computer-mediated brief intervention. Nevertheless, it also did not expand upon a detailed discussion of efficacy comparisons, for instance.

A review investigating methods for preventing alcohol use during pregnancy [26] indicated that studies on computer-delivered BI were either feasibility and acceptability or pilot studies. Outcomes demonstrated the feasibility of these approaches, but with limited sample sizes to evaluate effectiveness. Another research with the aim of investigating whether digital interventions are effective in preventing alcohol consumption during the pregnancy/pregnancy-planning period, analyzed six studies in the final review [27]. They found that digital interventions for preventing alcohol consumption during pregnancy may be effective, especially on computer/internet-based platforms. The author also affirms that digital technologies are being embraced rapidly for personalized health care. Furthermore, this study shows the potential of digital technologies that may help pregnant women and women planning to become pregnant, however, it does not include women at other stages of life.

There is evidence that women are less likely to seek help and report more reasons for not seeking help when compared to men [28]. Furthermore, alcohol consumption among women is underestimated, and they are sometimes not screened for alcohol use, which constitutes a barrier to the detection, prevention, care, and longitudinal monitoring necessary to reduce their consumption and health risks [29,6,30,25,31].

Considering the increase in alcohol consumption among women and the potential harm to physical and mental health, in addition to social, economic, and cultural harm, studies have suggested the effectiveness of digitally brief interventions in this population. However, there are no systematic reviews available on their effectiveness. This study maps and analyzes the scientific evidence found in the literature on the effectiveness of digital BI for reducing alcohol consumption and alcohol use among women.

METHODS

This is a systematic review with a meta-analysis conducted according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) checklist. The absence of previous records or publications in the PROSPERO system was verified. The protocol of this systematic review was prospectively registered in the PROSPERO international database (CRD42024602967).

Eligibility Criteria

This review considered studies that included female participants over 18 years of age, of reproductive age, pregnant, or in the postpartum period who had risky or harmful alcohol consumption. Studies focus was solely on fetal health were excluded. All data derived from experimental and quasi-experimental study designs, including randomized controlled trials (RCTs) that evaluated the effectiveness of brief interventions (digital BI) using ICT, written either in English, or Spanish or Portuguese and available of the full-text were considered.

Search strategy

The search strategy for the studies was conducted online in databases with the aim of locating all published studies that addressed the topic. Words contained in the titles and abstracts were analyzed to identify alternative terms and their similarities using the PICO strategy (P - population; I - intervention of interest; C - comparator; and O - results). Thus, the following question was formulated: How effective is the digital BI in reducing alcohol consumption among women users of health services? Therefore, the PICO strategy was the following: P - women; I - electronic-Brief Intervention, C - any other intervention; and O - reduction in alcohol consumption. The descriptors indexed in the Health Sciences Descriptors (DeCS) and Medical Subject Headings (MeSH) in Portuguese and English were used in combination with the Boolean operators AND and OR. The current review only considered experimental (RCTs) and quasi-experimental trials. Experimental and quasi-experimental designs are prioritized because they provide the strongest causal inference on intervention effectiveness by incorporating randomization or well-defined comparison groups, thereby minimizing selection bias and confounding.

The databases searched included the Virtual Health Library (Portal BVS), Cinahl, PubMed, Web of Science, EMBASE, and Scopus. The date range of the studies between 2003 and 2024 and delimitation of the period, is justified to encompass the evolution and increasing integration of digital technologies in healthcare, particularly in the development and implementation of brief digital interventions and by the increase in people's access to ICTs.

Article Selection

The studies were selected through the following steps: identification of the theme and selection of the hypothesis; establishment of criteria for the inclusion and exclusion of studies; definition of the information to be extracted from the selected studies; categorization of the studies; evaluation of the studies included in the review; interpretation of the results; and presentation of the review/synthesis of knowledge [32].

Six main databases were searched, and 496 articles were identified, 326 duplicate articles were excluded using the EndNote® bibliography manager, and 170 studies were selected and exported to the Rayyan® application for analysis.

The reports were prepared through three screening stages, resulting in the final inclusion in this systematic review. In the first phase of the review, the articles included in Rayyan® were independently evaluated by three reviewers, who read the title and abstract, carefully following the inclusion criteria, and made comments that justified the inclusion or exclusion in the review. If there was any discrepancy, the article was discussed with a fourth reviewer.

The second phase involved importing the selected studies into Microsoft Excel® to create a table with the results of the review. The authors independently read the complete articles selected for the review. If there was any divergence of opinion, the three reviewers discussed the reasons for excluding the study.

The third phase assessed the methodological aspects of the quality of each study. The results of this screening and study selection process are presented in the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) flowchart.

Data extraction

After reading the full text, the studies included in the review were synthesized. Data

extraction was conducted with a pre-piloted, standardized form designed to capture all information needed for synthesis while minimizing transcription error. Three independent reviewers extracted study identifiers (authors, year, country), participant characteristics (sample size, age, settings), intervention (ICT) and comparator and all reported outcome statistics. Discrepancies were resolved by discussion or, when necessary, consultation with a fourth reviewer, and consensus values were entered into a centralized spreadsheet with built-in range and logic checks. When information was missing or unclear, corresponding authors were contacted twice; if no reply was received, the item was coded as “not reported” and its potential impact was considered in the risk-of-bias assessment.

Data Analysis

A narrative synthesis approach was used in this systematic review.

Interventions

The types of interventions included in this review were: interactive three-dimensional film software [32,20,33], “Drinkwise” software [34], questionnaires and motivational guidance [35,36,37,19]. The included interventions also pertained to and the three main ICTs used were: I) Interactive computers; II) Tablet and interactive videos; and III) Telephone motivational guidance. Studies that reported the use of any of these interventions and ICTs were reviewed in full.

Comparators

This review considered studies that used enhanced usual care comparators, guidance from healthcare professionals [38,39], educational pamphlet [20], video clips [35,36], no intervention [34] and/or assessment only [19].

RESULTS

A systematic literature search returned 496 studies. After and after removing 326 duplicates, the remaining 170 studies were screened based on their titles and abstracts. Of

these, 125 were excluded because they did not meet the eligibility criteria in the titles and abstracts and two did not have available abstracts available. The remaining 45 studies were reading, of which 35 were excluded based on the full-text review, and two were not available for full reading even after contact with the main author. An email was sent to the corresponding authors of these two articles, but contact was unsuccessful. After this process was completed, the sample consisted of 8 studies. The PRISMA of the review process for the selection and inclusion of studies, as well as the justification for exclusion, are presented in Figure 1. After selection, the main findings of the eight studies are presented in Table 1.

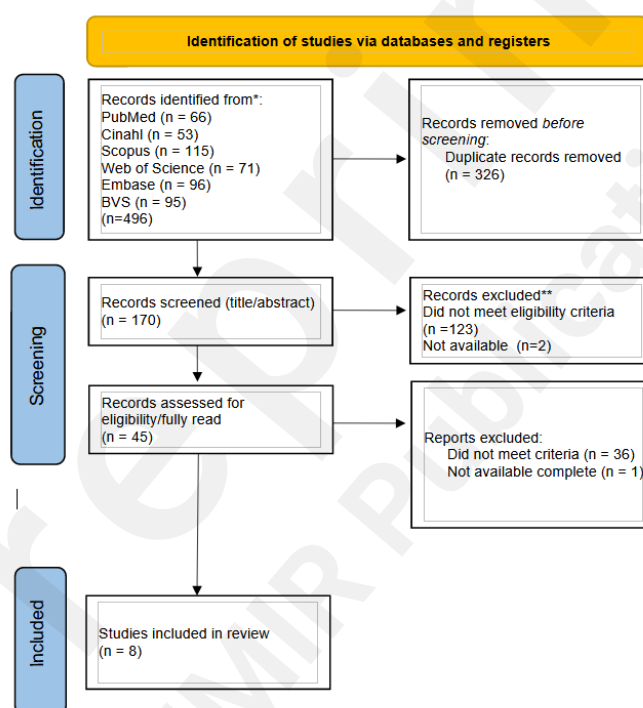


Figure 1: PRISMA diagram, São Paulo, 2025.

AUTHORS/ STUDY	Study site	Sample (n)	STUDY OBJECTIVE	Study design	Intervention and ICT used	Comparator	Results	Conclusions
FORRAY, A.; MARTINO, S.; GILSTAD- HAYDEN, K.; KERSHAW, T.; APENDERSMA, S.; OLMSTEAD,	United States	Women users of reproductive health services that were or not pregnant (n = 216).	Evaluate the impact of SBIRT interventions (Screening, Brief Intervention and Referral to Treatment) on three primary substance subgroups: cigarettes, illicit drugs and alcohol.	Randomized clinical trial	Software was developed to be used on the computer with an interactive, three- dimensional and excited narrator to	Enhanced usual care	Women were divided into two groups: those that made a single consumption of alcohol and those that made concomitant consumption with other substances (secondary	Alt den sig con tho sec the

T.; YONKERS, K. A.;					provide components of a single brief intervention lasting 20 minutes (e-BSBIRT).		alcohol consumption). E-BI demonstrated a significant decrease between those who performed secondary alcohol consumption per month. alcohol. E-BI had a small to medium effect on comparisons between Baseline, 1 month after, 3 months after and 6 months after intervention regarding the effect on changing the amount of consumption days. However, there was no significant decrease in primary alcohol consumption when compared to E-IB to enhanced usual care.	
MARTINO, S.; APENDERSMA, S. J.; FORRAY, A.; OLMSTEAD, T. A.; GILSTAD-HAYDEN, K.; Howell, H. B.; KERSHAW, T.; YONKERS, K. A.;	United States	Women who used two reproductive clinics from two university hospitals, who were pregnant or not (n = 439)	Determine whether "screening, brief intervention and treatment for treatment" provided electronically (e-sbirt) or by a professional are more effective than habitual care enhanced in decreasing days of use of primary substances.	A randomized clinical trial	Software was developed to be used on the computer with an interactive, three-dimensional and excited narrator to provide components of a single brief intervention lasting 20 minutes (e-BSBIRT).	IB > personally performed by a Health Professional (Sbirt). Delivery of an existing educational pamphlet that constituted enhanced usual care	E-BB has shown a decrease in consumption days per month. The use of the substance decreased 7 days in the 3 months after electronic intervention. In the usual care (EUC) the decrease was 4 days. The result was similar among pregnant and non-artic women.	
NAYAK, Madhabika B.; KASKUTAS, Lee A.; MERICICE, AMY A.;	United States	Non -pregnant women, in childbearing age (n = 185)	Evaluate the effectiveness of an innovative and self-administered (e-BSBI) sorting and Spanish e-Spanish electronic intervention, "Drinkwise" to reduce alcohol consumption among non-pregnant women in childbearing age.	Randomized test. A parallel study.	Drinkwise for two innovative components: a) Drink size assessment (DSA), using a royal poster of beverage containers (9 cups) placed above the study computer ("display vessels"), as well as photos on their screen and other containers (cups, bottles, cans); b) Feedback on the size of the drink (DSF), to	Without intervention	The results showed the effectiveness of an innovative e-SBI, called "Drinkwise", easy to use and possible to be administered to reduce alcohol consumption among women of fertile age. It was observed that the women who completed Drinkwise showed a higher reduction from the beginning to the 6-month follow-up.	

					educate the person who uses the program on standard drink sizes and display discrepancies between drink sizes and standard drinks, noting that the drinker may be drinking more than he thinks.			
AIDERSMA, Steven J.; SVIKIS, DACE S.; THACKER, Leroy R.; BEATTY, Jessica R.; LOCKHART, Nancy;	United States	Postpartum women (n = 123)	Evaluate a single 20-minute e-SPROPING ELECTRONIC INTERVENTION (E-SBI) for postpartum alcohol use.	Randomized clinical trial	e-SBI with tablet	Participants attributed to the control condition were asked a series of questions about their preferences in music and television, brief music videos were displayed with their preferences and were asked to provide feedback on their preferences. Opinion about the various music videos.	It was observed that E-SBI was moderately accepted, however, this study found no clear evidence of the effectiveness of the intervention. The effects of 3 months-although not large enough to be significant-compare favorably with them in terms of magnitude. However, the results at 6 months suggest that these effects, if any, were transient.	This una... sing... for... am... wo... res... mo... gre... cor... effe... effe... var... SB... app... res... adv... tec... rep... mo... cor...
AIDERSMA, Steven J.; BEATTY, Jessica R.; SVIKIS, DACE S.; STRICKLER, Ronald C.; TZILOS, Gulf K.; Chang, Grace; DIVINE, George W.; TAYLOR, Andrew R.; SOKOL, Robert J.;	United States	Pregnant women (n = 48)	Evaluate the feasibility and acceptability of an interactive, empathic, video-enhanced and computer delivered (E-SBI) SBI, as well as three separate custom correspondences and estimated effects of the intervention.	Randomized clinical trial	e-SBI with tablet or computer	A moderately interactive session on child nutrition, without mention of alcohol use during pregnancy	The group that received the more custom correspondence e-SBI showed a non-significant advantage of moderate magnitude in terms of the primary abstinence outcome in 90 days, with an increase in the abstinence rate. The results were similar to secondary outcomes, all showing non-significant effects of small to small magnitude in favor of intervention condition. Similarly, the result related	This sho... con... of... per... cor... via... acco... par... the... of... inte... the... pro... brie... the... des...

							to the number of alcohol consumption days in the last 90 days also suggested small effects. In terms of search for treatment for alcohol consumption, only one participant reported in follow -up that he had sought some substance abuse service in the last five months.	
WILTON, G.; MOBERG, D. P.; VANSTELLE, K. R.;	United States	Women (n = 131)	Evaluate the effectiveness of telephone intervention.	Randomized clinical trial	E-SBI by phone	E-SBI PERSONALLY	By testing the difference in the effectiveness of a brief intervention designed to reduce the risk of an alcohol exposed pregnancy, comparing women who received personally counseling sessions and those who received the same telephone intervention, it was observed that both modalities have a high volume of success. "Healthy Choices" intervention significantly reduced the risk of an alcohol pregnancy in women aged 18 and 44 who drank above recommended levels and did not use effective contraceptive methods (or used a specific contraceptive method ineffectively). This study demonstrated the effectiveness of both delivery methods, without significant differences between modalities (in person or remote).	
TZILOS, Gulf K.; SOKOL, Robert J.; AIDERSMA, Steven J.;	United States	Pregnant women (n = 50)	Preliminary assessment of acceptability and viability of a brief computer intervention for alcohol use during pregnancy.	Randomized clinical trial	E-SBI Computer	Assessment conditions only	Participants significantly decreased alcohol use in follow -up, without differences between intervention and control groups; However, the birth	

							weight of women born to women in the intervention group was significantly higher ($p < 0.05$, $d = 0.62$).	rea alco acco eva con ide risk with use mo and we use pre and
GIMENEZ, Paula Victoria; Lichtenberger, Aldana; CREMENT, MARIANA; Cherpitel, Cheryl J.; PELTZER, Raquel Inés; CENTO, Karina;	Argentina	Pregnant women in prenatal care (n = 295)	Evaluate the effectiveness of IB among Argentine pregnant women.	Randomized clinical trial	E-E-Brief Intervention (BI).	Screening (SC). As the women in this group received no intervention and brief counseling groups (BA).	The results between the groups of pregnant women who received brief counseling (BA) and brief intervention (BI) show that pregnant women who received BI had a 4% reduction in the likelihood of increasing the amount of beverages consumed on the occasion and a 5% reduction in the likelihood of increasing the frequency of consumption. The children of pregnant women who received BI and BA had better health indicators.	Co of imp BA rou risk con imr ind nev cha ma too tre stig

Characterization and design of the studies included in the Review

The studies analyzed were predominantly conducted carried out in developed countries, with the majority being conducted in the United States [20,34,35,36,37,33] and one in Argentina [21]. All of them were Randomized Clinical Trials (RCTs) [32,20,34,35,36,33,39,19] that focused on evaluating the effectiveness of digital BI in pregnant women, comparing this intervention with other health practices [20, 34, 35, 36, 33, 39, 19], and in addition to examining the impact of digital BI use during pregnancy [32].

The studies evaluated the effect of digital interventions (digital BI) in pregnant women and, observing a predominance of positive and consistent results in reducing alcohol consumption after the intervention during pregnancy [32, 20, 34, 36, 37, 33]. One of the studies [35] concluded that there was no significant difference in the application of digital BI, when compared to the brief face-to-face intervention, for reducing alcohol use among women after childbirth. Regarding the sample recruitment locations, reproductive centers and prenatal clinics were the most common predominant [32, 20, 36, 33, 19], followed by a nutrition programs for mothers and babies [34], hospitals [35], and university campuses [37].

Characterization of study participants

The included studies involved a sample of 1,487 participants. The number of participants per study ranged from 48 to 439 people. Two studies had less than 100 participants [33], three studies had between 101 and 200 participants [34, 35, 33], two studies had between 201 and 300 participants [32, 19], and one had over 400 participants [20].

It was observed that in five studies, the focus was on pregnant or postpartum women [32, 20, 36, 37, 33], where three sought to identify the effects of interventions (digital BI) in focused on non-pregnant women of childbearing age [34, 37, 19], associating the application of the intervention with sexual and reproductive life and, seeking to reduce the risks of alcohol exposure in pregnancy exposed to alcohol. In general, the age of the participants was an important criterion for their inclusion in the studies; in seven studies, only pregnant or postpartum women aged 18 years or older were included, related to the age of majority [32, 20, 34, 35, 36, 37, 33]. However, one study [19] included pregnant women from 13 years of age, which is the legal age in Argentina to consent to treatment

without the need for parental approval.

Components of intervention and control groups

In the studies reviewed, the following configuration of the intervention and control groups was observed. Two: two studies compared the electronic administration of Screening, Brief Intervention and Referral to Treatment SBIRT (e-SBIRT or digital SBIRT) and the in-person administration of SBIRT by a physician, both compared with enhanced usual care in the control group [32, 20]. In another study, the electronic intervention called DrinkWise was administered, whereas the control group received no intervention [34]. In two studies, the intervention group used an online software to reduce alcohol consumption, whereas the control group answered questions about their preferences in music and television and provided feedback on video clips [35,33].

One study compared the administration of e-SBI with a moderately interactive session on child nutrition for the control group [36], another study used two intervention conditions, with administration by telephone or in person, whereas the control group received counseling sessions in person and by telephone [37]. The last study presented two intervention groups: one in which women received brief counseling and another with a brief intervention, both delivered by telephone. The control group did not receive intervention and was described as a “screening-only control,” in which pregnant women were asked about basic demographic information, such as age, marital status, education, occupation, gestational weeks, number of children, and socioeconomic status [19].

The technologies used to deliver the interventions included smartphones [37,19], tablets [35, 36], and computers [32, 20, 34, 35, 33].

Screening tools used

This review considered studies that measured alcohol consumption through the World Health Organization Alcohol, Smoking and Substance Involvement Screening Test (ASSIST), Tolerance, Annoyed, Cut down and Eye-opener (T-ACE) questionnaire, and the Alcohol Use Disorders Identification Test (AUDIT) using validated tools, in addition to applying a specific digital BI to raise awareness about behaviors, risks, consumption reduction, and harms associated with alcohol consumption changed as a result.

In all the studies, women were previously screened to identify their level of alcohol and substance use levels. In more than half of the studies, specific tools were used to screen for alcohol use, such as the World Health Organization Alcohol, Smoking and Substance Involvement Screening Test (ASSIST) [32, 20, 35], the Tolerance, Annoyed, Cut down and Eye-opener (T-ACE) questionnaire [33] and the Alcohol Use Disorders Identification Test (AUDIT) [19]. Three studies did not use a specific instrument and were screened through interviews with questions related to alcohol use [34, 36, 37].

Meta-analysis

Figure 2 shows the effectiveness of the electronically-Brief Intervention digital BI in reducing alcohol consumption and alcohol use among women. Four studies were included [32, 20, 34, 19], totaling of 545 observations. However, it is important to consider the differences between these studies, such as the screening tools used, the design of the interventions, and the ICT used. Given these differences, the measurement of heterogeneity was performed ($I^2 = 95.5\%$ and $CI=95\%$), presenting a high heterogeneity.

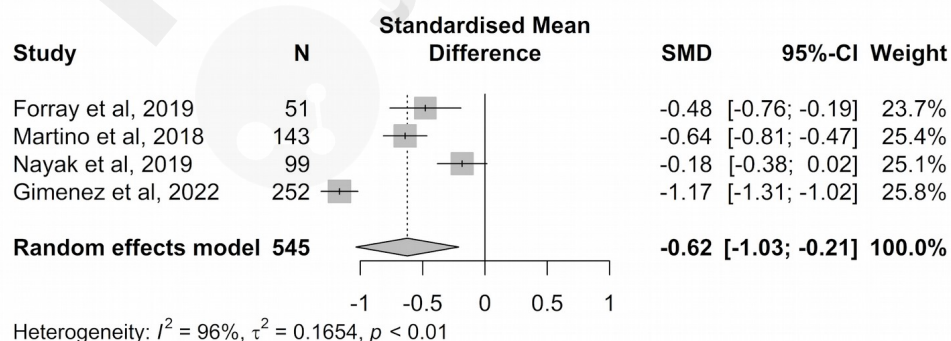


Figure 2: Forest plot of studies included in the meta-analysis (n=4), São Paulo, 2025.

The standardized mean difference (SMD) is -0.6228, with a 95% confidence interval ranging from -1.0345 to -0.2112, suggesting that the intervention has a moderate effect on reducing the outcome measure compared to the control. The results indicated that the intervention is effective, as observed by the statistically significant negative effect size. However, the high heterogeneity suggests that the effect may vary across studies or settings (Table 2).

Table 2: Estimated model aggregating all studies, 2025.

	SMD	Lower CI	Upper CI	z	p-value
Random effects model	-0.623	-1.035	-0.211	-2.970	0.003

DISCUSSION

This review is the first to evaluate how electronically delivered brief interventions (e-BI) influence alcohol use among women across different life stages and healthcare settings. The evidence indicates that e-BI, delivered via information and communication technologies, consistently lowers alcohol intake—especially among pregnant women, recent mothers, and women of child-bearing age who comprised the majority of study participants. In every included trial, women receiving an e-BI drank less than those in control conditions, reinforcing previous findings that digital brief interventions can effectively curb harmful alcohol consumption in female populations.

Beyond demonstrating efficacy, several studies highlighted e-BI's practicality. Participants rated the interventions as convenient, private, and easy to integrate into daily routines, while clinicians appreciated their potential to reduce workload and reach women who might not otherwise seek help. Notably, one study found electronic approaches to be as effective as face-to-face counselling, underscoring the promise of scalable digital solutions in overstretched health systems.

Still, implementation challenges remain. Successful adoption hinges on tailoring content to users' real-world contexts, ensuring intuitive interfaces, and embedding interventions within existing service pathways. Usability and engagement are critical: an e-BI that is

difficult to navigate or fails to resonate with users will see limited uptake and diminished impact. Participatory design processes, iterative testing, and ongoing user support to maximise intervention adherence and effectiveness.

Finally, equity concerns warrant attention. Seven of the eight trials were conducted in high-income countries, where women generally enjoy reliable internet access and familiarity with digital tools. In low- and middle-income settings, barriers such as limited infrastructure, device costs, digital illiteracy, and language constraints may restrict access to e-BI. Future research should prioritise these contexts, exploring affordable technologies and culturally appropriate content to ensure that the benefits of electronic brief interventions reach all women who could profit from reduced alcohol-related harm.

Limitations

This review has some limitations. The main ones include the scarcity of research on the effectiveness of e-BI in women from low- and middle-income countries (LMICs) on the effectiveness of the electronically-brief intervention in women, restricting the generalization of the results. Most studies were conducted with pregnant or postpartum women, limiting the applicability to other female populations. The heterogeneity of the control groups, which used varied formats of the intervention, makes it difficult to compare the results. Finally, the review's time frame (2003-2024) may have excluded relevant research or emerging studies not yet published or indexed. Additionally, rapid technological advancements during this period may result in heterogeneity in digital tools used, making it challenging to compare interventions across different time points. These limitations highlight the need for further research in different contexts. However, the meta-analysis showed the effectiveness of the digital Brief Intervention in women.

CONCLUSION

This review suggests that digital-Brief Intervention is effective in reducing alcohol consumption among women. Most digital-BI used the computers as information and communication technology ICT, in addition to being delivered to pregnant women or during the puerperium, since as this cycle stage of a woman's life requires abstinence from any and all psychoactive substances, including alcohol, in order to prevent maternal and child death and problems with fetal malformation and development. Studying women outside the gestational and postpartum periods helps avoid biases related to pregnancy-specific factors

that may alter alcohol consumption. This approach ensures more accurate evidence on typical use patterns. Research in this population is crucial for targeted and generalizable findings. It is observed that the digital-BI was carried out, especially, in specialized reproductive health care services, where women felt more comfortable and safer into addressing the harmful use of alcohol. However, further studies are needed in services at different levels of health care to demonstrate the effect of the intervention, especially in primary care services, which have a strategic position to identify women who engage in harmful alcohol consumption early, reduce the harm, damage, and health problems of these women, promote quality of life and quality of care, and reduce costs. It is important to highlight the scarcity of studies in countries with low economic development on the subject, which points to a gap in knowledge and the need for research to be carried out with these populations.

Acknowledgment

None.

Funding Statement

AVCL received a scholarship from the Brazilian Federal Agency for Support and Evaluation of Graduate Education (CAPES).

Authors' Contributions

Conceptualization: AVCL (lead), DV (equal)

Data curation: AVCL, JLOPG

Formal analysis: AVCL (lead), JLOPG (supporting)

Methodology: AVCL, DV, JLOPG

Project administration: AVCL (lead), DV (equal), JLOPG (supporting)

Supervision: AVCL (lead), DV (equal)

Visualization: EF (lead), AB (supporting)

Writing – original draft: AVCL (lead), JLOPG (supporting), TPD (supporting)

Writing – review & editing: AVCL (lead), JLOPG (supporting), TPD (supporting)

Data Availability

All data generated or analyzed during this study are included in this published article.

Conflicts of Interest

None to declare.

Abbreviations

ASSIST - Alcohol, Smoking and Substance Involvement Screening Test

AUDIT - Alcohol Use Disorders Identification Test

BI – Brief Intervention

CINAHL - Cumulative Index to Nursing and Allied Health Literature

DeCS - Health Sciences Descriptors

e-SBIRT – electronic Screening, Brief Intervention and Referral to Treatment

FASD - Fetal Alcohol Spectrum Disorders

ICT - Information and Communication Technology

LMIC - Low- and Middle-Income Countries

MeSH - Medical Subject Headings

PRISMA - Preferred Reporting Items for Systematic Reviews and Meta-Analyses

RCT - Randomized Controlled Trials

SBIRT - Screening, Brief Intervention and Referral to Treatment

T-ACE - Tolerance, Annoyed, Cut down and Eye-opener

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