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HIV Pre-Exposure Prophylaxis (PrEP) in Clinical Settings in Western Nigeria: Are Healthcare Providers Prepared?

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Background

HIV pre-exposure prophylaxis (PrEP) can decrease HIV incidence among several high-risk populations. In order to successfully implement PrEP, healthcare providers will need to have knowledge about counselling, monitoring and drug adherence which are keys to the success of the intervention. This study was carried out to determine the awareness, practice and preparedness of healthcare professionals to prescribe PrEP in clinical settings and identify the factors associated with or encouraging its prescription. This cross-sectional study was carried out in randomly selected primary, secondary and tertiary level hospitals across four states in Western Nigeria (Ondo, Ekiti, Osun and Lagos). The target population were physicians and nurses largely involved in the antiretroviral clinics in the hospitals. Data was collected by trained volunteers and supervised by appointed supervisors by a face-to-face interview. All data were statistically analysed, using Statistical Package for the Social Sciences (SPSS) and statistical test of significance was performed with Chi-Square test. A total of 256

consenting respondents participated in the study with a mean age \pm SD of 38.52 ± 9.29 years. Gender distribution of the subjects indicated that 130 (51.6%) of them were males while 124 (48.4%) are females. A total of 89.8% of the respondents have heard about PrEP, with 54.3% of them aware of both oral and topical PrEP while only 4.3% have ever prescribed PrEP. The main factor associated with PrEP prescription was work experience ($\chi^2 = 20.815$, $df = 1$, $p = 0.001$). Work experience has lower association with PrEP prescription (OR: 0.88, 95% CI: 0.82 – 0.95). Healthcare professionals in public hospitals in Nigeria are PrEP aware and willing to prescribe, but few have actually ever done the prescription. Regular supply of drugs for pre-exposure prophylaxis purpose and addressing the potential safety issues and medication-related adverse effects will help aid the PrEP implementation effort nationwide.

Keywords: HIV, Prophylaxis, Healthcare, Nigeria, Clinical



Introduction

HIV pre-exposure prophylaxis (PrEP) can decrease HIV incidence among several high-risk populations including serodiscordant couples as well as heterosexual men and women (Baeten *et al.*, 2012; Thigpen *et al.*, 2012; Abdool Karim *et al.*, 2010; Grant *et al.*, 2010). PrEP is a biomedical intervention that requires clinical monitoring and a high level of medication adherence. In order to successfully implement PrEP, healthcare providers will need to identify individuals at high risk for HIV infection, and prescribe antiretroviral medications to those willing to have them. Knowledge about counselling, monitoring and drug adherence are keys to the success of the intervention. In 2010, the centre for the AIDS program of Research in South Africa-004 (CAPRISA-004) study demonstrated that pericoital administration of a topical vaginal gel containing the antiretroviral medication tenofovir reduced the risk of HIV acquisition by 39% among at-risk South African women, showing PrEP efficacy in humans (Abdool Karim *et al.*, 2010). Furthermore, in the same year, the pre-Exposure Prophylaxis initiative (iPrEx) study reported that daily oral administration of a fixed-dose combination tablet containing the antiretroviral medications tenofovir and emtricitabine decreased HIV incidence by 44% among high-risk men who have sex with men (Grant *et al.*, 2010). Subsequently, daily oral PrEP efficacy in preventing heterosexual HIV transmission for African men and women has been proven (Baeten *et al.*, 2012; Thigpen *et al.*, 2012). However, another study focusing on African women couldn't prove oral or topical PrEP efficacy (Van Damme *et al.*, 2012).

The outcome of a 2014 research on sub-optimal awareness and comprehension of PrEP showed that 28% of physicians felt that the PrEP pill should not be available to all at risk persons and the majority indicated that they would prescribe the pill 76% and gel 83% to the populations in which efficacy had been demonstrated. But a majority also said they would prescribe the pill (52%) and gel (53%) to uninfected individuals in serodiscordant relationships or to individuals engaged in transactional sex (56%), despite the

absence of efficacy trials restricted to the populations (Mimiaga *et al.*, 2014). An online, cross-sectional survey of generalist and HIV specialist physicians in Massachusetts demonstrated that awareness of topical and oral PrEP was high, with 80-90% of physicians reporting awareness of these modalities. More physicians indicate that they would prefer to prescribe topical PrEP (75%) as compared to oral PrEP (25%), primarily because they believed that topical PrEP might have fewer medication-related adverse effects (95%). Concerns decreasing willingness to prescribe PrEP were said to include medication toxicities (85%), potential development of drug-resistant virus (93%), limited data on PrEP efficacy (75%), potential increases in risk behaviours among PrEP users, especially as only 4% of the physicians had prescribed PrEP (White *et al.*, 2012). In another US research, on the willingness to adapt future implementation of PrEP for HIV infection, showed that knowledge about PrEP was higher among physicians compared with non-Physicians, with the majority of providers concerned about the safety, efficacy and cost of PrEP (Tripathi *et al.*, 2012). In a research work on the attitudes of pre-exposure prophylaxis for HIV prevention among Physicians in Guatemala showed that 69% of the physicians were PrEP aware, with most of them (87%) willing to prescribe PrEP especially to the various key population groups (Rose *et al.*, 2017). The aim of the study therefore was to determine the awareness, practice and preparedness of healthcare professionals to prescribe PrEP in clinical settings and identify the factors associated with or encouraging its prescription.

Research Hypothesis

- 1) Healthcare professional cadre does not significantly affect PrEP prescription.
- 2) Work experience does not significantly affect PrEP prescription.

Methods

This study is a cross-sectional study carried out at randomly selected primary, secondary and tertiary level hospitals across four states in Western Nigeria (Ondo, Ekiti, Osun & Lagos). The target population were physicians and



nurses largely involved in the antiretroviral clinics in the hospitals. A pre-tested questionnaire was administered consecutively to 256 consenting respondents through a simple random sampling. Demographic and socio-economic information obtained were included. Data was collected by trained volunteers and supervised by appointed supervisors and investigators, by a face-to-face interview using a pre-tested structured questionnaire on the awareness and practice of PrEP as well as the preferences and perceived motivators and barriers to PrEP provision, among others.

Statistical Analysis

Data was statistically analysed using Statistical Package for the Social Sciences (SPSS) for windows version 23.0 software (SPSS Inc., Chicago, IL, USA). All data were expressed as Mean \pm Standard Deviation (SD). Frequency counts were generated for all variables and statistical test of significance was performed with Chi-Square test. Significance was fixed $p \leq 0.05$.

Results

Socio-Demographic Data

A total of 256 consenting respondents participated in the study. The mean age \pm SD is 38.52 ± 9.29 years. One hundred and thirty-two (51.6%) of them are males while one hundred and twenty-four (48.4%) are females. Occupation distribution of the respondents indicated that 98 (38.3%) are Physicians while 158 (61.7%) are Nurses. Distribution based on year of experience showed that 163 (63.7%) have less than five years' experience while 93 (36.3%) have five years' experience or more.

A vast majority of the respondents (more than two-thirds) described pre-exposure prophylaxis (PrEP) as when a person at high risk for HIV take HIV medications, with the aim of reducing the risk of HIV infection or lowering the chances of getting infected with the virus. Factors such as irregular condom use, illicit drug use, incarceration, individuals not in a monogamous relationship with active HIV negative partner, individuals exchanging sex for money, men having sex with men and individuals with alcohol dependence, were all identified factors that will help identify sexually active individuals at high risk of HIV. A significant number of the respondents 207 (80.9%) would prefer to prescribe topical as against oral PrEP to eligible individuals due to perceived fewer side effects, being probably easier to use, less stigmatizing, possible better adherence and possible lesser drug resistance issues. On the question of awareness of the route of administration of PrEP, 212 (82.8%) of the respondents were aware that PrEP may be given either orally, using antiretroviral drug available for the treatment of HIV infection (tenofovir plus emtricitabine called locally *truvada*) or topically as a vaginal gel containing tenofovir. On the question of knowledge of antiretroviral-related side effects, 185 (72.3%) knew the common serious side effects of *truvada* (tenofovir plus emtricitabine) to include bone problems, liver problems, kidney problems, lactic acidosis and hepatitis B infection worsening. Meanwhile, most of the respondents (more than two-thirds) were not aware of the use government policy on the use of PrEP for HIV prevention and reported not to have the drugs for PrEP purposes.

Table I: Socio-demographic data of respondents

Variables	Frequency (%)
Age Group (years)	
< 30 years	36 (14.1)
30 - 35 years	89 (34.8)
36 - 40 years	49 (19.1)
41 - 45 years	26 (10.2)
46 - 50 years	21 (8.2)
> 50 years	35 (13.7)
Gender	
Male	132 (51.6)
Female	124 (48.4)
Professional Cadre	
Physician	98 (38.3)
Nurse	158 (61.7)
Years of experience	
Less than five years	163 (63.7)
Five years or more	93 (36.3)

Table 2 – PrEP Awareness, Experience and Preferences

Variables	Frequency (%)
Heard about PrEP	
Yes	230 (89.8)
No	26 (10.2)
Type of PrEP heard	
Oral	81 (31.6)
Topical	10 (3.9)
Both	139 (54.3)
Ever prescribed PrEP	
Yes	11 (4.3)
No	245 (95.7)
PrEP prescription preference for eligible people	
Oral	49 (19.1)
Topical	207 (80.9)
Feasibility & sustainability of PrEP uptake among eligible individuals	
Support/subsidy from government or donor organizations	211 (82.4)
Health Insurance Coverage	28 (10.9)
Community Support Initiatives	17 (6.7)



Table 3 – Chi Square Result Showing Factors Influencing Art Adherence

Variables (Hypotheses)	χ^2	df	Critical value	Decision	P-Value
Healthcare professional cadre does not have significant effect on PrEP prescription	3.13	1	3.84	Accepted	0.077
Work experience does not have significant effect on PrEP prescription	20.15	1	3.84	Rejected	0.001

The null hypothesis is rejected when the test statistic is greater than the tabled value or critical value.

Table 4 – Odd’s Ratio (Or) Table

Variables	OR	95% CI
Estimated odds that work experience does not have effect on PrEP prescription	0.88	0.82 – 0.95

Discussion

This research outcome has shown that 89.8% of the respondents have heard about PrEP, with 54.3% of them aware of both oral and topical PrEP while only 4.3% have ever prescribed PrEP. This is in agreement with a previous study reported in Massachusetts, United States of America, which showed that awareness of topical and oral PrEP was high, with 80-90% of physicians reporting awareness of the modalities (White *et al.*, 2012) while it varies from the Guatemalan study that revealed 69% of the physicians were PrEP aware (Rose *et al.*, 2017). A low prescription rate of PrEP by healthcare workers indicates the need for support from government and donor organizations, among other initiatives, as the feasibility and sustainability of PrEP uptake is only guaranteed through the availability of the drugs in the healthcare facilities as majority of them do not have the drugs for the purpose of pre-exposure prophylaxis.

The study has also shown that 80.9% of the respondents would prefer to prescribe topical as against oral PrEP to eligible individuals due to perceived fewer side effects, being probably easier to use, less stigmatizing, possible better adherence and possible lesser drug resistance issues. This is similar to a previous research outcome where it was reported that the majority

of healthcare workers indicated that they would prescribe the PrEP pill (76%) and gel (83%) to the populations in which efficacy had been demonstrated (Mimiaga *et al.*, 2014). Similarly, another study revealed that more physicians would prefer to prescribe topical PrEP (75%) as compared to oral PrEP (25%), primarily because they believed that topical PrEP might have fewer medication-related adverse effects (White *et al.*, 2012). The preference for topical against oral could be due to the fact that most of the healthcare professionals believe that adherence issues, resistance and possible side effects are associated with the oral PrEP. A majority 82.8% of the respondents being aware that PrEP may be given either orally, using antiretroviral drug available for the treatment of HIV infection (tenofovir plus emtricitabine called locally truvada) or topically as a vaginal gel containing tenofovir, is an indication that most of the healthcare professionals have the technical ability for the prescription so long it is made available in their healthcare facility for eligible persons.

The Chi Square analysis shows that healthcare professional cadre does not have significant effect on PrEP prescription ($p = 0.077$) as observed by the acceptance of the null hypothesis, which may be a result of the fact that having the knowledge or requisite training

regarding its prescription is independent of cadre. This however differs from the outcome of a United States research work that showed that knowledge about PrEP was higher among physicians compared with non-physicians (Tripathi *et al.*, 2012). The rejection of the other hypothesis indicating that work experience has significant effect on PrEP prescription ($p = 0.001$) corroborate the fact that knowledge or requisite training and experience regarding PrEP prescription is more crucial. The odd's ratio (OR) shows that work experience has lower association with PrEP prescription. This shows that healthcare professional's work experience does not seriously or necessarily have impact on the prescription on pre-exposure prophylaxis (PrEP).

Conclusion

Healthcare professionals in public hospitals in Nigeria are PrEP aware and willing to prescribe, but few have actually ever done the prescription. Regular supply of drugs for pre-exposure prophylaxis purpose by necessary government agencies and addressing the potential safety issues and medication-related adverse effects will facilitate the successful implementation of PrEP nationwide.

Conflict of Interest

The authors declare that there is no conflict of interest.

References

- Abdool, K. Q., Abdool Karim, S. S., Frohlich, J. A., Grobler, A. C., Baxter, C., Mansoor, L. E., Kharsany, A. B., Sibeko, S., Mlisana, K. P., Omar, Z., Gengiah, T. N., Maarschalk, S., Arulappan, N., Mlotshwa, M., Morris, L., Taylor, D. and Group, T. (2010). Effectiveness and safety of tenofovir gel, an antiretroviral microbicide, for the prevention of HIV infection in women. *Science*; **333(6042)**: 1168 – 1174.
- Baeten, J. M., Donnell, D., Ndase, P., et al. (2012). Antiretroviral prophylaxis for HIV prevention in heterosexual men and women. *The New England Journal of Medicine*; **367(5)**: 399 – 410.
- Grant, R. M., Lama, J. R., Anderson, P. L., et al. (2010). Preexposure chemoprophylaxis for HIV prevention in men who have sex with men. *The New England Journal of Medicine*; **363(27)**: 2587–2599.
- Mimiaga, M. J., White, J. M., Krakower, D. S., Biello, K. B. and Mayer, K. H. (2014). Suboptimal awareness and comprehension of published preexposure prophylaxis efficacy results among physicians in Massachusetts. *AIDS Care*; **26(6)**: 684–693.
- Ross, I., Mejia, C., Melendez, J., Chan, P. A., Nunn, A. C., Powderly, W., Goodenberger, K., Liu, J., Mayer, K. H. and Patel, R. R. (2017). Awareness and attitudes of pre-exposure prophylaxis for HIV prevention among physicians in Guatemala: Implications for country-wide implementation. *PLoS ONE*; **12(3)**: e0173057.
- Thigpen, M.C., Kebaabetswe, P.M., Paxton, L.A., et al. (2012) 'Antiretroviral preexposure prophylaxis for heterosexual HIV transmission in Botswana', *The New England Journal of Medicine*, 367(5), 423 – 434.
- Tripathi, A., Ogbuanu, C., Monger, M., Gibson, J. J. and Duffus, W. A. (2012). Preexposure prophylaxis for HIV infection: healthcare providers' knowledge, perception, and willingness to adopt future implementation in the southern US. *Southern Medical Journal*; **105(4)**: 199 – 206.
- Van Damme, L., Corneli, A., Ahmed, K., Agot, K., Lombaard, J., Kapiga, S., Malahleha, M., Owino, F., Manongi, R., Onyango, J., Temu, L., Monedi, M. C., Mak'Oketch, P., Makanda, M., Reblin, I., Makatu, S. E., Saylor, L., Kiernan, H., Kirkendale, S., Wong, C., Grant, R., Kashuba, A., Nanda, K., Mandala, J., Fransen, K., Deese, J., Crucitti, T., Mastro, T. D. and Taylor, D.



(2012). Preexposure prophylaxis for HIV infection among African women. *The New England Journal of Medicine*; **367(5)**: 411 – 422.

White, J. M., Mimiaga, M. J., Krakower, D. S. and Mayer, K. H. (2012) ‘Evolution of

Massachusetts physician attitudes, knowledge, and experience regarding the use of antiretrovirals for HIV prevention. *AIDS Patient Care and STDs*; **26(7)**: 395 – 405.

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