

## Review

# Experiences with Cling Film and Dental Dam Use in Oral Sex: A Mixed-Methods Systematic Review

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**Abstract:** This study aimed to conduct a mixed-methods SR of the literature investigating the experiences (knowledge, attitudes, practices, and effects of use) concerning dental dam and cling film use. The SR methodology was informed by the Preferred Reporting Items for SRs and Meta-analysis framework, the Cochrane Handbook for SR of Interventions, the Joanna Briggs Institute guideline for conducting mixed-methods SRs, and the PICO (population, intervention (or exposure), comparison, and outcome) framework. Using a set of inclusion criteria, relevant studies in the literature were obtained for the review from 11 electronic databases, Teesside University Library, websites of multilateral health organisations, and reference lists of eligible literature. The included literature was appraised for quality using the Mixed Methods Appraisal Tool version 2018 and the AAOCDS Tool. Only those studies in the literature with sufficient quality were finally included for data extraction (using an adapted version of the JBI Quality Assessment and Review Instruments) and synthesis. Best evidence synthesis was performed for the quantitative data, while meta-aggregation was performed for the qualitative data. The synthesised data were then configured using the segregated approach. A total of 529 studies from the literature were obtained from the searched databases, while only four were obtained from the other sources. After de-duplication, screening, and quality appraisal, a total of 17 studies were found eligible and included in this review. Sixteen studies were non-grey literature while, one was grey literature, and only a few reported a finding on cling film and heterosexual populations. A total of 5516 adolescents and adults were investigated in the analysed literature. Overall, the reported knowledge of dental dams was generally poor, while no study reported knowledge of cling film. The attitudes towards dental dams/cling film were complex and predominantly negative, with very few participants using dental dams/cling film for oral sex. No study reported any finding on the effect(s) of dental dam/cling film use. In conclusion, there is a need for robust and strategic public health interventions for sexual health and safer oral sex practices.

**Keywords:** oral sex; cling film; saran wrap; plastic wrap; dental dam; rubber dam; knowledge; attitudes; practices; effects; experience; systematic reviews



**Citation:** Kanmodi, K.K.; Egbedina, E.A.; Nkhata, M.J.; Nnyanzi, L.A. Experiences with Cling Film and Dental Dam Use in Oral Sex: A Mixed-Methods Systematic Review. *Oral* **2023**, *3*, 215–246. <https://doi.org/10.3390/oral3020019>

Received: 22 October 2022

Revised: 23 April 2023

Accepted: 4 May 2023

Published: 17 May 2023



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## 1. Introduction

### 1.1. Definition of Oral Sex

Oral sex can be defined as an erotic practice that involves the sensual stimulation of the external genitalia or anus of a person by the tongue, teeth, throat, or mouth of a sexual partner [1,2].

### 1.2. Global Epidemiology of Oral Sex

Across different parts of the world, the rate of oral sex practices has been progressively increasing over the decades [3]. In the largest and most recent multi-continental survey on

oral sex, of 26,032 adults (aged 16 years and above), it was reported that about 38% of the respondents had practiced oral sex [4]. Based on this multi-continental survey report, it can be estimated that at least three out of every 10 adults aged 16 years and above in the world have engaged in oral sex at least once in their lifetime. European countries had the highest prevalence rates of sexual activities, with Austria and Greece having the highest proportion of oral sex givers (80%) and oral sex receivers (81%), respectively; therefore, this may suggest that oral sex is a widely accepted sexual practice in these two European countries [4].

Based on sexual orientation, it was also observed that the prevalence of oral sex practice was highest amongst homosexuals (>73%); this may be because homosexuals have fewer options of practicable sex forms (only penetrative anal sex and oral sex), unlike heterosexuals and bisexuals, who have all practicable options (penetrative anal sex, penetrative vaginal sex, and oral sex) [4]. Among homosexuals, males had a higher prevalence of oral sex activity compared to females (giving oral sex—83% versus 77%, receiving oral sex—81% versus 71%). This inter-gender disparity between males and females is not surprising, because the males perceive more sexual benefit from oral sex than the females; this, therefore, justifies the higher prevalence recorded among males [5].

Furthermore, the prevalence of oral sex is relatively higher in industrialised countries than in non-industrialised countries [6–8]. For example, the recent prevalence rates for oral sex in the United States of America (USA) and the United Kingdom (UK)—two highly industrialised countries—were higher than those reported in several African countries. About 41% and 85% of sexually active adolescents and adults, respectively, in the USA had engaged in oral sex [8]. In the UK, about 40.6% to 86.3% of adolescents and adults, respectively, had engaged in oral sex [6]. In Nigeria, the prevalence of oral sex among adolescents and adults ranges from 1.7% to 47.2% [7]. In South Africa, 26.2% and 8.1% of schoolboys and schoolgirls, respectively, had engaged in oral sex [7,9]. In Kenya, 29% and 21% of men and women (aged 18–34 years), respectively, self-reported a recent history of oral sex [10]. Notably, these observed differences may be due to greater access to the internet and social media, and the greater liberalism in highly industrialised countries, which invariably increases access to pornographic content and free sexual expressions, unlike in less-industrialised countries ([11].

Profession, gender, knowledge/beliefs, and age are notable individual-level determinants of oral sex engagement [7,12]. For example, the prevalence of oral sex is higher among sexual workers (98.4%) than among nurses (49.6%) [12,13]. By interpretation, it can be implied that sexual workers are more likely to engage in oral sex than nurses and virtually all other professions. Knowledge and beliefs concerning the benefits and risks associated with oral sex can deter or encourage people in engaging in oral sex [12,14]. For example, partners who want to preserve their virginity or prevent pregnancy/sexually transmitted infection infections prefer to engage in oral sex [5,7,14]. On the other hand, those who perceive oral sex as a risky sexual practice tend to avoid engaging in it [7]. Research evidence has shown that older people are less likely to have engaged in oral sex compared to younger people [7,15]. This implies that oral sex practice is more predominant among younger people.

### *1.3. Health Benefits of Oral Sex*

Oral sex has been reported in different studies to have health benefits to its giver and recipient. Oral sex has been reported in the literature as an alternative to penetrative sex because it improves intimacy, relationship quality, sexual satisfaction, and/or well-being among adolescent, adult, and older partners who do not want to engage in penetrative sex [5,16]. It is also notable that oral sex experience generates less worries and anxiety, unlike vaginal sex, because oral sex cannot result in pregnancy, and it is perceived to be less of a threat to the moral values of sexual partners—research has shown that unmarried partners perceive penetrative sex as an immoral act [5,17]. Oral sex has also been found to facilitate orgasms during sex [18].

Furthermore, oral sex has been associated with the reduction of risk of multiple gynaecological and obstetric problems such as vaginal and/or anal sexually transmitted infections, unwanted pregnancy, anxiety over becoming pregnant, pre-eclampsia, miscarriage and endometriosis [5,19–21].

#### *1.4. Health Risks of Oral Sex*

Oral sex is linked with multiple health-related risks, which range from mild psychological problems to life-threatening medical conditions [22]. Although it is relatively rare, oral sex is a cause of emotional guilt and worry among adolescents and young adults, as some of them perceive oral sex to be a morally wrong act that they should not be engaging in [5]. Additionally, oral sex has been reported to create disgust, “feeling of being used and helpless”, and disappointment among its givers and receivers, with some of the involved partners vowing to themselves to never engage in it again [23,24].

Additionally, oral sex has been associated with myriads of STIs, including human immunodeficiency virus (HIV) infection, herpes, syphilis, gonorrhoea, chlamydia, hepatitis (types A, B and E), human papillomavirus infection, shigellosis, typhoid fever, amoebiasis, and giardiasis [1,8]. These infections, if not treated early or completely, can develop into notorious and debilitating local and systemic sequelae [22,25].

#### *1.5. Physical Barrier Use: A Safer Oral Sex Practice*

Ways in which oral sex can be practiced safely have been well-described in the literature [1,22]. These safe practices target the prevention of STI transmission and the development of associated psychological problems. However, to ensure that the risk of contracting STIs is reduced during oral sex, it is recommended to keep body fluids (vaginal secretions and semen) out of oral contact as quickly as possible [1]. Further, the mucosal integrity of the mouth of the oral sex giver must be intact, with the giver/receiver having no genital wound or current history of any potential blood-borne disease [1]. However, the maintenance of mucosal or skin integrity cannot be ascertained during oral sex due to the possibility of friction between the mouth and/or throat and the anus or external genitalia; therefore, it is recommended that protective physical barriers be used during oral sex [1,22].

Oral sex physical barriers are materials used to prevent skin–mucosal contact during fellatio, cunnilingus, or anilingus [26–28]. These barriers are single-use synthetic materials that are usually made from latex, and they include male condoms, tongue condoms, dental dams, and cling film [29–31].

The male condom, commonly referred to as “condom”, is an elastic rubber-based sac worn on the penile shaft to serve as a physical barrier between the penile skin and penile orifice of the oral sex receiver and the mouth of the oral sex giver [32–34]. To ensure that a male condom serves its purpose, it must be worn before and during oral sex with complete adherence to the user instructions [34]. Male condoms have been found to have 80% efficacy in preventing the transmission of human immunodeficiency virus and other sexually transmitted infections during sex [35]. Therefore, it can be inferred that the use of male condoms is not absolutely (100%) safe.

The tongue condom is an elastic rubber-based sac worn on the tongue and lips to serve as a physical barrier between the mouth of an oral sex giver and the mucosal or skin surface of the anus, penis, vagina, or vulva of the oral sex recipient [33]. This implies that the tongue condom can be used for anilingus, fellatio, and cunnilingus. The tongue condom is very similar to the male condom, except for its open end, which is wider [33]. The open end of the tongue condom fits over the lips to prevent direct contact of the lips with the mucosa, skin, or body fluids [33]. To ensure its safe use, the oral sex giver must wear it before and during oral sex with complete compliance with the user instructions given by the manufacturer. However, to the best of the authors’ knowledge, the efficacy level of tongue condoms in the prevention of sexually transmitted infections is yet to be

ascertained via a systematic review (SR). This suggests that the tongue condom's efficacy is still based on limited evidence.

The dental dam, also known as "rubber dam", is a single-use rubber-based sheet (or latex square barrier) which, when applied, covers the vaginal or anal orifices to prevent direct contact between the mouth and the anus or vagina [36]. This means that dental dams can only be used for anilingus and cunnilingus, and not for fellatio. Because dental dams are rubber-based, there is a possibility that their integrity might be compromised if used with oil lubricants [1]. Moreover, due to its relatively small surface area, seepage of anal or vaginal fluids past the borders of a dental dam can occur; therefore, compromising its efficacy in preventing the transmission of sexually acquired infections [1]. However, the efficacy level of the dental dam, unlike the male condom, is yet to be ascertained through an SR of evidence.

A cling film, also known as "plastic wrap", "polythene wrap", "food wrap" or "saran wrap", is a thin and transparent polythene sheet that is used to seal foods kept in an open container. Cling film is sometimes used as an improvised barrier to prevent direct contact between the mouth and the anus or vagina [31]. Cling film is thinner than a dental dam, so it can easily be perforated by fingernails and teeth during cunnilingus or anilingus [1]. The efficacy level of cling film, unlike the male condom, is yet to be ascertained through an SR of evidence.

#### *1.6. Problem Statement*

Although there is no report on the global burden of sexually transmitted oral infections based on an overview of the current global STI burden, it can be projected that millions of people have sexually transmitted oral infections [25,37,38]. To curtail the global burden of sexually transmitted oral infections and their sequelae, there is an imperative need for customised public health interventions on oral sex, as this will further strengthen the current public health battle against sexually transmitted infections [39–41]. Pertinently, oral sex education and the promotion of safer oral sex behaviours can be used to achieve this goal [40]. However, the development, planning, implementation, and evaluation of these interventions need to be informed via decisions backed by strong research evidence [42].

There is a dearth of evidence from SRs and meta-syntheses concerning the experiences (knowledge, attitudes, practices, and effects) of some of the protective barriers used in oral sex, particularly cling film and dental dams. Evidence obtained from such studies would be useful for the development, planning, implementation, and evaluation of tailored interventions.

#### *1.7. Aim*

The aim of this SR was to review the existing empirical evidence on the experiences (knowledge, attitudes, practices, and effects) concerning the use of cling film and dental dams for oral sex.

### **2. Materials and Methods**

#### *2.1. Review Question*

The research question in this SR was "what are the experiences concerning the use of cling film and dental dams in oral sex among adult populations"?

#### *2.2. Reporting Guideline*

This SR was reported based on the 2020 version of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guideline [43].

#### *2.3. Title and Protocol Registration*

The title and protocol of this SR were registered with the International Prospective Register for Systematic Reviews (PROSPERO) (registration number: CRD42022309686).

#### 2.4. Search Strategy for Identifying Studies

The search strategy adopted for this SR was informed by the Cochrane Handbook of Systematic Review of Interventions [44]. As provided in the handbook, it is recommended to use both electronic database sources and other sources in a literature search strategy.

##### 2.4.1. Electronic Databases

A total of 11 major databases were searched: namely, Web of Science Core Collection, SCOPUS, PubMed, Embase, CINAHL Complete, APA PsycINFO, Allied and Complementary Medicine (AMED), Dentistry and Oral Science Sciences Source, MedNar, National Grey Literature Collection, and Google Scholar. The first eight databases were research databases, while the ninth, tenth, and eleventh databases were databases of grey English literature [45–47]. A combination of these databases was adopted for this SR to strengthen the robustness of this SR search strategy [46].

The Population, Intervention, Comparison, and Outcome (PICO) framework, being the most sensitive search framework, was used to develop the search terms and strings (Table 1) [44,48,49]. Appropriate search terms and synonyms (obtained from free texts and thesaurus) and Boolean operators ('AND' and 'OR') were used to develop the search strings used for each database search. The database search was focused on the title, abstract, and keywords search field, and it was conducted on 29 July 2022 to obtain publications relevant to the research question.

**Table 1.** List of PICO-guided search terms and synonyms.

PICO Framework	Search String
Population	No need for a search string on this because all population groups are included
Intervention (or Exposure)	'sex' OR 'coitus' OR 'intercourse' OR 'oral sex' OR 'fellatio' OR 'cunnilingus' OR 'anilingus' [field search: title, abstracts, and keywords] 'dental dam' OR 'rubber dam' [field search: title, abstracts, and keywords] 'plastic wrap' OR 'cling film' OR 'cling wrap' OR 'clingwrap' OR 'polythene wrap' OR 'food wrap' OR 'saran wrap' OR 'glad wrap' OR 'gladwrap' OR 'cellophane' [field search: title, abstracts, and keywords]
Comparison (or Context)	No need for a search string on this because all comparisons are included
Outcome	No need for a search string on this because all outcomes with no restriction are in the focus of the study

All of the publications retrieved from the research databases, except for the grey literature databases, were exported for further processing. A significant proportion of the hits obtainable from grey literature databases are oftentimes duplicate copies, or non-relevant to the searched contents; this is due to the poor calibration of these databases [45,50,51]. To avoid search redundancy, only the first 100 hits obtained from the searched databases of grey literature (MedNar, National Grey Literature Collection, and Google Scholar) were extracted for this SR [45,47].

##### 2.4.2. Other Sources

Not all publications are deposited in electronic databases; therefore, it is recommended that alternative sources of literature such as print-only publication sources, research expert consultations for relevant publications, websites of relevant government and non-governmental organisations, and reference lists of the included literature are included in the literature search strategy [44,46]. To assess relevant print-only publications, the Teesside University Librarian was contacted to retrieve records of print-only research and grey literature on the review topic area. Hand searching of the reference lists of the literature included in this SR was performed to identify any other literature that was not identified from the electronic database search. The websites of the CDC, WHO, West African Health Organisation (WAHO), and Pan American Health Organization (PAHO) were also searched



to identify grey literature. However, research expert consultations for relevant publications could not be conducted in this SR due to the limited timeframe required to complete this SR.

### 2.5. Deduplication of Identified Studies

Some publications were indexed in more than one electronic database; therefore, the possibility of having duplicate copies of retrieved publications was anticipated in this review [52,53]. The Rayyan web application was used for the deduplication process, being the most user-friendly and advanced software for SRs [54,55].

### 2.6. Screening and Selection of Studies

As provided in the Cochrane Handbook, the development of eligibility criteria for an SR should be based on an appropriate framework [44]. For this research, the criteria for eligibility were informed by the PICOS (Population, Intervention (or Interest), Comparison, Outcomes, Study Type) framework, full text accessibility, and language of publication [44]. These criteria are depicted in Table 2, and only those publications that met the eligibility (or inclusion) criteria were included in this review. Of particular interest was the inclusion of grey English literature in this SR. Although the inclusion of works from grey literature in SRs has its limitations, due to the uncertainties associated with their credibility, reliability, and validity [46,56], the inclusion of these works has been recommended by research experts, as they strengthen the robustness, timeliness, and unbiasedness of SR findings [46].

**Table 2.** Eligibility criteria for study inclusion.

Items	Exclusion Criteria	Inclusion Criteria
Population	Animal species	All populations of humans without restriction to race, ethnicity, gender, religion, socioeconomic class, age, creed or orientation
Intervention (or exposure/interest)	(1) Literature investigating the experiences (with focus on knowledge, attitudes, practices, or effectiveness) concerning the use of other physical barriers (genital condoms (male and female condoms) and/or tongue condoms) in oral sex only. (2) Literature on cling film and/or dental dams that did not investigate their association with oral sexual activity	Literature investigating the experiences (with focus on knowledge, attitudes, practices, effects, or effectiveness) of cling film or dental dam use in oral sex
Comparison (for intervention studies only)	Literature reporting only the effects and/or effectiveness of use of other physical barriers (genital condoms (male and female condoms) and/or tongue condoms) in oral sex	Literature reporting the effects and/or effectiveness of cling film and/or dental dam use in oral sex
Outcomes	For interventional studies: Literature reporting the effects and/or effectiveness of other physical barriers (genital condoms (male and female condoms) and/or tongue condoms) in oral sex. For non-interventional studies: Literature that did not report the experiences (knowledge, attitudes, or practices) concerning the use of cling film and dental dams in oral sex	For intervention studies: Literature reporting the effects and/or effectiveness of cling film and/or dental dam use in oral sex. For non-intervention studies: Literature reporting the experiences concerning cling film and dental dam use in oral sex. These experiences include knowledge, attitudes, or practices
Study (literature) type	Editorials, correspondence (letters), bibliometric reviews, systematic reviews, narrative reviews, and any other non-empirical study	Grey and non-grey empirical studies such as cross-sectional studies (surveys and qualitative studies), before-and-after studies, case-control studies, cohort studies, randomised controlled trials, quasi-experimental studies, qualitative studies, quantitative studies, and mixed-methods studies
Language of publication	Literature published in German, French, Chinese, Spanish, Arabic, or any other language except English	Literature published in English
Full text accessibility	Literature having inaccessible full texts, i.e., those studies that could not be obtained within two weeks from the corresponding author or Teesside University's Interlibrary Loan	Literature having accessible full texts

To ensure that the risks of human error or bias were reduced, two independent researchers were involved in the literature screening and selection process [44]. Additionally, to reduce such error, the Rayyan web application was used for the process [54,55].

### 2.7. Quality Appraisal of Selected Literature

The Mixed Methods Appraisal Tool (MMAT) version 2018 and the Authority-Accuracy-Coverage-Objectivity-Date-Significance (AAOCDS) checklist were used for the quality appraisal of the included research literature and grey literature, respectively [56–58]. Adapting the approach by [59] for the MMAT grading, a “Yes” response was scored as “1” point, a “No” response was scored as “0” point, and an “I can’t tell” response was scored as “0.5” point. Thereafter, a cumulative score range of “1 to 3” points was graded poor, a score of “3.5” points was graded average, and a score range of “4 to 7” points was graded above average. Only those studies in the grey literature graded above average were included in this SR. However, for the scoring and grading of non-grey literature, a response of “Yes” or “Not applicable” was scored “1” point, while a response of “No” or “Not stated” was scored as “0” point on the AAOCDS checklist. A cumulative score range of “1 to 16” points was graded poor, while a score range of “17 to 34” points was graded good. However, for this SR, only those that were graded “above average” (for non-grey literature) or “good” (for grey literature) were considered to be of high quality and were subsequently considered for data extraction and synthesis.

### 2.8. Data Extraction

The extraction process was data type specific. For the qualitative data extraction, an adapted version of the JBI QARI Data Extraction Form for Interpretive and Critical Research was adapted and used [60,61]. However, for the quantitative data extraction, an adapted version of the JBI QARI Data Extraction Form for Experimental/Observational Studies was adapted and used [60,61].

### 2.9. Data Synthesis

For this SR, a segregated approach was adopted for data synthesis. In the approach, qualitative and quantitative data were synthesised separately and, thereafter, configured to determine if both findings refuted, confirmed, or complemented each other [62,63].

Only narrative synthesis was performed on the extracted quantitative data, and it involved the classification and synthesis of the data, in a prose format, based on research design, participants’ characteristics (age, gender, race, ethnicities, geographical location, etc.), and outcomes/findings. Meta-analysis was not performed in the quantitative data synthesis due to observed heterogeneities in the methodologies of the included literature [64].

The JBI’s meta-aggregation approach, which has three steps, was used for the synthesis of the extracted qualitative data [61]. The first step involved the extraction of relevant findings from the included qualitative studies as well as in the qualitative part of the included mixed-methods studies. Pertinently, each extracted finding was assigned a plausibility level: unsupported, unequivocal, or equivocal [61]. The second step involved the grouping of the findings obtained in the first step into categories, with each category having a minimum of two findings ([61]). The third (final) step involved the creation of one or more findings synthesised from two or more categories created in the second step [61].

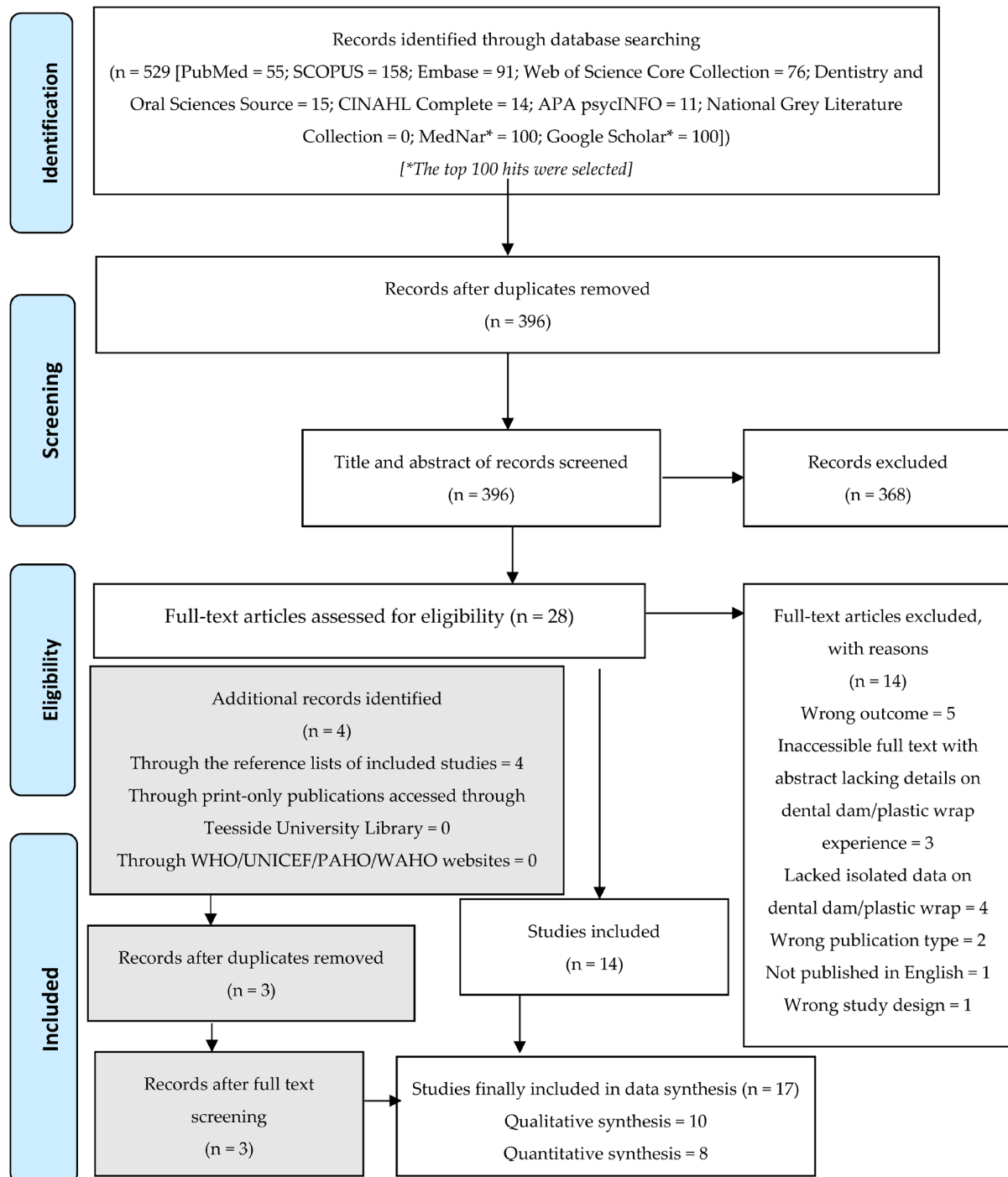
### 2.10. Configuration of Synthesised Data

In this SR, the configuration was performed on the basis of guidelines provided in the article by [63]. The configuration process involved the comparison of the synthesised qualitative and quantitative data to conclude if they confirm (support), complement (add to), or refute (contradict) one another [63].

### 3. Results

#### 3.1. Literature Search Outcomes

A total of 529 publications were obtained from the search of 11 electronic databases (Figure 1). SCOPUS contributed the highest proportion (29.9%; 158/529) of these publications, while the National Grey Literature Collection contributed nothing.



**Figure 1.** PRISIMA flow chart of the literature search and selection process.

Only four publications were obtained from other sources searched, and all were obtained from the reference lists of the publications included in this review (Figure 1).



### 3.2. Deduplication Outcomes

Out of the 529 publications obtained from the electronic databases, only 133 publications were duplicate copies and were excluded from the study, leaving only 396 publications for screening (Figure 1).

Out of the four potentially eligible publications obtained from other sources, only one was a duplicate and was removed, leaving a total of three publications for screening.

### 3.3. Literature Screening Outcomes

#### 3.3.1. Electronic Databases

From the screening of the titles and abstracts of the deduplicated publications (n = 396), only 28 publications were found relevant, while the remainder (n = 368) were found to be irrelevant and were excluded. Thereafter, these 28 publications were subjected to full text screening, the outcome of which resulted in the exclusion of 14 publications from and inclusion of 14 publications in the review (Figure 1 and Table 3).

**Table 3.** Records (n = 28) obtained from databases with full texts screened for eligibility.

No.	Citation	Included	Excluded (Reasons)
1	[65]		Yes (Inaccessible full text with abstract lacking details on dental dam/plastic wrap experience)
2	[66]	Yes	
3	[67]		Yes (Wrong outcome, wrong study design, wrong publication type)
4	[68]		Yes (Lacked isolated data on dental dams/plastic wrap)
5	[69]	Yes	
6	[70]	Yes	
7	[71]		Yes (Lacked isolated data on dental dams/plastic wrap)
8	[72]	Yes	
9	[73]	Yes	
10	[74]	Yes	
11	[75]		Yes (Lacked isolated data on dental dams/plastic wrap)
12	[76]		Yes (Not published in English)
13	[77]	Yes	
14	[78]		Yes (Inaccessible full text with abstract lacking details on dental dams/plastic wrap experience)
15	[79]	Yes	
16	[80]		Yes (Wrong outcome)
17	[81]	Yes	
18	[82]		Yes (Wrong outcome)
19	[29]	Yes	
20	[83]	Yes	
21	[84]		Yes (Inaccessible full text with abstract lacking details on dental dams/plastic wrap experience)
22	[85]		Yes (Wrong outcome)
23	[86]		Yes (Wrong outcome)
24	[87]	Yes	
25	[88]	Yes	
26	[89]		Yes (Lacked isolated data on dental dams/plastic wrap)
27	[90]	Yes	
28	[91]		Yes (Wrong publication type)

### 3.3.2. Other Sources

The search of other sources (outside electronic database sources) for relevant publications was accompanied by full text screening for eligibility. Out of the diverse sources searched, only three publications were eligible and included after deduplication.

### 3.4. Quality Appraisal Outcomes

A total of 17 publications were finally included in this review (Tables 3 and 4). All but one of these 17 publications were non-grey literature. Table 5 shows the scoring and grading of the non-grey literature, while Table 6 shows the ones for the grey literature.

**Table 4.** Eligible records (n = 3) obtained from hand searching of reference lists of included publications.

No.	Citation
1	[92]
2	[93]
3	[94]

**Table 5.** Quality appraisal outcomes for non-grey literature (n = 16).

No.	Author(s) (Year)	Study Design	MMAT Version 2018 Questions (Hong et al., 2018) [57]							Total Score (Over 7)	Grading	Status
			Screening Questions		Questions Specific to Study Design							
			S1	S2	1st	2nd	3rd	4th	5th			
1	Krienert et al. (2014) [77]	QI	Y	Y	Y	Y	Y	Y	Y	7	Above average	Accept
2	Yap et al. (2007) [87]	Qn	Y	Y	Y	Y	Y	Y	Y	7	Above average	Accept
3	Richters et al. (2010) [29]	QnR	Y	Y	Y	Y	Y	N	Y	6	Above average	Accept
4	Gil-Llario et al. (2022) [72]	QnR	Y	Y	I	Y	Y	N	Y	5.5	Above average	Accept
5	Carlin et al. (1997) [66]	QnR	Y	Y	I	Y	Y	N	Y	5.5	Above average	Accept
6	Craig Rushing and Gardner (2016) [83]	QI	Y	Y	Y	Y	I	N	Y	5.5	Above average	Accept
7	Grant and Nash (2018) [74]	QI	Y	Y	Y	Y	Y	Y	Y	7	Above average	Accept
8	Mahon (1996) [79]	QI	Y	Y	Y	Y	Y	Y	Y	7	Above average	Accept
9	Emetu et al. (2022) [70]	QI	Y	Y	Y	Y	Y	Y	Y	7	Above average	Accept
10	Bailey et al. (2003) [92]	Qn	Y	Y	Y	I	Y	Y	Y	6.5	Above average	Accept
11	Fujii (2019) [93]	QnR	Y	Y	I	Y	Y	Y	Y	6.5	Above average	Accept
12	Yap et al. (2010) [88]	MM	Y	Y	Y	Y	Y	Y	Y	7	Above average	Accept
13	Marrazzo, Coffey and Bingham (2005) [94]	QI	Y	Y	Y	Y	Y	Y	Y	7	Above average	Accept
14	Muzny et al. (2013) [81]	QI	Y	Y	Y	Y	Y	Y	Y	7	Above average	Accept
15	Zappulla et al. (2020) [90]	QnR	Y	Y	Y	Y	Y	Y	Y	7	Above average	Accept
16	Doull et al. (2018) [69]	QI	Y	Y	Y	Y	Y	Y	Y	7	Above average	Accept

QI—Qualitative study design; QRCT—Quantitative randomised controlled trial design; QnR—Quantitative non-randomised design; Qn—Quantitative descriptive design; MM—Mixed-methods design; Y—Yes; N—No; I—I can't tell.

**Table 6.** Quality appraisal of the included grey literature (n = 1).

Checklist	Gomez et al. (2014) [73]
Authority	
Associated with a reputable organisation?	Yes
Professional qualifications or considerable experience?	Yes
Produced/published other work (grey/black) in the field?	Yes
Recognised expert, identified in other sources?	Yes
Cited by others?	No
Higher degree student under “expert” supervision?	Not applicable
Is the organisation reputable?	Not applicable
Is the organisation an authority in the field?	Not applicable
Does the item have a detailed reference list or bibliography?	Not applicable
Score	8
Accuracy	
Does the item have a clearly stated aim or brief?	Yes
If so, is this met?	Yes
Does it have a stated methodology?	Yes
If so, is it adhered to?	Yes
Has it been peer-reviewed?	Yes
Has it been edited by a reputable authority?	Yes
Supported by authoritative, documented references or credible sources?	Not applicable
Is it representative of work in the field?	Yes
If no, is it a valid counterbalance?	Not applicable
Is any data collection explicit and appropriate for the research?	Yes
If item is secondary material, refer to the original. Is it an accurate, unbiased interpretation or analysis?	Not applicable
If original, is it an accurate, unbiased interpretation or analysis?	Not stated
Score	11
Coverage	
Are any limits clearly stated?	Not applicable
Score	1
Objectivity	
Opinion, expert or otherwise, is still opinion: is the author’s standpoint clear?	Yes
Does the work seem to be balanced in presentation?	Yes
Score	2
Date	
Does the item have a clearly stated date related to content?	Yes
If no date is given but can be closely ascertained, is there a valid reason for its absence?	Not applicable
Check the bibliography: has key contemporary material been included?	Not applicable
Score	3
Significance	
Is the item meaningful? (This incorporates feasibility, utility and relevance)	Yes
Does it add context?	Yes
Does it enrich or add something unique to the research?	Yes
Does it strengthen or refute a current position?	Yes
Would the research area be lesser without it?	Yes
Is it integral, representative, typical?	Yes
Does it have impact?	Yes
Score	7
AACODS score	32
Grade	Good
Status	Accept

All of the 16 appraised research articles in the literature were graded “above average”, of which only 10 (66.7%) had a score of 7/7. The three publications with the lowest scores (a score of 5.5 each) were articles by [65–67], (Table 5). Based on the outcomes of the appraisal, these 16 publications were all accepted for data extraction and synthesis. The appraisal score of the only included article from the grey literature was scored 32/34; hence, it was graded good and accepted for data extraction and synthesis (Table 6).

### 3.5. Synthesised Findings

Relevant data were extracted from each of the 17 appraised grey and non-grey publications for data synthesis. Below is a summary of the characteristics of the included articles from the literature as well as the quantitative and qualitative syntheses.

#### 3.5.1. Summary of Characteristics of the Included Literature

##### Study Design

Out of the 17 publications, only one (0.6%) adopted a mixed-methods study design, one (0.6%) adopted a cross-sectional descriptive design, one (0.6%) adopted a secondary qualitative data analysis design, one (0.6%) adopted a multiple method qualitative research design, three (17.6%) adopted a qualitative (interview) research design, four (23.5%) adopted a qualitative (focus group) research design, and six (35.3%) adopted a cross-sectional analytic design (Tables 7 and 8).

##### Studied Population

Eight (47.1%) publications were reports of studies conducted amongst United States populations, five (29.4%) were on Australian populations, two (11.8%) publications were on United Kingdom populations, one (0.6%) was on a Spanish population, and one (0.6%) was on a Japanese population (Tables 7 and 8).

Cumulatively, these studies investigated a total of 5516 adolescents and adults. The estimated age range of these participants was 15 to 60 years; however, the pooled mean age could not be determined due to the heterogeneity in the methodologies of the studies coupled with the lack of reports on the age distribution of participants in all of the included studies (Tables 7 and 8).

Twelve (70.6%) publications were reports of studies investigating female populations only, two (11.8%) investigated male populations only, two (11.8%) investigated a combination of male and female populations, and one (0.6%) did not specify the gender characteristics of the populations investigated (Tables 7 and 8).

**Table 7.** Data obtained from the included quantitative studies (and quantitative part of mixed-methods studies).

No.	Author(s) (Year)	Quantitative Study Design	Country; Settings	Sample	Participants' Characteristics	Relevant Barriers Identified (or Investigated)	Key Findings (on Dental Dams/Cling Film)	Limitations
1	Yap et al., 2007 [87]	Cross-sectional descriptive design	Australia; Prisons in New South Wales	Two samples (1996 survey = 538 participants; 2001 survey = 747 participants)	Males and female inmates; no information on age and other sociodemographic characteristics was provided	Dental dam	(1) 54% of female inmates favoured (in their opinion) the use of dental dams in prisons. (2) 1% of female inmates opined that dental dam use would increase the rate of sexual assault among inmates	Inability of the authors to determine the proportion of use, by purpose, of the condoms and dental dams issued monthly in the surveyed prisons
2	Richters et al., (2010) [29]	Cross-sectional analytic design	Australia; community- and health facility-based	543 participants	Women only, aged 16 to 64 years (median = 33 years); 65% were lesbians, dyke, homosexual or gay	Dental dam	(1) 86.7% of the participants had never used dental dams for oral sex. (2) The frequency of dental dam use was not significantly higher among women with multiple sexual partners, compared to those with one partner (RR = 1.5, CI = 0.7–3.0, $p = 0.3$ ). (3) Compared to those who had not engaged in group sex, women who had engaged in group sex were not more likely to use dental dams (RR = 1.64, CI = 0.6–4.5, $p = 0.33$ ). (4) Women who had had oral sex involving blood were significantly more likely to use dental dams (CI = 1.5–5.9, $p = 0.002$ )	Not provided in the literature
3	Gil-Llario et al., (2022) [72]	Cross-sectional analytic design	Spain; different parts of Spain (community-based)	327 participants	Only women who had sex with women (WSW); aged 18 to 60 years; mean age (SD) was 27.82 (9.35) years; 27.5% resided in central-eastern area	Dental dam	(1) 79.9% and 81% of the participants had never used dental dams for cunnilingus and anilingus, respectively. (2) Having older age, having high self-efficacy for dental dam use, being assertive, non-use of cannabis during sex, self-perception of HIV as a serious infection, and self-perception of one's vulnerability to HIV infection were significant predictors of dental dam use in oral sex ( $p$ -values < 0.05)	Online recruitment of participants through LGBT organisations in Spain
4	Carlin et al. (1997) [66]	Cross-sectional analytic design	United Kingdom; health facility-based	390 participants	HIV seropositive men; no information on age and other sociodemographic characteristics was provided	Dental dam	150 participants were practising anilingus, of which only one (0.6%) had ever used a dental dam during sex	Not provided in the literature

Table 7. Cont.

No.	Author(s) (Year)	Quantitative Study Design	Country; Settings	Sample	Participants' Characteristics	Relevant Barriers Identified (or Investigated)	Key Findings (on Dental Dams/Cling Film)	Limitations
5	Bailey et al. (2003) [92]	Cross-sectional analytic design	London, United Kingdom; community- and health facility-based	1218 participants (Health facility = 803 participants; community = 415)	All were women Clinic Sample: Mean (SD) age was 31.2 (6.4) years; 92% Lesbian; 65% employed; 91% residing in London Community Sample: Mean (SD) age was 34.4 (9.8) years; 86% Lesbian; 64% employed; 68% residing in Other England and Scotland	Dental dam	86% of those participants (n = 296) who indicated having had sex with women had never used dental dams	Not provided in the literature
6	Fujii (2019) [93]	Cross-sectional analytic design	Japan; events involving/engaging lesbian women (community-based)	104 participants	99% were registered females (1% were registered males); aged 19 to 55 years; mean (SD) age was 31 (8.9) years	Latex film (dental dam)	(1) 92.4% of the participants had never used latex film during oral sex. (2) A higher proportion of bisexuals (25.8%) had used latex film in oral sex compared to homosexuals (10.7%), although not statistically significant ( $p$ -value = 0.099).	(1) Study sample was not normally distributed. (2) The reliability and validity of the study instrument (questionnaire) were not tested. (3) Participants' recruitment was at events where alcoholic beverages were served; the sample might be biased towards alcohol drinkers. (4) Possibility of biased responses due to the prevailing socio-cultural influence on homosexuality in Japan as at the time of data collection
7	Yap et al., (2010) [88]	Mixed methods study (Quantitative part: cross-sectional descriptive design)	Australia; Prisons in New South Wales	199 participants (quantitative Part)	All were female inmates; 63% were heterosexual	Dental dam	Only 4% of the participants had ever used dental dam for oral sex (in prison)	Not provided in the literature



Table 7. Cont.

No.	Author(s) (Year)	Quantitative Study Design	Country; Settings	Sample	Participants' Characteristics	Relevant Barriers Identified (or Investigated)	Key Findings (on Dental Dams/Cling Film)	Limitations
8	Zappulla et al. (2020) [90]	Cross-sectional analytic design	Melbourne, Australia; Health facility-based	180 participants	All were female sexual workers; median age was 28 years; 86.7% spoke English at home	Dental dam	<p>(1) Only 3.1% of those participants who had given cunnilingus used dental dams consistently.</p> <p>(2) A higher proportion (5.9%) of Asian-language speaking participants who had practiced cunnilingus used dental dams consistently, compared to their English-speaking counterparts (2.7%). This difference was statistically significant (<math>p</math>-value = 0.428).</p> <p>(3) A higher proportion (5.3%) of those participants, who had practiced cunnilingus working in brothels used dental dams consistently, compared to their counterparts who worked privately or as escorts (0.0%). This difference was statistically significant (<math>p</math>-value = 0.585).</p>	<p>(1) The study was health facility-based; hence, it may not be representative of the general population.</p> <p>(2) It was difficult to ascertain the total number of female sexual workers invited to participate in the study</p> <p>(3) The proportion of Asian-language speaking participants was low; hence, the comparisons between the English speaking and the Asian-language speaking participants.</p>

### Study Setting

Five (29.4%) publications were reports of studies adopting community-based settings only, five (29.4%) adopted a combination of community and health facility settings, three (17.6%) adopted jail/prison/correctional facility settings only, two (11.8%) adopted health facility settings only, one (0.6%) adopted an online setting only, and one (0.6%) adopted a combination of prison- and community-based settings (Tables 7 and 8).

### 3.5.2. Quantitative Synthesis

The findings obtained from the quantitative synthesis were grouped into four themes—knowledge, attitude, practice, and effect—to reflect the objectives of this SR, as narrated below.

#### Knowledge of Dental Dams/Cling Film

None of the analysed quantitative studies reported any finding on the participants' knowledge of cling film and/or dental dams (Table 7).

#### Attitudes toward Dental Dams/Cling Film

None of the analysed quantitative studies reported any finding on the participants' attitudes concerning cling films. However, only one study, by [87] investigated the attitudes of their female participants concerning dental dams, while none were reported among the male participants. Amongst the females, only 54% favoured (in their opinion) the use of dental dams in prisons, while only 1% opined that dental dam use would increase the rate of sexual assault among inmates (Table 7).

#### Practices Concerning Dental Dam/Cling Film Use

None of the analysed quantitative studies reported any finding on the participants' practices concerning the use of cling films. However, seven studies reported some practices concerning the use of dental dams (Table 7). These practices are discussed below:

#### Frequency of Use

Only seven studies reported the prevalence of dental dam use among their participants. In those studies, the prevalence of “ever used dental dam in oral sex” ranged from 0.6% to 20.1%. The lowest prevalence rate (0.6%) was recorded among HIV seropositive men, while the highest rate (20.1%) was recorded among women who had sex with women (Table 7).

#### Factors Influencing Use

Only four studies investigated the factors influencing dental dam use (Table 7); these factors were grouped below.

#### Sociodemographic Factors

Only two studies investigated the relationship between dental dam use and a socio-demographic factor (Table 7). In the first study, by [90], the only sociodemographic factors that were investigated were spoken language and place of work. In the study, a significantly higher proportion of Asian-language speaking female sexual workers (5.9%) who had practiced cunnilingus reported using dental dams consistently, compared to their English-speaking counterparts (2.7%) ( $p$ -value = 0.428). Regarding their place of work, a significantly higher proportion of those (5.3%) who were working in brothels used dental dams consistently for cunnilingus, compared to those who worked privately or as escorts (0.0%) ( $p$ -value = 0.585).

The second study was the study by [72]. In that study, it was reported that older age was a significant predictor of dental dam use among women who had sex with women ( $p$ -value < 0.05).

### Sexual Behaviours

Some common sexual behaviours, such as number of sexual partners, forms of oral sex that people engage in, etc., have been investigated to identify if they influence dental dam use or not. In the study by [29], it was reported that the number of sexual partners of females did not significantly increase the frequency of dental dam use ( $RR = 1.5$ ,  $CI = 0.7\text{--}3.0$ ,  $p = 0.3$ ). It was also reported in the study that women who had not engaged in group sex were not significantly more likely to use dental dams compared to those women who had engaged in group sex ( $RR = 1.64$ ,  $CI = 0.6\text{--}4.5$ ,  $p = 0.33$ ). However, the study noted that women who had had oral sex involving blood were significantly more likely to use dental dams ( $CI = 1.5\text{--}5.9$ ,  $p = 0.002$ ) (Table 7).

In the study by [66], the “ever use” of dental dams among women who have sex with women was higher for cunnilingus (20.1%) than for anilingus (19%); however, no  $p$ -value was reported to demonstrate the significance of this difference (Table 7).

In the study by [93], a higher proportion of bisexuals (25.8%) were reported to have used latex film in oral sex compared to homosexuals (10.7%), although no statistically significant difference was recorded between the two groups ( $p$ -value = 0.099) (Table 7).

### Knowledge

Only one study [72] investigated the influence of knowledge on dental dam use. In the study, it was reported that having high self-efficacy for dental dam use, self-perception of HIV as a serious infection, and self-perception of one’s vulnerability to HIV infection were significant predictors of dental dam use among women who have sex with women ( $p$ -values < 0.05) (Table 7).

### Drug Influence

Only one study [72] investigated the influence of drugs on dental dam use. In the study, it was reported that the non-use of cannabis during sex was a significant predictor of dental dam use among women who have sex with women ( $p$ -value < 0.05) (Table 7).

### Communication Skills

Only one study [72] investigated the influence of communication skills on dental dam use. In the study, it was reported that being assertive was a significant predictor of dental dam use among women who have sex with women ( $p$ -value < 0.05) (Table 7).

### Effects of Dental Dam/Cling Film Use

None of the analysed quantitative studies reported any finding on the effects of the use of cling films and dental dams on their participants.

### 3.5.3. Qualitative Synthesis

All of the included qualitative studies reported at least one finding concerning dental dams while only three reported on cling film. The qualitative synthesis of the findings reported in these studies was grouped into three themes—knowledge, attitude, and practice—to reflect the objectives of this SR (Table 9). No study reported a finding on the effects of dental dam or cling film use; hence, no theme was generated for this.

#### Theme 1: Knowledge of Dental Dams/Cling Film

The findings grouped under theme 1 were obtained from four studies. All four studies reported findings on their participants’ knowledge of dental dams, while none of them reported on cling film (Table 9). In those studies, gross misconceptions and lack of awareness of dental dams was a common observation among the participants in two studies (F1, F2, F3 and F4; Table 9).

## Theme 2: Attitudes toward Dental Dams/Cling Film

The findings grouped under theme 2 were obtained from four studies that reported on the attitudes of their participants toward dental dams/cling film. These findings were only on dental dams, and all of them were negative—none of these studies reported any finding on cling film. These attitudes were based on multiple factors that were categorised under five sub-themes:

### Sub-Theme 1: General Perception of Dental Dams

The general perception of the participants regarding dental dams was negative, as some perceived its use to be “silly” and unimaginable to recommend its use during sex (F5; Table 9).

### Sub-Theme 2: Preference for Other Protective Measures

The preference for other protective measures also impacted the participants’ attitudes toward dental dams, as some of them preferred to undergo screening for sexually transmitted infections before choosing a sexual partner; therefore, they were not positively disposed toward dental dam use (F6; Table 9).

### Sub-Theme 3: Poor Perceptions of the Risk of Contracting Sexually Transmitted Infections

Some participants did not see the need for using dental dams as a barrier in oral sex due to poor perceptions of the risk of contracting sexually transmitted infections; also, some felt unprotected oral sex is more natural and pleasurable than when a dental dam is used (F7; Table 9).

### Sub-Theme 4: Previous Experience with Dental Dam Use

Most of the participants that had experience with the use of dental dams in oral sex expressed some displeasure with it. Some specific comments were that the dental dam reduces sexual sensation during oral sex, is awkward to use, not romantic, not user-friendly, unflavoured, powdery, has a powdery taste, is too thick, and too dry (F8 and F9; Table 9).

### Sub-Theme 5: Attitudes toward the Future Use of Dental Dams

Attitudes concerning the future use of dental dams were reported to be positive among those that had never used them. However, no finding was specifically reported concerning the attitudes of previous users regarding future use (F10 and F11; Table 9).

**Table 8.** Data describing the included qualitative studies (and qualitative part of mixed-methods studies).

No.	Author(s) (Year)	Qualitative Study Design	Country; Settings	Sample and Participants' Characteristics	Data Collection; Analysis	Study Objectives	Barriers Identified/Investigated	
							Dental Dam	Cling Film
1	Krienert et al. (2014) [77]	Secondary data analysis design	United States; correctional institutions	900 participants—30 participants per prison facility, across 30 correctional institutions in 10 states; age and other sociodemographic features were not described	Secondary data; thematic analysis	To examine the attempts of inmates toward having safe sex	No	Yes
2	Craig Rushing and Gardner (2016) [83]	Multiple qualitative research designs	United States; community- and health facility-based	Phase 1 (the relevant phase): 30 participants—7 urban males, 7 tribal males, 7 urban females, 7 tribal females, and 7 LGBT-TS (lesbians, gays, bisexuals, trans, and two spirit); age and other sociodemographic features were not described	Focus groups and key informant interviews; analysis approach was not provided	To design a video-based STI/HIV intervention for heterosexuals and LGBT-TS	Yes	No
3	Grant and Nash (2018) [74]	Qualitative interview design informed by feminist methodological principles	Tasmania, Australia; Community-based	15 participants; all were lesbian, bisexual, or queer women, based on sexual orientation, and aged 19 to 26 years; 86% were white, university educated, and middle class; 80% lived in the urban areas of Southern Tasmania	Semi-structured in-depth interviews using the feminist approach; thematic analysis	To investigate how lesbian, bisexual, and queer women in rural Australia construct meaning concerning safe sex and how they rationalise risks and safety with their sexual partners	Yes	No
4	Mahon (1996) [79]	Qualitative study—focus group design	United States; New York State prisons and New York City jails	50 female participants—22 were former prisoners, 28 were inmates; 80% were aged ≤39 years; 28% had finished grade school; 32% were African Americans; 71% had been imprisoned at least twice	Focus groups; data analysis approach not identified	To evaluate the perceptions of inmates in New York State prisons and New York City jails on high-risk sexual behaviours	Yes	Yes
5	Emetu et al. (2022) [70]	Qualitative study—telephone interview design	United States; Dinah Shore—a festival for lesbian and bisexual women in Palm Springs, California (United States) (community-based)	19 participants—13 and 6 were lesbians and bisexual females, respectively; aged 22 to 43 years; 63% were single; half were White	Telephone interview aided by a question guide; thematic analysis	To explore the current sexual behaviours of women who have sex with women, and to examine the current protective methods they use to prevent sexually transmitted infection	Yes	No
6	Yap et al. (2010) [88]	Mixed-methods research design (Qualitative part adopted an in-depth face-to-face interview design)	Australia; New South Wales prison- and community-based settings	19 participants—10 were inmates; 9 were ex-prisoners; all were females aged 19 to 50 years; 12 (63.2%) had served prison terms at least thrice; 5 (2.6%) were Aboriginal	Face-to-face in-depth interviews; thematic analysis	To examine the consensual practices among women imprisoned in New South Wales prisons with a focus on dental dams		
7	Marrazzo, Coffey and Bingham (2005) [94]	Qualitative study—focus group discussion design	United States; greater Seattle metropolitan area (community-based)	23 participants; all were females aged 18 to 29 years; 18 were White	4 focus group discussions; thematic analysis	To explore the sexual practices among women who have sex with women, and to identify the most acceptable and most likely-to-practice protective behaviours amongst them	Yes	Yes

Table 8. Cont.

No.	Author(s) (Year)	Qualitative Study Design	Country; Settings	Sample and Participants' Characteristics	Data Collection; Analysis	Study Objectives	Barriers Identified/Investigated	
							Dental Dam	Cling Film
8	Muzny et al. (2013) [81]	Qualitative study—focus group discussion design	United States; health facility and community settings in Birmingham	29 participants—all were African American women who had sex with women	7 focus group discussions; analysis approach was not provided	To explore the perception of safer sex and the risk of sexually transmitted infections among African American women who had sex with women	Yes	No
9	Doull et al. (2018) [69]	Qualitative study—focus group discussion design	United States; Online setting	160 participants—all were lesbians/bisexuals aged 14 to 18 years; 52% were White; 20% were from the West	8 focus group discussions; thematic analysis approach	To explore the participants' choices of barrier use in sex	Yes	No
10	Gomez et al. (2014) [73]	Qualitative study—in-depth one-on-one interview design	United States; community- and health facility-based	25 participants—all were adolescent African American men who have sex with men; all were aged between 15 and 19 years	In-depth one-on-one interview design; categorical and contextualising analytic methods	To explore the behaviours of adolescent African American men who have sex with men during their first same-sex sexual experiences	Yes	No

Table 9. Extracted, categorised, and synthesised qualitative findings obtained from the included qualitative studies (and qualitative part of mixed-methods studies).

No.	Meta-Aggregation Stages			
	Extracted Finding (Relevant to Dental Dams or Plastic Wrap) [First Step]		Category [Second Step]	Synthesised Finding [Third Step]
	Findings (F)	Supporting Quotes		
<b>Theme 1—Knowledge of Dental Dams/Cling Film</b>				
F1	<i>“Misperceptions regarding protective barrier methods were common, exemplified by over half of the participants. Many women claimed familiarity with dental dams, though further questioning revealed confusion as to what dental dams are and how they are used. Most notable was the conflation of dental dams and female condoms. A few women spoke of using female condoms when performing oral sex on female partners but their descriptions indicated they were actually referring to dental dams . . . ”</i> (Muzny et al. (2013) [81] (p. 139)); [Unequivocal]	<i>“Ours is square” “This [barrier method] is [on] the outside, pretty much like a box of paper [gesturing to indicate a 4-inch square].” “I know . . . like you said, you’re all talking about a dental dam. I’m under the impression that that’s the female condom, [so I] didn’t know the difference. I never knew how to use them. I mean it was showed to me, but I didn’t know . . . I thought they were the same thing . . . ”</i>	Knowledge of Dental Dams	Knowledge of Dental Dams/Cling Film
F2	<i>“Even those familiar with the concept of barriers for sex with male partners shared that they were unaware of dental dams or of where to find them.”</i> (Doull et al. (2018) [69] (p. 413)); [Unequivocal]	<i>“Barriers aren’t really available for lesbians. Like where the heck do you buy dental dams?” “I didn’t even know dental dams were even a thing.” “I’ve never used barriers, I honestly did not know that was an option during girl-on-girl sex until maybe a year ago.”</i>		
F3	<i>“Lack of knowledge about safer sexual practices when engaging in sexual activity with women extended to dental dams, which three participants had never heard about.”</i> (Emetu et al. (2022) [70] (p. 9)); [Equivocal]	<i>“Definitely something better than dental dams. They’re super awkward and hard to use and just really poorly constructed, so if there was some sort of barrier that was easier to use on a woman, I think, would go a long way.” (#101, Northeastern Middle Eastern lesbian, age 34).</i>		
F4	<i>“Youth who described oral-anal sex described non-use because of lack of knowledge of dental dams.”</i> (Gomez et al. (2014) [73] (p. S4)) [Unsupported]			



Table 9. Cont.

Meta-Aggregation Stages				
No.	Extracted Finding (Relevant to Dental Dams or Plastic Wrap) [First Step]		Category [Second Step]	Synthesised Finding [Third Step]
Findings (F)		Supporting Quotes		
Theme 2—Attitudes toward Dental Dams/Cling Film				
Theme 2: Sub-Theme 1				Attitudes toward Dental Dams/Cling Film
F5	“Many expressed a belief that dental dams were “silly” and that they couldn’t imagine asking a sexual partner to use one.” (Craig Rushing and Gardner, (2016) [83] (p. 35)); [Unsupported]		General perception of Dental Dams	
Theme 2: Sub-Theme 2				
F6	“Discussions in all groups included the idea of using STI testing as a safe-sex strategy. Girls, especially inexperienced ones, explained that STI testing, as a couple, could effectively manage their risk.” (Doull et al. (2018) [69] (p. 413)); [Equivocal]	“I know I should use barriers even with girls, but I’d also prefer if I could be tested and my partner could be tested. If we’re clean, I’d much rather go without any barriers.” (17-year-old experienced lesbian) “I would much rather just have both of us be tested for STDs than use a dental dam. I feel like it would be uncomfortable and ruin the mood.” (14-year-old inexperienced lesbian)	Preference for Other Protective Measures	
Theme 2: Sub-Theme 3				
F7	“Others preferred to have sex without dental dams since they saw it as more ‘natural’ or they perceived their partners not to be at risk” (Yap et al. (2010) [88] (p. 173)); [Unequivocal]	“No, because I haven’t really, like I said, only the one person [her current partner] that I’d ever [sleep with], you know. And I was comfortable enough with her to [not use dental dams], you know, she’s anally clean [not promiscuous], you know.” (Female prisoner, 25 years)	Poor Perception of the Risk of Contracting Sexually Transmitted Infections	
Theme 2: Sub-Theme 4				
F8	“Of the 16 participants who knew what dental dams were, only two claimed to have tried them during oral sex. Participants expressed aversion and displeasure for the product. The interviewees used terms such as “awkward,” “unsexy,” and “not user-friendly” to describe their experiences with this barrier method.” (Emetu et al. (2022) [70] (p. 9)); [Unequivocal]	“Definitely something better than dental dams. They’re super awkward and hard to use and just really poorly constructed, so if there was some sort of barrier that was easier to use on a woman, I think, would go a long way.” (#101, Northeastern Middle Eastern lesbian, age 34).	Previous Experience with Dental Dam Use	
F9	“Women, even the few regular users of dental dams, reported that they did not like the taste or feel of the dental dams from the vending machines. They found that they tasted powdery, plastic or rubbery; were not flavoured; and were too thick or dry, reducing sexual sensations during oral sex” (Yap et al. (2010) [88] (p. 173)); [Unequivocal]	“They taste terrible. I’ve put it up in my mouth, and sucked it in and fucked around with it. It tastes funny. Powdery plastic shit. They’re not flavoured.” (Female prisoner, 26 years) “No, generally people just gig the dental dams, because they’re plastic, and, you know, if you’re going down on someone, you know, your tongue’s [on her], they’ll feel the pressure of your tongue but there’s no wetness there, and it sort of kills the whole thing.” (Female prisoner, 28 years) “But a couple of the girls that I’ve shown have used them, and it was also them that said, “They’re too thick; you can’t feel anything through them,” you know. I agree with them; they are thick, these ones. It’s like there’s about five of them together, because they’re that thick.”(Female prisoner, 35 years)		
Theme 2: Sub-Theme 5				
F10	“When prompted that using condoms on sex toys can be a safe-sex practice, individuals among both the inexperienced bisexual and lesbian groups responded that they would consider using dental dams or a condom.” (Doull et al. (2018) [69] (pp. 412–413)); [Unsupported]		Attitudes toward the Future Use of Dental Dams	

Table 9. Cont.

No.	Meta-Aggregation Stages		Category [Second Step]	Synthesised Finding [Third Step]
	Extracted Finding (Relevant to Dental Dams or Plastic Wrap) [First Step]	Supporting Quotes		
	<b>Findings (F)</b>	<b>Supporting Quotes</b>		
F11	<i>“Participants, especially those who identifying as inexperienced, seemed open to using barriers in the future.”</i> (Doull et al. (2018) [69] (p.413)); [Unequivocal]	<i>“I’ve literally never heard of dental dams but like I said before, I’m so paranoid about STDs that I’m fine with whatever prevention is possible.”</i> <b>(14-year-old inexperienced lesbian)</b> <i>“I think for the most part, it’s a good idea to always use barriers because even if someone thinks they’re clean, they might have an STD.”</i> <b>(17-year-old inexperienced lesbian)</b>		
<b>Theme 3—Practices concerning Dental Dam/Cling Film Use</b>				
<b>Theme 3: Sub-Theme 1</b>				Practices concerning Dental Dam/Cling Film Use
F12	<i>“Of the 16 participants who knew what dental dams were, only two claimed to have tried them during oral sex.”</i> (Emetu et al. (2022) [70] (p. 9); [Unsupported]		Frequency of Dental Dam Use	
F13	<i>“Although several WSW identified dental dams as a way to prevent STIs, none reported having used them.”</i> (Craig Rushing and Gardner (2016) [83] (p. 35)); [Unsupported]			
F14	<i>“None of the participants report using barrier methods recommended for preventing fluid exchange between women (e.g., dental dams, gloves) and only three considered using them in the future:”</i> (Grant and Nash (2018) [74] (p. 313)); [Unequivocal]	<i>“I only found out about dental dams recently, so, um, yeah, I’ve never used them and . . . I don’t really think I would. They seem a bit . . . gross, really. Not something I would (laughing) purchase!”</i> <b>(Carrie, 23, bisexual)</b> <i>That kind of thing hasn’t ever really come up with girls. Like, how would I . . . ? I don’t know what I’d say . . . No. Nup. They’d just take all the fun away. I was given [a dental dam] at [a queer event] once and I read about what it was and I was like, cool, but I’m not using one of these—straight in the bin (laughs).”</i> <b>(Stella, 25, bisexual)</b>		
F15	<i>“Participants mentioned that their peers were not using dental dams and desired a better alternative.”</i> (Emetu et al. (2022) [70] (p. 10)); [Unequivocal]	<i>“I never heard anyone use them [dental dams]. Like my friends, I never heard of anyone saying they use it.”</i> <b>(#102, Western Asian lesbian, age 33)</b>		
F16	<i>“Two women interviewed who had had same-sex encounters in prison had used dental dams, either as a one-off or as a regular practice with casual partners.”</i> (Yap et al. (2010) [88] (p. 173)); [Unequivocal]	<i>“But I’ve always used dams, especially on, as I was saying, women that I’ve only known for a couple of weeks; or on the two or three occasions where I have slept with someone on the first time of seeing and meeting them, I’ve used them as well.”</i> <b>(Female prisoner, 35 years)</b>		
F17	<i>“Participants generally agreed that use of barrier methods, including dental dams and plastic wrap, to cover the genitals is not a common approach to reducing the risk of STD transmission with oral sex.”</i> (Marrazzo, Coffey and Bingham (2005) [94]); [Unsupported]			
<b>Theme 3: Sub-Theme 2</b>				
F18	<i>“Although less common, safe sex practices were also revealed in female inmate narratives.”</i> (Krienert et al. 2014) [77] (p. 395)); [Unequivocal]	<i>“Some will use saran wrap, you can buy it if someone steals it from the kitchen. People are worried about disease and most will take precautions.”</i> <i>“they say they put saran wrap on it and protect themselves, [if] they have AIDS.”</i>	Reason for the Use: Protection against Infections	

Table 9. Cont.

No.	Meta-Aggregation Stages		
	Extracted Finding (Relevant to Dental Dams or Plastic Wrap) [First Step]	Category [Second Step]	Synthesised Finding [Third Step]
<b>Theme 3: Sub-Theme 3</b>			
F19	<i>“LGBT-TS youth reported that accessing condoms was relatively easy and free at clinics, nonprofit organizations, and events for queer youth; however, those seeking dental dams and gloves were often hard pressed to find these forms of protection.”</i> (Craig Rushing and Gardner (2016) [83] (p. 35)); [Unsupported]	Access to Dental Dams or Cling Film	
F20	<i>“Without any access to condoms or dental dams, participants described home-made devices that they had used in state prison to practice safer sex, including plastic gloves and plastic wrap stolen from the kitchen.”</i> (Mahon (1996) [79] (p. 1213)); [Unequivocal] <b>Findings (F)</b>		
F21	<i>“Several female participants commented that in light of the frequency of sexual relations with male correctional officers, female prisoners should have access to condoms as well as dental dams.”</i> (Mahon (1996) [79] (p. 1213)); [Unsupported]		
F22	<i>“The accessibility of dental dams was problematic for some participants. Many stated that finding and purchasing them was difficult, even though male condoms could be purchased anytime at drug stores. Some stated that dental dams were accessible only online or in adult stores. Some participants had never seen a dental dam outside its packaging.”</i> (Emetu et al. (2022) [70] (p. 10)); [Unequivocal]		
F23	<i>“Some participants highlighted the differential accessibility of female and male barrier methods. Some stated that men’s use of condoms was much more normalized and common than women’s use of dental dams or finger cots”</i> (Emetu et al. (2022) [70] (p. 10)); [Equivocal]		
F24	<i>“Most women interviewed said that dental dams were available to them in prison, although two women reported that they had heard of but had never seen a dental dam while incarcerated . . . Our observations in one prison found that one dispensing machine was filled with dental dam kits but the box had become wet from the rainy weather as the vending machine was located outside a residential prison block. Another vending machine in a segregated unit of a women’s prison was empty.”</i> (Yap et al. (2010) [88] (p. 173)); [Unequivocal]		
	<i>“Half of the time they’re [inmates] not really finding no Saran Wrap, and if they’re finding Saran Wrap, they are taking that Saran Wrap and using it over and over and over again”</i> (Transcript of focus group of female former state inmates, November 1993, pp. 49–50 [hereinafter “Women’s State”]) <b>Supporting Quotes</b>		
	<i>“I’ve never used one [dental dams] and I don’t think I’ve ever even seen one at, like, a pharmacy, where they have the condom section. I don’t believe I’ve seen dental dams. I mean, I honestly have not looked for them, but obviously when you go through one of the aisles, you can tell, “Okay. I see condoms right there,” loud and clear. But I have not come across the dental dams at any store.”</i> (#111, Western White lesbian, age 35)		
	<i>“When you go anywhere, Pride or whatever, they like, throw out condoms but they never give you finger condoms. That could be a thing where if you gave people finger condoms, they might actually use them and then be like, “Oh, we’re having sex on the first date. Maybe I should use the finger condom.”</i> (#108, Northeastern Black lesbian, age 30)		
	<i>“One said, ‘Oh yeah, I know what they are. No, never took one”</i> (ex-prisoner, 24 years) <i>“Another woman reported that dispensing machines had not been filled in a long time or were quickly emptied”</i> (ex-prisoner, 38 years)		

### Theme 3: Practices Concerning Dental Dam/Cling Film Use

The practices concerning dental dam/cling film use were contained in theme 3. Only seven studies contributed to the findings grouped under theme 3, and only one of these studies reported a finding on saran wrap (Table 9). Theme 3 had five sub-themes:

#### Sub-Theme 1: Frequency of Dental Dam Use

The use of dental dams was consistently reported to be rare or none in multiple studies reporting the frequency of dental dam use amongst the participants (F12, F13, F14, F15, F16, and F17; Table 9).

#### Sub-Theme 2: Reason for Use: Protection against Infections

None of the qualitative studies reported a finding on the reasons for the use of dental dams; however, only one study reported on cling film. In that study, it was reported that the participants, although few, used cling film as a protective barrier for oral sex to protect them from contracting sexually transmitted infections (F18; Table 9).

#### Sub-Theme 3: Access to Dental Dams or Cling Film

Only one of the qualitative studies reported a finding on the participants' access to cling film; however, four studies reported on dental dams. All of the studies reporting on access to dental dams, except one, consistently reported that access to dental dams was difficult among their participants (F19, F20, F21, F22, F23, and F24; Table 9). To compensate for this limited/lack of access, some of the participants resorted to stealing cling film from the kitchen (F20; Table 9).

### Configuration of Synthesised Data

The findings obtained from the synthesised quantitative and qualitative studies identified diverse information that was complex. Notably, most of the findings were on dental dams; only very scanty information was reported on cling film. Therefore, the data configuration was focused on dental dams only.

### Knowledge

In the quantitative synthesis, no findings were obtained on the participants' knowledge of dental dams/cling film, whereas a few findings were obtained from the qualitative synthesis, including "a gross misconception or lack of knowledge of what a dental dam is". Therefore, it can be concluded that the synthesised qualitative and quantitative findings obtained on the participants' knowledge of dental dams/cling film were complementary.

### Attitudes

Concerning the attitudes of the participants toward dental dams, a positive finding was reported in the quantitative synthesis—more than half of the female participants in the only quantitative study reporting attitudes on dental dams favoured the use of dental dams. However, in the qualitative synthesis, most of findings obtained were negative; for example, some believed that it is "silly" to use dental dams for oral sex. The only few positive dispositions towards dental dams were from young females who had never used them. Therefore, it can be concluded that the synthesised qualitative and quantitative findings obtained on the participants' attitudes toward dental dams were contradictory.

### Practices

Concerning the practices of the participants concerning dental dam use, the quantitative synthesis obtained findings on the frequency and determinants of dental dam use, while the qualitative synthesis obtained findings on the frequency and reasons for dental dam use and access to dental dams. These findings were non-overlapping except for those on the frequency of dental dam use. Therefore, it can be concluded that the synthesised

qualitative and quantitative findings obtained on the participants' practices regarding dental dam use were complementary.

#### 4. Discussion

##### 4.1. Population Characteristics

The rationale for this SR was to synthesise all available findings on the experiences concerning dental dam/cling film use globally; however, from the analysis of the characteristics of the population groups investigated in the literature included in the review, it was observed that many population groups were yet to be investigated for this experience. Based on the obtained findings, only populations in Europe, Australia, North America, and Asia had been investigated while no African or South American population had been investigated. Overall, this shows that research productivity in this topic area is lacking in Africa and South America. Many factors, ranging from resources to socio-cultural factors, might have been responsible for the low scholarship in this topic area [11,95]. For example, oral sex is a sociocultural taboo in many African countries; as a result, researchers from the African continent might have shied away from such topic areas to avoid being perceived awkwardly [96,97].

It is also notable that the investigated population groups in the included literature were predominantly inmates, ex-convicts, and LGBT-TS (lesbians, gays, bisexuals, trans, and two spirit); only a very few studies investigated heterosexuals. However, studies have shown that a high proportion of heterosexual males and females do engage in oral sex [7]. This, therefore, demonstrates the need for more research on the non-queer and general population groups.

##### 4.2. Knowledge of Cling Film and Dental Dams

The empirical evidence on people's knowledge of the use of cling film in oral sex is currently lacking, and this can be proven by the lack of reports on this in the literature included in this SR. However, evidence exists across different population groups on the knowledge of dental dams and other forms of sexual barriers [81,98–100]. Notably, the knowledge of dental dams was very poor (Table 9). Comparing this finding with that obtained for other barrier types, it can be deduced that condoms are the most known barrier type [81,98–100].

Notably, only qualitative evidence exists on the knowledge of dental dams. Qualitative evidence is primarily used for the exploration of experiences and quality of information; it does not quantify evidence [101]. Therefore, the current body of evidence concerning the knowledge of dental dams is not substantial enough, as statistical data are also required to quantify the level of knowledge on them. Therefore, further research is needed to fill this knowledge gap.

##### 4.3. Attitudes toward Cling Film and Dental Dams

The findings obtained on people's attitudes concerning cling film and dental dams were interesting. To start with, there is no evidence on attitudes toward cling film. However, the little evidence obtained on dental dams shows that attitudes towards dental dams is complex, and multiple factors shaped people's attitudes towards them.

In the only quantitative study reporting attitudes on dental dams, the majority of participants were positively disposed toward the use of dental dams; however, the study did not explore the history of use of dental dams amongst them [87]. The knowledge of this history is essential and of public health relevance, as such information would provide deeper insights into why the participants favoured dental dam use. Therefore, this study identified a gap in the literature that needs to be filled.

However, in the qualitative studies reporting attitudes concerning dental dams, there were overwhelmingly negative attitudes toward dental dam use. Many factors have been reported to determine attitudes toward the use of physical barriers in sex; they include self-efficacy of barrier use, perception of STI risk, and previous experience of use [69,87,99].

In this study, negative attitudes toward dental dam use were predominantly found among previous users, and their reasons were based on the texture, appearance, and taste of dental dams and their preference for having “natural” sex. These reasons are crucial, and they point toward sexual satisfaction.

#### *4.4. Practices Concerning the Use of Cling Film and Dental Dams*

Overall, the rate of use of cling film and dental dams was consistently found to be very low. This may suggest that the rate of unprotected anilingus and cunnilingus, across different populations, is very high. This is an issue of serious public health concern, given the enormous and unabating burden of STIs globally.

The sequelae of STIs are economically devastating to the infected person, the facility of care, and the society [25]. Preventing the spread of STIs is much cheaper and less overwhelming for the currently fragile healthcare systems in various countries. Therefore, serious attention needs to be focused on how to increase dental dam/cling film use globally, as their use in oral sex has been reported to be safer than their non-use [1,36]. However, it was observed in this study that the possibility of using dental dams was high among those who have the knowledge of how to use them, are of older age, engage in sex without using drugs, have high perceptions of STI risk, are of bisexual orientation, assertive with good communication skills, or have positive attitudes toward or access to dental dams. This implies that those who do not belong to the above categories have a higher risk of contracting STIs due to non-use of dental dams.

#### *4.5. Effects of Cling Film and Dental Dam Use*

Notably, no study was found to report the effects of cling film and dental dam use. For evidence-based practice, it is essential to know the efficacy level and other effects of dental dam/cling film use in oral sex and STI prevention. Multiple studies, including randomised controlled trials, have investigated such effects for condoms and other protective agents [35, 102]. This lacking evidence is needed to fill in this knowledge gap.

#### *4.6. Limitations of the Study*

However, this research has its limitations, all of which are not uncommon to an SR. To start with, ethical clearance was not obtained for this study because the study did not involve contact with human participants. However, some unavoidable circumstances surrounding SR methodology still pose notable concerns regarding this research. These include: (i) ethical heterogeneity; (ii) risk of inclusion of unethical studies; (iii) lack of ethical consent; and (iv) the risk of bias. Ethical heterogeneity refers to variation in ethical conduct among a group of studies under comparison; however, this was not determined in this study, as ethical heterogeneity management is currently lacking in SR methodology [103]. Based on this, it is difficult to conclude whether the studies included in this SR were ethically homogenous or not. The possibility of having included unethical studies in this SR cannot be ruled out, as the appraisal of ethical compliance was not performed in this review due to the lack of such provisions in the PRISMA 2020 guideline for reporting SRs [103]. Obtaining informed consent is a crucial part of ethical research conduct [103]. Unfortunately, ethical consent was not obtained from the subjects involved in the primary studies analysed in this review, as they were unknown to the researchers; pertinently, ethicists have posited that this is, in some sense, unethical [103]. However, this is a universal practice in SRs that is not limited to the present study alone.

#### *4.7. Strengths of the Study*

Notwithstanding its limitations, this study has its own strengths. It is the first known SR of the experiences concerning the use of dental dams and cling film in oral sex. Secondly, this study adopted the most comprehensive research design—a mixed-methods design—for investigating a complex public health problem [104]. Thirdly, the findings obtained in



this study provided deep and robust information vital for the development of public health policies and interventions targeting the prevention of sexually transmitted infections.

#### 4.8. Indications for Further Research

The findings obtained in this study clearly reveal an indication for further research on sexual health and safer oral health practices. Notably, substantial research evidence on experiences concerning the use of cling film in oral sex is lacking. In contrast, while some significant evidence exists for dental dams, it is limited, as the level of effectiveness of dental dams cannot be objectively ascertained. To fill these knowledge voids, further scientific investigations are highly recommended.

#### 4.9. Public Health and Policy Recommendations

Based on the findings obtained in this SR, it is imperative that some key public health and policy-relevant recommendations be provided. These recommendations are listed below:

1. Robust and strategic public health research on all forms of protective sex barriers and domains of evidence (including knowledge, attitudes, and practices), especially on dental dams and cling film, should be performed, as it will provide further evidence that will help in tackling the non-abating global burden of STIs [25].
2. Public policies that will improve public access to, and knowledge of, the sexual use (including self-efficacy) of dental dams and cling film should be formulated and implemented. Pertinently, the policies should be all-inclusive, favouring both the privileged and disadvantaged populations (such as prisoners, HIV patients, etc.), and they should be applied at all tiers.
3. Massive health education campaigns should be implemented to inform the public about the health benefits of protected oral sex and dental dam/cling film use.
4. Further research, especially experimental studies, should be conducted to determine the level of efficacy of dental dams in reducing the transmission of sexually transmitted oral infections.
5. The manufacturers and suppliers of dental dams should improve the quality of dental dams sold to the public. Importantly, user manuals should be included in the product packets, and the taste, texture, and appearance of dental dams should be made more appealing without altering their functional integrity.

### 5. Conclusions

This SR provided a robust evidence base required for the planning and implementation of public health strategies aimed at reducing the global STI burden. Pertinent issues concerning the knowledge, attitudes, practices, and effects related to dental dams and cling film were identified and critically explained, with recommendations.

**Author Contributions:** Conceptualization, K.K.K.; methodology, K.K.K.; software, K.K.K. and E.A.E.; validation, K.K.K. and E.A.E.; formal analysis, K.K.K.; investigation, K.K.K. and E.A.E.; resources, K.K.K. and E.A.E.; data curation, K.K.K.; writing—original draft preparation, K.K.K. and E.A.E.; writing—review and editing, K.K.K., E.A.E., M.J.N. and L.A.N.; visualization, K.K.K. and E.A.E.; supervision, K.K.K., L.A.N. and M.J.N.; project administration, K.K.K. and E.A.E.; funding acquisition, K.K.K. All authors have read and agreed to the published version of the manuscript.

**Funding:** This research received no external funding.

**Institutional Review Board Statement:** Not applicable.

**Informed Consent Statement:** Not applicable.

**Data Availability Statement:** Not applicable.

**Conflicts of Interest:** The authors declare no conflict of interest.

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