



Psychosocial Aspects of HIV/AIDS

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Abstract

Research show that the HIV/AIDS spread is affected by psychosocial and cultural elements, among other reasons. Targeting the spread of the HIV both in personal and in the community level, requires preventive measures, which are using a multi-level approach. Part of this approach could rely on Social Cognitive Models (SCM) such as the Health Belief Model and Theory of Planned Behaviour in order to overcome risky behaviour.

This manuscript is observing the need to expand the use of SCM and offers to widen the understanding of the overall context of the HIV through the term of Syndemics, mainly in the Sub Saharan context. Syndemics is define as "a theoretical perspective to understand the synergistic interaction of coexisting diseases and biological and environmental factors that worsen the complex outcomes of those diseases in populations" Examining the HIV pandemic in a more cultural and psychosocial lens might contribute to the efforts conducted to reduce the spread of the HIV/AIDS worldwide.

Keywords

Syndemics; Sub Saharan Africa; Social cognitive model; Prevention; HIV

Abbreviations: AIDS: Acquired Immune Deficiency Syndrome; ART: Antiretroviral Treatment; ARV: Antiretroviral; FSW: Female Sex Workers; HAART: Highly Active Antiretroviral Treatment; HBM: Health Belief Model; HIV: Human Immunodeficiency Virus; MSM: Men who have Sex with Men; Prep: Pre-Exposure Prophylaxis; SAVA: Substance Abuse, Violence And HIV/AIDS; SCM: Social Cognitive Models; TB: Tuberculosis; TPB: Theory Of Planned Behavior

Introduction

Human immunodeficiency virus (HIV), causes Acquired Immune deficiency Syndrome (AIDS). It is one of the mortal diseases known to the humankind. The estimated number of people living with HIV is 37.7 Million worldwide and about 25.5 Million estimated in Sub Sahara alone (SSA). Among them, 34.9 are adults and 17.8 from this population are women and 1.8 Millions are children under 15 years old. During 2015, it is estimated that 2.1 Million people are newly infected. From the 2.1 million newly infected, 1.4 million are in Africa alone. Among the global HIV/AIDS related deaths which were 1.1 million during 2015, 800,000 of them are from Africa. When looking at the prevalence of HIV among adults aged 15 to 49 globally,

the percentage is 0.8%, while Africa holds 4.4% of prevalence in the same population. [1,2]. It is evident that Sub-Sahara Africa carries the heaviest burden of the HIV. Two genetically distinct species of HIV exist- HIV-1 and HIV-2, which tough are differ in the epidemiology, they are similar in terms of pathogenicity and both can lead to AIDS [3,4]. The importance of the distinction when it comes to the SSA context is the fact that HIV-2 is relatively endemic to West Africa alone, with other specific and limited geographical regions outside of the continent [3]. HIV-1 on the other hand is considered more of pandemic, thus receives more attention from the scientific community than the HIV-2 [5]. HIV-1 is further subdivided in to strains, which are each representing different pathogenesis speeds and risk factors [6]. Pathogenicity of HIV has been observed with infections such as Tuberculosis (TB), Hepatitis B and C, and parasitic like Malaria and Leishmania, some of which are spread through out the SSA [7-13]. Moreover, co-infection with more than one strain of HIV is possible too. The new combination of the different strains can lead to viral recombination which than new recombinant form and be passed on to another individual [14,15]. This phenomenon was reported in several geographical areas in different continents alongside with reports about coinfection with two distinct main groups of HIV (i.e. group M and group O) [14]. In cases of co-infections, it is reported that frequently the CD4⁺ T-cells count is declining along with viral load proliferation [14-16]. In cases of coinfection or super-infections, the virus might become drug-resistant [16]. An important progress was achieved in the recent years as it comes to developing medicines to address HIV/AIDS. The Antiretroviral Treatment (ART) was the first treatment for HIV. However, the virus formed drug-resistant recombinants [17]. This formation required from researcher to look for a variety of potentials treatments. In the last decade, developing of combinations of antiretroviral (ARVs) being used, and referred to as Highly Active Antiretroviral Treatment (HAART) [18,19]. The medicines that were developed targeted a variety of cellular mechanism of the virus. Some of the medicines are preventing the replication of the virus through interrupting the process of Reverse Transcriptase [18,20,21], some target the protease enzyme in the viral bundle of HIV, and some work by preventing the fusion and entry to target cell membranes [18,22]. A further development in the research found that if a certain combination of medicines is being taken (TRUVADA and TENOFIVIR) before exposure, then the risk of being infected is reduced. These medicines are used in treatment but recent researches found these medicines effective as a Pre-Exposure Prophylaxis (PrEP) as well [23-27]. Its effectiveness depends on the adherence of individuals within population under risk such as Sero-Concordant couples, Men who have Sex with Men (MSM) or Female Sex Workers (FSW). Observing populations under risk such as the above, and observing unto population under risk- mainly in The Sub Sahara, researchers are facing communal and sociological challenges. These challenges, which are derived from the psychosocial aspect of the disease, are opportunities if constructed correctly.

Psychosocial and Cultural Aspects of HIV

Regardless the importance of developing medical response to the HIV, it is also important to elaborate on its uniqueness when it comes to the psychosocial and cultural aspects. Sexual intercourse and gender related issues are subject to sociological context. This context

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requires a shift from an individual treatment to more of sociological structural approach. Thus, observing the human interaction in social groups as a major consideration when it comes to conceptualize the social drivers in the HIV/AIDS context. Though, the impact of values, norms, institutions, network and culture is difficult to measure, it is highly evident that there is an importance to cope with applicability and manifestations of these terms in order to strive for reducing the infections. These sociological terms are applied within poverty, gender inequality and human rights violation, which increase the vulnerability to HIV infection [28-30]. Gender inequality for instance is defined as one of the drivers for HIV epidemic. Yet, past studies, show that gender inequality alone cannot be defined as a direct driver of HIV infection. Instead, ways in which gender and sexuality dynamics operate in conjunction with social issues such as poverty or accessibility to education can produce vulnerability to HIV infection [31-35]. The sociological and cultural context is often given and though influencing the vulnerability to HIV infection, it is influencing other aspects of individual's life. Having said that, the context is sometimes creates a negative stigma about People Living with HIV (PLHIV). The negative stigma [36] can influence the actual selfness of the host quality of life by depression, life satisfaction [37] or by social behavior of the host's social and communal circle. The negative stigma among the social community might create discrimination [38, 39] loss of social support, social exclusion and negative labeling [40] of the host. It influences the access to human rights, [41] or to health service [42,43]. Beside these consequences, the stigma influences the behavior of the host related directly to the AIDS, by reduction in adherence to take ARV medication [44] or to delays in seeking care [45-47]. The way HIV is conceptualized might reach AIDS denialism or AIDS conspiracy beliefs [48]. Regardless the disease itself, the main method of infection (i.e. sexual intercourse) is a cultural and sociological issue. Unprotected sexual intercourse, which include vaginal, anal or oral penetration accounts for 75%-85% of HIV infection in adults [49]. Studies show that persistent condom use reduces the risk of contracting HIV [50-53] hence, this is a major way for preventing HIV, worldwide. Yet, negative stigma is related to condom use to and not only to the HIV. The negative stigma of condom use is exemplified through studies that show that condom use is associated with promiscuity [54], and that condoms are impregnated with HIV or cause cancer [55]. Other social factors reflect environmental pressures, which can reduce condom use. For example, African Caribbean Black women reported marital infidelity, trust in partner, cultural and religious attitudes as factors that discourage condom use [56]. In addition, one study in Mumbai, India, found that the lack of privacy in stores and social stigma, were most frequently indicated as social barriers for condom use [57]. Further studies observing the negative social stigma and attitudes towards people living with HIV, resulted in lower condom use among 1979 women in Nigeria [58]. Concluding all the above, though medical treatment is crucial to cure the disease, it is apparent that the treatment should take under consideration preventive measures and an approach that examines the individual within the sociological context. The individual behavior is the key component to prevent and reduce the infection in accordance of the risk factors mentioned above.

Interventions

In the recent years, researchers are conducting researches in order to try to understand better what are the social barriers, which influencing healthy sex behaviour. These researches mapping barriers for condom use and incentives to do so. Lack of knowledge or access

to condoms were related to low adherence of condom use, but studies offer social barriers as a major component in encouraging for condom use [58] regardless knowledge. In light with these findings, researchers are offering adjusted interventions to try to overcome the multi-level complexities of the pandemic derived from the biological and the sociological characteristics. A variety of models and programs targeting the complexities of the disease were developed. Some of the programs follow the line in which individual interventions should take under consideration the sociological context. Thus, targeting sociological issues. Few theories were developed combining health behaviour in relation to sociological context. Moreover, these theories perceived the individual's barriers in terms of cognition, and by that adding another layer to the analysis of one's behaviour. Alongside individual interventions, community based interventions were combining activities and peer educators added tools to target the health behaviour in the community level. Using the community as a source of a solution is a breakthrough in situations where the community used to be a barrier. The strength and the importance of the community in the individual's life is stronger in traditional societies. As it comes to condom use, two important social cognitive models (SCM) have been tested. The health belief model (HBM) [59] and the theory of planned behavior (TPB) [60]. The HBM discuss perceived susceptibility and perceived severity of a disease. It is also discuss people's barriers for adopting preventative behaviors. The model offers a prediction of one's behavior in light of the perceptions of benefiting from this behavior. Analyzing these perceptions and targeting it, might lead eventually to adopt healthy behavior. The TPB analyzes attitudes about health behaviors and perceived social norms. Moreover, it analyzes perceived behavioral control, which eventually may lead to adoption of a health behavior. These social-cognitive models represent human control and self-regulation mechanisms, which involve expectations about the potential outcomes resulting from performing certain behaviour [61]. Few studies were conducted using these models in related to condom use. The main findings suggest that using components from these models may add an important tool to researchers as approaching to conduct interventions [62,63]. Unfolding all the above, it is suggested to strive to conceptualize the disease as a medical challenge, but also as a sociological one. The initial technical preventive required measure is clear, yet global efforts have reached a limited proven success. The limited success is resulted from a variety of reasons. One of them might be resulted from the fact that the science offered initially mainly treatment and not evidence based preventive behavioral measures in the Sub-Saharan context. Moreover, the main scientific efforts were conducted in developed societies, thus not always connected to the local challenges communities under risk are facing.

The Syndemics

An optional approach of conceptualizing the framework of which researchers may use in related to the HIV within its sociological context is the syndemics. Syndemics is defined as "a syndemics framework examines the health consequences of identifiable disease interactions and the social, environmental, or economic factors that promote such interaction and worsen disease. A conceptual framework for understanding diseases or health conditions that arise in populations and that are exacerbated by the social, economic, environmental, and political milieu in which a population is immersed" [64]. Further definitions and explanations refer to it as "a theoretical perspective to understand the synergistic interaction

of coexisting diseases and biological and environmental factors that worsen the complex outcomes of those diseases in populations” [65]. And it claims to “improves on conventional frameworks in both theoretical and practical terms by illuminating how macro-level social factors promote disease clustering at the population level and impact disease pathologies at the individual level” [66]. Observing the nature of the HIV when it comes to coinfections with other diseases such as Hepatitis and TB and in light of the presented above, it is reasonable to offer syndemics as a framework for analyzing the morbidity and the infection by the virus [67]. Conceptualizing the HIV/AIDS within the syndemics approach was previously discussed in a study such as Meyer et al., [68] who reviewed literature of Substance Abuse, Violence and HIV/AIDS (SAVA) among women. Hence, though it is not new to the literature, we are offering to widen the use of this approach in order to define strategies for recognizing vulnerabilities, so as to understand how vulnerable are consigning to their environment. These strategies and better understanding will enable researchers to expand the knowledge for more effective interventions.

References

1. AIDS by the numbers (2016) UNAIDS Joint United Nations Programme on HIV/AIDS
2. Mental health related activities (2016) World Health Organization.
3. Levy JA (2006) HIV pathogenesis: Knowledge gained after two decades of research. *Adv Dent Res* 19: 10-16.
4. Lewthwaite P, Wilkins E (2005) Natural history of HIV/AIDS. *Medicine* 33: 10-13.
5. Reeves JD, Doms RW (2002) Human immunodeficiency virus type 2. *J Gen Virol* 83: 1253-1265.
6. Spira S, Wainberg MA, Loemba H, Turner D, Brenner BG (2003) Impact of clade diversity on HIV-1 virulence, antiretroviral drug sensitivity and resistance. *J Antimicrob Chemother* 51: 229-240.
7. Brites C, Sampaio J, Oliveira A (2009) HIV/Human T-cell Lymphotropic Virus coinfection revisited: Impact on AIDS progression. *AIDS Rev* 11: 8-16.
8. Djoba Siawaya JF, Ruhwald M, Eugen-Olsen J, Walz G (2007) Correlates for disease progression and prognosis during concurrent HIV/TB infection. *Int J Infect Dis* 11: 289-299.
9. Nikolopoulos GK, Paraskeris D, Hatzitheodorou E, Moschidis Z, Sypsa V et al. (2009) Impact of hepatitis B virus infection on the progression of AIDS, and mortality in HIV-infected individuals: A cohort study and meta-analysis. *Clin Infect Dis* 48: 1763-1771.
10. Petrovic LM (2007) HIV/HCV co-infection: Histopathological findings, natural history, fibrosis, and impact on antiretroviral treatment: A review article. *Liver Int* 27: 598-606.
11. Rénia L, Potter SM (2006) Co-infection of malaria with HIV an immunological perspective. *Parasite Immunol* 28: 589-595.
12. Soriano V, Vispo E, Labarga P, Medrano J, Barreiro P (2010) Viral hepatitis and HIV co-infection. *Antivir Res* 85: 303-315.
13. Talaat KR, Kumarasamy N, Swaminathan S, Gopinath R, Nutman TB (2008) Filarial/Human Immunodeficiency Virus coinfection in urban Southern India. *Am J Trop Med Hyg* 79: 558-560.
14. Blackard JT, Cohen D, Mayer KH (2002) Human Immunodeficiency Virus superinfection and recombination: Current state of knowledge and potential clinical consequences. *Clin Infect Dis* 34: 1108-1114.
15. Smith DM, Richman DD, Little SJ (2005). HIV superinfection. *J Infect Dis*, 192: 438-444.
16. Van der Kuyl A, Cornelissen M (2007) Identifying HIV-1 dual infections. *Retrovirology* 4: 67.
17. Paredes R, Clotet B (2010) Clinical management of HIV-1 resistance. *Antivir Res* 85: 245-265.
18. Harris A, Bolus NE (2008) HIV/AIDS: An update. *Radiologic Technology* 79: 243-252.
19. Simon V, Ho DD, Karim QA (2006) HIV/AIDS epidemiology, pathogenesis, prevention and treatment. *Lancet* 368: 489-500.
20. De Clercq E (2010) Antiretroviral drugs. *Curr Opin Pharmacol* 10: 1-9.
21. Pozniak A (2008) Tenofovir: What have over 1 million years of patient experience taught us? *Int J Clin Pract* 62: 1285-1293.
22. Orsega S (2007) Treatment of adult HIV infection. *J Nurse Pract* 3: 612-624.
23. Naswa S, Marfatia YS (2011) Pre-exposure prophylaxis of HIV. *Indian J Sex Transm Dis* 32: 1-8.
24. Murnane PM, Brown ER, Donnell D, Coley RY, Mugo N, et al. (2015) Estimating efficacy in a randomized trial with product nonadherence: application of multiple methods to a trial of pre-exposure prophylaxis for HIV prevention. *Am J Epidemiol* 182: 848-856.
25. Cohen SE, Vittinghoff E, Bacon O, Doblecki-Lewis S, Postle BS, et al. (2015) High interest in pre-exposure prophylaxis among men who have sex with men at risk for HIV-infection: baseline data from the US PrEP demonstration project. *J Acquir Immune Defic Syndr* 68: 439.
26. Haberer JE, Bangsberg DR, Hendrix C, Celum C, Brantley J, et al. (2014) HIV protective efficacy and correlates of Tenofovir blood concentrations in a clinical trial of PrEP for HIV prevention. *J Acquir Immune Defic Syndr* 66: 340-348
27. Thomson KA, Baeten JM, Mugo NR, Bekker LG, Celum CL, et al. (2016) Tenofovir-based oral PrEP prevents HIV infection among women. *Curr Opin HIV AIDS* 11: 18-26
28. Coates TJ, Richter L, Cáceres C (2008) Behavioural strategies to reduce HIV transmission: how to make them work better. *Lancet* 372: 669-684.
29. Kurth AE, Celum C, Baeten JM, Vermund SH, Wasserheit JN (2011) Combination HIV prevention: significance, challenges, and opportunities. *Curr HIV/AIDS Rep* 8: 62-67.
30. Auerbach JD, Parkhurst JO, Cáceres CF (2011) Addressing social drivers of HIV/AIDS for the long-term response: conceptual and methodological considerations. *Glob Public Health* 6: 293-309.
31. Obermeyer C M (2006) HIV in the Middle East. *BMJ* 333: 851-854.
32. Krishnan S, Dunbar MS, Minnis AM, Medlin CA, Gerdtts CE, et al. (2008) Poverty, gender inequities, and women's risk of human immunodeficiency virus/AIDS. *Ann N Y Acad Sci* 1136: 101-110.
33. Robert RMJ (2003) Poverty and sexual risk behaviour among young people in Bamenda, Cameroon.
34. Hallman K (2005) Gendered socioeconomic conditions and HIV risk behaviours among young people in South Africa. *Afr J AIDS Res* 4: 37-50.
35. Weiser SD, Leiter K, Bangsberg DR, Butler LM, Percy-de Korte F, et al. (2007). Food insufficiency is associated with high-risk sexual behavior among women in Botswana and Swaziland. *PLoS Med* 4: e260.
36. Peitzmeier SM, Grosso A, Bowes A, Ceesay N, Baral SD (2015) Associations of stigma with negative health outcomes for people living with HIV in the Gambia: Implications for key populations. *J Acquir Immune Defic Syndr* 68: S146-S153.
37. Greeff M, Uys LR, Wantland D, Makoae L, Chirwa M, et al. (2010) Perceived HIV stigma and life satisfaction among persons living with HIV infection in five African countries: a longitudinal study. *Int J Nurs Stud* 47: 475-486.
38. Simbayi LC, Kalichman S, Strebel A, Cloete A, Henda N, et al. (2007) Internalized stigma, discrimination, and depression among men and women living with HIV/AIDS in Cape Town, South Africa. *Soc Sci Med* 64: 1823-1831.
39. Mo PK, Lau JT, Yu X, Gu J (2015) A model of associative stigma on depression and anxiety among children of HIV-infected parents in China. *AIDS and Behavior* 19: 50-59.
40. Mukolo A, Blevins M, Victor B, Vaz LM, Sidat M, et al. (2013) Correlates of social exclusion and negative labeling and devaluation of people living with HIV/AIDS in rural settings: evidence from a general household survey in Zambézia Province, Mozambique. *PLoS one* 8: e75744.
41. Kohi TW, Makoae L, Chirwa M, Holzemer WL, RenéPhetlhu D, et al. (2006) HIV and AIDS stigma violates human rights in five African countries. *Nurs Ethics* 13: 404-415.

42. Turan JM, Miller S, Bukusi EA, Sande J, Cohen CR (2008) HIV/AIDS and maternity care in Kenya: how fears of stigma and discrimination affect uptake and provision of labor and delivery services. *AIDS care* 20: 938-945.
43. Mtetwa S, Busza J, Chidiya S, Mungofa S, Cowan F (2013) "You are wasting our drugs": health service barriers to HIV treatment for sex workers in Zimbabwe. *BMC public health* 13: 698.
44. Dlamini PS, Wantland D, Makoae LN, Chirwa M, Kohi TW et al. (2009) HIV stigma and missed medications in HIV-positive people in five African countries. *AIDS Patient Care STDS* 23: 377-387.
45. Steward WT, Bharat S, Ramakrishna J, Heylen E, Ekstrand ML (2013) Stigma is associated with delays in seeking care among HIV-infected people in India. *J Int Assoc Provid AIDS Care* 12: 103-109.
46. Lifson AR, Demissie W, Tadesse A, Ketema K, May R et al. (2013) Barriers to retention in care as perceived by persons living with HIV in rural Ethiopia focus group results and recommended strategies. *J Int Assoc Provid AIDS Care* 12: 32-38.
47. Omosanya OE, Elegbede OT, Agboola SM, Isinkaye AO, Omopariola OA (2014) Effects of stigmatization/discrimination on antiretroviral therapy adherence among HIV-infected patients in a rural tertiary medical center in Nigeria. *J Int Assoc Provid AIDS Care* 13: 260-263.
48. Conserve D F, Middelkoop K, King G, Bekker LG (2016) Factors Associated with HIV Discussion and Condom Use with Sexual Partners in an Underserved Community in South Africa. *J Health Care Poor Underserved*. 27: 131-144.
49. Oguntibeju O, Van den Heever WMJ, Van Schalkwyk FE (2007) A review of the epidemiology, biology and Pathogenesis of HIV. *J of Biol Sci* 7: 1296-1304.
50. Weller SC, Davis Beaty K (2002) Condom effectiveness in reducing heterosexual HIV transmission. *Cochrane Database Syst Rev* 1: CD003255.
51. Mansergh G, Herbst JH, Mimiaga MJ, Holman J (2015) Preference for condoms, antiretroviral preexposure prophylaxis, or both methods to reduce risk for HIV acquisition among uninfected US Black and Latino MSM. *J Acquir Immune Defic Syndr* 70: 153-155.
52. Ramjee G, Abbai NS, Naidoo S (2015) Women and Sexually Transmitted Infections in Africa. *Open J Obstet Gynecol* 5: 385.
53. Smith DK, Herbst JH, Zhang X, Rose CE (2015) Condom effectiveness for HIV prevention by consistency of use among men who have sex with men in the United States. *J Acquir Immune Defic Syndr* 68: 337-344.
54. Chandran TM, Berkvens D, Chikobvu P, Nöstlinger C, Colebunders R, et al. (2012) Predictors of condom use and refusal among the population of Free State province in South Africa. *BMC public health* 12: 381.
55. Dusabe J, Mchome Z, Nnko S, Changalucha J, Obasi A (2014) "There are bugs in condoms": Tanzanian close-to-community providers' ability to offer effective adolescent reproductive health services. *J Fam Plann Reprod Health Car* 1: 1-7.
56. Baidooobonso S, Bauer GR, Speechley KN, Lawson E (2013) HIV risk perception and distribution of HIV risk among African, Caribbean and other Black people in a Canadian city: mixed methods results from the BLACCH study. *BMC Public Health* 13: 184.
57. Roth J, Satya KP, Bunch E (2001) Barriers to condom use: results from a study in Mumbai (Bombay), India. *AIDS Educ Prev* 13: 65-77.
58. Lammers J, Van WS, Willebrands D (2013) Condom use, risk perception, and HIV knowledge: a comparison across sexes in Nigeria. *HIV AIDS (Auckl)* 5: 283-293.
59. Rosenstock IM (1974) Historical origins of the Health Belief Model. *Health Educ Monogr* 2: 328-335.
60. Ajzen I, Fishbein M (1980). Understanding attitudes and predicting social behaviour. Englewood Cliffs, NJ.
61. Luszczyńska A, Schwarzer R (2005) Social cognitive theory. Predicting health behaviour 2: 127-169]
62. Eggers SM, Aarø LE, Bos AE, Mathews C, Kaaya SF, et al. (2016) Sociocognitive predictors of condom use and intentions among adolescents in three sub-saharan sites. *Arch Sex Behav* 45: 353-365.
63. Crosby RA, DiClemente RJ, Salazar LF, Wingood GM, McDermott S, et al. (2013) Predictors of consistent condom use among young African American women. *AIDS Behav* 17: 865-871.
64. Sharma A (2017) Syndemics: health in context. *The Lancet* 389: 10072
65. Hart L, Horton R (2017) Syndemics: committing to a healthier future. *The Lancet* 389: 888-889.
66. Mendenhall E, Kohrt BA, Norris SA, Ndeti D, Prabhakaran D (2017) Non-communicable disease syndemics: poverty, depression, and diabetes among low-income populations. *The Lancet* 389: 951-963.
67. Kwan CK, Ernst JD (2011) HIV and tuberculosis: a deadly human syndemic. *Clinical microbiology reviews* 24: 351-376.
68. Meyer JP, Springer SA, Altice FL (2011) Substance abuse, violence, and HIV in women: a literature review of the syndemic. *Journal of Women's Health* 20: 991-1006.

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