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## Utility of syndromic approach in management of sexually transmitted infections: public health perspective

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### PEER REVIEW

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#### Comments

Author has attempted to do justice with the topic. Considering the burden of the STIs globally, and the cost-effective nature of the syndromic approach along with other advantages as mentioned, this approach remains a potential solution in STI management and preventing adverse outcomes, such as genital infections, pregnancy related outcome, burden on the health system, and minimization of the threat of contracting HIV.

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### ABSTRACT

Sexually transmitted infections (STIs) are infections that are mainly transmitted from person-to-person through sexual contact. Untreated or inadequately treated STIs can have significant impact on the maternal and newborn health. An extensive search of all materials related to the topic was made using library sources including PubMed, Medline and World Health Organization website for a period of one month. Relevant documents, technical publication series, systematic reviews, research articles focusing on the practice of syndromic management in treatment of STIs published in the period 1995–2013 were included in the review. The identified articles were then re-grouped into different sections for better understanding. Keywords used in the search include syndromic management, sexually transmitted infections, women, reproductive age-group and pregnancy. There is an immense need for implementation of prevention and control of STIs because of the associated morbidity/mortality, association with HIV and adverse outcomes of pregnancy and burdening of the health system. Multiple socio-demographic determinants have been identified, which usually precipitates STIs. In addition, some of the barriers have been recognized which is hampering with the expected utilization of the health care services. To counter the high prevalence of reproductive tract infection/STI, especially in countries with limited resources, syndromic diagnostic approach has been adopted by countries for the standardized management of sexually transmitted disease cases. The aim of syndromic management is to identify a syndrome and treat it accordingly with combination therapy which will cover the main pathogens that cause it. Strategies have been suggested to overcome the limitations of the syndromic approach and bring the problem under control. To conclude, syndromic management is a rapid and cost-effective approach in reducing the transmission of STIs.

### KEYWORDS

Sexually transmitted infections, Syndromic approach, Barriers, Reproductive age-group

## 1. Introduction

Sexually transmitted infections (STIs) are infections that are mainly transmitted from person-to-person through sexual contact<sup>[1]</sup>. Almost 30 types of causative bacteria, viruses and parasites have been isolated, which are responsible for multiple sexually transmissible diseases such as gonorrhoea, chlamydial infection, syphilis, trichomoniasis,

chancroid, genital herpes, human immunodeficiency virus (HIV) infection and hepatitis B infection, *etc.* Some of the above conditions, especially HIV and syphilis, can also be transmitted from mother to child during pregnancy and childbirth, and through blood products<sup>[1]</sup>. Out of the 30 recognized STIs, four STIs, namely, syphilis, gonorrhoea, chlamydia, and trichomoniasis have been found to be curable while four of those caused by the viral origin,

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namely, HIV, human papilloma virus, herpes simplex virus, and hepatitis B virus are incurable, though modifiable with treatment<sup>[2]</sup>. STIs and their associated complications are regarded as one of the top five reasons for which adults avail health care services in developing countries<sup>[2]</sup>. STIs has also been identified as the second most common cause of years of healthy life lost among women in the reproductive age group in developing countries<sup>[3]</sup>. Untreated or inadequately treated STIs can have significant impact on the maternal and newborn health. Failure to diagnose and treat STIs at an early stage may result in serious complications and long-term sequelae<sup>[2]</sup>. Strategies for prevention and control of STIs should be merged with the comprehensive sexual and reproductive health services for ensuring attainment of the millennium development goals<sup>[4]</sup>.

## 2. Materials and methods

An extensive search of all materials related to the topic was made using library sources including PubMed, Medline and World Health Organization website for a period of one month. Relevant documents, technical publication series, systematic reviews, research articles focusing on the practice of syndromic management in treatment of STIs published during the period 1995–2013 were included in the review. The identified articles were then re-grouped into different sections *viz.* distribution of the STIs; need of implementation of prevention and control strategies; socio-demographic determinants of STIs; identified barriers hampering the utilization of health care services; pros and cons of syndromic approach; challenges ahead in the control of STIs; public health interventions; and implications for practice and research. Keywords used in the search included syndromic management, sexually transmitted infections, women, reproductive age-group and pregnancy.

## 3. Distribution of STIs

Globally, sexually transmitted infections have a serious and considerable impact on the sexual and reproductive health<sup>[1]</sup>. World Health Organization has reported that almost 499 million new cases of curable STIs (syphilis, gonorrhea, chlamydia and trichomoniasis) have been recorded in the year 2008 across the globe in adults aged 15–49 years, with the largest proportion in the region of southeast Asia, followed by sub Saharan Africa, Latin America and the Caribbean. These estimates do not encompass the contribution by conditions like HIV/herpes simplex virus<sup>[1]</sup>. Nearly a million people acquire a sexually transmitted infection (STI), including the HIV every day<sup>[4]</sup>.

STIs are a major cause of concern to all sexually active

adolescents. Every year, one in 20 adolescents contracts sexually gets a bacterial infection, and the age of acquiring infection is becoming younger<sup>[5]</sup>. The prevalence of reproductive tract infections (RTIs) among adolescent girls was found to be 64% in a cross-sectional study done in Kolkata<sup>[6]</sup>. Considering the social, demographic and migratory trends observed across the globe, it has been estimated that population at risk for STIs will continue to increase in the future years<sup>[4]</sup>. As discussed earlier, though the burden of STIs has been high in the developing world, developed nations can still expect a significant rise in the incidence and the prevalence of the disease owing to the non-curable nature of most of the viral STIs, high risk sexual behavior and increased travel<sup>[4]</sup>.

## 4. Do we really need implementation of prevention and control strategies for STIs globally

### 4.1. Morbidity and mortality

STIs can adversely affect the health of women and are one of the crucial determinants for reproductive, maternal and newborn health. Implementation of appropriate prevention and control strategies customized to local settings can have a significant and effective impact on the STIs associated morbidity and mortality<sup>[2,6]</sup>.

### 4.2. STIs and HIV

The presence of untreated or inadequately treated STIs (ulcerative/non-ulcerative lesions) increases the risk of both acquisition and transmission of HIV, by a factor of up to eight to ten fold. Thus prompt treatment for STIs is advocated to minimize the risk of acquiring HIV infection, especially in people with high-risk behaviors<sup>[1]</sup>.

### 4.3. STIs and adverse outcome of pregnancy

Untreated STIs has often been associated with acquisition of congenital and perinatal infections in neonates (*viz.* ophthalmia neonatorum, pneumonia), preterm labor, low birth weight, stillbirths and neonatal deaths<sup>[1,7]</sup>. Transmission of hepatitis B infection from mother to child at the time of delivery can result in development of chronic infections and cancer<sup>[1]</sup>. Findings of multiple studies have revealed the utility of STIs management during antenatal period in reducing the incidence of adverse outcomes of pregnancy<sup>[8–10]</sup>.

### 4.4. Associated long-term complications and sequelae

Infections with chlamydia/gonorrhea can lead to infertility

among men and women. Furthermore, women with a past history of pelvic inflammatory disease are carrying almost 6–10 times risk for ectopic pregnancy. In addition, these STIs has also contributed to the development of pelvic inflammatory disease and cervical cancer<sup>[2,4]</sup>.

#### 4.5. Burden on the public health system—economic constraints

Ensuring comprehensive and complete management of each and every patient suffering from STIs can cast a major economic burden on the public health system as well as on the individuals. This financial load is attributed to the appropriate treatment of STIs, management of the STIs associated long-term complications such as infertility and cancers, and ensuring availability of health care services for promoting neonatal survival<sup>[3,7]</sup>.

#### 4.6. Unique opportunity

In order to warrant adequate control of STIs, effective management of the disease is of critical significance as it not only eliminates the chance of development of any complications/sequel, but also decreases the spread of these infections in the community. Simultaneous management of STIs offers a unique opportunity to the health care providers, imparting targeted health education to the clients and for treating them as they may never come back in future<sup>[3,11]</sup>.

### 5. Socio-demographic determinants and barriers

#### 5.1. Role of socio-demographic parameters in occurrence of STIs

Multiple socio-demographic parameters have been identified as the risk factors in the causation of STIs *viz.* female gender<sup>[12]</sup>, literacy status<sup>[6]</sup>, family size<sup>[6]</sup>, women residing in rural areas<sup>[13,14]</sup>, poor menstrual hygiene<sup>[15,16]</sup>, and poor socioeconomic status<sup>[16]</sup>.

#### 5.2. Utilization of STI clinic services—barriers

Irrespective of the nature of STIs, most of the women fail to avail the benefit of health care services. The health-seeking behavior of a community indirectly envisages the extent of awareness pertaining to disease, availability of health services, and to some extent client satisfaction. Different factors such as lack of awareness, cultural and economic barriers<sup>[15]</sup>, a mindset of women to hide the symptoms until the development of serious complications, careless behavior<sup>[17]</sup>, lack of trained doctors, gynecologists and paramedical personnel in remote areas<sup>[18]</sup>, low morale of the

health care workers<sup>[18]</sup>, poor community participation<sup>[4]</sup>, and inconsistent supply of drugs and condoms<sup>[19]</sup>.

In a cross-sectional study aimed to assess health care providers' competence regarding management of STIs in Laos, it was observed that 87% respondents gave inadequate advice regarding health education to patients suffering from STIs<sup>[20]</sup>. Similarly findings of another study revealed that health care providers had difficulties in using the algorithms which might have contributed to the problems of drug resistance<sup>[21]</sup>. In a study to assess the health seeking behavior of patients suffering from RTIs/STIs, it was revealed that more than half of the symptomatic patients did not avail any treatment for their complaints<sup>[22]</sup>. Considering the global nature of the problem, burdened with inadequate resources in tackling the situation, the syndromic approach for STI provides a handy and simple solution to the peripheral doctors working in the primary health centers and other remote areas<sup>[23]</sup>.

### 6. Syndromic management

The conventional mode of diagnosis of sexually transmitted diseases (STDs) is by performing laboratory tests. However, considering either unavailability/expensive nature of the laboratory tests or absence of laboratory technician, syndromic management of STDs have been recommended by World Health Organization since 1990 for use in patients with symptoms of STD<sup>[24]</sup>.

#### 6.1. Syndromic approach—utility and advantages

Syndromic approach for treatment of STIs has been implemented in different countries *viz.* Ethiopia<sup>[24]</sup>, India<sup>[25]</sup>, South Africa<sup>[26]</sup>, and Tanzania<sup>[27]</sup> *etc.* as per the World Health Organization recommendations<sup>[28]</sup>. To counter the high prevalence of RTI/STI, especially in countries with limited resources, syndrome diagnostic approach has been adopted by countries at the primary health center level<sup>[28,29]</sup>. The World Health Organization firmly advocates syndromic management for the standardized management of patients suffering from STDs<sup>[4]</sup>. It is based on the identification of a group of symptoms and easily recognized signs associated with infection with well-defined pathogens. The aim of syndromic approach is to identify and treat a syndrome with combination therapy which will also take care of the main causative pathogen<sup>[4]</sup>. The salient features of syndromic case management are that it is related to the patient's symptoms; highly sensitive; treats the patient at first visit; wide accessibility owing to its availability at primary health care level; use of simple flowcharts for guiding health worker; provides opportunity and time for education and counseling; facilitates notification and treatment of sex

partners; and no laboratory tests required<sup>[30]</sup>.

In a community-based randomized controlled trial to evaluate the impact of syndromic management against STD, it was observed that there was a significant decrease in the incidence and prevalence of STD following improved case management<sup>[31]</sup>. Similar results have been observed in studies done across the globe<sup>[32,33]</sup>.

### 6.2. Syndromic approach—limitations

It has been reported that though the prescribed algorithm for treatment of STDs had 100% sensitivity but it has a low specificity because almost 87% of the money has been spent on overtreatment<sup>[34]</sup>. Also majority of the women with cervical infections are asymptomatic and thus it remains undetected for long by the syndromic approach which exclusively relies on signs and symptoms<sup>[35]</sup>. Studies have revealed that the vaginal discharge syndrome algorithm for the management of vaginal and cervical infections are far from ideal, and for chlamydia or gonorrhoea, this simplified approach is neither sensitive nor specific<sup>[36,37]</sup>. Similarly no encouraging results have been obtained in the management of trichomoniasis and bacterial vaginosis infections in pregnant women<sup>[38,39]</sup>. In a study to estimate the validity of syndromic management for RTIs among pregnant women in Jamaica, it was revealed that utility of syndromic case management is questionable<sup>[40]</sup>. The habit of relying on their own clinical judgment by the health care workers, instead of following the guidelines jeopardizes the effectiveness of treatment algorithms<sup>[41]</sup>. To diagnose and treat asymptomatic cervical infections, and to minimize the chances of overtreatment in the syndromic management, use of specific diagnostic tests have been advocated<sup>[37]</sup>.

## 7. Challenges ahead in the control of STIs

Although most of the developed countries have registered a considerable fall in incidence of STIs but it remains far from expected in case of developing nations and in countries with low resource settings. Multiple barriers and challenges have been acknowledged in the global initiative to attain the millennium development goal *viz.* sustained political commitment from the policy makers and program managers; availability of affordable and rapid diagnostic tests; ensuring consistent supplies of medicines and condoms; facilitation of community participation; promoting continuous training in syndromic approach and supervision; encouraging behavior change communication to eliminate the associated stigma with STIs<sup>[2,4,30]</sup>. Furthermore, the situation has worsened because of reported emergence of antimicrobial resistance, in management of gonorrhoea<sup>[1]</sup>.

## 8. Public health interventions

STI control will be achieved when there is a significant reduction in incidence and prevalence of the STDs<sup>[42]</sup>. Multiple measures have been suggested for bringing about a reduction in the incidence of STIs, such as facilitation of community participation<sup>[4]</sup>, strengthening of the existing resources<sup>[13,43]</sup>, capacity building<sup>[13,44]</sup>, multi-sectoral involvement, developing partnerships with international agencies, involvement of non-governmental organizations and community-based organizations<sup>[44]</sup>, adoption of newer modalities of diagnosis and treatment (*viz.* rapid diagnostic tests, vaccines, availability of effective drugs)<sup>[19,43,44]</sup>, organizing health education campaign for promoting safe sexual behavior and for reduction of associated stigma, appropriate use of media<sup>[4]</sup>, promotion of early health care seeking behavior, promotion of the correct and consistent use of condoms<sup>[4,32]</sup>, ensuring partner notification, ensuring services for patients at the peripheral level<sup>[45]</sup>, integrating prevention and care activities for STIs along with HIV services<sup>[35]</sup>, integration of STD prevention and care activities with primary health care<sup>[46]</sup>, strengthening of surveillance of STIs at the national, regional and global levels<sup>[4]</sup>, establishment of proper monitoring and supervision activities to ensure that activities are performed as planned, on time and within budgeted resources, and determine whether the activities are producing the expected outcome or impact<sup>[4]</sup>.

In a study done in Andhra Pradesh to compare the syndromic approach versus laboratory aid for reaching a diagnosis, it was concluded that the combination of simple laboratory tests with syndromic approach can augment the effectiveness of syndromic approach<sup>[43]</sup>. Findings of a systematic review has established four major activities for STI clinics *viz.* STI treatment of high risk populations, comprehensive case management of symptomatic STIs, condom promotion, and risk reduction counseling<sup>[47,48]</sup>. In a study conducted among women attending a gynecology outpatient department it was observed that syndromic case management along with the periodic evaluations of etiological diagnosis should be advocated to ensure adequacy of treatment algorithms and prescribed medications<sup>[49]</sup>.

## 9. Implications for practice

There is an immense need for a public health education program to facilitate health-seeking behavior among women so that they can avail the benefit of health care services and thus reduce the chronic complications/ sequel of STIs. Health care professionals, including grass root level health workers, have to play a significant role

in educating the public especially the high risk men and women. All the implemented measures should be tailor-made to suit the local settings so that community participation can be encouraged. The need of the hour is to ensure multi-sectoral involvement including engagement of non-governmental organizations for extending the benefit to those who need these services the most. Concurrently, family physicians should be encouraged to raise awareness, following the flowchart in managing clients of STIs and promote referral as well. Surveillance networks should be established to have an approximate estimate of the magnitude of the problem so that due steps can be planned for countering the burden of STIs.

## 10. Implications for research

It is important to conduct studies to determine the level of knowledge regarding the syndromic management among the clinicians practicing in the local areas so that based on the results proper training sessions can be organized for their benefit. Community based studies can be planned to assess the attitude, practice and the barriers among community members regarding the uptake of syndromic approach. Further studies are needed to explore how the best syndromic approach can be made more specific so that the present risk of overtreatment can be minimized and thus appropriate utilization of resource can be planned. Results derived from these studies will help the program managers and health care professionals to modify, emphasize and strengthen the existing strategies so that the ultimate challenge of late complications of STIs can be curbed and the chances of survival improved.

## 11. Conclusion

Syndromic management has been acknowledged as a rapid and cost-effective approach in reducing the spread of STIs. It is a comprehensive approach to case management as it offers complete STI care at the patient's first visit, ensures compliance to treatment, provides opportunity for prevention through health education. Considering the substantial role that can be played by syndromic management in low resource settings, there is an urgent need for countries to first implement, then monitor and ultimately evaluate the outcome of such therapy. Also, to bridge the wide knowledge-application gap, health education and awareness campaigns should be organized to empower the general population on the causes, risk factors and prevention of STIs.

## Conflict of interest statement

We declare that we have no conflict of interest.

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## Comments

### *Background*

Syndromic approach offers the best cost-effective approach to management of STIs. It is a simple tool that can be utilized even by the paramedical workers in remote areas and can achieve good results in terms of minimizing the morbidity and subsequent sequelae associated with these infections.

### *Research frontiers*

Manuscript refers to utility of syndromic approach in management of STIs. It describes the impact of STIs on pregnancy, maternal health, risk of contracting HIV, and the influence of STI in long-term complications. Later it describes the application of syndromic approach in different settings.

### *Related reports*

Review comprises of different forms of research findings reported in PubMed, Medline and World Health Organization website. The studies and reports have been categorized based on the headings and sub-headings so as to ensure to present a complete picture of the topic in consideration.

### *Innovations & breakthroughs*

Presentation of literature in the entire review and sequence of issues is appreciable. Sections such as challenges ahead, implications for practice and implications for research makes the review even more interesting. Not only the review is presented well but the studies, research findings and technical reports discussed are recent, so it provides current scenario pertaining to STIs and its management with syndromic approach across the world.

### *Applications*

The potential applications of syndromic approach in management of STIs have been explained in almost all of the headings. If the heading is STIs and pregnancy adverse outcomes, it means that application of syndromic approach has got utility in prevention of adverse pregnancy outcomes. Similar applications have been described in entire review. Further implications for practice explains about the probable modifications and changes that are needed for enhancing the uptake of syndromic approach.

### *Peer review*

Author has attempted to do justice with the topic.

Considering the burden of the STIs globally, and the cost-effective nature of the syndromic approach along with other advantages as mentioned, this approach remains a potential solution in STI management and preventing adverse outcomes, such as genital infections, pregnancy related outcome, burden on the health system, and minimization of the threat of contracting HIV.

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