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Knowledge, attitude, beliefs and practices in HIV/AIDS in India: identifying the gender and rural-urban differences

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ABSTRACT

Objective: To promote the use of preventive measures and raise awareness regarding HIV/AIDS in India. **Methods:** Data from the population-based NFHS-3 survey 2005-06 was used. In this study, information collected on 87 961 women aged 15-49 years and 44 717 men aged 15-54 years was used in the final analysis. The data collected was stratified by gender and place of residence. Analyses of the variables related to the outcomes i.e. knowledge, attitude, belief and practices, was conducted using *Chi*-square test to calculate significant differences among proportions of categorical variables. **Results:** We found that knowledge of HIV transmission and prevention was low among women and rural residents. Most of the respondents had a non-discriminatory attitude towards HIV positives and majority agreed that children should be educated on HIV/AIDS. The use of condoms and proportion of respondents who had undergone HIV testing was found to be significantly low. We found a significant gap in the beliefs regarding ways to avoid HIV. **Conclusions:** There are significant gender and urban-rural differentials in India in terms of knowledge, attitude, beliefs and practices in HIV/AIDS. Information dissemination in India should be designed in a way that not only raises the level of awareness but also result in behavioral change.

1. Introduction

India is committed to achieving the Millennium Development Goals (MDGs) for HIV/AIDS. With this view the Government of India has initiated programs that are targeted at increasing awareness, offering preventive services and providing the continum of care for people living with HIV/AIDS. These have remained the guiding strategy for the National AIDS Control Program (NACP), which aims to halt and reverse the epidemic in India.

The epidemic of HIV in India has been reported as highly complex[1]. Even after two decades since its evolution, a clear understanding of the magnitude and diversity of the epidemic is not available. Previously, based on surveillance data from HIV sentinel sites it had been estimated that around 5.2 million people were living with HIV in India. However, more recently these figures have been revised based on the results of the National Family Health Survey III (NFHS-3), which was the first national household survey to estimate HIV prevalence. The findings of this survey suggest that the number of people living with HIV may be around 2.45 million (1.75-3.15 million)[2].

The epidemic in India has also been reported to be highly heterogeneous with diverse modes of infection and wide variance in the HIV prevalence between states and even within districts. Current estimates suggest that the epidemic in India is mainly concentrated in the southern and western states, namely, Tamil Nadu, Karnataka, Andhra Pradesh, Maharashtra and two north-eastern states, namely, Nagaland and Manipur[3].

In India, information from AIDS case reporting indicates that sexual route continues to be the most common route of transmission accounting for 87.4% of the transmission[4]. The other routes of transmission like blood products, intravenous drug use and perinatal transmission appear to be less important except for intravenous drug use which is the predominant route of transmission in the north eastern states of India[5].

NACP has been focusing on promoting the use of preventive measures and raising awareness regarding HIV/AIDS to prevent the spread of the infection into the general population. It is believed that this strategy will not only protect more than 99% of the population who are HIV negative but also create a non stigmatizing environment and enhance access to services. However, recent studies from India have indicated that the virus has moved from urban to rural areas and from high risk to general population,

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disproportionately affecting women and the youth[6]. This has resulted in increased concern regarding the level of awareness, beliefs and practices in HIV/AIDS in the general population and more specifically amongst the rural residents and women.

In the past, few studies have assessed the knowledge, attitude, beliefs and practices in issues related to HIV/AIDS. The National Behaviour Surveillance Surveys (BSS) in 2001 and 2006, and the BBC-World Service Trust (BBC-WST) study in 2005 are examples of few initiatives undertaken to assess the risk behaviour and to measure the behavioral change in specific populations in India[5].

In the present study, we have used data collected during the National Family Health Survey-3 to identify the knowledge, attitude, beliefs and practices related to HIV/AIDS in the general adult population in India. Compared to previous studies, in this study we have used a larger and more representative sample population. Given an emerging interest in the level of the above parameters amongst rural inhabitants and women, we have also tried to identify the differences based on gender and rural-urban residence of the respondents.

2. Materials and methods

2.1. Data

The data from 2005-2006 National Family Health Survey (NFHS-3) was analyzed. NFHS-3 is a nationally representative, cross-sectional survey using a systematic, two-stage, cluster sample of households. Further details on sampling and basic descriptive statistics can be found in the final report of the NFHS-3 survey[7].

The data during the survey was collected by visit to the selected households by the trained field staff. Three structured questionnaires were administered and information on socio-demographic variables (such as age, religion, caste, education, wealth index, marital status etc.), knowledge, attitude, beliefs and practices in HIV/AIDS was collected from a sample of women aged 15-49 years and men aged 15-54 years.

In the present study, we have analyzed the collected information under four domains i.e. knowledge, attitude, practice and beliefs, amongst the subset of the respondents who were aware of HIV/AIDS and had provided complete response for the outcome variables and most of the covariates. Based on these criteria, the final sample analyzed consisted of 87 961 women and 44 717 men.

2.2. Outcome

The main outcomes analyzed in the present study can be broadly classified under the following heads:

Knowledge: During the survey, the respondents were asked questions concerning their knowledge of HIV transmission and prevention. These included questions such as "Can people reduce their chance of getting HIV/AIDS by abstaining from sexual intercourse", "Can people reduce their chances of getting HIV/AIDS by using a condom every time they have sex", "Can people reduce their chances of getting HIV/AIDS by having just one uninfected sex partner who has no other sex partners" *etc*.

Attitude: The survey collected information on the attitude of the respondents towards HIV positives. This included questions such as "If a relative of yours became sick with the HIV/AIDS, would you be willing to care for her or him in your own household", "If a member of your family got infected with HIV/AIDS, would you want it to remain a secret or not", "Would you buy fresh vegetables from a shopkeeper or vendor if you knew that this person had HIV/AIDS" *etc*. Questions were also asked regarding their attitude towards HIV/AIDS education for boys and girls.

Belief: The respondents were given several options to assess their beliefs regarding ways to avoid HIV infection. The options included "abstinence from sex", "use of condoms", "limit the number of sex partners", "being faithful to one partners", "avoiding sex with sex workers", "avoiding sex with drug abusers", "avoiding sex with homosexuals" *etc*.

Practice: Information was collected during the survey regarding their current sexual behaviour, use of condoms and history of HIV testing. These variables were chosen to represent the current practices of the individual with regards to HIV/AIDS.

The responses to the above questions were recorded during the survey as "yes", "no" or "don't know".

Many participants did not provide a response to the questions on "knowledge of drugs used to prevent transmission of AIDS during pregnancy" and "use of condoms during last intercourse". In order to retain their otherwise valuable information in the analyses, we created "Missing" categories for these two variables.

2.3. Ethical considerations

The survey was approved by the International Institute of Population Sciences (IIPS) ethical review board in India and the institutional review boards of the funding agencies and the technical assistance agency[8]. Informed consent was taken from all respondents who participated in the survey.

2.4. Statistical analysis

The survey data was analyzed using the primary sampling units and national weights, for men and women separately, as determined by Demographic and Health Surveys(DHS). To identify the differences in the knowledge, attitude, belief and practices based on the gender and urban-rural residence, all the analyses were stratified by sex and place of residence. *Chi*-square (χ^2) test was used to calculate significant differences among proportions of categorical variables. The STATA for windows version 10.0 (Stata Corp. College Station, Texas, USA) was used for the data analysis.

3. Results

In our study sample, we found that 55.6% of the female respondents were from urban areas and 44.4% from rural areas. Similarly amongst the male respondents, 55.1% of the men were from urban areas while 44.9% were residing in rural areas. One-third of the respondents were in the age group of 15-24 years and more than two-third of them were Hindus. More than half of respondents had at least secondary level education and almost two-third of the respondents were married at the time of the survey (Table 1).

Table 1
Socio-demographic characteristics of the survey population, stratified by sex and residence.

Characteristics		Male			Female		
		Urban(%)	Rural(%)	*P*	Urban(%)	Rural (%)	*P*
Age	15-24 years	34.8	35.7	0.002	37.9	43.7	0.001
	25-34 years	28.0	29.4		31.1	30.0	
	35-44 years	22.8	21.5		23.3	20.1	
	45 years and above	14.4	13.4		7.6	6.2	
Education	No education	7.8	13.8	0.000	13.8	25.3	0.010
	Primary	12.2	17.7		11.2	17.3	
	Secondary	58.5	58.9		55.3	51.7	
	Higher	21.6	9.6		19.6	5.7	
Religion	Hindu	78.9	85.3	0.000	76.8	83.0	0.000
	Muslim	14.4	9.2		15.3	9.9	
	Christian	2.9	2.1		3.8	3.1	
	Sikh	1.3	1.9		1.7	2.7	
	Others	2.3	1.4		2.4	1.3	
Wealth Index	Poorest	1.9	15.2	0.030	1.3	11.3	0.001
	Poorer	4.7	24.5		3.9	19.8	
	Middle	13.8	28.5		10.7	27.3	
	Rich	31.0	21.5		27.3	26.3	
	Richest	48.6	10.3		56.8	15.2	
Caste	Schedule caste	17.2	19.7	0.000	15.6	17.9	0.000
	Schedule tribe	2.9	7.5		2.5	7.3	
	Other backward class	40.7	44.0		35.9	39.2	
	General	39.2	28.8		45.9	35.5	
Current marital status	Not married	40.1	33.9	0.000	27.5	24.0	0.000
	Married	58.9	64.7		68.4	71.8	
	Widowed	0.5	0.8		2.6	2.8	
	Divorced/ Separated	0.5	0.6		1.5	1.4	

As defined by the NFHS-3 survey.

3.1. Knowledge about HIV/AIDS

Our analysis of the sample to assess the knowledge of the respondents about HIV/AIDS showed that while most of the respondents were aware of ways to prevent transmission of HIV/AIDS, this knowledge was significantly lower in the rural areas compared to the urban areas, especially amongst the women. Only about half of the female respondents knew about ways to avoid HIV infection (Table 2). Overall, two-third of the respondents knew that abstinence from sexual activity could be a way to prevent HIV/AIDS. Approximately half of the rural female respondents knew that the risk of HIV could be reduced by using condoms. More than three-fourth of the respondents knew that practicing monogamy could reduce the risk of HIV infection though this was found to be less amongst the rural females (69%). Also, only about 57% of the rural women knew that even healthy looking individuals can transmit the virus. While more than two-third of the respondents knew that HIV can be transmitted during pregnancy, less than one-fourth of the survey respondents knew about the availability of drugs to reduce the risk of transmission. Similarly, the knowledge amongst the respondents regarding HIV testing sites and the availability of drugs to treat HIV/AIDS was found to significantly low in both genders, irrespective of the place of residence. Less than one-fifth of the respondents knew about drugs to treat AIDS. Only one-third of the women from rural areas knew about HIV testing sites.

3.2. Attitude towards HIV/AIDS

We analyzed the study sample to assess the attitude of the respondents towards HIV/AIDS. Our analyses showed that approximately one-third of the respondents were of the opinion that the HIV status of an individual should be kept confidential (Table 3). Irrespective of their gender or place of residence, more than two-third of the respondents were willing to care for their relatives with AIDS. Most respondents had a non-discriminatory attitude towards people living with HIV/AIDS though this was found to be higher in the urban areas. More two-third of the urban and slightly more than half of the rural residents were willing to buy vegetables from infected vendors. Most respondents agreed that teachers with HIV/AIDS should continue to teach though the proportion was comparatively lower in the rural areas. Irrespective of the place of residence, more than four-fifth of the respondents agreed that both boys and girls should be taught about HIV/AIDS.

3.3. Beliefs about ways to avoid HIV/AIDS

We then analyzed the sample to assess the beliefs

Table 2
Knowledge about HIV/AIDS in the study population.

Knowledge		Male			Female		
		Urban(%)	Rural(%)	*P*	Urban(%)	Rural (%)	*P*
Ways to avoid aids	No	16.4	16.9	0.010	16.2	20.9	0.020
	Yes	66.6	58.1		55.4	43.5	
	Don't know	16.9	24.9		28.4	35.6	
Risk can be reduced by abstinence	No	10.5	10.6	0.000	12.2	13.5	0.010
	Yes	83.8	78.5		70.7	62.2	
	Don't know	5.7	10.8		17.1	24.3	
Risk can be reduced by using condoms	No	6.2	7.0	0.001	9.3	11.7	0.000
	Yes	87.9	80.6		67.1	53.6	
	Don't know	5.9	12.4		23.6	34.8	
Risk can be reduced by having one partner	No	3.7	4.8	0.000	6.8	8.9	0.000
	Yes	90.4	85.4		77.8	69.4	
	Don't know	5.9	9.8		15.4	21.6	
Healthy person can get AIDS	No	12.6	18.6	0.010	18.8	24.2	0.010
	Yes	79.6	69.3		67.6	57.1	
	Don't know	7.8	12.1		13.6	18.6	
AIDS can be transmitted during pregnancy	No	9.8	12.1	0.002	8.5	11.4	0.000
	Yes	79.5	73.7		80.6	73.4	
	Don't know	10.7	14.1		10.9	15.2	
Place to get tested for HIV	No	30.7	43.6	0.020	47.9	60.8	0.001
	Yes	69.2	56.3		52.1	39.2	
Drugs to prevent transmission of AIDS during pregnancy	No	27.5	22.4	0.030	23.4	22.8	0.020
	Yes	27.7	24.2		34.2	27.7	
	Don't know	24.3	27.1		22.9	22.9	
	Missing	20.5	26.3		19.4	26.6	
Drugs to treat AIDS	No	80.3	83.4	0.000	84.5	87.6	0.000
	Yes	19.7	16.6		15.5	12.4	

Table 3
Attitude towards about HIV/AIDS in the study population.

Attitude		Male			Female		
		Urban(%)	Rural(%)	*P*	Urban(%)	Rural(%)	*P*
To keep AIDS infection a secret	No	60.4	63.1	0.001	61.1	66.3	0.002
	Yes	37.2	34.4		34.6	29.8	
	Don't know	2.3	2.4		4.3	3.9	
To care for relative with AIDS	No	15.3	22.6	0.000	16.6	22.4	0.000
	Yes	81.1	73.8		78.1	72.0	
	Don't know	3.6	3.5		5.3	5.6	
To buy vegetables from HIV infected vendor	No	26.3	41.9	0.010	28.8	40.4	0.020
	Yes	71.8	55.8		67.1	54.7	
	Don't know	1.9	2.2		4.1	4.9	
To allow male teacher with AIDS to continue teaching	No	19.3	31.0	0.020	15.9	24.2	0.010
	Yes	78.3	65.5		79.5	69.2	
	Don't know	2.4	3.4		4.6	6.6	
To allow female teacher with AIDS to continue teaching	No	19.2	30.9	0.000	15.8	24.1	0.000
	Yes	78.4	65.6		79.6	69.3	
	Don't know	2.4	3.5		4.6	6.6	
To allow boys to be taught about HIV	No	6.4	11.3	0.000	12.9	19.0	0.010
	Yes	93.5	88.7		87.1	80.9	
To allow girls to be taught about HIV	No	7.2	12.4	0.000	12.7	18.6	0.010
	Yes	92.8	87.6		87.3	81.4	

regarding ways to avoid HIV/AIDS. Almost two-third of the respondents did not consider abstinence from sexual activity as a way to avoid HIV/AIDS. Less than one-fourth of the respondents, lower amongst females, believed that practicing monogamy was a way to avoid HIV/AIDS. Less than 10% of the respondents believed that limiting the number partners could reduce the risk of HIV transmission (Table 4). Approximately 28% of women in urban and 18% in the rural areas believed that use of condoms during sex was a way to prevent transmission of HIV. Even amongst the men this percentage was low especially in the rural areas (39%). Only around one percent of the respondents believed that avoiding sexual contact with high-risk groups like homosexuals and intravenous drug users was a way to avoid transmission of HIV. Less than one-fourth of the respondents believed that use of sterilized/new needles was important for reducing the risk of HIV transmission.

3.4. Practices regarding HIV/AIDS

Our study found that the use of condoms during intercourse was significantly low amongst both men and women, irrespective of their place of residence. Less than 5% of the respondents reported use of condoms during the last intercourse in the rural areas. However, it must also be mentioned that more than a quarter of the respondents did not provide an answer to the question (Table 5). We found that the proportion of respondents who had multiple sex partners was low in both urban and rural areas. In the rural areas it was less than 1%, while in the urban areas it was around 3%. It was found to be higher amongst men as compared to the women. The proportion of our respondents who had undergone HIV testing was found to be markedly low. Less than 10% of the urban residents and below 5% of the rural residents had ever been tested for HIV.

Table 4
Beliefs about ways to avoid HIV/AIDS in the study population.

Beliefs		Male			Female		
		Urban(%)	Rural(%)	*P*	Urban(%)	Rural(%)	*P*
HIV/AIDS can be avoided by abstaining from sex	No	73.8	67.4	0.010	61.9	57.1	0.002
	Yes	9.2	7.7		9.6	7.3	
	Don't Know	16.9	24.9		28.4	35.6	
HIV/AIDS can be avoided by limiting to only one partner	No	56.1	53.1	0.010	48.3	46.3	0.001
	Yes	26.9	21.9		23.3	18.1	
	Don't Know	16.9	24.9		28.4	35.6	
HIV/AIDS can be avoided by limiting the number of partners	No	72.7	66.2	0.000	62.7	57.3	0.003
	Yes	10.3	8.8		8.9	7.1	
	Don't Know	16.9	24.9		28.4	35.6	
HIV/AIDS can be avoided by using condom during sex	No	33.5	36.2	0.030	43.5	46.8	0.020
	Yes	49.5	38.9		28.1	17.6	
	Don't Know	16.9	24.9		28.4	35.6	
HIV/AIDS can be avoided by avoiding sex with homosexuals	No	81.9	74.5	0.003	71.2	64.2	0.000
	Yes	1.1	0.6		0.4	0.2	
	Don't Know	16.9	24.9		28.4	35.6	
HIV/AIDS can be avoided by avoiding sex with intravenous drug users	No	81.1	74.1	0.000	69.4	63.2	0.002
	Yes	1.9	0.9		2.2	1.2	
	Don't Know	16.9	24.9		28.4	35.6	
HIV/AIDS can be avoided by using only sterilized/new needles	No	59.9	56.8	0.001	50.2	50.3	0.001
	Yes	23.1	18.3		21.4	14.1	
	Don't Know	16.9	24.9		28.4	35.6	

Table 5
Practices regarding HIV/AIDS in the study population.

Practices		Male			Female		
		Urban(%)	Rural(%)	*P*	Urban(%)	Rural(%)	*P*
During the last intercourse used condom	No	51.8	60.7	0.000	58.3	65.3	0.001
	Yes	8.3	4.9		7.5	3.7	
	Missing	39.9	34.4		34.2	31.9	
Has had sex with women (men) other than spouse	No	96.9	96.2	0.000	99.9	99.8	0.000
	Yes	3.1	3.8		0.1	0.2	
	Don't know	0.0	0.0		0.0	0.00	
Has been tested for HIV	No	93.6	96.4	0.000	93.1	96.1	0.000
	Yes	6.4	3.6		6.9	3.9	

4. Discussion

There have been previous reports from India about the increase in the awareness of the general population regarding issues related to HIV/AIDS[4]. The NFHS-3 survey conducted in 2005-06 reported that 61 percent of women and 84 percent of men had heard of HIV/AIDS. This was considered as a sizeable increase given that the percentage of the population that was aware of HIV/AIDS was only 41 percent during the NFHS-2 survey conducted in 1998-99[7].

Despite the reported increase in the awareness, our analysis of the NFHS-3 data shows that there are significant gaps in the knowledge, attitude, beliefs and practices of individuals with regards to HIV/AIDS. These gaps become more apparent when the data is stratified by gender and place of residence.

We found that the proportion of respondents who admitted that they had knowledge about ways to be prevent the HIV transmission varied based on the gender and place of residence.

In general, women and rural residents had lower levels of awareness. Similarly, while more than two-third of the respondents knew about safe sex practices such as use of condoms, limiting the number of partners, abstinence from sexual activity; the same was found to be lower amongst women and rural residents. These findings are similar to studies done elsewhere in the country[4] and probably suggest that the information disseminated on these issues have not been clearly comprehended, especially by the women and those in rural areas. Such findings suggest that the need to convey information in a manner that is contextually appropriate, socio-culturally acceptable and gender-sensitive.

Knowledge regarding HIV diagnosis and treatment was found to be significantly low amongst the respondents, more so in the rural areas and amongst women. Less than one-fifth of the respondents knew about drugs to treat HIV/AIDS. Similarly, the proportion of the respondents who knew about HIV testing sites was approximately half of the total sample. While more than three-fourth of the respondent knew that HIV can be transmitted during pregnancy, less than a quarter of the respondent knew about availability of drugs to reduce the risk of the transmission. These are important findings and probably suggest that the current awareness campaigns have not been effective in spreading information regarding the range of HIV/AIDS treatment services that have been made available under the national program.

People living with HIV/AIDS (PLWHAs) and the social groups to which they belong have often been stigmatized worldwide. Stigma has been found to interfere with effective societal response to AIDS and has imposed hardships on people living with HIV as well as their kins, caregivers, and communities[9]. In our study we found that in general the respondents seemed to have a favorable attitude towards people with HIV. More than three-fourth of our respondents were willing to care for relatives with AIDS, besides about two-third of them were in favor of confiding information regarding the HIV status. These are encouraging findings and indicate the favorable socio-cultural milieu for HIV/AIDS related interventions in India.

In the past, there have been several debates in India regarding the introduction of modules on sex education for adolescents. The proponents of sex education argue that this will help reduce the spread of HIV while the opponents say that it will corrupt the young people[10]. In our study we found that majority of our respondents, from both urban and rural areas, agreed that education regarding HIV/AIDS should be imparted to adolescents. This is an important finding and may reflect a general consensus regarding the introduction of modules on HIV/AIDS and other issues related to sexual health.

Another important finding from this study is the significant difference in beliefs of the respondents regarding the ways to avoid HIV/AIDS. Majority of the respondents did not believe that pursuing safe sexual practices such as use of condoms, abstinence and monogamy could reduce the risk of HIV infection. Similarly a high proportion of the respondents had low risk perception regarding sexual contact with high risk groups like homosexuals and intravenous drug users. Notable amongst the findings was also the perception amongst the respondents that unsafe injection practices was not a risk factor for HIV transmission. The above findings raise concern as it appears that the existing communication strategies may have been relatively ineffective in influencing the community's beliefs regarding HIV/AIDS, especially in the rural areas and amongst women.

Our analysis also found difference in practices regarding HIV/AIDS amongst the respondents. We found that irrespective of the gender or place of residence, the use of condoms remains substantially low. Though condom promotion has remained one of the key strategies under NACP[4], our study substantiates findings from previous studies[5] that condom use is still extremely low in India. This suggests the need to change the existing approaches to condom promotion such as free distribution and awareness generation; to a more proactive process aimed at creating an enabling environment for sustained change in behavior and practice through community involvement[11]. Previous studies[12] have reported low rate of multiple partners and concurrent sexual relationships amongst the Indian population. Our analysis showed similar results. We found that an extremely low proportion of our respondents had multiple sexual partners.

Amongst our study sample we found that on an average less than five percent of the respondents had undergone voluntary or prescribed testing for HIV. Considering that HIV counseling and testing is freely available at the Integrated Counseling and Testing Centers (ICTC) attached to most health facilities in India, this can be considered as extremely low.

The actual reason for the above finding is not known but it could be either due to lack of awareness regarding HIV testing, the lack of existence of a favorable social atmosphere for HIV testing or poor individual risk perception.

Our study has certain limitations. The data used in the study is cross-sectional in nature hence must be taken to reflect the knowledge, attitude, beliefs and practices of a specific population at a certain point in time rather than objective fact or a population-based measure. Also, since the present analysis was based on survey data collected through face-to-face self-reported behaviors it may have led to misreporting of particularly sensitive items, like sexual practices and beliefs.

Knowledge, attitude, beliefs and practices of the general population play a pivotal role in the dynamics of HIV transmission and have to be adequately addressed to successfully control the spread of the epidemic.

In India, despite coordinated efforts[13] our findings suggest that there are persistent gaps in the knowledge regarding HIV/AIDS especially regarding services related to diagnosis and treatment. There are deficits in the beliefs of the general population about ways to avoid HIV/AIDS and the level of compliance with preventive measures is generally low. These observations become more obvious in the context of women and rural residents.

Our findings indicate the need for a well-coordinated communication strategy that is not limited to raising the awareness in the community but promotes behavioral and attitudinal changes through greater community involvement with a conscious focus on women and rural denizens.

Conflict of interest statement

The author declares no conflict of interest.

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