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Anti gonorrheal Activity of Medicinal Plants: A Review

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ABSTRACT

Gonorrhea is a sexually transmitted infection caused by Niesseria gonorrhoeae. According to the World Health Organization (WHO), there are around 30.6 million cases of gonorrhea globally, with approximately 4000 babies blinded each year as a result of untreated maternal gonococci infections. Although it can be effectively treated. It can lead to significant consequences in certain people, including pelvic inflammatory disease in women and epididymitis in males. The treatment of gonorrhea is largely based on oral or injectable third-generation cephalosporins like cefixime and ceftriaxone, but concerns have recently been raised as to their continuing adequacy in the condition, as well as the rise of diminished resistance to azithromycin, which has improved the control of gonococcal infections. Medicinal plants have been used for centuries in the management of various diseases. They are cheaper and have relatively lesser adverse effects. This review is aimed at giving an exposition on the use of medicinal plants in the treatment of gonorrhea with the different species of flowering plants which are used for the treatment of gonorrhea. The etiology, clinical manifestations, epidemiology, and effective remedies from medicinal plants are discussed in this review.

Keywords: *Antigonorrheal; Niesseria gonorrhoeae; Gonorrhea; Herbal Remedies; Medicinal Plants; Epidemiology*

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INTRODUCTION

According to the World Health Organization, more than 340 million young people with sexually transmitted diseases are diagnosed each year worldwide. There are more than 30 fungal infections, viruses, and parasites, but the most common sexually transmitted infections (STIs) are *Treponema pallidum* (syphilis), gonococcus, *Chlamydia trachomatis*, and *Leucomonas vaginalis* [1]. As in sub-Saharan Africa, Latin America and the Caribbean, South Asia, and Southeast Asia have the highest rates of infectious diseases in the population [1]. Southeast Asia and Southeast Asia have the highest rates of STDs in sub-Saharan Africa, Latin America, and the Caribbean [1]. The most common sexually transmitted infections are the human immunodeficiency virus (HIV), human herpes virus, human papillomavirus, and hepatitis B. According to a recent study by the World Health Organization (2007), they accounted for 25% of the world's fertility rate. According to African reports, between 4% and 15% of pregnant women are infected with syphilis. Globally, 4,000 new births each year are not treated for gonorrhea and chlamydia. The type 2 herpes simplex virus causes peptic ulcers, affecting 30-80% of sub-Saharan African women and 10-50% of men. The herpes virus plays an important role in the spread of HIV. Approximately 500,000 HPV cases of breast cancer occur each year, and 240,000 people die in countries with healthy health systems [https://www.nature.com/articles/s41420-022-01005-5]. Presumably, that number will increase. It offers social characteristics and travel systems [1]. Many cancers are treated with chemicals that prevent the growth of good bacteria. However, the economic value of the disease and its complications remains one of the top 10 death rates among adults seeking treatment in developing countries. In South Africa, 26% of deaths in 2000 were due to traditional diseases. The study also found that almost 26.4% of workers in KwaZulu-Natal, South Africa, were infected

with HIV. The current ethnobotanical survey was conducted in the poor region of KwaZulu-Natal, where 85% of the population has no income. As a result, more men are moving to large cities in search of work, which increases the city's risk of traffic jams. Two published studies have shown that men are more susceptible to STDs and therefore more likely to contract STDs [2]. According to Green [3], most people in sub-Saharan Africa believe that traditional treatments for STIs are better than "modern" treatments [3]. Numerous ethnobotanical studies in developing countries such as Bangladesh, India, Central America, Zambia, and Zimbabwe support the use of trees to treat infectious diseases [4]. In most ethnobotanical studies, information on plants treated for fungal diseases was discarded by major consumers, and less information came from rural and secular areas. General knowledge about the medicinal plant is obtained separately from a study by Dahlberg and Trygger [5] in rural South Africa. Common herbs in the area were found to help cure many ailments. Previously two ethnobotanical studies were performed in the same field of study. According to Wit et al. [6] List of medicinal plants used, Plantlife records are used with the help of the population to treat respiratory diseases. This book is part of a large-scale rural genetic study in Maitland that provides citizens with information about plants that grow in the environment and are used to treat diseases [6].

Epidemiology of Gonorrhea

N. gonococcal infection affects the mucosa of open anatomical sites such as the urogenital tract, rectum, pharynx, and conjunctiva. The risk of vaginal infections is about 50% [7] and about 20% of vaginal infections [7]. Changes in long-term condom function (63% for the urethra and 9% for the pharynx for the urethra) and sexual intercourse (84% for the rectal urethra and 2% from the rectum to the urethra) were estimated from the mathematical model [8]. When oral or anal intercourse is common, asymptomatic disease at this anatomical site is more common than in the urethra at some point (if so, it can be treated quickly). Untreated left cervical gonorrhea can lead to non-surgical medical conditions such as genital herpes (PID), chronic pelvic pain, ectopic pregnancy, and infertility. Infants born to mothers with untreated cervical gonorrhea may develop hypothermic conjunctivitis (inflammation of the newborn's eye) and may result in corneal insufficiency and blindness [9]. According to the World Health Organization (WHO), the total incidence of urogenital gonorrhea in 2016 (percentage of global gonorrhea per year) was 0.9% for girls and 0.7% for boys, to 30.6 million people in total in the world [10]. In some places, the WHO recorded the highest rates of HIV infection for women in Africa (1.9%), the United States (0.9%), the Western Pacific (0.9%), and lower especially in Europe (0.9%-0.3%). Similarly, the highest male growth rates were in Africa (1.6%), the United States (0.8%) and the Western Pacific (0.7), and the lowest rates were in Europe. (0.3%). In most countries, health professionals or researchers can find information about gonorrhea for gays, bisexuals, and other men (called MSM) who have sex with men in the United States. Lack of gender awareness (often leading to stigma and discrimination) [11]. In 2016, the European Center for Disease Prevention and Control (ECDC) reported infectious disease activity in 15 EU/EEA countries, with 60% of all cases, including 46% of cases in which a man has had sexual intercourse with a man [12]. In the UK (information on gender and sexuality is available in most cases), 51.6% of 2014 cases were involved with MSM.

The incidence rate of gonorrhea between men and women increased from 1.0 in 2012 to 1.4 in 2017, indicating that the male-female relationship contributed to the growth rate. [13-14]. Transgender is a period of shadow used to define identity or sexual expression in an established relationship at birth. The available statistics are based on several factors that are thought to increase the risk of sexually transmitted infections. Stories of transphobia, discrimination, and abuse. Lack of legitimate gender recognition; gender-neutral healthcare barriers; poverty; mood disorders was also a cause. Fear on the inside leads to depression and drug addiction. According to two studies [15,16],Germans were especially at risk of sexually transmitted diseases, unrelated to sex jobs or images of sex trafficking with affinity anal abdominal intercourse without a condom.

The available data support the spread of gonorrhea in menopausal women. Although the positive prognosis of urogenital gonorrhea is 0.1% (of 764 women from hospitals in Thailand), near to 2.8% (of participants406 in STD hospitals in more than one location in the United States), Oropharyngeal samples ranged from 3.5 to 37.3 peoples and studies (with 8.1–9.8% accuracy in major studies from Thailand and the United States) [13] Anatomical estimates of the modified model concluded that the proportion of transgender women was 2.1% (of 63 adults in the United States) and 4% (of 77 people in an STD clinic)... Of the 105 transgender men who visited an STD clinic, the urogenital ear replacement was 7.1%, the pharyngeal ear hearing was 5.9% and the earlobe hearing was 14.7% [17]. These results were seen in other samples from San Francisco, California, USA, and Melbourne, Australia [18]. In contrast, none of the 82 transgender people who attended the Network Fitness Clinic in Boston, Massachusetts, USA, developed gonorrhea.

Sex workers have money, work, security (such as food or shelter), or medicine. SW includes people from all backgrounds, as well as social and economic factors ranging from the poorest to the richest (SES), with the potential to lead to risky change and sexually transmitted diseases. The United Nations Program on HIV/AIDS (UNAIDS) estimates that there are about eight million people in the Southwest. Recent data estimated of urogenital gonorrhea in the women's health sector in the South-West (FSW) increased from 2.7% of women in the UK in 2011 (n = 2534) to 21.2% of women in Guatemala in 2012 (n = 3213). There was no information on the spread of gonorrhea and pharyngeal among domestic

workers, however, a large group of 18,475 people visited 42 clinics in Australia from 2009-15 (reporting urogenital gonorrhea 1). Steps up to 1,000 PY, oropharyngeal 3.6 % PY of gonorrhea, and rectal gonorrhea equal 0. All three could be 100 %. [19]. Individual annual activity increased slightly during this trial, from 1.6 % in 2009 to 4.9 % in 2015 for pharyngeal gonorrhea. FSW may pose a significant risk to the transmission and transmission of antimicrobial-resistant *N. gonorrhoeae*. In 2009, Ohnishi et al. reported gonorrhea-resistant ceftriaxone, *N. ceftriaxone* (low inhibitory [MIC] = 2 mg ml), and a 31-year-old FSW patient with pharyngeal gonorrhea was found in a hospital in Kyoto, Japan [20]. Recently, Katz et al. Collected in Hawaii, USA, separated from *N. gonorrhoeae*resistant azithromycin (MICs 256 mg mL) and low ceftriaxone (MICs 0.06-125 mg mL) [21]. Four of the six men said they had sex with an FSW employee recently in Honolulu. Although there were only a small number of men in the South-Eastern United States, the data published in 2003 gave the wrong impression of using the situation [22]of the 53 men southwest of Tel Aviv, Israel, 1.8% had gonorrhea urethra and 7.5% had pharyngeal gonorrhea. The positive outcome of rectal gonorrhea was 9.9% in 334 men from southwest India and 8.5% out of 96 men were healed at a prostitution hospital in Abidjan, Ivory Coast [23]. Considering the prevalence of the disease, 17.4% of the 488 male health facilities in the southwestern United Kingdom had gonorrhea (more than 2.8% of those infected with gonorrhea).

Air travel and globalization can increase gas and human activity around the world and spread disease around the world. Between 1980 and 2016, the number of immigrants increased from 278 million to 1.2 billion [24]. Having sex with an accidental partner is a high risk of sexually transmitted diseases, including gonorrhea, around the world. A large study of the risk of sexual intercourse around the world shows that 34% of the risk of having sex with a new partner abroad differs from the census, 4 to 86% of older Britons work in Ibiza) [25]. On the other side of the study, 16.8% (complete) reported having sex without a condom as a means of transportation. Evidence from Scandinavian countries (Denmark, Finland, Norway, and Sweden) also shows that many cases of gonorrhea have been reported. Between 2008 and 2013, 25.5% of the 12,645 cases of gonorrhea were associated with gait, of which 86% (n = 2432) were male. 652 (26.8%) were classified as MSM. About half of migrants occur in Asia, mainly in Thailand (31.2% of immigration cases) and the Philippines (8.0%), and 32% in Europe. The highest rates were obtained from Spain (7.1%) and Germany (6.2%) [26].

Risk Factors of Gonorrhea

Sex without a condom is a leading cause of gonorrhea in adults and adolescents who have sex. It can also be involved in all types of sexual activity (often called penis) involving the mucous membranes (mouth, vagina, and anus) [26]. The probability of infection due to unprotected intercourse is considered to be 58% for male-female transmission and 23% for female-to-male transmission [27]. Neonatal gonococcal infections often include side effects of infection-related birth-related gonococcal infections. Severe illness occurs two to five days after birth. The most common symptom of eye infection is sepsis in children, which may include dizziness and meningitis. Symptoms include rhinitis, vaginitis, urethritis, and repeated fetal testing. If left untreated, neonatal ophthalmia can lead to serious complications or infections. Joint infections increase the risk of sexually transmitted HIV infection, as evidenced by the increased risk of HIV infection in urinary tract infections, both of which have been proven naturally [28]. *Neisseria gonorrhoeae* no longer live outside of humanity, and therefore sexual violence should be suspected in all children with gonorrhea [29].

Most physicians recognize specific manifestations of the gonococcal urethra and occur at the onset of dysuria and mucosal urethral secretions after one week of the incubation period. Examining nearly 1,700 cases of gonorrhea in men who have sex with men, Sherard and Barlow suggest that the clinical symptoms of gonorrhea in men may also change: the composition of gastrointestinal and gastrointestinal diseases, urination. Only 55% of men have gonads, but only once. It remains a significant symptom of the disease, affecting 82% of infected men [30].
Collapse is rare. Symptoms can occur much less. 20% of patients may include mucus and anal, bleeding, rash, pain, orgasm, and erection [31]. In men diagnosed with rectal gonorrhea, the mucous membranes may also appear thin, scaly, and erythematous when examined with the eyes or appear normal. Most oropharyngeal gonococcal infections are asymptomatic, although inflammatory bowel disease and symptomatic lymphadenitis have been reported [32]. Gonorrhea infection is becoming more prevalent among HIV patients, but there are no data to support whether this condition is more common or the other four are the most common complications of gonorrhea in HIV patients [33].

Pathogenesis of *Neisseria gonorrhoeae*

Neisseria gonorrhoeae is a compelling pathogen that causes diseases of the upper mucosal organs of the male, and female pharynx, rectum, and conjunctiva. Gonococcal disease and subsequent inflammatory response lead to a condition considered a pelvic inflammatory disease (PID)[https://sti.bmj.com/content/98/Suppl_1/A59.3.abstract]. The result of damage to the tubular epithelium of the fallopian tubes is a high risk of ectopic pregnancy with no tubular cause. *Neisseria gonorrhoeae* (gonococcus, GC) usually begins in most cases in the female cervix, marking between the lower tract (vagina, cervix) and upper part of the uterus (uterus, fallopian tubes, ovaries, and endometrium).The cervical disease can be asymptomatic or asymptomatic, but unless treated, from 10% to 20% of cervical diseases would affect the upper part of the female body, including the endometrium and fallopian tubes [34].

Gonorrhea treatment

The second most frequent illness in the United States, gonorrhea, is the major cause of cervicitis, urethritis, and inflammatory pelvic disease. The capacity of *Neisseria gonorrhoeae* to cause gonorrhea makes it difficult to choose an effective gonorrhea therapy (i.e., it is safe, effective, single -dose and free of charge). The treatment of gonorrhea has always been held to a high standard: It must be successful, very effective, non-invasive, and as painless as possible. Because many people are treated for gonorrhea, the safety and efficacy of gonorrhea therapy are critical, as pain and recurrence necessitate frequent treatment recommendations. The United States has also fought to determine the effectiveness of gonorrhea treatment. In 1992, Handsfield et al. supported the definition of accepted medical care as a 95% treatment rate and a 95% reduction in CI of an average of 90% [35]. Strong standards for clinical efficacy, described as 95% treatment rates had a wide range of subjects born to establish a 95% CI reduction of 95% in those scientific experiments, in the 1995 edition using Moran et al. al[36]. when the criterion was shifted to the recommended one, the range of antimicrobial treatment varied to a total treatment rate of 95%. As a result, Mora et al. [36]. The most effective approaches (those with a 95% confidence interval of 95%) may minimize the likelihood of illness recurrence and avoid the creation of preventive measures, according to warning and decreasing evidence [37]. It is also crucial to discuss how conventional treatment with medicine to illustrate the treatment's efficacy. Treatment of gonococcal urethritis with penicillin in adults was well tolerated. According to Jaffe et al.[38], as were blood penicillin levels included 3 to 4 MIC values in 7-10. Ceftriaxone 125 mg can store a large number of microorganisms in the bloodstream. Significant clinical trials have indicated that ceftriaxone is successful in treating refractory gonorrhea in all areas of the body, with 98.8% (95 %t CI, 97.9% -99.8%) of patients being treated. Spectinomycin (2 g) has been proved to be an effective and safe therapy for N.], but it must be accepted as an intramuscular injection, which is costly or affordable and has pharyngitis side effects.) The poll resulted in a 51.8 % response rate (95 % confidence interval: 38.7% -64.9 %). Spectinomycinwas produced in the US (Memphis Pharma and Chemical Industry) [https://link.springer.com/article/10.1007/s10570-022-04614-6] or anyplace else in the globe [https://iopscience.iop.org/article/10.1088/1755-1315/848/1/012085/meta].A single cycle might cause elevated spectinomycin levels. Gonococcal kidney failure was linked to a total of 2 g of azithromycin (chance, 99.2 %; confidence time 95 % for placebo, 97.2 % -99.9 %). However, because roughly 35 % of patients with double melasma have intestinal symptoms, it is not necessarily a cure for gonorrhoea; also, such methods create tiny medications that are considered beneficial in treating gonococcal illness [39].

Herbal Treatment of *N. Gonorrhoeae*

Helichrysum caespititium

More than 80% of Africans rely on traditional knowledge for their benefit and rely on plants for medicine. Although *Helichrysum caespitium* is one of the most commonly used herbs by African healers, science and medicine need to verification of its biological function. The main objective of this study was to determine the function of gonorrhea and the overall cytotoxicity of *H. caespitium* plants. Wood dyes are used meticulously to obtain one of the most effective solvents of n-hexane, dichloromethane, methanol, and water. Plant gonorrhea activity 4 (n-hexane, dichloromethane, methanol, and liquid) against World Health Organization 2008 registered for gonorrhoeae and extract poisoning against hepatocyte proliferation. Four *H. caespitium* compounds had a positive effect on N-strain. N-hexane extract proved to be the strongest antagonist among the four lines, with a low MIC of 0.037 ± 0.0 mg/ml on the G side, i.e., on the G. side corresponds to gentamicin and is effective compared to amoxicillin. Type 2), with the most toxic LC50 being 428.77 x 4.76/g/ml, followed by water (394.36 x 5.41/g /ml) and methanol (357 x 2.81/g/ml). The results indicated the use of *H. caespitium* in traditional medicine for the treatment of gonorrhea [40].

Opuntia stricta

(*Cactaceae*)**.**Local name: erect prickly pear

Its decoction of leaves and stem is used for the treatment of gonorrhea [41].

Senecio serratuloide

(A*steraceae*)**.** Local name: ragworts and groundsels and family is *Asteraceae*.Decoction of leaves is effective for the treatment of gonorrhea[40].

Hypoxis hemerocallidea

(*Hypoxidaceae*)**.**Local name: African potato.

Decoction of roots is an effective remedy for the treatment of gonorrhea [42].

Ranunculus multifidus

(*Ranunculaceae*).Local name: common buttercup

The decoction of the whole plant is used for the treatment of gonorrhea. [43]

Abutilon indicum

(*Malavaceae*). Local name: Kanski
For the treatment of gonorrhea, a new infusion of the herb is taken before supper.

Aerva lanata
(*Amaranthaceae*). Local name: Mountain knotgrass
Decoction of flowers is used for the treatment of gonorrhea if dosed from 2to 3 times a day for 20 to 30 days.

Clerodendrum phlomidis
(*Verbenaceae*). Local name: Arni.
Fresh root decoction is a good treatment for gonorrhea.

Corchorus capsularis
(*Tiliaceae*). Local name: Jute
A decoction of the plant is used to treat gonorrhea.

Hemidesmus indicus
(*Asclepiadaceae*). Local name:Indian Sarsaparilla
Cuminum cyminus is given administered orally for the treatment of gonorrhea. The roots are dried powdered and combined with sugar.

Polyalthia longifolia
(*Annonaceae*) Local name: False ashoka
For the treatment of gonorrhea, stem bark was dried, crushed, and combined with butter and taken twice a day for a few weeks.

Pedalium murex
(P*edaliaceae*). Local name: Gokhru-kanti.
Orally, a mucilaginous infusion of fresh leaves is considered highly useful in treating gonorrhea [44].

CONCLUSION

Obtaining information regarding sexually transmitted disease and the prevention of these diseases is highly important and everyone should aware of this. Luckily, with the advancement in the field of research and technology, most people all over the world are becoming aware of this. In conclusion, this review revealed the truth regarding the anti-gonorrheal activity of medicinal plants. *Helichrysum caespititium, Opuntia stricta, Senecio serratuloide, Hypoxis hemerocallidea, Ranunculus multifidus, Abutilon indicum, Aerva lanata, Clerodendrum phlomidis, Corchorus capsularis, Hemidesmus indicus, Polyalthia longifolia, and Pedalium murex* are considered as the proper remedy for the treatment of gonorrheadue to their best therapeutic potential. Different parts and chemical constituents have a role against this disease and are mostly used in the form of decoction but in other forms, these plants are effective as well. It is indicated according to the pharmaceutical and phytochemical investigation and data analysis about all of these plants mentioned in this review, that these plants by containing the phenolic and due to their anti-oxidant activity possess the optimal role in the treatment of gonorrhea.

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