https://doi.org/10.5272/jimab.2022284.4688

Journal of IMAB
ISSN: 1312-773X
https://www.journal-imab-bg.org

Journal of IMAB - *Annual Proceeding (Scientific Papers).* 2022 Oct-Dec;28(4)

Original article

PRE-EXPOSURE PROPHYLAXIS (PREP) OF HIV INFECTION – A CRUCIAL TOOL FOR REDUCING THE BURDEN UPON THE PUBLIC HEALTH

Ivaylo Pakov[1,2], Elena Birindzhieva[2], Ivva Philipova[3], Kalina Terzieva[1], Galya Gancheva[1]

1) Department of Infectious Diseases, Epidemiology, Parasitology and Tropical Medicine, Faculty of Public Health, Medical University-Pleven, Bulgaria.
2) Checkpoint Sofia – Centre for Sexual Health, Sofia, Bulgaria
3) National Center of Infectious and Parasitic Diseases, Sofia, Bulgaria.

ABSTRACT:

HIV is a major global public health problem.The increased access to effective prevention, diagnosis and treatment transformed HIV-infection intoa manageable chronic health condition.Our **purpose** was to assess the effectiveness of oral pre-exposure prophylaxis (PrEP) of HIV-infection.

Material and Methods: CheckPoint Sofia (former Sexual Health Centre – Sofia) is a medical center for consultations, prevention, diagnosis and treatment of sexually transmitted infections (STI's) and HIV/AIDS. A retrospective study was conducted on 410 consulted males (HIV-seronegative) (October 2020 to August 2022).

Results: The mean age was 32±7.6 years (18-57 years) with prevalent ages <30 and 30-40 years (42% and 47%, respectively); Bulgarian citizens 90%, MSM (97%). The clients' profile revealed active sporting (38%), past STI's (26%), vaccinated for HBV (54%). No one of the subjects had chronic kidney disease and mandatory investigations of renal functions at starting of PrEP revealed mean levels of urea and creatinine 4.9±1.42 mmol/L and 78±18.2 μmol/L, respectively. On demand regimen (2+1+1 tablets) of PrEP was preferred at 91% and 15% switched to everyday receiving before an increased risk. After starting of PrEP, 55% of the subjects were tested voluntary and no one was positive for HIV, HBV, and HCV. The once reported side effect was transitory diarrhea (in 5%) after the start of PrEP. It is notable that the increased STI's (syphilis, chlamydia and gonorrhea – 10%, 6% and 5%, respectively) – fact in accordance with global trends.

Conclusion: PrEP is an effective prevention of HIV infection and deserves budgetary finance. The increase of STI's requires concrete preventive implementations.

Keywords: HIV, PrEP, STI's,

INTRODUCTION

HIV is a major global public health issue with 36.3 million deaths so far [1].The increased access to effective prevention, diagnosis and treatment transformed HIV infection intoa manageable chronic health condition.The new proposed global 95–95–95 targets set by Joint United Nations Programme on HIV/AIDS (UNAIDS), requires efforts to avoid increasing HIV infections due to HIV service disruptions during COVID-19, and the slowing public health response to HIV. The updated UNAIDS targets for 2025 aim for 95% of those living with HIV to know their status, 95% of those who know their status to be on treatment and 95% of those on treatment to be virally suppressed. While the previous 90-90-90 targets for 2020 were met by some countries, they were not met globally. The goals of fewer than 500,000 annual new infections and 500,000 AIDS-related deaths were also not in sight in 2019, with an estimated 1.7 million new infections and 600,000 AIDS-related deaths [2].

In 2014, UNAIDS launched the 95–95–95 targets. The aim was to diagnose 95% of all HIV-positive individuals, provide antiretroviral therapy (ART) for 95% of those diagnosed and achieve viral suppression for 95% of those treated by 2030 [3] Significant progress has been made in controlling the HIV epidemic in the past 20 years, with substantial declines in incidence[4]. Despite successes in some regions, many countries are still falling behind UNAIDS targets [5] and only 67% of people with HIV globally were accessing treatment in 2019. Approximately 690 000 people died from HIV-related illnesses and 1.7 million people became newly infected with HIV in 2019 [5, 6].

PrEP is an HIV preventive intervention which involves the pre-exposure use of daily (or event-based) ARTs [tenofovirdisoproxilfumurate (TDF) and emtricitabine (FTC)] to reduce the risk of HIV acquisition if exposed [7]. Our **purpose** was to assess the effectiveness of PrEP of HIV-infection.

MATERIAL AND METHODS

CheckPoint Sofia (former Sexual Health Centre – Sofia) is a medical center for consultations, prevention, diagnosis and treatment of sexually transmitted infections (STI's) and HIV/AIDS. A retrospective study was conducted on 410

males (seronegative for HIV) consulted from October 2020 to August 2022.

RESULTS

The age distribution revealed that the mean age of the subjects was 32±7.6 years (18-57 years; median age was 33 years) with prevalent ages <30 and 30-40 years (41.95% and 47.07%, respectively) (Figure 1). Bulgarian citizens were 369 (90%) and 41 (10%) were foreign citizens temporarily living in Bulgaria.

Fig. 1. Age distribution (number and percentage of the subjects)

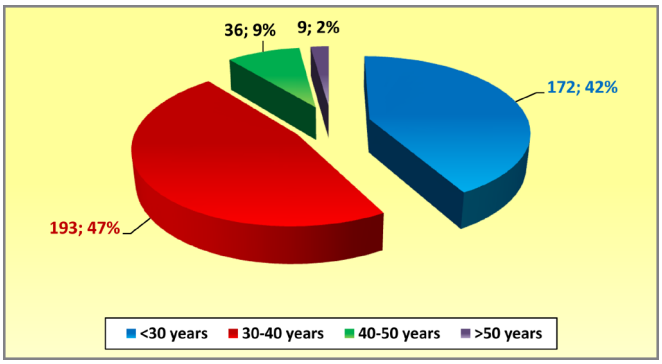
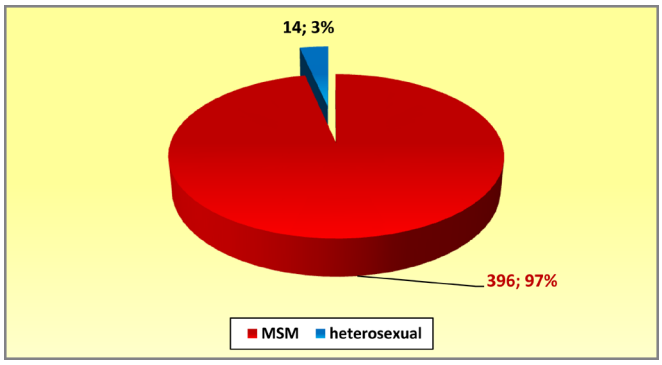


Fig. 2. Sexual behavior (number and the subjects)



Characteristic of the sexual behavior revealed that 396 of the subjects (96.58%) were men who have sex with men (MSM) (Figure 2).

The clients' profile revealed 156 active sporting men (38.05%), receiving only nutrients and vitamins. One hundred and two (24.88%) received recreational drug substances such as marihuana,cocaine, amphetamines and ecstasy – 3,4-Methyl enedioxy methamphetamine (MDMA) once monthly, and forty (9.76%) – once weekly. One hundred and seven subjects (26.10%) reported past sexually transmitted infections (STI's). Two hundred and twenty one of the subjects were vaccinated for HBV (53.90%) including 164 young men up to 29 years of age (40.00%) mandatory immunized according to the National Immunizations Schedule of Bulgaria and the remainder 57 (14.00%) voluntary immunized, preferably by combined anti-A, anti-B vaccine.

Three hundred and thirty two of the subjects (80.98%) had not reported any past diseases or co-morbidities.

No one of the subjects had chronic kidney disease. Sixteen (3.90%) reported nephrolithiasis. The mandatory investigations of renal functions at starting of PrEP had found mean levels of urea and creatinine 4.9±1.42 mmol/L (range 2.8 – 7.4 mmol/L) and 78±18.2 μmol/L (range 51 – 130 μmol/l), respectively.

There are two regimens for PrEP – on demand (evidence-based) and every day. On demand regimen includes two tablets, taken a minimum of 2 h to a maximum of 24 h before risky sexual contact, followed by 1 tablet 24 h after the first intake and another 1 tablet 48 h after the first intake (4 tablets in total). This schedule was preferred by 373 subjects (90.98%) and 62 (15.12%) switched to everyday receiving before an increased risk. Thirty seven (9.02%) received PrEP constantly one tablet daily (every day schedule). After starting of PrEP, 226 of the subjects (55.12%) were tested voluntary and no one of them was positive for HIV, HBV, and HCV. The reported side effects were mild nausea and transitory diarrhea in 21 subjects (5.12%) within two weeks period after the start of PrEP.

It is notable the increased STI's such as syphilis, chlamydia and rectal gonorrhea – at 42 (10.24%), 23 (5.61%) and 22 (5.27%) of the subjects, respectively. Mixt infection (gonorrhea and chlamydia) was confirmed at 2 (0.49%). Thirty three of the patients with syphilis (78.57%) were in the initial phase of the disease. They received appropriate treatment and were followed up. Due to the increased antibiotic resistance, the therapy was initiated after an antibiogramof all of the patients. Blood samples for TPHA/RPR and quantitative tests for *Treponemapallidum* were investigated. Real-time polymerase chain reaction (PCR) of samples of urine or urethral secrete in patients with chlamydia was performed atthe National Center of Infectious and Parasitic Diseases (NCIPD) – Sofia.

DISCUSSION

In 2016, the United Nations General Assembly achieved a consensus that a fast-track response requires ending AIDS by 2030. Another aim was to reduce new HIV infections to fewer than 500,000 annually by 2020 worldwide. The response is through continued progress towards the 90–90–90 target (by 2020, 90% of all people living with HIV will know their HIV status, 90% of those diagnosed will receive ART and 90% will have viral suppression). Another tool for the achievement of this strategic goal was a focus on the people-centred implementation of the five prevention pillars. These pillars are prevention approaches including programmes for human rights, sexual education and economic empowerment to women, condom programmes, voluntary medical male circumcision, and the use of PrEP [8].

During the last years, there are notable breakthroughs in the prevention of new HIV infections [5]. But the transmission of HIV among MSM remains a serious challenge. The reduction of the HIV burden among this population is important to ending the HIV epidemic. Globally, MSM are estimated to be at almost twenty times greater risk of acquiring HIV compared to the general population [8]. ART alone is not enough to eliminate the HIV epidemic. PrEP is an HIV preventive intervention which involves a dailyuse (or event-based) ARTs (as was mentioned above tenofovir disoproxil

fumurate and emtricitabine) to reduce the risk of HIV acquisition after exposure [7, 8]. PrEP is with low toxicity. It is effective (especially when the adherence is high) among high risk groups such as MSM. PrEP is an integral tool in the effective strengthening of a combined HIV prevention programme among MSM, which includes the use of condoms, voluntary HIV testing and counselling services, and HIV treatment as prevention. Based on these facts, WHO and UNAIDS have recommended PrEP implementation for populations at the highest risk of HIV [9].

Regulatory approval of PrEP in recent years has changed international research activity towards PrEP demonstration projects. The aim of the projects is to provide information about cultural specificities and MSM population variability in the acceptance of PrEP, stigma associated with HIV and interactions with healthcare workers, understanding of adherence, the impact on sexual behaviour, and the development of drug resistance [8].

To date, the existing literature for PrEP has focused on knowledge and willingness to its usage. Implementation trials are being carried out, but there is a need for further evidence to identify suitable approaches to service delivery for PrEP. It is necessary to concretize how PrEP can optimally be involved in existing HIV prevention programmes for MSM, in order to create an effective regimen and efficient model of service delivery. An important aspect of PrEP programs is how the services and healthcare providers have been communicated to MSM. This will ensure the integration of PrEP into healthcare settings and finally a global change in attitudes and behaviour [10].

For a period of 1 year and 10 months, 410 men started PrEP, after a free anonymous consultation, according to the needs and requirements of the patients – on site or online, using the optimized Internet platform of Checkpoint-Sofia. The preferred and more widespread regimen for taking PrEP is on demand (2+1+1 tablet), with 97% of users being from the group of MSM, mostly up to 40 years of age. The gradually increasing number of foreign citizens seeking counseling is also impressive.

After starting PrEP, 55% of switched patients were voluntarily followed up within 3 months to 1 year after the first consultation, missing patients with impaired renal function, missing newly diagnosed HIV and acute viral hepatitis, despite unsatisfactory immunization coverage against viral hepatitis B (about 54%).

A serious problem among those taking PrEP is the increased number of other STI's, especially syphilis (10% newly infected), a fact in accordance with the global trends, requiring additional preventive measures.

The PrEP with an oral tablet is a hopeful tool for the achievement of the strategic goal. PrEP is not yet funded by the budget in Bulgaria. The lack of new HIV infections during 22 months is evidence of the positive effect of this preventive implementation about HIV but not for STI's.

In conclusion, PrEP is an effective prevention of HIV infection and deserves budgetary finance. The increase of STI's requires concrete preventive implementations.

REFERENCES:

1. Fact Sheet 2022. Global HIV statistics. UNAIDS. [Internet]

2. Samuel K. Getting to 95-95-95: global use of HIV generics would result in large reductions in spending, new infections and deaths. NAM AIDSmap. 9 July 2021. [Internet]

3. Understanding Fast-Track: accelerating action to end the AIDS epidemic by 2030. UNAIDS. June2015. [Internet]

4. Girum T, Wasie A, Worku A. Trend of HIV/AIDS for the last 26 years and predicting achievement of the 90-90-90 HIV prevention targets by 2020 in Ethiopia: a time series analysis. *BMC Infect Dis.* 2018 Jul 11;18(1):320. [PubMed]

5. 2020 Global AIDS update. Seizing the moment. Tackling entrenched inequalities to end epidemics. UNAIDS. 6 July 2020. [Internet]

6. Heath K, Levi J, Hill A. The Joint United Nations Programme on HIV/AIDS 95-95-95 targets: worldwide clinical and cost benefits of generic manufacture. *AIDS.* 2021 Dec 15; 35(Suppl 2):S197-S203. [PubMed]

7. Davies O, Ustianowski A, Fox J. Pre-exposure Prophylaxis for HIV Prevention: Why, What, Who and How. *Infect Dis Ther.* 2016 Dec;5(4):407-416. [PubMed]

8. Guidance on Pre-exposure Oral Prophylaxis (PrEP) for Serodiscordant Couples, Men and Transgender Women Who Have Sex with Men at High Risk of HIV: Recommendations for Use in the Context of Demonstration Projects. WHO. Jul. 2012. [PubMed]

9. Global HIV & AIDS statistics - fact sheet. UNAIDS. 2021. [Internet]

10. Hillis A, Germain J, Hope V, McVeigh J, Van Hout MC. Pre-exposure Prophylaxis (PrEP) for HIV Prevention Among Men Who Have Sex with Men (MSM): A Scoping Review on PrEP Service Delivery and Programming. *AIDS Behav.* 2020 Nov;24(11): 3056-3070. [PubMed]

Please cite this article as: Pakov I, Birindzhieva E, Philipova I, Terzieva K, Gancheva G. Pre-Exposure Prophylaxis (PrEP) of HIV Infection – a Crucial Tool for Reducing the Burden upon the Public Health. *J of IMAB.* 2022 Oct-Dec;28(4):4688-4690. DOI: https://doi.org/10.5272/jimab.2022284.4688

Received: 31/08/2022; Published online: 18/11/2022

Address for correspondence:
Ivaylo Nikolaev Pakov, Clinic of Infectious Diseases, University Hospital, 8A, Georgi Kochev Str., Pleven, Bulgaria.
E-mail: ivaylo.pakov@gmail.com