

Prevention and Control of Infectious Diseases

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Abstract. With the development of today's world, with the development of the times, medical technology is becoming more and more advanced. But infectious diseases and pandemics remain one of the most troubling problems of this era. Even, some infectious diseases cannot be cured at all and can only be controlled by some special drugs. Three of them are the most troublesome: tuberculosis, AIDS and Human papillomavirus. Among them, tuberculosis and AIDS have long incubation periods. The characteristics of the HPV virus are very clear and the incubation period is very short. This paper is going to discussing the prevention and control of infectious diseases. The purpose of this article is to let the public know how to protect themselves against infectious diseases.

Keywords: Prevention, AIDS, HPV, Infectious Diseases.

1. Introduction

Tuberculosis (TB) is a chronic infectious disease caused by the cobacterium TB bacterium, which can invade various organs throughout the body, especially affect the lungs. The disease mainly affects young people, with an incubation period of four to eight weeks. With environmental pollution and the spread of HIV/AIDS, the incidence of TB is increasing.

HIV virus can attack the human immune system, it will be the most important in the human immune system CD4T lymphocytes as the main target of attack, and a lot of damage, is the loss of the human immune system function. Therefore, the human body is susceptible to various diseases and can occur malignant tumors, with a high fatality rate. It has a very long incubation period, averaging eight to nine years.

Human papillomavirus (HPV) can cause human body skin mucous membrane of the squamous epithelial proliferation and unusual for verruca vulgaris, the symptom such as genital warts, although can be caused by A sexually transmitted diseases like HIV, but the incidence of acuteness wet wart grew rapidly into anal cancer and cervical cancer, the disease of infection as AIDS worldwide attention [1, 2].

2. Protection of elderly patients with tuberculosis

Among them, with the speeding up of the population aging, the elderly tuberculosis has become a major challenge, though the world health organization (who) has the youth and children were susceptible to high-risk groups for dozens of tuberculosis (TB) guidelines or blueprint, but in view of the older population policy really very few, especially for diseases of effective targeted intervention and protection on this action. The most effective way to prevent the TB epidemic is to cut off the transmission route. In institutions for the elderly, emphasis should be placed on strengthening personal protection measures (such as mask rationing), engineering environmental control (UV sterilization) and institutional management (rapid identification of suspected cases). For older people, an annual health check - up program should be added. Simply put, the idea is to increase chest X-rays in combination with bacteriology in older patients to increase the chances of getting care for older patients who are infected. When it comes to TB prevention without considering the vaccine, BCG has been for many years to diagnose the intervention of choice for infectious diseases, but considering the less chance the elderly vaccinal BCG vaccine and the BCG vaccine and the cross reaction of mycobacterium tuberculosis have lower sensitivity and specificity, so IGRAs is a new alternative, a higher sensitivity and specificity, and is not affected by age and BCG vaccine. Society and

Community should put the focus of the tuberculosis (TB) prevention objects tend to old people, because there are too many factors that affect sickness, such as aging itself, smoking, poor nutrition. BMI < 18.5 is also a risk factor for the elderly tuberculosis, and when the patient's immune system has more other diseases, especially malignant tumor and cardiovascular disease, more attention is required. In China, a focus on TB transmission prevention and intervention among the elderly is estimated to reduce TB morbidity and mortality by 48% and 58%, respectively, over the past two decades [3, 4].

Moreover, from a public health perspective, these policy frameworks can effectively address the TB challenge of an aging global population.

However, some regional TB policies remain problematic. For example, the editions of these policies are published only in domestic languages and not in foreign languages. Thus, the scarcity of policy resources and other interventions available also affects the further refinement of the policy framework [5].

3. Protection of AIDS adolescents and proper sex education

Turning now to AIDS, which remains a major public health problem worldwide. High-risk groups mainly appear among young people between the ages of 15 and 24, who are extremely susceptible to infection. Therefore, different from the prevention and control of tuberculosis infectious diseases, we should focus on the prevention and control of HIV among adolescents.

According to the survey report, there were 1.7 million new HIV infections worldwide in 2019, among which 62 percent of new HIV infections in adults belong to key groups and their sexual partners. In the same year, young people between the ages of 15 and 24 accounted for about 28 percent of HIV infections globally and more than a quarter of new HIV infections in the Asia-Pacific region. For this, there must be relevant measures to follow up [1, 4].

4. Prevention strategies

4.1. Promote the Application of Condom

Not using condoms will greatly increase the risk of HIV infection, and the program targets both individuals and society. Especially in society, now the campus has been opened to free condom distribution activities. In the United States, several states have instituted statewide CDPs. Relevant studies have shown that CDPs can not only reduce the barriers to access to condoms, but also promote condom use, leading to the occurrence of risky sex among teenagers [4].

4.2. Drug prophylaxis before the onset of AIDS symptoms

The term PrEP can be used to protect against specific antiretroviral drugs for people who are not infected with HIV, and studies have shown that taking PrEP daily reduces the risk of sexual transmission by about 99 percent. In 2019, the WHO identified three oral drug combinations as PrEP. They are TDF, TDF/FTC, and FTC/TAF. Intramuscular injection once every two months can achieve the preventive effect [5].

4.3. Attitudes and behaviors of adolescent students

In addition to social intervention and drug intervention, adolescent students' attitude and behavior towards the disease is the most fundamental problem. In sub-Saharan Africa, one study researched on number of young people infected with HIV. Of those, 62 percent did not know they were infected with HIV, and 54 percent had had sex with at least one partner. All of the teens surveyed said they had not discussed the disease with their families. At the very least, the results show that their attitudes and knowledge and practices about AIDS are inadequate [6].

Therefore, there should be a systematic AIDS education program for teenagers. When it comes to education plans, this paper still has to talk about the importance of condom use. Fortunately, as

teenagers, they are relatively easy to accept and use new things. Although they do not have much knowledge reserve, they still have some basic knowledge and the ability to judge things. So, there's a lot of promise in promoting the importance of condoms. But in the final analysis, the most important thing is the sex education [5]. In China, we still do not do a good job of sex education. Especially at school, many traditional teachers are shy about teaching sex knowledge, so students don't take sex knowledge seriously. But fortunately, China is paying more and more attention to this problem. In 2018, UNESCO released the "International Education Technology Guide", which incorporated comprehensive sex education into campuses and became an important direction for campus interventions, which can also improve the comprehensiveness and effectiveness of campus interventions [6].

5. HPV virus factors, treatment methods and vaccine inoculation protection

Finally, speaking of the HPV virus, in the initial stage of infection, the patient's genital area there are tiny reddish papules, which will continue to grow larger, and there will be obvious itching. And its shape is diverse, have comb shape, cauliflower shape, and nipple shape. Second, the infected person may have abnormal leucorrhea. Unlike AIDS, HPV infection is not necessarily caused by sexual transmission, but can also be caused by poor hygiene practices in daily life. Unfortunately, there is no good treatment for HPV, only prevention. One study showed that the drug was effective in reducing symptoms of HPV infection. The researchers selected 60 HPV-infected patients and divided them into two groups on average, excluding other diseases. Through the test, it is concluded that the components of Baofu Kang suppository have the effect of promoting blood circulation, removing blood stasis, and clearing heat and detoxification, but it is easy to relapse after drug withdrawal. The experimental data are shown in the tables below [7-9].

Table 1. Comparison of the clinical efficacy between the two groups [7-9].

group	cure	Significant improvement	Take a turn for the better	Of no avail	Total effective rate
Study group(=30)	9(30.00)	12(40.00)	6(20.00)	3(10.00)	27(90.00)
Control group(=30)	7(23.33)	9(30.00)	4(13.33)	10(33.33)	20(66.67)
X price					4.812
P price					0.028

Table 2. Comparison of Treg cells, Th17 cells, and TGF- β levels before and after the two treatment groups ($x \pm s$)

group	The cells (by) Before treatment	after treatment	The 17 cells with(%) Pretreatment	after treatment	TGF- β (ngl.) pretherapy	Post-treatment
Study group(n=30)	13.52 $\pm$ 1.72	6.12 $\pm$ 0.69	10.15 $\pm$ 183	5.09 $\pm$ 65	44.92 $\pm$ 6.32	19.21 $\pm$ 2.21
Control group(n=30)	1361 $\pm$ 168	7.01 $\pm$ 152	10.21 $\pm$ 152	6.11 $\pm$ 132	44.756 $\pm$ 28	21.15 $\pm$ 3.25
proce	0.205	2.920	0.147	3.797	0.105	2.704
P price	0.419	0.002	0.442	0.001	0.459	0.004
Note: Compared with that before treatment, P<0.05						

Although there are many treatments for HPV, such as microwaves, freezing, cervical circumcision, and focused ultrasound. These procedures only have a 33% negative conversion rate, so the best way to prevent HPV is to get a vaccine. The HPV vaccine is more effective to inject before sex begins, and the effect is also related to age. According to the American Cancer Society, injections are less effective in people who are too old. Vaccines for HPV are bivalent, quadrivalent, and nine-valent, and cover different types of HPV. It is important to note that it is not only women who have had sex with boys who also need the HPV vaccine to prevent transmission to their future partners and to prevent their own cancers of the mouth, throat, genitals and anus [10].

6. Conclusion

To sum up, the expression of the concepts of these three types of viruses, the effects of these three types of viruses on different age stages and how to prevent and control them accurately are all areas that need to be improved in today's society.

The virus is terrible, but as long as the methods are in place and efficient prevention and control is achieved, these problems will not become serious, and may be solved in the future.

References

- [1] Zhang J, Dai Q, Gong Z, et al. Effect of targeted prevention and control nursing on nosocomial infection of liver disease patients in infectious ward [J]. *Journal of Practical Medical Technology*. 2020, 27(12): 1720-1721
- [2] Black E, Richmond R. Prevention of cervical cancer in Sub-Saharan africa: The advantages and challenges of HPV vaccination [J]. *Vaccines*, 2018, 6(3): 61.
- [3] Li Y, Cui W, Guo X, et al. Study on AIDS prevention intervention strategies among young students who have sex with men [J]. *Chinese School Health*, 2020, 12: 1907-1911.
- [4] Fu H. Clinical effect of Baofukang Supposition combined with recombinant human interferon $\alpha 2b$ vaginal effervescent capsule on cervical human papillomavirus infection [J]. *China Minkang Medicine*. 2021, 1: 22-24.
- [5] Timbang M R, Sim M W, Bewley A F, et al. HPV-related oropharyngeal cancer: A review on burden of the disease and opportunities for prevention and early detection [J]. *Human Vaccines & Immunotherapeutics*. 2019, 15(7-8): 1920–1928.
- [6] Shanmugasundaram S, You J. Targeting persistent human papillomavirus infection [J]. *Viruses*, 2017, 9(8): 229.
- [7] Chelimo C, Wouldes T A, Cameron L D, et al. Risk factors for and prevention of human papillomaviruses (HPV), genital warts and cervical cancer [J]. *Journal of Infection*. 2013, 66(3): 207–217.
- [8] Zeng Y, Duan Xi, Zhang Y, et al. The research progress of prevention and treatment of cervical cancer HPV vaccine [J]. *Inner Mongolia Medical Journal*, 2019, 3: 274-275.
- [9] Wang R, Pan W, Jin L, et al. Human papillomavirus vaccine against cervical cancer: Opportunity and challenge [J]. *Cancer Letters*, 471, 2020: 88–102.
- [10] Vorsters A, Bosch F X, Poljak M, et al. HPV prevention and control-the way forward [J]. *Preventive Medicine*, 2022, 156: 106960.