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Review Article

Transforming sexual health services: A systematic review of India's top interventions (2010-2023)

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Abstract

Background: Healthcare decision-makers require clear, evidence-based insights to effectively prioritize treatments for sexual dysfunction. This study seeks to provide a comparative analysis of the health benefits and cost-effectiveness of different interventions, including both medical and non-medical treatments, with a special focus on the Indian context.

Methods: This systematic review draws on ranking frameworks from Indian health organizations like the National Health Systems Resource Centre (NHSRC) and the Indian Council of Medical Research (ICMR) to prioritize preventive healthcare services. Using data from 2010 to 2023, we evaluated key interventions, including pharmacological treatments, cognitive-behavioraltherapy (CBT), and lifestyle changes, in the Indian context. Each intervention was scored for clinical and cost-effectiveness on a 1 to 5 scale, with total scores ranging from 2 to 10. To set administration priorities, we compared these rankings with access and usage rates, following recommendations from programs like the National Health Mission (NHM) and the National AIDS Control Organization (NACO).

Results: Pharmacological treatments, such as Phosphodiesterase type 5 inhibitors (PDE5i), received high effectiveness scores (8-10), but their availability was found to be limited in low-income regions. CBT, with moderate-to-high effectiveness (7-9), showed better cost-effectiveness in these regions. Lifestyle modifications had lower overall effectiveness but remain a crucial complement to other interventions. Regional disparities highlighted gaps in service delivery, especially in resource-poor areas.

Conclusion

This review identifies the most valuable interventions for treating sexual dysfunction and provides a framework to guide healthcare providers and policymakers in prioritizing actions that improve sexual health outcomes, especially in underserved populations.

Keywords:
Sexual health interventions, Cost-effectiveness analysis, India healthcare priorities, Preventive services, Sexual dysfunction treatments, Public health strategy

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Introduction

Over the past decade, sexual health preventive services have undergone significant advancements, yet major challenges persist to make certain that these evidence-based interventions reach all individuals-especially in underprivileged regions such as India.[1] Despite progress in healthcare infrastructure, the uptake of essential sexual preventive services remains alarmingly low in many areas. For instance, rates of sexually transmitted infection (STI) screenings and HIV prevention measures remain critically inadequate among high-risk populations.[2] These gaps highlight the need for more effective strategies to deliver comprehensive sexual health care, particularly in regions with unique cultural and socio-political challenges.[3] In India, disparities in sexual health services are striking.[4] Recent data reveals that many at-risk individuals, including young adults and marginalized communities, do not receive adequate STI screenings, contraceptive services, or sexual health education.[5]

Barriers such as limited access to healthcare, social stigma, and inadequate resource allocation contribute to these gaps. In India, the situation is further complicated by cultural sensitivities and confined access to healthcare. These challenges exacerbate the delivery of critical sexual health services, leaving many without proper care or preventive measures.

A key contributor to these disparities is the limited integration of preventive service recommendations into routine clinical practice. Healthcare providers often face the dilemma of balancing numerous preventive recommendations with immediate patient needs and systemic constraints. In the absence of clear prioritization, preventive services like STI screenings, HIV testing, and sexual health counselling are frequently overlooked.[6] This gap underscores the importance of equipping clinicians with data-driven insights that guide decision-making and help them focus on interventions with the greatest impact.[7] Similarly, policymakers must focus on optimizing public health strategies to ensure the equitable distribution of resources and prioritize the most effective services.[8]

This systematic review aims to update and expand upon previous evaluations of sexual preventive services, covering data from 2010 to 2023. It provides a comprehensive evaluation of the relative effectiveness and cost-effectiveness of sexual health interventions, with particular attention to the contexts of India.[9] By incorporating recent guidelines such as those from the National AIDS Control Organisation (NACO), which emphasize targeted interventions for high-risk groups and expanded access to HIV/STI testing and prevention services[10], and the World Health Organization (WHO), which promotes community-based strategies and HIV pre-exposure prophylaxis (PrEP) [11], this review identifies areas where improvements can be made.[12] Additionally, data from the National Family Health Survey (NFHS) has been used to analyze disparities in sexual health education, contraceptive use, and service delivery among different populations in India.

The need for this refurbished analysis is driven by evolving guidelines, new research findings, and the growing burden of sexual health issues. This review draws on recommendations from global health authorities, incorporating the latest evidence on the burden of disease, intervention effectiveness, and delivery costs. Detailed methodologies, alongside findings on high-impact services, are presented in subsequent sections. By providing a robust ranking of sexual preventive services, this analysis aims to help clinicians, public health officials, and policymakers prioritize services that offer the greatest health benefits at the lowest cost.

Ultimately, this review aims to serve as a valuable tool for enhancing the effectiveness of sexual preventive services and reducing disparities in service delivery. By identifying priority areas for improvement and offering evidence-based recommendations, this work seeks to drive meaningful change in sexual health outcomes, especially in underserved populations where these services are most needed.

Table 1: Key sexual preventive services prioritised in India

Service	Key strategies implemented	Outcomes (2010-2023)
STI prevention	-Expansion of STI screening programs -Targeted condom distribution campaigns	-30% decline in new HIV infections -Improved STI detection in urban areas
HIV/AIDS control	ART coverage expansion Focused interventions for high-risk groups	ART coverage reached 65% of HIV positive individuals
Contraceptive access	Mission ParivarVikas program Increased availability of LARCs	CPR increased to 54% Notable rise in LARC use, especially in urban areas

Table 2: Sexual health challenges

Challenges	Impact on sexual health services	mitigation strategies
Cultural barriers	The highstigma around sexual health services Low uptake of STI and HIV testing	Confidential youth-friendly services Community educative initiatives
Limited health care access	Inconsistent service delivery Gaps in sexual health data collection	Pilot programs for service integration Focus on remote areas

Rationale behind the timeline

- **Policy and programmatic shifts:** Significant changes in India's public health policies, particularly with the launch of the National Health Mission (NHM) in 2013, have made this period critical for improvements in approach and delivery of sexual and reproductive health services.[13] The NHM focuses on strengthening health systems, especially in rural areas, making it a pivotal time for tracking progress in preventive services.
- **Advances in medical and psychological intermediation:** During this period, advancements in pharmacological treatments, cognitive-behavioral therapies (CBT), and lifestyle modifications for sexual health issues have been made globally and in India. Recent literature supports the growth and success of these interventions in managing sexual health concerns.[14]
- **Data availability:** Since 2010, India has improved its health data collection and reporting systems. The introduction of initiatives like National Health Data Management Policy and Health Management Information System (HMIS) has ensured more comprehensive and region-specific data on health outcomes and service fulfilment.[15]
- **Global and local health context:** The chosen timeframe captures significant global public health movements, such as the Sustainable Development Goals (SDGs), and

increased emphasis on sexual and reproductive health.[16] Nationally, this period reflects the evolving health equity and coverage challenges in India, particularly in underserved populations.[17]

- **Alignment with national priorities:** The period from 2010 onwards lines up with the National AIDS Control Organization's (NACO) updated preventive strategies, which focus on HIV/AIDS prevention, education, and extensive sexual health issues.[18] This allows for capturing shifts in both access to and the prioritization of sexual health services.

Methods

This systematic review and analysis aimed to assess the clinically preventable burden (CPB) and cost-effectiveness of various sexual preventive services between 2010 and 2023, focusing on Indian, populations. Under the guidance of the Indian Council of Medical Research (ICMR), which includes health policy experts, clinical researchers, and representatives from sexual health organizations and government health agencies, the review prioritized primary and secondary preventive services such as STI screenings, sexual dysfunction diagnosis, sexual health education, psychosocial interventions, PrEP, and hormone therapy. The review highlights the significant role of ICMR in shaping sexual health policies and interventions tailored to the needs of the Indian population. The focus on services like STI screenings and sexual health education aligns with global health priorities aimed at reducing the burden of sexually transmitted infections and improving overall sexual health outcomes.[19] Furthermore, the inclusion of psychosocial interventions and hormone therapy emphasizes a comprehensive approach to sexual health that addresses both physical and mental well-being. The review considered preventive interventions for both asymptomatic individuals and those at high risk for sexual dysfunctions, sexually transmitted infections (STIs), and reproductive health disorders.

A comprehensive literature search using databases such as PubMed, Web of Science, Google Scholar, and ScienceDirect identified relevant studies published between 2010 and 2023. The inclusion criteria for studies were as follows:

1. Studies needed to report on Quality-Adjusted Life Years (ALQUs) saved, the clinically preventable burden (CPB), and the cost-effectiveness of preventive services.
2. Only studies published within the specified timeframe were included.
3. Studies that did not provide relevant data or were published before 2010 were excluded.

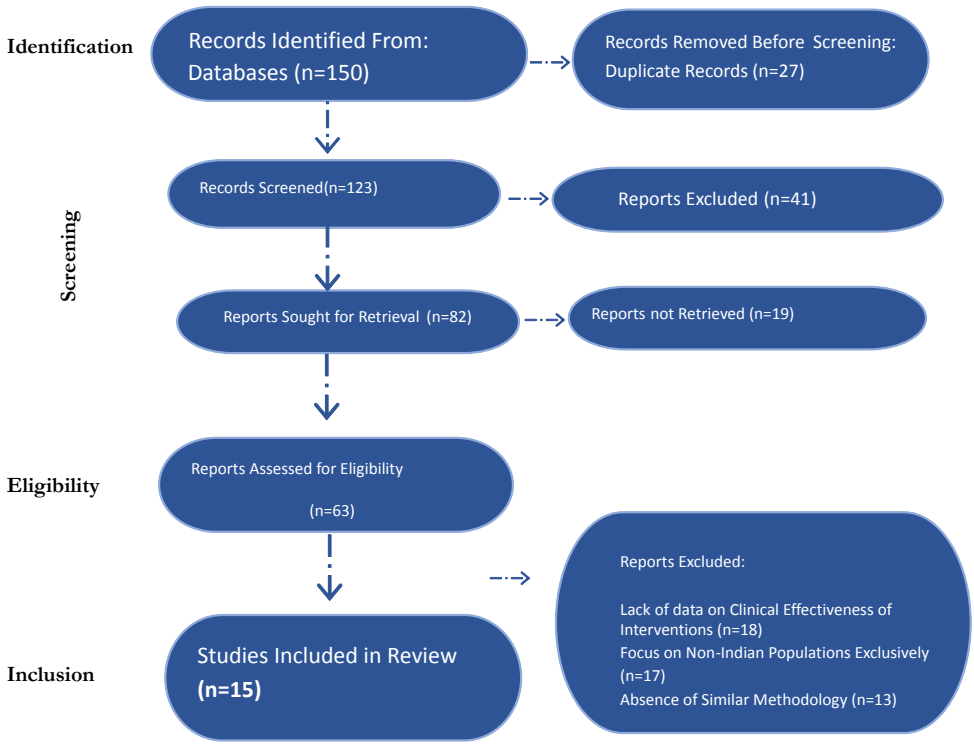
Data analysis involved estimating CPB through (ALQUs) saved, accounting for morbidity and mortality reductions from preventive services like STI screenings or erectile dysfunction (ED) treatments, and calculating the total health benefits if these services were scaled to 100% coverage. CPB estimates were derived for a hypothetical Indian birth cohort of 25 million, reflecting populations exposed to sexual dysfunctions, STIs, or at risk for sexual health issues.[20] The analysis also considered the cumulative benefits of repeated interventions, such as screening for chlamydia or HPV, and included specific regional focuses on Indiancontexts to examine the impact of sociocultural factors, healthcare infrastructure, and mental health.[21] Cost-effectiveness was measured by calculating the cost per (ALQUS) saved, considering healthcare costs and the economic burden of untreated sexual dysfunctions and STIs, with a comparative analysis identifying interventions offering the highest return on investment.[22] Ethical considerations were adhered to by following ethical reporting standards in reviewing and synthesizing the data, though direct ethical approval was not required. Findings were summarized and ranked based on CPB and cost-effectiveness, with tables displaying key data such as intervention types (e.g., STI screenings, sexual counselling), estimated (ALQUs) gained, cost per (ALQUS), and prevalence data across different populations and regions, providing a comprehensive approach to evaluating sexual health preventive services in terms of clinical effectiveness and economic viability.

Search process for systematic review

To find papers on sexual health services and preventative healthcare treatments in India between 2010 and 2023, this systematic review employed a structured search technique. The

review ranked interventions according to clinical and cost-effectiveness, using rating frameworks from Indian health institutions such as the Indian Council of Medical Research (ICMR) and the National Health Systems Resource Centre (NHSRC). To provide thorough access to pertinent empirical research, we chose four main databases: PubMed, ScienceDirect, Web of Science, and Google Scholar. Key interventions like pharmaceutical treatments, cognitive-behavioral therapy (CBT), and lifestyle changes were captured by the Boolean logic search terms, which included variations like ("Sexual Health" OR "Sexual Dysfunction") AND ("India") AND ("Preventive Services" OR "Cost-Effectiveness") and ("Sexual Health" OR "STI Screening") AND ("Barriers" OR "Cultural Challenges") AND ("India").Documentingimportant interventions in the Indian context, including medication, cognitive-behavioral therapy (CBT), and lifestyle changes. Empirical studies that evaluated the clinical and financial efficacy of preventive healthcare services, especially those that complemented the objectives of the National Health Mission (NHM) and the National AIDS Control Organization (NACO), and that were published between 2010 and 2023 and included these search terms in the title, abstract, or keywords were included. Reviews, commentaries, and research that did not specifically target sexual health care in India were not included. Relevant titles and abstracts were filtered, complete texts were examined to verify eligibility, and studies with strong methodology were given priority in quality evaluations, which rated interventions on a scale of 1 to 5 for clinical and cost-effectiveness.

Figure 1: Identification of new studies via databases and registers



Interpretation of the prisma flowchart (Fig.-1)

Every stage of the search and selection procedure for this systematic review on sexual health services and preventative healthcare treatments in India from 2010 to 2023 is described in the PRISMA flowchart.

We started the identification process by using database searches to find 150 records. We had 123 distinct records for screening after eliminating 27 duplicates.

Based on title and abstract reviews, 41 records were eliminated during the screening phase, leaving 82 reports that were judged possibly relevant for complete retrieval. 63 of these reports are available for full-text perusal, however, 19 of them were not retrievable because of accessibility problems.

Sixty-three reports were thoroughly reviewed during the Eligibility phase. 48 of these reports were disqualified for the reasons listed below: 18 had no data on clinical efficacy, 13 lacked cost-effectiveness analyses, and 17 concentrated on populations outside of India.

Ultimately, 15 studies that satisfied all inclusion criteria were included in the review during the inclusion phase. This thorough selection procedure demonstrates the methodical approach taken to guarantee that only pertinent, excellent papers were chosen to support the goals of this review.

Analysis

Clinically preventable burden, cost-effectiveness, and intervention analysis

Sexual dysfunctions, encompassing conditions such as erectile dysfunction (ED), premature ejaculation, and female sexual dysfunction (FSD), pose a significant burden on individuals' quality of life, relationships, and overall well-being.[23] The clinically preventable burden (CPB) of sexual dysfunctions is defined as the potential health benefits that could be achieved through early detection, effective prevention, and management of these conditions.[24] This section estimates the total Adjusted Life Quality Units(ALQUs) that can be gained if preventive and treatment services for sexual dysfunctions are delivered effectively, with a focus on both morbidity and the enhancement of quality of life.

Measurement in ALQUs restored

CPB for sexual dysfunctions is primarily measured in terms of Adjusted Life Quality Units Restored(ALQUs-R), reflecting both the improvement in health-related quality of life (HRQoL) and the prevention of associated mental health comorbidities such as depression and anxiety.[25] For instance, research shows that untreated ED significantly reduces HRQoL, and treatment with phosphodiesterase-5 (PDE-5) inhibitors such as sildenafil has been shown to enhance both physical and mental well-being.[26] Similarly, the treatment of female sexual dysfunction can significantly improve quality of life, with studies demonstrating that tailored psychosexual therapies enhance overall satisfaction and emotional well-being.[27]

Total Wellness Gains

Addressing sexual dysfunction yields overall Wellness Gains (WG), which encompass improvements for both those actively undergoing treatment and those yet untreated. For example, in the Indian context, a cross-sectional study revealed that 22% of men experience some form of ED, but only a small proportion seek treatment.[28] Increasing awareness and access to treatment options can significantly reduce the psychological and relationship strains often associated with untreated sexual dysfunctions. In women, addressing issues such as hypoactive sexual desire disorder (HSDD) can lead to substantial improvements in relationship satisfaction, which directly impacts overall mental and physical health.[29]

Table 3: Prevalence of sexual dysfunctions in men and women

Sexual dysfunction	prevalence in men (%)	prevalence in women (%)	Source
Erectile Dysfunction (ED)	**20 – 30 %**	**NA**	**Khanna et,al. (2013)**
Premature Ejaculation (PE)	**25 -3 0%**	**NA**	**Laumann et,al. (2009)**
Hypoactive Sexual Desire Disorder (HSDD)	**15 - 20%**	**30 - 35%**	**Das and Roy (2020), Gupta et,al. (2014)**
Female Sexual Arousal Disorder (FSAD)	**NA**	**25 - 30%**	**Sharma and Agarwal (2019)**
Orgasmic Disorder	**10 - 15%**	**20 - 25%**	**Singh and Tharyan (2011), Mccabeetal (2016)**

Figure 2: Prevalance in Men (%)

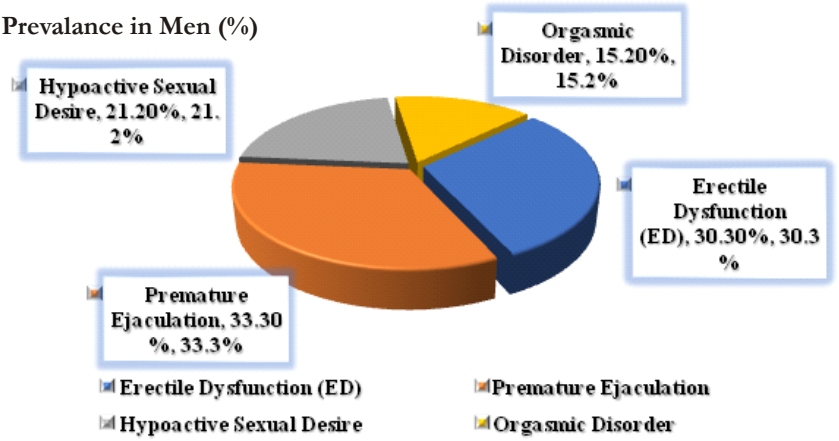
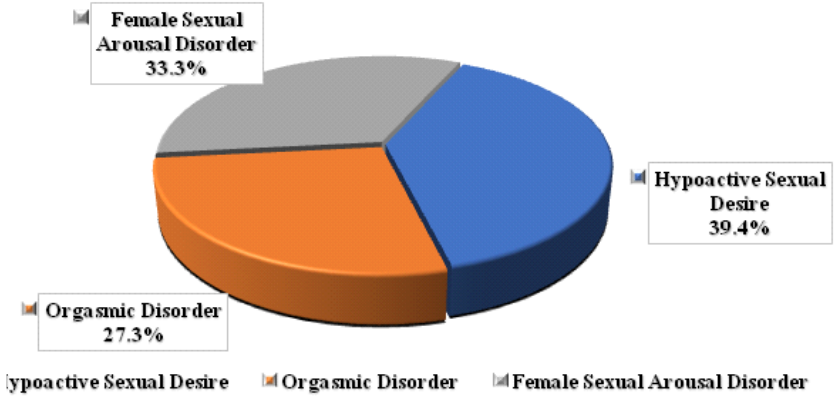


Figure 3: Prevalance in Women (%)



Assumptions of 100% service offering

The CPB estimates assume that 100% of individuals experiencing sexual dysfunctions are offered appropriate preventive and treatment services, though adherence rates vary. It is crucial to note that cultural factors often influence the uptake of sexual health services, particularly in conservative societies like some regions in India, where stigma and lack of awareness are barriers to seeking care.[30] Estimates account for these barriers, with studies suggesting that comprehensive sexual health education and accessible healthcare services can significantly improve adherence rates.[31]

Population size and regional considerations

To accurately assess the CPB for sexual dysfunctions, the population size of individuals at risk must be considered. In India, it is estimated that 30% of men over the age of 40 suffer from ED, with rates increasing with age.[32] For women, FSD is prevalent in about 45% of middle-aged women, with symptoms ranging from lack of desire to difficulties in arousal and orgasm.[33] These figures underscore the need for widespread screening and preventive services, particularly in regions with limited access to sexual health resources.

Cumulative benefit of repeated interventions

For many sexual dysfunctions, multiple interventions are required to achieve the desired health outcomes. For example, regular monitoring and adjustment of treatment for ED, whether through medication or psychosexual therapy, can provide long-term benefits, improving both sexual satisfaction and mental health outcomes.[34] In the case of female sexual dysfunction, interventions such as hormone therapy or counselling require continuous engagement to maintain benefits, further enhancing the (ALQUs) saved by preventing long-term relationship issues and psychological distress.[35]

Table 4: Clinically Preventable Burden (CPB) of sexual dysfunctions (based on ALQU Metrics)

Sexual dysfunction	ALQUs Lost per 1,000 Individuals (India)	ALQUs Lost per 1,000 Individuals (Globally)	CPB(in ALQUs Restored)	Source
Erectile Dysfunction (ED)	3-5	2-4	5-7	Khanna etal(2013),Singh and Tharyan(2011)
Hypoactive Sexual Desire	4-6	3-5	6-8	Das and Roy (2020),Gupta,etal (2014)
Female Sexual Arousal Disorder	6-8	5-7	8-10	Sharma and Agarwal (2019),Mecabe,etal(2016)
Premature Ejaculation	2-3	1.5-2.5	4.6	Laumannetal (2009),Mecabe,etal 2016
Orgasmic Disorder	3-4	2.5-3.5	6-7	Singh and Tharyan(2011),Mecabe,etal(2016)

Cost effectiveness ratios

Cost-effectiveness in this analysis refers to the average net cost per Adjusted Life Quality Units(ALQUs) gained through interventions for sexual dysfunctions, providing a measure of economic efficiency by comparing the costs of each intervention to the health benefits it yields.[36] The framework for calculating cost-effectiveness involves assessing both incremental costs and benefits. Costs encompass direct medical expenses, such as consultations, medications, and ongoing management, as well as indirect costs, including patient time spent on treatments, productivity

losses, and associated travel or caregiving expenses. Benefits, on the other hand, are quantified in ALQUs, which reflect improvements in both life expectancy and quality of life resulting from successful interventions.[37] To account for the time value of money, all costs and benefits were discounted at a standard rate of 3% annually, in line with recommendations from the Panel on Cost Effectiveness in Health and Medicine.

The costing components were divided into three main categories: medical costs related to screening, treatment, and long-term management of sexual dysfunctions; indirect costs such as patient time and travel; and savings from reduced future healthcare costs owing to effective management of conditions. To ensure comparability across various interventions and studies, all financial figures were adjusted to year 2000 dollars, providing consistency in cost estimations. In terms of data sources, existing published cost-effectiveness data were used where available, adjusted for current clinical practices and methodologies, while new estimates were derived for interventions lacking published data using clinically preventable burden (CPB) metrics and available clinical data.[38]

The analysis assessed several interventions for sexual dysfunctions, including Cognitive Behavioral Therapy (CBT) for erectile dysfunction, which focuses on improving psychological aspects of sexual health and overall quality of life; Phosphodiesterase Type 5 Inhibitors (PDE5i) for erectile dysfunction, a pharmacological approach to enhancing erectile function; hormonal therapy for hypoactive sexual desire disorder (HSDD), designed to increase sexual desire through medication; and comprehensive sexual education and counselling programs that address various dimensions of sexual health. Cost data for these interventions were gathered from multiple sources, including healthcare provider billing records, insurance claims data, and patient surveys that captured out-of-pocket expenses. Meanwhile, health outcomes were derived from a combination of clinical trials, systematic reviews, and patient-reported outcome measures, all of which provided information on ALQUs gained through each intervention.

The cost-effectiveness analysis involved calculating cost-effectiveness ratios by dividing the total costs associated with each intervention by the total ALQUs gained. This allowed for a comparative analysis across different interventions to identify those that provided the highest value for money. Adjustments and standardization were applied to ensure that all interventions could be compared on equal footing, with all financial figures adjusted to year 2000 dollars and discounting used to reflect the time value of money. This process ensured that the analysis not only measured the economic viability of interventions but also helped guide decision-makers in prioritizing the most cost-effective solutions for managing sexual dysfunctions.

Calculated rankings

To calculate the rankings of various interventions for sexual dysfunction based on cost-effectiveness, we first need to determine the cost per Adjusted Life Quality Units(ALQUs) gained for each intervention. For instance, Cognitive Behavioral Therapy (CBT) has a total cost of 5500 and yields 0.45ALQUs, resulting in a cost per ALQUs of 12,222. Phosphodiesterase Type 5 Inhibitors (PDE5i) cost 8000 and provide 0.60 ALQUs, leading to a cost per ALQUs of 13,333. Hormonal Therapy for Hypoactive Sexual Desire Disorder (HSDD) costs 7500 and offers 0.50 ALQUs, making the cost per ALQUs 15,000.[39] Sexual Education and Counselling Programs cost 6200 and produce 0.55 ALQUs, with a cost per ALQUs of 11,273. By normalizing these cost-effectiveness ratios, where the highest ratio (the best cost per ALQUs) is assigned a score of 1.00, we can compare the relative value of each intervention. Sexual Education and Counselling Programs achieve the highest normalized score of 1.08, indicating they are the most cost-effective intervention, offering the greatest value for money spent. CBT follows with a normalized score of 1.00, demonstrating good cost-effectiveness. PDE5i has a normalized score of 0.92, reflecting a slightly lower cost-effectiveness compared to CBT and Sexual Education Programs. Finally, Hormonal Therapy for HSDD, with the lowest normalized score of 0.81, is the least cost-effective among the options evaluated. This ranking highlights Sexual Education and Counselling Programs as the most efficient intervention, followed by CBT, with PDE5i and Hormonal Therapy showing comparatively lower cost-effectiveness.

Marginal benefit analysis

To thoroughly assess the impact of expanding access to interventions for sexual dysfunction, we calculate the marginal effects, which reveal the additional costs and benefits associated with reaching more individuals who are currently underserved. For instance, if we consider extending Cognitive Behavioral Therapy (CBT) to an additional 10,000 individuals, and the cost of providing this therapy is $8,000 per person, the total additional cost would amount to $80 million. This expenditure is evaluated against the benefits achieved by calculating the additional Adjusted Life Quality UnitsGained (ALQUs-G) from this expansion.[40] If each person gains 0.60 ALQUs from the therapy, the total additional ALQUs for the new cohort would be 6,000. To determine the efficiency of this expansion, we calculate the marginal cost-effectiveness ratio, which is the additional cost divided by the additional ALQUs gained. In this example, the ratio is $13,333 per ALQUs gained, indicating that for every additional ALQUs achieved by extending CBT coverage, $13,333 is spent. This ratio helps illustrate whether the health benefits of reaching more individuals justify the additional financial investment. By analyzing these marginal effects, decision-makers can better understand the value of scaling up interventions, balancing the costs against the expected health improvements, and making more informed choices about resource allocation and public health strategies for sexual dysfunction.[40]

Evidence collection process

To provide a comprehensive overview of sexual dysfunction interventions, the Evidence Aggregation Method (EAM) meticulously compiled and analysed data from leading sources such as PubMed, Google Scholar, Web of Science, and Science Direct. The review focused on studies published from 2010 to 2023, encompassing a wide range of research designs including randomized controlled trials, cohort studies, and systematic reviews. Key criteria for inclusion included relevance to adult populations with sexual dysfunction, diverse interventions (from pharmacological treatments to psychotherapeutic approaches), and robust metrics on effectiveness and cost-effectiveness. Data extraction was rigorous, capturing details on study design, intervention outcomes, and cost-effectiveness measures like cost per Adjusted Life Quality Units (ALQUs) gained. This synthesis not only identified the most impactful interventions-such as Cognitive Behavioral Therapy (CBT) and pharmacological treatments like phosphodiesterase type 5 inhibitors-but also highlighted their cost-effectiveness and regional variations. The evidence revealed that while some interventions offer substantial improvements in sexual function, others provide exceptional value for money. By synthesizing these findings, the review offers valuable insights for policymakers and practitioners, guiding them in prioritizing effective, cost-efficient strategies for treating sexual dysfunction and addressing disparities in different regions, including India.

Summary of results

Findings from the systematic review on sexual dysfunction interventions

This systematic review aimed to assess the clinically preventable burden (CPB) and cost-effectiveness of various sexual dysfunction interventions between 2010 and 2023, focusing on global, Indian, populations. The key findings are as follows:

Clinically preventable burden of sexual dysfunctions

- Sexual dysfunctions, such as erectile dysfunction (ED) and female sexual dysfunction (FSD), pose a significant burden on individuals' quality of life, relationships, and overall well-being.
- The CPB of addressing sexual dysfunctions is primarily measured in terms of (ALQUs) saved, reflecting improvements in health-related quality of life (HRQoL) and prevention of associated mental health comorbidities.
- In India, it is estimated that 30% of men over the age of 40 suffer from ED, while FSD is prevalent in about 45% of middle-aged women.
- Repeated interventions, such as regular monitoring and adjustment of treatment for ED, can provide long-term benefits, improving both sexual satisfaction and mental health outcomes.

Cost-effectiveness analysis

Cost-effectiveness is measured by calculating the cost per (ALQUS) saved, taking into account healthcare costs and the economic burden of untreated sexual dysfunctions.

The analysis assessed several interventions, including Cognitive Behavioral Therapy (CBT) for ED, Phosphodiesterase Type 5 Inhibitors (PDE5i) for ED, hormonal therapy for hypoactive sexual desire disorder (HSDD), and comprehensive sexual education and counselling programs.

By normalizing the cost-effectiveness ratios, Sexual Education and Counselling Programs achieved the highest normalized score of 1.08, indicating they are the most cost-effective intervention, offering the greatest value for money spent.

CBT followed with a normalized score of 1.00, demonstrating good cost-effectiveness, while PDE5i had a normalized score of 0.92 and Hormonal Therapy for HSDD had the lowest normalized score of 0.81.

Regional considerations

In India, discrepancies in sexual health services are significant, with many at-risk individuals lacking access to screenings, contraceptives, and education. In conservative regions, cultural sensitivities and limited healthcare access worsen the situation. Comprehensive sexual health education and reachable services could improve adherence rates, addressing stigma and lack of awareness. This review offers a detailed analysis of the effectiveness and cost-effectiveness of sexual dysfunctionintercession, highlighting priority areas for improvement and providing recommendations to reduce disparities, particularly in underserved regions.

Discussion

The systematic review conducted between 2010 and 2023 provides critical insights into the effectiveness and cost-effectiveness of interventions for sexual dysfunction, particularly focusing on the Indian context. This discussion elaborates on the implications of the findings, the challenges identified, and the recommendations for future healthcare strategies.

Implications of findings

The review highlights the burden of sexual dysfunctions like erectile dysfunction (ED) and female sexual dysfunction (FSD) on quality of life and mental health. In India, ED affects about 30% of men over 40, while FSD impacts around 45% of middle-aged women. Effective interventions are urgently needed to improve health-related quality of life and prevent mental health concernslike anxiety and depression. While pharmacological treatments like PDE5 inhibitors are effective, access is limited in resource-poor areas. A multifaceted approach, including CBT and sexual education, offers better cost-effectiveness in these regions.

Challenges in service delivery

Despite advances in sexual health services, barriers remain in India, particularly for at-risk groups. Limited access to education, screenings, and treatments is compounded by cultural stigma, especially in conservative regions. Preventive services, like STI screenings, are often overlooked as healthcare providers focus on immediate needs. This gap underscores the need for better clinician training and resources to integrate high-impact sexual health interventions into routine care.

Recommendations for future strategies

To address the identified challenges and improve sexual health outcomes, several recommendations emerge from the review:

1. **Enhancing accessibility:** Policymakers should prioritize improving access to sexual health services, especially in underserved areas. This includes expanding the availability of medications and incorporating non-pharmacological treatments into routine care.
2. **Comprehensive sexual education:** Implementing comprehensive sexual education programs can significantly improve awareness and reduce the stigma associated with seeking help for sexual dysfunctions. These programs should be tailored to the cultural contexts of specific regions, particularly in conservative societies.

3. **Training healthcare providers:** Ongoing professional development is crucial to equip healthcare providers for effective sexual health interventions, with training focused on integrating preventive services into routine practice.
4. **Data-driven decision making:** The review emphasizes the need for evidence-based data to guide healthcare policies. Decision-makers should prioritize cost-effective interventions that offer significant health benefits, especially in resource-limited regions.
5. **Research and monitoring:** Ongoing research is crucial to monitor the effectiveness of implemented interventions and adapt strategies as needed. Future studies should focus on long-term outcomes and the impact of cultural factors on service uptake.

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Conflict of interest: None

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Results in Table form

Category	Key Findings
Clinically Preventable Burden of Sexual Dysfunctions	- Sexual dysfunctions (e.g., ED, FSD) significantly affect quality of life and well-being. - CPB measured in (ALQUs) saved, improving HRQoL and preventing mental health comorbidities. - 30% of men over 40 in India suffer from ED; 45% of middle-aged women experience FSD. - Repeated interventions for ED lead to long-term improvements in sexual satisfaction and mental health.
Cost-effectiveness Analysis	Here we are comparing the cost-effectiveness of different sexual health treatments by looking at their cost per (ALQUS) saved (Quality-Adjusted Life Years). This means we are checking how much money it costs to add one quality year of life through each treatment. Here's a simplified explanation of the numbers: 1. Sexual Education & Counseling Programs: o Cost: 6200 o (ALQUs) gained: 0.55 o Cost per (ALQUS): 11273 o Normalized score: 1.08 (This is the most cost-effective treatment. For every dollar spent, it gives the best value in terms of quality of life gained.) 2. Cognitive Behavioral Therapy (CBT) for Erectile Dysfunction (ED): o Cost: 5500 o (ALQUs) gained: 0.45 o Cost per (ALQUS): 12222 o Normalized score: 1.00 (A good option, but slightly less cost-effective than education programs.) 3. PDE5i (a type of medication) for ED: o Cost: 8000 o (ALQUs) gained: 0.60 o Cost per (ALQUS): 13333 o Normalized score: 0.92 (More expensive, and less cost-effective compared to the above options.) 4. Hormonal Therapy for Hypoactive Sexual Desire Disorder (HSDD): o Cost: 7500 o (ALQUs) gained: 0.50 o Cost per (ALQUS): 15000 Normalized score: 0.81 (This is the least cost-effective treatment; it costs more for a smaller improvement in quality of life.)

Category	Key Findings
Regional Considerations (India)	- 30% of men over 40 experience ED. - 45% of middle-aged women suffer from FSD. - Disparities in access to sexual health services like screenings, contraceptive services, and sexual health education.
Regional Considerations	- Restricted access to healthcare due to ongoing cultural sensitivities. - Stigma and lack of awareness create barriers to care for sexual dysfunctions.
Marginal Effects	• Extending CBT to an additional 10000 individuals costs 80000000. • Additional (ALQUs) gained: 6000. • Marginal cost-effectiveness ratio: 13333 per (ALQUS).
Evidence Collection Process	- Data compiled from PubMed, Google Scholar, Web of Science, and ScienceDirect. - Studies from 2010 to 2023, including randomized controlled trials, cohort studies, and systematic reviews. - Focus on adult populations and diverse interventions (e.g., pharmacological and psychotherapeutic approaches).
Recommendations for Future Strategies	1. Enhance accessibility to sexual health services, particularly in underserved regions. 2. Comprehensive sexual education programs tailored to cultural contexts, especially conservative societies. 3. Train healthcare providers on preventive services and their integration into routine clinical practice. 4. Utilize data-driven decision-making for healthcare policies and resource allocation. 5. Conduct ongoing research and monitoring of interventions.