

SELECTED SEXUALLY TRANSMITTED INFECTIONS (STIs) DURING THE COVID-19 PANDEMIC - CHALLENGES AND MANAGEMENT: LITERATURE REVIEW

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ABSTRACT

The COVID-19 pandemic had a dramatic effect on health, economic growth, employment, and way of life worldwide. To measure the effect of the coronavirus pandemic on STIs in public healthcare, multiple studies have been carried out concerning key elements, such as: challenges and management. To review literature focused on studies in global and national aspects concerning initiatives in public healthcare to curb the coronavirus pandemic and at the same time have an effect on the levels of sexually transmissible infections. A review of studies has been carried out for the period January 2020 - November 2022 in databases PubMed, and Google Scholar, as well as data from international and national platforms with the following keywords: "COVID-19", "STI", "Challenges", "Management". The review outlines the conceptual framework of the issue on a global level. The majority of authors take into consideration major points such as management and challenges to them concerning the coronavirus pandemic and STI. Major challenges to the management of the most common STI in relation to the COVID-19 pandemic and the measures for curbing it have been presented and discussed. The global COVID-19 pandemic and STIs have their intersection point consisting of significant effects on the prevention, therapy, and monitoring of these diseases. At the same time, there are no sufficient studies on the topic about lower-income countries, and high-risk social groups.



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1. Introduction

The COVID-19 pandemic had a dramatic effect on health, economic growth, and way of life worldwide [1], [2]. The number of deaths related directly or indirectly to the pandemic described as "excess mortality" for

2020 – 2021 is 14,9 million. At the same time, according to data from WHO, 1 million people are infected daily with sexually transmitted infections. Sexually transmitted infections (STI) are a global burden. Each year 276,4 million people get sick with trichomoniasis, 146 million with chlamydia infection, 51 million with gonorrhoea, and 5 million with syphilis [3], [4], [16]. Numerous studies have been conducted to measure the effect of the coronavirus pandemic on these most common STIs. Through this review, we attempt to identify studies leading to findings and conclusions by which we will address the current challenge through effective evidence-based management.

Deadly pandemics and large-scale epidemics have challenged human existence throughout history. As in Albert Camus's *La Peste (The Plague)*, the familiar rhythms of our lives are shaken by an unknown existential threat. What is a pandemic? Used since the mid-17th century, the word “pandemic” conjures up an image of an impressively large epidemic. “Epidemic” is often translated from Greek as “that which is upon the people”, i.e. a high-incidence or widely prevalent condition and is most commonly used to refer to diseases with rapid temporal and geographic spread. After the sudden onset of global influenza in 1889, the term “pandemic” was acquired, and as of today officially retains the narrower meaning of a disease “...occurring widely a region, country, continent or globally” [5].

[5] ask the rhetorical question: “What lessons have we learned from this long history of pandemics, and how do they relate to the current situation with COVID-19 and STIs?” The authors point out that HIV emerged between 1880 and 1920, but it did not become pandemic until 1981, when the global population size expanded, migration processes had become more geographically extensive and complex (e.g., transnational road building and routes, leading to travel-related prostitution, and affordable international air travel).

As to syphilis, according to one of the hypotheses about the origin of the disease in scientific literature, after the first voyage of Columbus to the Americas in 1492, syphilis was brought back to Europe. No explosive sexually transmitted disease had ever been seen in Europe at the time that the syphilis pandemic appeared suddenly, in the late 15th century. The horrifying gummatous deformities and tragic deaths characteristic of the first decades of the pandemic were unprecedented.

Four centuries later, the HIV/AIDS pandemic was just as shocking in high mortality, this time in association with multiple human-to-human modes of transmission (e.g., sexual transmission, needle sharing, blood product transfusion, maternal transmission), significantly complicating control of the disease [5].

Numerous authors outline the challenges to epidemic management policies.

2. OBJECTIVE

To outline the challenges and the basis for management of selected STIs (gonorrhoea, syphilis, HIV, chlamydia, trichomoniasis) during COVID-19, which is a key approach for establishing effective, evidence-based interventions for their control.

3. GOALS

1. To present the challenges to the prevention, therapy and screening of STIs under COVID-19 conditions;
2. To outline the broken balance between access to testing and timely treatment of STIs under COVID-19 conditions, as one of the key approaches for effective control of these socially significant

diseases;

3. To outline some difficulties facing STI management as a public health problem - resources, and measures of the institutions.

4. MATERIALS AND METHODS

A review of studies in the following databases was made: PubMed, and Google Scholar, as well as data from publications in the following international and national organizations and platforms: WHO /World Health Organisation/, ECDPC /European Centre for Disease Prevention and Control/, Centers for Disease Control and Prevention USA /CDC /, Ministry of Health in the Republic of Bulgaria, National Statistical Institute /NSI/, National Center of Public Health and Analyses /NCPHA/; published in the period January 2020 – November 2022. The search was done with the following keywords: “COVID-19”, “I”, “STI”, “HIV”, “Syphilis”, “Gonorrhoea”, “Chlamydia”, “Trichomoniasis”, “Challenges”, “Management”. Included: After a title and abstract review, original studies and reviews with open access, referenced data from reports of international and national institutions, in Latin and Cyrillic script, dealing with concepts such as COVID-19 and STIs, challenges and management have been selected (as the most relevant to the objectives of our study). Excluded: Articles and data unrelated to the search objectives; those published in the mass media, clinical studies concerning single cases and those that are case reports, duplicate studies; as well as studies published before 2020 (Fig.1).

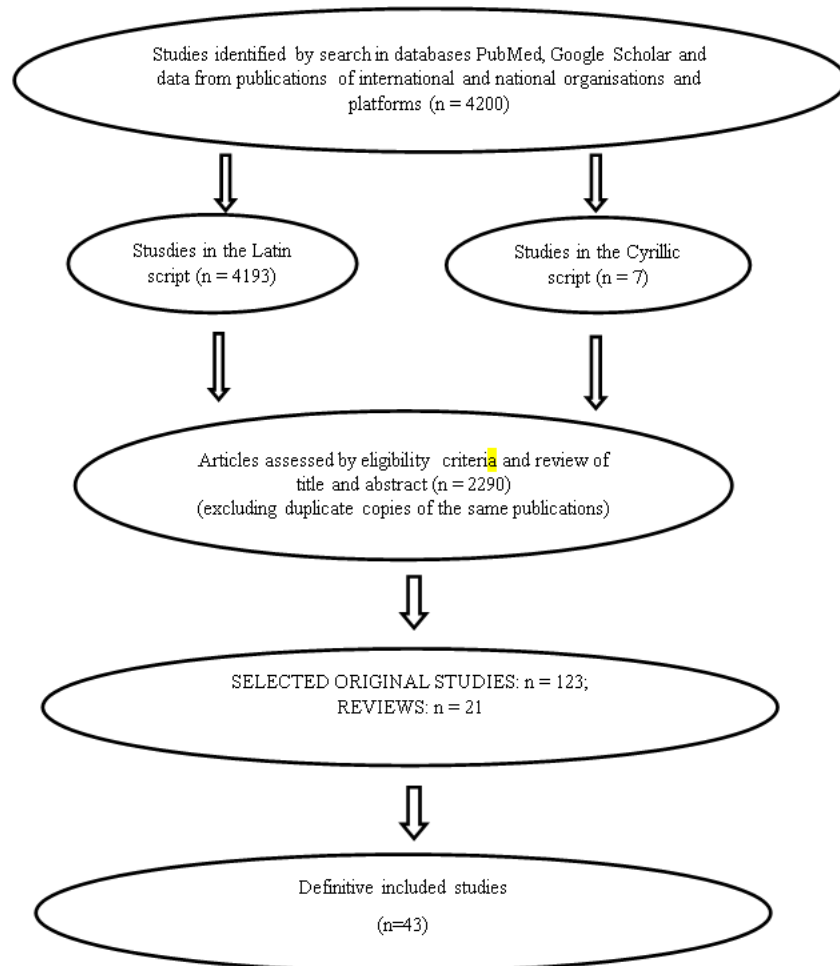


Fig. 1. Diagram of the search and selection process of scientific publications – according to PRISMA - Preferred Reporting Items for Systematic Reviews and Meta-Analyses

5. RESULTS AND DISCUSSION

The COVID-19 pandemic has exposed and exacerbated existing socioeconomic and health disparities, including disparities in sexual health and well-being. Each year, there are approximately 376 million new infections with one of the following STIs: chlamydia, gonorrhea, syphilis, and trichomoniasis. According to the latest data, an average of one in twenty-five people worldwide has one of these most common STIs [6], [7].

5.1 Covid-19, HIV and Syphilis

Although HIV infection was initially thought not to be a risk factor for COVID-19, more recent large studies have shown that people living with HIV (especially with low CD4 cell counts or untreated HIV infection) may have a more severe clinical course than those who are HIV-negative. The COVID-19 pandemic has disrupted HIV prevention and treatment services worldwide, posing enormous challenges to mainstream activities [3], [7- 9], [10]. A number of authors emphasize that the medical community should be alerted to a possible increase in sexually transmitted diseases in the near future and that continued efforts are needed to prevent and treat socially and economically vulnerable groups of people that are at high risk of COVID-19 and HIV [3], [8- 12]. Modeling studies in high HIV burden settings show possible irreversible consequences: deaths due to HIV can increase by up to 10%, and a 6-month interruption of antiretroviral therapy can lead to more than 500,000 deaths of AIDS-related diseases in sub-Saharan Africa in 2020–2021, compared with 470,000 AIDS-related deaths for the region in 2018 [1], [3], [4], [11- 15].

Social distancing and lockdown measures related to COVID-19 have resulted in reduced diagnosis rates of syphilis for some European cities [3], [8], [11] and of syphilis and HIV in Taiwan [2], [13], [16], compared with the same time periods in previous years. Public health reports comparing 2020 data on HIV and syphilis in regions of Canada and the US have noted the same trend [3], [8], [9], [11], [17], [18], emphasizing that it is unclear whether the decrease is due to less frequent intercourse and a true decline in syphilis and HIV rates, or patients delaying diagnosis and care, resulting in underreporting. The authors outline the need to analyze whether COVID-19 would have a lasting, substantial effect on the epidemiology of STIs, whether this is: a reduction in prevalence due to more careful and limited sexual contact; increase in STIs due to lack of prevention and treatment; or no lasting effect at all [3], [8], [9], [11], [15].

According to ECDC data, HIV diagnostic testing is recognized as a critical factor in the medical and public response to the HIV epidemic. On the other hand, the resurgence of syphilis has stimulated interest in expanding syphilis prevention methods beyond traditional measures in order to minimize morbidity, transmission, and mortality. Research into pharmacologic prevention strategies has increased recently with the advent of pre-exposure prophylaxis (PrEP) for HIV. Meanwhile, a systematic review of studies evaluating the efficacy of intermittent treatment for bacterial STIs among prostitutes showed efficacy in reducing the incidence of chlamydia, gonorrhoea and ulcerative STIs, but not syphilis. A number of authors have emphasized that an effective and affordable syphilis vaccine, even if discovered years from now, could have a significant impact on disease control worldwide [8], [3], [8], [9], [11- 14], [19].

Integrating HIV care with syphilis prevention and care is critical. New strategies to improve STI screening rates include home test kits for asymptomatic individuals, such as those used by Sexual Health London in the UK [3], [7- 9], [11], [12], [20], [21]. Adapting these different tools and strategies to the needs of local communities around the world is critical to preventing both syphilis and HIV [3]. According to CDC data, in 2020 there were 1,200,000 new cases of syphilis in women and 1,300,000 in men in the Americas region. Despite the increase in treatment coverage among pregnant women with syphilis, the coverage of syphilis screening during prenatal care has decreased, highlighting the need for greater efforts in this direction.

Since 2010, there has been a 27% reduction in AIDS-related deaths. The risk of transmission from pregnant women with HIV to their children has decreased from 21% in 2010 to 12% in 2020. These facts point to the elimination of these infections as a top public health priority [7], [20], [22].

[10] recorded progress in providing various testing methods in Europe and Central Asia. The provision of self-testing services has increased between 2020 and 2021. This may be due to the COVID-19 pandemic and the resulting lockdowns, preventing more traditional methods of testing and providing impetus for new modalities.

According to ECDC data, in 2019 a total of 35,039 newly diagnosed cases of syphilis were reported from 27 countries. The male-to-female ratio of the total number of cases in the EU is 8.6:1. When considering cases in which HIV status was reported, 4% of heterosexual cases and 31% of MSM cases occurred in people living with HIV. Although the number of syphilis cases has remained stable among MSM living with HIV, there was a 44% increase in syphilis diagnoses among HIV-negative MSM from 2015–2019 [10], [23]. Within the concepts of sexually transmitted infections, key objectives have been identified for effective service delivery and access, increasing diagnostic capacity, and taking the lead in improving the quality of care for people living with HIV [7], [9], [10], [16], [23].

Early strategies to mitigate COVID-19 impacted the ability to provide rapid in-person care, leading to a huge shift to virtual medicine platforms, including telephone and video telemedicine. This transition has charted a new path for treatment, but on the other hand, has highlighted inequalities and may have exacerbated disparities due to a lack of means to participate in virtual care, such as an appropriate device, internet access or technological literacy. Many HIV and sexual health clinics have suspended in-person visits, disrupting the continuum of HIV care as well as limiting access to in-person sexual health services for STI screening and management. A decline in antiretroviral therapy initiation and viral suppression rates has been noted in HIV clinics in the US and worldwide [1], [10- 12], [18], [19], [22], [26- 35].

Nearly a third (28.8%) of participants in a Panamanian study reported reduced casual sex compared to pre-COVID-19 measures. During the COVID-19 measures, HIV/STI testing could not be done by 58.0% (58 of 100) of participants who needed testing, and interrupted HIV care was reported by 53.3% (8 of 15) of participants living with HIV [15], [22], [36].

HIV and syphilis testing among high-risk marginalized populations (prostitutes, inmates, etc.) is an important mechanism and should be implemented in an informed voluntary manner [9], [11], [16], [37- 39]. This way is important both for the respect of individual human rights and for public health.

Costs can also create a barrier to HIV testing [21]. Most countries in Europe and Central Asia provide free testing services for certain groups and/or in certain geographical areas [7], [9], [10], [14], [15], [35].

5.2 COVID-19 and Chlamydia

Chlamydia trachomatis is one of the four species in the *Chlamydia* genus and *Chlamydiaceae* family, including *C. pneumoniae*, *C. psittaci*, and *C. pecorum*. Genital chlamydia is a sexually transmitted infection caused by the *Chlamydia trachomatis* bacterium. According to data by ECDC (European Centre for Disease Prevention and Control) genital chlamydia is the leading sexually transmitted infection in Europe and the cause of significant fresh morbidity and long-term reproductive health problems, especially in young people. The data show that the number of chlamydia infections is increasing in Europe: more than 250,000 new cases are reported each year. Because the infection is often asymptomatic, the increasing number of

reported cases is likely the result of increased awareness of the disease and increased testing. An asymptomatic course leads to delayed diagnosis and continuous transmission. According to ECDC data, chlamydia is under epidemiological surveillance in the EU: the overall notification rate (number of cases per 100,000 population) is 157, with rates ranging from <1 (Cyprus, Greece, Romania) to >500 (Denmark, Iceland, Norway). Of the cases with reported modes of transmission, 82% were in heterosexual women and men and 13% in men who have sex with men (MSM) [9], [10], [14], [15], [27- 32]. At least 70% of genital *C. trachomatis* infections in women and 50% in men are asymptomatic at the time of diagnosis. Many patients with asymptomatic infections will eventually develop symptoms and clinical diseases [9], [10], [15], [17- 23], [41].

The risk factors for chlamydia infection are common and include: young age (<24 years), a new sexual partner, multiple sexual partners (more than one sexual partner in the past one year), and inconsistent or non-use of condoms.

Sexual risk behavior is an important risk factor, and re-infection rates of 10-30% have been documented in adolescents with multiple sexual partners. Studies among women under 30 years of age have found prevalence rates between 2 and 6% in the Netherlands, Denmark and the United Kingdom. Consistent condom use outside monogamous relationships is the most effective primary prevention. Control of chlamydial infection relies on effective secondary prevention and includes: 1. Easy access to counseling and testing for symptomatic sexually transmitted infections. 2. Opportunistic research and screening of sexually active young people. 3. Effective partner management of diagnosed cases [7], [10], [18], [20], [21], [27], [41].

Data from the European Surveillance System (TESSy) as of 9 September 2021 indicate the following: for 2019, 26 EU member states reported 434,184 confirmed cases of chlamydia infection. Notification rates continue to be the highest among young heterosexual women. Over the past five years, the number of persons diagnosed with chlamydial infection has increased among men by 19% and among women by 9%. During the same period, the number of chlamydial infections among HIV-negative men who have sex with men (MSM) doubled in a number of countries [7], [10], [15], [20], [27], [28], [36].

In a UK study, of 106 individuals who reported using STI test services, 64.4% accessed the services remotely (telephone, video or online). Among 2,581 women aged 25–59, 2.4% also reported that they were more likely to have failed to use STI services [9], [10], [13], [20], [21], [36].

5.3 COVID-19, Gonorrhoea and Trichomoniasis

Gonorrhoea is a sexually transmitted infection (STI) caused by the bacterium *Neisseria gonorrhoeae*. The incubation period is from three to 14 days after sexual contact with an infected partner, before symptoms appear. According to ECDC data, untreated cases can remain infectious from six months to more than a year. Notifying and treating the partner is essential to limit transmission. If the infection is not treated, it can spread and lead to ectopic pregnancy or infertility. ECDC fact sheets indicate the ways of contracting gonorrhoea: the infection is transmitted through sexual contact, including sex without the use of a condom, vaginal intercourse, and anal and oral sex. During intercourse, gonorrhoea is more likely to be transmitted from a man to a woman than from a woman to a man. The infection can also be transmitted from mother to child during childbirth. Avoiding risky sexual behavior has a preventive effect on STIs, including gonorrhoea. There is a significant risk in: young people, especially those under 25; men who have sex with men (MSM); people with a history of sexually transmitted infections (STIs) or who are HIV positive, as well as those offering paid sex.

According to ECDS data, a record number of 117,881 cases of gonorrhea were reported in 2019 from 27 countries, with an incidence rate of 32 per 100,000 population. The incidence varies for individual European countries from less than 1 per 100,000 people (Bulgaria, Cyprus, Poland, Romania) to more than 30 per 100,000 for Great Britain, Denmark, Iceland, Ireland, Malta, Norway, and Sweden. For cases with reported modes of transmission, 48% were in MSM, 24% in heterosexual women, and 22% in heterosexual men [7], [10], [16], [21], [23], [24], [29].

Trichomoniasis is caused by *Trichomonas vaginalis* (a protozoan parasite). According to CDC data, about 70% of people are asymptomatic. The global incidence of trichomoniasis is 40 per 1,000 women and 42 per 1,000 men. The WHO African region has the highest rates of gonorrhea and trichomoniasis in women and men [2], [7]. *Trichomonas* infection is associated with various health complications, including pelvic inflammatory disease, significant pregnancy complications, cervical cancer, prostatitis, infertility [23], [24]. Trichomoniasis can lead to long-term compromised male fertility if left untreated [9], [27], [41]. [39] found in their study that positive tests for trichomonas in asymptomatic patients were 3.6% during the entire study period, 3.7% during the pre-pandemic period and 3.3% during the pandemic period. At the same time, they pointed out that the COVID-19 pandemic has the potential to seriously disrupt access to sexual health services for young people: STI testing rates, both for symptomatic and asymptomatic cases, declined in the early months of the pandemic.

5.4 COVID-19, STIs and management

The Covid-19 pandemic has disrupted the balance between access to testing and timely treatment of STIs. The WHO Global Health Sector Strategy on Sexually Transmitted Infections 2016–2021 aims to end sexually transmitted infections by 2030 [9], [16].

Significant challenges in continuing to provide STI care during a pandemic include: a lack of personal protective equipment, limited staff to screen and refer patients, limited resources, and limited laboratory services. COVID-19 restrictions had no effect on the incidence or ratio of young to older infected with gonorrhea or syphilis [9], [10], [24], [32], [33], [39]. The number of diagnosed STIs depends on the behavior and access to medical services [7], [9], [10], [15], [38]. According to [43], in Italy, for the period 15 March – 14 April 2020, compared to the same period of 2019, the number of reported cases of chronic STIs decreased, but acute sexually transmitted infections increased among MSM. The COVID-19 pandemic, despite lockdowns and social distancing advice, does not appear to have deterred risky behavior, particularly among MSM.

A team of researchers conducted an analysis of sexual and reproductive health during COVID-19 (I-SHARE) in adults from 30 countries before and during the initial wave of coronavirus disease. The results show that among 4546 respondents with casual partners, for the majority of them - 3374 (74.4%), condom use remained the same, and for 640 (14.1%) there was a decline [28]. Data from other studies show that COVID-19 measures have hindered access to condoms (by 8.7%), contraceptives (by 7.5%) and human immunodeficiency virus/sexually transmitted infections (HIV/STI) tests (by 30.7%) [7], [9], [10].

In summary, robust management of STIs is needed during the ongoing COVID-19 pandemic, based on minimizing the risk of transmission of infections through appropriate measures, establishing best practices regarding the provision of care for patients with sexually transmitted infections, within the context of the coronavirus pandemic. The Centers for Disease Control and Prevention CDC (USA) in the report “Impact of COVID-19 on STIs” 2020 indicated the following impact factors: 1. Limited screening: many health clinics have either closed completely or limited personal visits to only symptomatic patients; 2. Limited

resources: STD program resources have been redirected to help control the spread of COVID-19. Many jurisdictions have redirected staff from routine STD surveillance and control efforts to COVID-19 activities; 3. Social distancing measures: fear of exposure to COVID-19 and limited access to public transportation may also have affected sexual behavior and caused people with STD symptoms to delay treatment.

5.5 COVID-19 and STI in the Republic of Bulgaria

In the Republic of Bulgaria, a National program for the prevention and control of HIV and sexually transmitted infections has been adopted for the period 2021- 2025 focusing on the challenges and the need for effective national policies concerning the high STI risk groups and upgrading the previous such National programs [14]. More than apparent are the social, economic, organizational, and ethical challenges to the management of STIs not only during the Covid-19 pandemic, but in general. Under the pandemic conditions changes have taken place in the digital area, fieldwork, and personal contact. Adequate methods of access to a representative of vulnerable groups of people have been implemented: people using drugs by injections; males having sex with males; marginal ethical communities at risk; people in prison; people offering sex services and their clients; people seeking and having obtained international protection, migrants and mobile population. Regarding the Normative Regulations, there is Ordinance No. 3 dated 26 May 2016 on the conditions and procedure for diagnosis, prevention, and control of Syphilis, Gonorrhea, and urogenital chlamydial infection. An Expert Council on HIV and STIs was established at the Ministry of Health with functions to develop and propose to the Council of Ministers a national policy for the prevention and limitation of the spread of AIDS, tuberculosis, and STIs [6].

Both the National Center of Public Health and Analyses (NCPHA) and the National Statistical Institute (NSI) by regulation provide, respectively, weekly and monthly information on registered infectious diseases. Mandatory reporting of STIs including chlamydia, gonorrhea and syphilis (including congenital) is not required [38].

6. CONCLUSIONS

1. Management of STIs as a public health problem within the context of the COVID pandemic proved to be a challenge for global health policies. Lockdowns and social distancing advice did not deter STI risk behavior. At the same time, STI control resources were diverted to controlling the coronavirus epidemic.
2. The COVID-19 pandemic is a syndemic that has led to a lack of sufficient prevention, including sexually transmitted infections, aggravation of social and health inequalities and disruption of the sustainable development of society. Manifested difficulties in the prevention, treatment, and follow-up of STIs appear to be similar for the countries. There are challenges in the prevention, therapy, and screening of STIs within the context of COVID-19.
3. Every pandemic the world goes through is different, but the pandemic of the 21st century is distinguished by its seismic effect on public health policies, expressed in difficulties in accessing health care. Unlike in past centuries, modern society cannot accept not being provided with health assistance, care, and treatment for other diseases. Therefore, a new vision is needed for coordinating, monitoring, and financing the management of other socially significant diseases, including STIs.
4. The new perspective of STI management should include strategic interventions in the direction of improved diagnostics and targeted efforts for early diagnosis of vulnerable groups. It is necessary to introduce and widely use the possibilities of e-management by building an the electronic database for sexually transmitted diseases and monitoring and evaluating the treatment of STIs, within the context of a pandemic, and not only.

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