Exploring Interconnection Among Status of Literacy, Awareness and Comprehensive Knowledge about HIV/AIDS in India

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ABSTRACT

It has long been believed that improved health outcomes are positively associated with enhanced literacy and better awareness. The study investigates the relationship between literacy rates, knowledge, awareness of HIV/AIDS, and adult HIV prevalence in Indian states over the last years.

In India the adult HIV prevalence rate always remains a significant concern because access to primary health care is still a distant goal for the development practitioners. The study in India highlights the need for a comprehensive, multisectoral strategy to combat the adult HIV prevalence rate, highlighting disparities in literacy status, HIV awareness, and prevalences, and the need for a multisectoral approach to access primary health care.

The study emphasizes the importance of interventions promoting gender equality, reducing stigma, improving HIV education, and increasing healthcare access, particularly personalized therapies for high-risk populations like drug injectors and sex workers.

The study uses secondary data sources to examine the relationship between adult HIV prevalence rates and literacy rates, highlighting that awareness and literacy alone are not sufficient to combat the HIV epidemic.

The study emphasizes the urgent need to address societal issues like discrimination, stigma, gender inequality, and knowledge gaps and highlights the importance of understanding the link

between HIV prevalence in India, awareness, and literacy. It suggests that literacy and awareness are not the only factors to address HIV. Other societal norms like gender inequality, stigma, discrimination, and knowledge gaps are also crucial for creating a healthier, more equitable society.

Key words: Awareness, HIV/AIDS, HIV Prevalence, Knowledge, Literacy rate

Introduction

India with more than 1.3 billion population having highest risk to contain substantial HIV population in the world. Nonetheless, the pandemic continues to be confined to particular demographic groups and geographical areas, underscoring the necessity for a more comprehensive comprehension of the elements that contribute to HIV transmission and prevention (World Bank, HIV/AIDS in India, 2012). As per the India HIV Estimates, 2022, in India, the estimated number of individuals living with HIV (PLHIV) in 2022 is 24.67 lakhs. India is the country with the third-largest HIV epidemic globally. India's adult HIV prevalence rate decreased gradually between 2010 and 2019, going from 0.26% to 0.21%. (India HIV Estimates, 2019) HIV prevalence may be influenced by literacy, which is both a basic human right and a prerequisite for social and economic advancement. Several studies have shown that literacy and HIV prevention are positively correlated, with lower HIV prevalence being linked to greater literacy rates. India's literacy rate has been rising rapidly; in 2011, the country's overall literacy rate was 74.04%. But there are still large differences in gender, age, and socioeconomic level, which could have an impact on the correlation between HIV prevalence and literacy (UNAIDS, 2021). To move further with this study, it is important to have a clear overview of Knowledge, Awareness and Literacy. Here according to the 2011 Census of India, the percentage of people who can read and write in any language with understanding at the age of seven and beyond is known as Literacy, whereas Knowledge is the comprehension and familiarity gained via experience or education, whereas awareness is the state of knowing or seeing something.

There are several different and related ways that literacy may influence the prevalence of HIV. Increased access to correct information on HIV transmission, prevention, and treatment may result from higher literacy rates, enabling people to make more educated decisions regarding their sexual health. In addition to improving critical thinking and problem-solving abilities, literacy may help people traverse complicated social and economic contexts, which may make them more susceptible to HIV.

Cohort research revealed that HIV positivity among infants exposed to the virus was 6.67% in mothers who were illiterate, 5.55% in mothers who had completed elementary school, and 3.93% in mothers who had completed secondary school. HIV infection was non-existent in the exposed

newborns whose mothers completed higher secondary education or above. The trend indicates a rising risk of HIV infection among infants exposed to the virus together with a decline in literacy. (Ganguly, S., Goswami, D. N., et al, 2018)

Furthermore, as gender equality and a decrease in gender-based violence increases with incidents like hiding HIV status by spouses are some recognized risk factors for HIV transmission, literacy may have an impact on HIV prevention. Women who are more literate tend to have more influence over decisions, experience less violence against women, and have better access to healthcare. In India, there is a notable gender gap in literacy rates: the average global rate for women is 79.9%, while the average rate for males is 89.2%. India lags behind, with 62.3% of women and 80% of males in this regard (Cook, J., 2020).

It is imperative to recognize, although, that the correlation between HIV prevalence and literacy is intricate and multidimensional, and that HIV transmission and prevention are also significantly influenced by other factors, including poverty, stigma, and access to healthcare services. With the ultimate objective of guiding focused initiatives and policies meant to lessen the burden of HIV in India, this study attempts to investigate the ultimate goal of informing targeted interventions and policies aimed at reducing the burden of HIV in India.

Conclusively, the correlation between adult HIV prevalence in India and literacy is an essential field of study that can guide focused actions and policies meant to lessen the impact of HIV and raise literacy rates. This research intends to explore the complex interplay between these two factors, this study aims to shed light on the intricate connections between education and public health outcomes, ultimately contributing to a healthier and more equitable society.

Review of Literature:

The 2020 UNAIDS Report states that worldwide, HIV and AIDS remain the greatest cause of death for women who are of reproductive age. As per the India HIV estimates reports, In India, there were estimated to be 39.63 thousand annual AIDS related death cases in 2022, the estimated annual AIDS related death cases among adult females aged 15 years and above was 11.38 thousand and among young adults aged 15 to 24 and children aged 0 to 14 years, the estimated annual AIDS related death was 1.05 thousand and 2.18 thousand, respectively. Moreover,16.6% of the 37.7 million HIV-positive individuals in India do not know their status (UNAIDS, 2021).

According to India HIV predictions from 2020, there would be 23.19 lakh persons living with HIV globally, of whom 3.5 percent are children (those under 15 years old). Of these, 44.3 percent are female. In India, the main route for transmission of HIV is unprotected sexual

intercourse, which accounts for more than an 87 percent of new infections in the country (NACO Annual Report, 2014–2015).

Health Literacy is the important factor that affect the vulnerable communities like person living with HIV/AIDS. The most vulnerable individuals are more likely to have inadequate health literacy because of the strong correlation between health literacy and education and socioeconomic position. Furthermore, HIV-positive people now live to ages when other chronic health issues are more prevalent because of advancements in therapy. With the aging population and higher life expectancy associated with HIV/AIDS, the problem of low health literacy within this population may become more pressing. These make it imperative that study on HIV/AIDS patients' health literacy be carried out in order to better understand and support them. (Wawrzyniak, A. J., Ownby, R. L., et al., 2013).

There is no direct correlation between illiteracy and the transmission of the HIV virus. But because illiterate women and men lack access to written knowledge, they are nonetheless ignorant of a great deal of national and global issues that impact them and are increasingly being discussed in printed publications. They grow more susceptible the little they know. They are unable to protect themselves because they lack the reading comprehension necessary to understand what HIV is and how it spreads. They might occasionally be verbally informed incorrect information as well, but they are unable to confirm this using trustworthy written sources. Upon deeper examination, there is more nuance to the relationship than first appears between education, reading, and HIV prevention. Research has demonstrated that the pandemic's stage of spread plays a significant role in determining the current state of HIV education. There is a clear and positive correlation between the rate of HIV prevalence and education level in the early phases of the pandemic, there is a contention that during the initial stages of the pandemic, individuals who are more mobile and well-educated are among the infected, as they have greater possibilities to travel around. Following this early phase, there is a decline in the association between the illness and schooling. Access to information and understanding of the virus's spread are essential at this point. Some have claimed that although individuals with higher levels of education are more likely to alter their behaviour after learning about risky behaviour. (Medel-Anonuevo, C. and Cheick, D. M., 2007)

The process of economic and social marginalization that impacts the poor is just intensified by the inaccessibility of schools and/or the unfavourable circumstances surrounding their attendance. In addition to the connection between poverty and literacy, gender is an important factor, the literacy rate of women in India is 64.6 per cent. The largest gender disparities occur in nations with greater rates of illiteracy (Medel-Anonuevo, C. and Cheick, D. M. (2007).

Objectives of the Study:

As per India HIV Estimates 2021 factsheet, in India the number of People Living with HIV (PLHIV) are estimated to be around 24 lakhs. Since the decades of early 90's, HIV became a matter of threat to the humanity as well as for the world. As HIV affects the immune system and reduces the body's defences to protect against various infectious diseases including cancer, it also hampers the social surrounding of the effected person. A worldwide drive by WHO and UNAIDS has been initiated to attain the 95-95-95 target of HIV in order to provide availability of treatment to slow down the spread of the virus but there is no cure to this virus once infected. The 95-95-95 target states that:

i. Out of the total population 95% of the people will know their HIV status
ii. Out of the people who know their HIV status and are found to be positive 95% of them will be on treatment
iii. Out of the people who are on treatment 95% will be virally suppressed

Hence, the target essentially involves the concept for educating people in order to provide them with the knowledge and skills to prevent infection. Numerous factors influence the prevalence of HIV infection; awareness is not the only element that contributes to the virus's transmission. Several studies have indicated that inadequate and erroneous data regarding HIV/AIDS might give rise to misunderstandings and anxiety, perhaps exacerbating the virus's spread (Popa MI, 2009).

A major conducive reason to the rise in new HIV infections, especially among women, has been found to be a lack of knowledge and understanding about HIV/AIDS (A.Desta Chilot,2020). Moreover, a majority of population are still having social stigma to talk about the issues related with HIV/ AIDS in the countries like India.

Considering the above-mentioned realities the following objectives has been drawn for the purpose of present study:

• To understand the association of state-wise literacy rate of India along with the adult HIV prevalence rate.

• To understand the association of comprehensive knowledge of HIV among women and men in different states of India along with the adult HIV prevalence rate

Research Methodology

This paper aims to address the research questions or objectives through the information available from different secondary sources, no primary data has been used for this study. The present study

has tried to find the relationship between literacy rate and comprehensive knowledge of HIV and furthermore, in this study an attempt has been made to reveal the interconnection between knowledge of HIV and adult HIV prevalence rate among the age group of 15-49 years.

To gather that information various sources of secondary data were reviewed, gathered from authentic sources i.e., Census of India, reports from the Ministry of Health and Family Welfare, National Family Health Survey (NFHS) datasheet, reports, and the website of the National AIDS Control Organization, (NACO) reports, India HIV estimates 2021 and HIV Sentinel Survey (HSS) reports.

During the process of data analysis, two statistical tools were used 1) The chi-square ($\chi2$) statistic and 2) Pearson Corelation to see the association between literacy rate and Adult HIV Prevalence rate.

The chi-square ($\chi2$) statistic is a test used to examine the differences between categorical variables from a random sample to assess the goodness of fit of a model to the observed data. It measures how well the observed data fit the expected data.

The Pearson correlation coefficient, also known as Pearson's r, is a statistical measure that assesses the strength and direction of the linear relationship between two variables. It provides a numerical estimate ranging from -1 to +1.

Results and discussion:

Since people get infected by HIV because of lack of awareness about the virus and its way of transmission, it is usually assumed that people who are literate are likely to have less chance of getting infected by HIV. So, keeping all these things in mind a null hypothesis was set that the States with Highest Literacy rate will lead to Less HIV Prevalence and to prove that top 10 states with the highest literacy rates were chosen and the percentage of adult HIV Prevalence was kept side by side. The present study aims to understand the relationship between Literacy rate and Percentage of Adult HIV Prevalence.

In course of examining the general concept regarding literacy rate and HIV prevalence the following table, **Table 1**, shows the "Total Literacy rate and Percentage of Adult HIV Prevalence (15-49 years)"

In order to understand the association between Literacy Rate and Percentage of Adult HIV Prevalence chi-square ($\chi2$) test is used. Since the test is often used to test hypotheses about the relationship between categorical variables i.e. ten high ranking states of India in respect of literacy rate and their respective percentage of adult HIV prevalence.

The chi-square value compares the size of discrepancies between the expected and observed results, taking into account the sample size and the number of variables in the relationship. The degrees of freedom are used to determine whether a null hypothesis can be rejected based on the chi-square value. Here after calculation, it can be seen that

$\chi^2_9 = 21.49$

Table 1: States with Highest Literacy Rate* and Percentage of Adult HIV Prevalence**		
State/Union Territory	**Total Literacy rate**	**Percentage of adult HIV Prevalence (15-49 yrs)**
Kerala	94.0	0.06
Mizoram	91.3	2.70
Goa	88.7	0.31
Tripura	87.2	0.12
Himachal Pradesh	82.8	0.11
Maharashtra	82.3	0.33
Sikkim	81.4	0.09
Tamil Nadu	80.1	0.22
Nagaland	79.6	1.36
Uttarakhand	78.8	0.12

Source: *Office of Registrar General, India, 2011, **India HIV estimates, 2021, NACO, ICM

H_0: There is no significant association between literacy rate and HIV prevalence among states with highest literacy rates.

H_1: There is significant association between literacy rate and HIV prevalence among states with highest literacy rates.

χ^2 has 9 degrees of freedom.

From the table $\chi^2_{.05, 9} = 16.919$,

Since χ^2_9 is greater than $\chi^2_{.05, 9}$, H_0 is rejected at 5% level of significance.

Given that the Chi-Square Value χ^2_9 (21.49) is greater than the critical value $\chi^2_{.05,9}$ (16.919) at the 0.05 significance level, it can be concluded that there is significant association between the literacy rate of the states and the percentage of adult HIV prevalence among its population.

Moreover, from the Chi-Square Value χ^2_9 (21.49) at the 0.05 significance level and 9 degrees of freedom (*DF*) the *p-value* is 0.010644 and the result is significant at $p < 0.05$. The *p-value* of 0.010644 is less than the significance level of 0.05 (or 5%). This indicates that the observed results are statistically significant at the 0.05 level. Since the *p-value* (0.010644) is less than the predetermined significance level of 0.05, we can reject the null hypothesis in favour of the alternative hypothesis

Therefore, it is evident that the null hypothesis is rejected, and alternative hypothesis indicating that there is significant association between literacy rate and HIV prevalence among the states with highest literacy rates.

The literacy rate has impact on the HIV prevalence but it is not the sole determinant to control the prevalence of HIV, because such occurrence is associated with many other factors like lack of awareness regarding HIV and its transmission, moreover there is no such scope of proper convergence with the education system and the health-related awareness program. Moreover, even the higher literacy rate doesn't indicate greater awareness about HIV since this issue already have lot of social stigma and associated discrimination. Here we can see that the other factors are more influencing in prevalence of HIV. Also, from the table we can see that the Socio-economic cultural difference in North eastern states vary from other states in India which explains the literacy rate is extremely high but the Adult HIV prevalence rate is not declining.

Knowledge and adult HIV Prevalence rate

It has been clearly observed that literacy rate and adult HIV prevalence are not substantially related to each other. In the present study, the adult HIV prevalence and associated awareness, has also been observed as another determinant. However, the prevalence of the HIV epidemic and its effects are primarily dependent on the levels of knowledge and awareness, therefore lack of knowledge and awareness regarding HIV can directly contribute to the prevalence of the HIV epidemic, so it can be definitely assumed that people having a comprehensive knowledge of HIV are less likely to be affected by the virus thus leading to less HIV Prevalence (Haque, M. A., Hossain, M. S. N., et al, 2018). According to NFHS 5, the comprehensive knowledge regarding HIV/AIDS means knowing that consistent use of condoms every time they have sex and having just one uninfected faithful sex partner can reduce the chance of getting HIV/AIDS, knowing that a healthy-looking person can have HIV/AIDS, and rejecting two common misconceptions about transmission or prevention of HIV/AIDS.

This idea gives rise to another hypothesis that states with high comprehensive knowledge of HIV/AIDS will have a low percentage of Adult HIV Prevalence. Pearson Correlation Coefficient method has been used to examine the relationship between Adult HIV Prevalence and Comprehensive knowledge of Men and Women (aged between 15-49 years old).

The **Table 2** shows the states with percentages of Men and Women having Comprehensive knowledge on HIV/AIDS along with the Percentages of Adult HIV Prevalence (15-49 years) of the same state.

Table 2: States with percentages of Men and Women having Comprehensive knowledge on HIV/AIDS along with the Percentages of Adult HIV Prevalence (15-49 years)

State/UT	Women (age 15-49 years) who have comprehensive knowledge of HIV/AIDS (%)	Men (age 15-49 years) who have comprehensive knowledge of HIV/AIDS (%)	Percentage of adult HIV Prevalence (15-49 years)
A & N Islands	14.9	34.7	0.14
Andhra Pradesh	24.6	38.6	0.67
Arunachal Pradesh	12.3	33.4	0.07
Assam	19.2	25.3	0.09
Bihar	10.3	25.2	0.16
Chandigarh	20.3	53.6	0.19
Chhattisgarh	23.1	30.7	0.17
Dadra & Nagra Haveli and Daman & Diu	25.3	28.1	0.19
Delhi	29.5	43.9	0.31
Goa	49	67.2	0.31
Gujarat	28.5	35.7	0.19

Haryana	19.7	36.4	0.22
Himachal Pradesh	36.2	40.8	0.11
Jammu & Kashmir	15.8	33.6	0.06
Jharkhand	13.8	31.2	0.08
Karnataka	24.5	26.6	0.46
Kerala	34.8	45.4	0.06
Madhya Pradesh	18.7	26.3	0.08
Maharashtra	34.4	42.6	0.33
Manipur	50.6	55.9	1.05
Meghalaya	14.5	15.9	0.42
Mizoram	64.1	65.6	2.7
Nagaland	25.6	40.1	1.36
Odisha	21.4	24.6	0.14
Puducherry	30.2	32.5	0.31
Punjab	20.6	20.6	0.28
Rajasthan	26.8	36	0.1
Sikkim	23.9	18.5	0.09
Tamil Nadu	23.6	26.6	0.22
Telangana	30.7	30.5	0.47
Tripura	15.4	30	0.12

Uttar Pradesh	13.1	22.1	0.1
Uttarakhand	24.5	36.1	0.12
West Bengal	18.5	15.5	0.08

Source: NFHS-5, Phase-I and Phase-II, 2019-20 & 2019-21, India HIV Estimates, 2021

Table 2.1 shows the Pearson Correlation clearly depicts the fact that the comprehensive knowledge about HIV/AIDS is very much related with the occurrence of HIV/AIDS related complications. People show concern about HIV/AIDS only when they encounter such issues in their personal life and when their closed ones are affected. For this reason, the positive correlation between knowledge of HIV/AIDS and HIV Prevalence has been found. The reason behind this is because HIV is still not a mainstream health issue of concern among general people and also among local health workers. There are a lot of stigmas related to HIV because of which HIV positive people still face a lot of discrimination.

Table: 2.1 - The Pearson Correlation

Correlations				
		Women who have comprehensive knowledge of HIV/AIDS (%)	Men who have comprehensive knowledge of HIV/AIDS (%)	Percentage of adult HIV Prevalence (15-49 yrs)
Percentage of adult HIV Prevalence (15-49 yrs)	Pearson Correlation	.678**	.527**	1
	Sig. (2-tailed)	0.000	0.001	
	N	34	34	34
**. Correlation is significant at the 0.01 level (2-tailed).				

It's also worth mentioning that the strength of a correlation is typically measured by the correlation coefficient, which ranges from -1 to 1. A correlation coefficient of 1 indicates a perfect positive correlation, while a correlation coefficient of -1 indicates a perfect negative

correlation. A correlation coefficient close to 0 indicates little to no correlation. In the previous example, the correlation coefficients of 0.678 and 0.527 suggest moderate to strong positive correlations between HIV/AIDS knowledge and HIV prevalence among women and men, respectively.

However, it's important to note that this does not necessarily mean that increased knowledge causes higher prevalence. It could be that individuals with higher HIV/AIDS knowledge are more likely to get tested and diagnosed, leading to higher detected prevalence. Alternatively, it could be also seen that areas with higher HIV prevalence have more awareness campaigns and related education programs, leading to higher HIV/AIDS knowledge.

Conclusions:

It is generally assumed that literacy level and health awareness have a strong relationship with each other and are very much strongly dependent on each other. Especially it is generally assumed that higher literacy will lead to better health outcomes but the results of this study indicates that adult HIV prevalence doesn't show substantial relationship with literacy rates of the states, similarly, states with high levels of HIV/AIDS awareness and understanding do not have any relationship with low rates of adult HIV prevalence. Thus, in the present study, using the data gathered from various sources like NFHS 5 Phase I and Phase II, India HIV Estimates 2021, Office of Registrar General, India, 2011 it has been observed that literacy rates does not have any impact on the adult HIV prevalence rates in the states having higher literacy rates. Similarly, knowledge and awareness about HIV does not essentially affect the adult HIV prevalence in states with higher comprehensive knowledge about HIV/AIDS. Thus, the finding is quite different from what is usually documented in earlier research.

The enduring societal and cultural norms that support gender inequity, stigma, and discrimination against marginalized groups, as well as restricted access to HIV prevention initiatives and healthcare facilities, are likely the root causes of this surprising discovery.

The high adult HIV prevalence in India must be addressed, and to do so, a comprehensive, multisectoral strategy that targets the epidemic's underlying causes must be implemented. This strategy should include actions to advance gender equality, lessen discrimination and stigma, improve the quality of education and literacy initiatives on matter related to HIV/AIDS, and expand access to healthcare services and HIV prevention initiatives. Stigma and discrimination are still prevailing to some extent among front line workers or community health workers. To meet the unique requirements of high-risk groups including drug injectors, sex workers, and men who have sex with men, separate interventions are required. Knowledge and practice gap may be another key indicator leading to HIV prevalence, for example many people know that using of

condom while having intercourse can protect you from not only unwanted pregnancy but also saves from Sexually Transmitted Disease (STD) and HIV as well, but question lies how many of them actually follow this knowledge as practice. So awareness sessions on behaviour change among masses is very much crucial

In summary, although high literacy rates and knowledge and awareness about HIV are critical for both social and economic advancement, they might not be enough to tackle India's complicated HIV prevention and control issues. To lessen the impact of HIV and advance a healthier, more just society, a comprehensive, multisectoral strategy that tackles the epidemic's underlying causes is required. More emphasis to be given on spreading the awareness from the adolescent stage regarding HIV/AIDS so no one becomes victim of HIV/AIDS in future. Community level awareness is much required especially among front line workers like ASHA so that stigma and discrimination related to HIV/AIDS is reduced.

In summary, it can be said low adult HIV prevalence in Indian states is not always correlated with high literacy rates. Similar to this, states with high levels of HIV/AIDS awareness and understanding do not always have low rates of adult HIV prevalence.

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