



Knowledge and Awareness about Recent Advances in HIV Diagnostics Among General Population - A Survey

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ABSTRACT

HIV (Human immunodeficiency virus) is a virus which cripples the immune system and causes AIDS; with no effective cure. It can be diagnosed by many techniques like HIV-Antigen/antibody test, Nucleic acid test-CD4 T Cell count, viral load (HIV RNA)-drug-resistant, complications test, tuberculosis, hepatitis B or C-STIS, Liver or kidney damage. The aim of this study was to assess the popular perception about the advances in diagnostics of HIV among the general population. An online survey with a self-structured questionnaire was prepared based on the advances in diagnostics of HIV/AIDS. A questionnaire containing 10 questions was distributed among the general population through an online survey platform. Results were analyzed using SPSS software version 2.0. 37% of them were aware of the various HIV diagnostic tests and the majority were not aware. 92% of the population believed that Antigen/antibody test can also be a diagnostic test for HIV. 69% were familiar about the recent testing methods which have the potency to diagnose p24. Based on this survey, it was concluded that the general population was well aware about the recent techniques of diagnostics used in HIV.



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INTRODUCTION

HIV a retrovirus that preferentially decimates the immune system of the human being which if diagnosed in the early stage can be effectively treated

with Anti Retroviral Therapy (ART) and may not progress to Acquired immunodeficiency syndrome which is the last stage of the disease with reduced life expectancy ([Chakraborty et al., 2014](#)). The virus can be transmitted through contact with infected bodily fluids. AIDS can be treated but can't be cured and has the potential to be a life-long condition ([Gupta and Ramani, 2016](#)). It spreads mainly by sexual transmission and from an infected mother to her infant during pregnancy, during childbirth and through breastfeeding ([Premkumar et al., 2014](#)). Within all such biological fluids, HIV can be present as infectious virus particles or virions. HIV-1 testing is primarily done using Enzyme Linked immunosorbent assay (ELISA) to detect antibodies. People who undergo ELISA with non-reactive results are considered as HIV negative, people who are reactive to ELISA are HIV-positive ([Sridharan et al., 2017](#)).

Only those who are repeatedly reactive by ELISA and positive by Indirect Fluorescent Antibody test (IFA) or Polymerase Chain Reaction (PCR) or reactive by western blot are considered HIV-positive and indicative of HIV infection. Although much less commonly available, acid testing (E.g., Viral RNA or pro-viral DNA amplification method) can also help in diagnosis (Thangaraj *et al.*, 2016). Modern HIV testing is extremely accurate, Single screening test is correct more than 99% of the time (Shree *et al.*, 2019). Recommendations of the US Centers for disease control and prevention (CDC) showed that HIV testing must start with an amino acid combination test for HIV-1 and HIV-2: Antibodies and P 24 antigen. Nucleic acid test must be carried out to detect the acute infection of HIV-1 or its absence (Krishnan *et al.*, 2018; Palati *et al.*, 2019).

Although Indirect fluorescent antibody (IFA) can be used to confirm infection in ambiguous cases, this assay is not in common usage (Thangaraj *et al.*, 2016). Non- confirmatory western blot results should be followed up a month later by retesting. Although much less commonly available, nucleic acid testing (e.g., viral RNA or proviral DNA amplification method) can also help diagnosis in certain situations. In case of low quantity specimen yielding inconclusive results; a second specimen is collected and tested (Hannah *et al.*, 2018). It is important to note that although HIV is highly virulent, transmission does not occur through sex when an HIV-positive person has a consistently undetectable viral load due to ART (Shree *et al.*, 2019). Previously it was said the chance of transmission was "very low" or "negligible" (The "Swiss Statement").

The term viral tropism refers to preferred cells which the virus usually infects (Prasanna and Gheena, 2016; Abitha and Santhanam, 2019). HIV can infect a variety of immune cells such as CD4+ T cells, macrophages, and microglial cells (Gunasekaran and Abilasha, 2016; Uma *et al.*, 2020). HIV-1 entry to macrophages and CD4+ T cells is mediated through interaction of the virion envelope glycoproteins (gp120) with the CD4 molecule on the target cells' membrane and also with chemokine co-receptors (Sarbeen and Gheena, 2016; Harrita and Santhanam, 2019). The CCR5 co-receptor is used by almost all primary HIV-1 isolates regardless of viral genetic subtype. Indeed, macrophages play a key role in several critical aspects of HIV infection (Ahad and Gheena, 2016; Sukumaran and Padavala, 2018). The main aim of this study was to assess the knowledge and awareness about the advances in diagnostics of HIV among the general population (Manohar and Abilasha, 2019; Sheriff and Santhanam, 2018).

MATERIALS AND METHODS

The self structured questionnaire was prepared to check the knowledge and awareness of the public on recent advances in diagnostics of HIV and AIDS. The questionnaire contained 10 questions. The sample size of this survey was 100. The questionnaire was reviewed and amendments were made to improve clarity of pertinent questions and eliminate ambiguous responses. The survey instrument was a structured questionnaire with both open and close ended questions. The participants did the survey voluntarily and no incentives were given to them. The study was conducted in the month of May, 2020. The study was approved by the institutional review board. Informed consent from the participants were obtained. Only completely filled online forms were included in the study. The filled responses were verified by two reviewers and the collected data was entered on the same day. The entered data was analyzed using SPSS. Descriptive analysis was performed to calculate frequencies of categorical variables.

RESULTS AND DISCUSSION

In this survey, among 100 participants 48% were male and 52% were female. 37% of the participants were aware of HIV diagnostics and 63% were not aware (Figure 1). 39% of respondents believe that HIV diagnosis can be done at an early stage and 61% disagree (Figure 2). 96% opined that they were aware of several advanced diagnostic tests (Figure 3). 92% of the population believe that a Antigen Antibody test- IgG is also a diagnostic test (Figure 4). 64% responded yes that they know rapid tests like finger prick and oral swab test the antibody only whereas 37% responded negatively (Figure 5). 61% opined that they are aware of P 24 antigen and

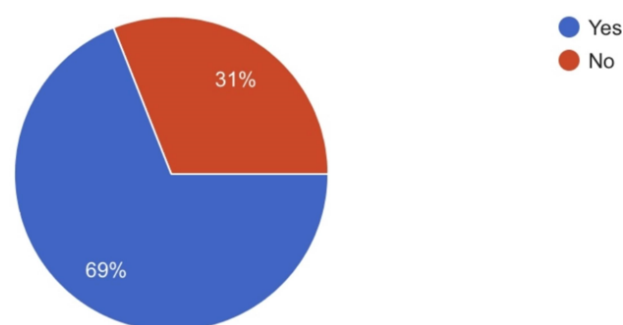


Figure 1: Awareness of HIV and causes. 69% were aware of HIV and its causes (blue) and 31% did not (red)

39% were not aware (Figure 6). 80% of the population have faith that research for further vaccines

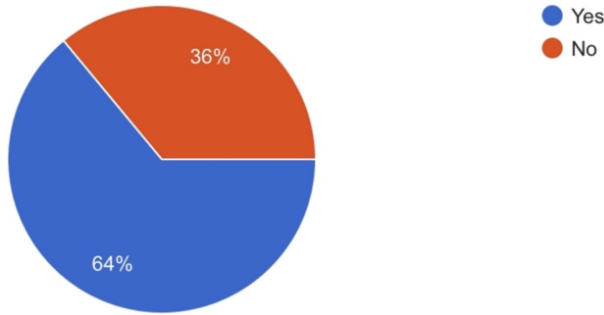


Figure 2: Early diagnosis of HIV: 64% believed that HIV can be diagnosed in early stage (blue) 36% did not (red)

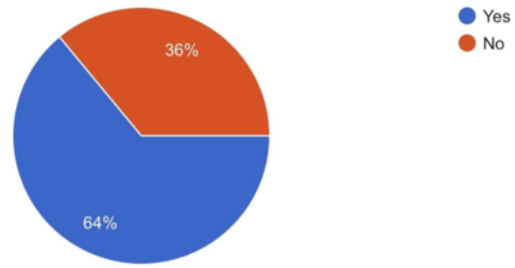


Figure 6: Awareness on the use of recombinant protein or peptides in the latest diagnostic tests: 64% were aware (blue) and 36% were not aware (red)

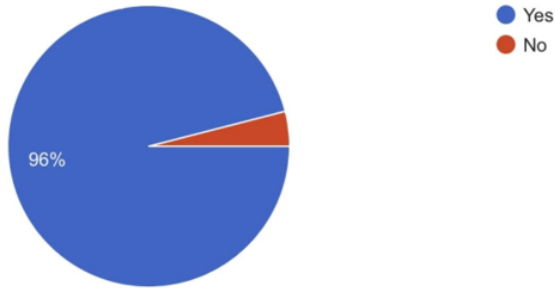


Figure 3: Awareness on several advanced diagnostic tests: 96% were aware (blue), 4% were not aware (red)

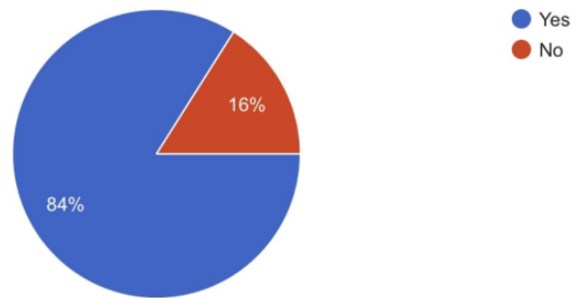


Figure 7: Awareness on rapid tests: 84% were aware (blue) and 16% were not aware (red)

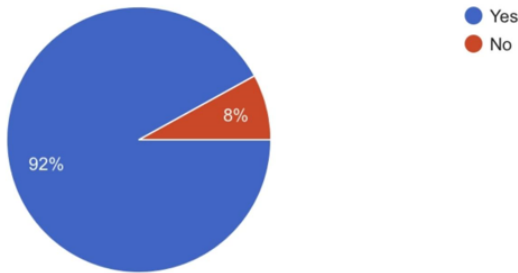


Figure 4: Awareness about Ag only tests: 92% were aware (blue) and rest were unaware (red)

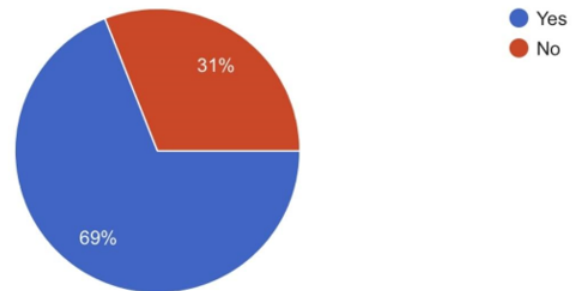


Figure 8: Awareness on the potency to diagnose p24 antigen: 69% were aware (blue) and 31% were not (red)

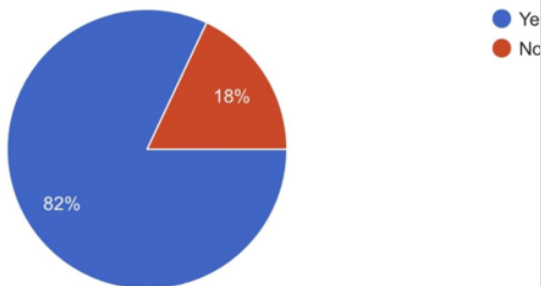


Figure 5: CDC and APHL recommendations for HIV diagnostics. 82% were aware (blue) and 18% were not aware (red)

is in full swing and 20% were unaware (Figure 7). 84% know that rapid test tests only antibody and 16% were not aware (Figure 8). 69% know that recent testing methods have the potency to diagnose p24 antigen and 31% don't know (Figure 9). 65% believed in rapid test methods and 35% didn't believe (Figure 10). Figure 11 represents the association between gender and awareness of HIV and its causes. It was found to be statistically not significant. Figure 12 represents the association between

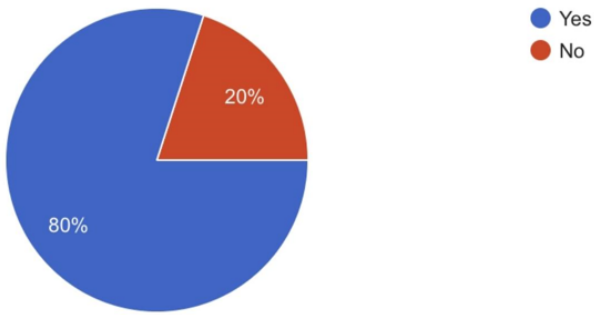


Figure 9: Awareness on research in the direction of a future vaccine: more than 80% believes so (blue) and 20% didn't believe (red)

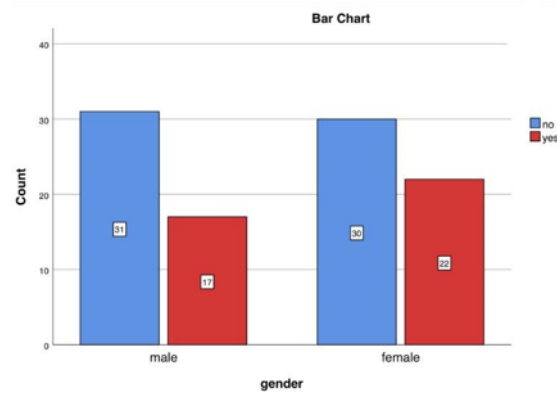


Figure 12: Bar graph representing association between gender and Knowledge on early diagnosis of HIV

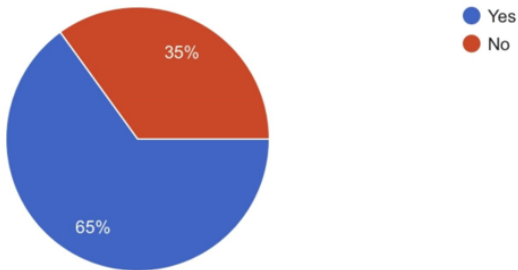


Figure 10: Discovery of rapid test methods to diagnose HIV: more than 65% believed in rapid test methods (blue) and 35% didn't believe (red)

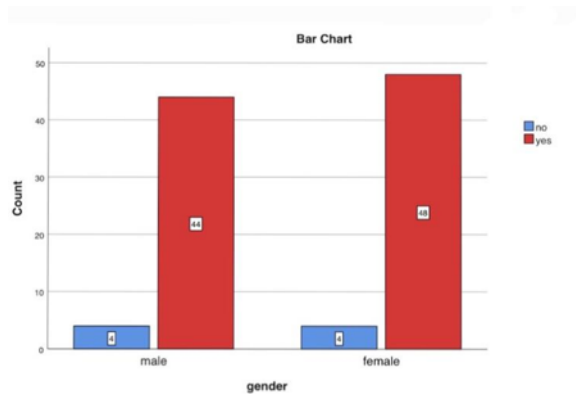


Figure 13: Bar graph representing association between gender and knowledge of various tests for HIV

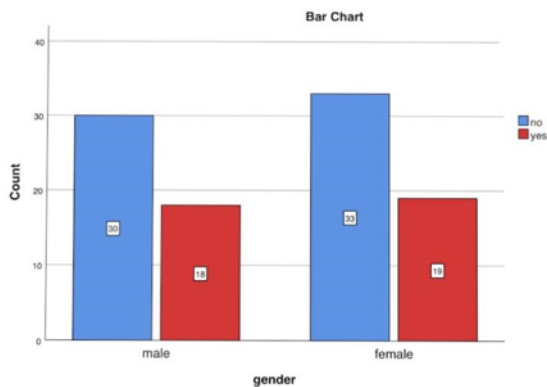


Figure 11: Bar graph representing association between gender and awareness on HIV and its causes

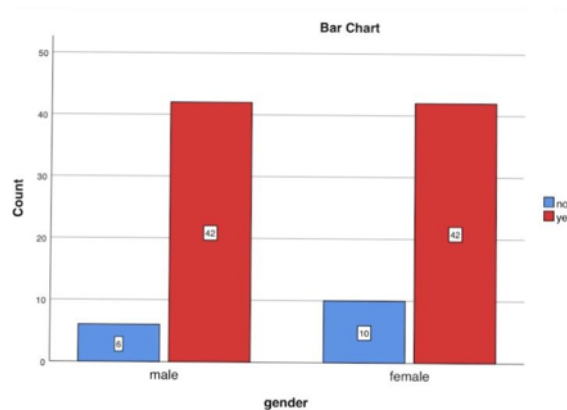


Figure 14: Bar graph representing association between gender and knowledge of Rapid tests

gender and knowledge on early diagnosis of HIV, it was found to be statistically not significant. Figure 13 represents the association between gender and awareness of various tests for HIV, it was found to be statistically not significant. Figure 14 represents the association between gender and awareness of rapid tests like finger prick and oral swab test and was found to be statistically not significant.

Literature search revealed that there are various diagnostic methods available for HIV diagnosis such as P24 antigen (Sridharan *et al.*, 2017; Hannah *et al.*, 2018), rapid test method (Shree *et al.*, 2019), recombinant tests (Chakraborty *et al.*, 2014), AG test which is also known as ELISA (Uma *et al.*, 2020; Gupta and Ramani, 2016). Even though many researches were carried on HIV diagnosis, many scientists are facing challenges to discover a curative vaccine.

In Figure 11, Pearson Chi-Square analysis-0.498, P-value-0.480, statistically not significant implying that there is no difference between the gender on awareness about HIV and its causes. In Figure 12, Pearson Chi-Square analysis-0.88, P-value was 0.347, statistically not significant implying that there is no difference between the gender and awareness of Knowledge on early diagnosis of HIV. In Figure 13, Pearson chi-square-0.730, P-Value was 0.393, statistically not significant implying that there is no difference between the gender and awareness on knowledge of various tests for HIV. In Figure 14, Pearson chi-square-0.003 P-value was 0.959, statistically significant implying that there is difference between the gender and awareness of rapid tests like finger prick and Oral swab test the Antibody only.

CONCLUSION

HIV has become a chronic condition but the progression of AIDS is reduced. Treatment has been successful in many parts of the world. Based on this survey, many of the people are well aware about the recent techniques of diagnostics used in HIV. This survey will help the society by aiding in increasing awareness of the recent diagnostics of HIV, time period for diagnosis and its causes.

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Conflict of interest

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