



Are partners of HIV-infected people being tested for HIV? A mixed-methods research from Gujarat, India

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Setting: Four selected antiretroviral therapy (ART) centres of Gujarat State, India, which accounts for 8% of the human immunodeficiency virus (HIV) burden in India.

Objectives: 1) To assess the proportion of people living with HIV (PLHIV) whose partners were not tested for HIV; 2) to assess sociodemographic and clinical characteristics of index cases associated with partner testing; and 3) to understand perceived facilitators and barriers to partner testing and make suggestions on how to improve testing from the perspective of the health-care provider.

Design: A mixed-method design with a quantitative phase that involved reviewing the programme records of married PLHIV enrolled during 2011–2015, followed by a qualitative phase of key informant interviews.

Results: Of 3884 married PLHIV, 1279 (33%) did not have their partners tested for HIV. Factors including index cases being male, illiterate, aged >25 years, belonging to key populations, substance use and being in advanced clinical stages were more likely to be associated with partner non-testing. Non-disclosure of HIV status (due to fear of marital discord) and lack of awareness and risk perception were the key barriers to testing.

Conclusion: One third of PLHIV did not have their partners tested for HIV. Several factors were identified as being associated with the non-testing of partners, and solutions were explored that need to be implemented urgently if we are to achieve the 90–90–90 targets and end HIV.

The human immunodeficiency virus (HIV) is the second most common cause of mortality worldwide among communicable diseases, and there are approximately 36.7 million people living with HIV (PLHIV).¹ In India, there is an estimated 2.1 million PLHIV, with 86 000 new HIV infections occurring annually.² The National AIDS (acquired immune-deficiency syndrome) Control Programme (NACP) in India has an ambitious objective of achieving 'zero infection, zero death, zero stigma and discrimination', which requires identifying high-risk groups and targeting them for HIV prevention interventions.³

Among the modes of HIV transmission, the heterosexual route is the most common, accounting for nearly 80% of transmission in India. Of this, approximately 63% of incident HIV transmission occurs in low-risk, stable heterosexual relationships.⁴ In terms of absolute numbers, therefore, couples living in a se-

rodiscordant relationship (in which the partner of the index case is HIV-negative) are the largest group at risk for HIV.

Two key strategies are recommended to improve care among serodiscordant couples: 1) partner testing and targeting serodiscordant couples for HIV preventive interventions, and 2) starting the index case on antiretroviral therapy (ART).^{5,6} A multinational clinical trial showed that early ART, started immediately after diagnosis, reduced the risk of transmission to the non-infected partner by 96%.^{7,8} This finding prompted a change in global policy in 2013, when the World Health Organization (WHO) recommended initiating all PLHIV living in a serodiscordant relationship on ART, irrespective of CD4 count.⁹

An essential prerequisite to implementing this recommendation is identification of PLHIV living in serodiscordant relationships, which in turn is dependent upon disclosure of HIV status to the partner and having the partner tested for HIV. As HIV is a disease driven by behavioural factors entangled within complex sociocultural and legal contexts, there are numerous challenges involved in partner disclosure and testing. Studies from African countries have reported that more than one third of PLHIV in couples do not disclose their HIV status to their spouse due to fear of marital discord.^{10–12}

While the NACP in India recommends regular HIV testing for the partners of PLHIV at 6-month intervals, there is limited information from programmatic settings on the prevalence of partner HIV testing and factors influencing partner testing.^{13,14} Understanding these factors is crucial for planning appropriate interventions to improve partner disclosure and testing and to provide appropriate care for both index patients and their partners. Generating such evidence requires a combination of quantitative and qualitative research methods.

In this context, we aimed to assess the status of partner testing and factors influencing it among PLHIV registered in selected ART centres in Gujarat, India, during 2011–2015. The specific objectives were 1) to assess the proportion of PLHIV whose partners were not tested for HIV; 2) to assess the sociodemographic and clinical characteristics of index cases associated with partner non-testing; and 3) to understand the perceived facilitators and barriers to partner testing and make suggestions on how to improve testing from the perspective of the health-care provider.

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MATERIALS AND METHODS

Ethics approval

Ethics approval was obtained from the Institutional Ethics Committee of the BJ Medical College and Civil Hospital, Ahmedabad, Gujarat, India, and the Ethics Advisory Group of the International Union Against Tuberculosis and Lung Disease, Paris, France. Informed consent was obtained from all key informants before conducting the interviews.

Study design

We used an explanatory mixed-methods design in which the quantitative phase (a retrospective cohort analysis) was followed by a qualitative phase (one-to-one interviews).¹⁵

AIDS setting

The most recent recorded HIV prevalence in Gujarat state in western India is 0.42%, compared with a national average of 0.26%. Gujarat ranks fourth among Indian states in terms of HIV burden, and accounts for 8% of the total national HIV burden.²

This study was conducted in four selected ART centres in Gujarat: the Sola and Vadilal Sarabhai hospitals in Ahmedabad district, and Jamnagar and Gandhinagar ART centres (convenience sampling). These ART centres are embedded within the hospitals of medical colleges.

Once they have been diagnosed as positive for HIV, the patients are referred from integrated counselling and testing centres (ICTCs) to ART centres for counselling, assessment of ART eligibility and, if eligible, initiation on ART per national ART guidelines.^{13,16} Care at ART centres is provided by a team of multidisciplinary care providers, including a qualified and experienced treating physician, nurse, pharmacist, counsellor, data manager and community representatives working as care coordinators. The details of all PLHIV registered for care are recorded in a treatment card designated for this purpose, known as a 'white card' at the ART centre. Some of these details are captured and maintained in an electronic database (Master Line-list) by the centre's data manager.

Per national guidelines, when patients are enrolled at an ART centre, they are counselled to disclose their HIV status to their partner and family members and to have their partners undergo HIV testing as soon as possible. If the results are negative, non-infected partners are counselled to undergo HIV testing once every 6 months. The HIV status of the partner is recorded on the white card and kept confidential.

Study population and study period

Quantitative

All PLHIV enrolled for care in the four selected ART centres in Gujarat, India, from 1 January 2011 to 31 December 2015, who were married at the time of enrolment, and their partners, were included in the study, irrespective of the HIV status of the partners. Unmarried, divorced, separated and widowed PLHIV were excluded, as there was no information on extra-marital partners in the programme records. There was no sampling (comprehensive sample). Spouses who were legally married and living with a PLHIV were considered to be partners.

Qualitative

Health-care providers involved in patient care and management (treating physicians, nurses, counsellors and care coordinators) were interviewed. A saturation of findings was used to guide the sample size. A total of 10 key informant interviews were conducted with four ART counsellors, two care coordinators, two staff nurses and two ART medical officers. The interviews lasted on average 25 min (range 18–42 min). When saturation was achieved, we did not interview any further.

Data variables, sources of data and data collection

Quantitative

Data on the index cases' characteristics (age, sex, baseline WHO clinical staging, baseline CD4 count, ART status) and the partners' HIV status were extracted from the ART treatment cards and the electronic patient database into a structured pro forma.

Qualitative

Health-care providers were interviewed by KS (a female medical doctor trained in qualitative research) by telephone, in English or Hindi as preferred, and audio-recorded using a 'call recorder' application after obtaining consent. An interview guide was used to explore the challenges and make suggestions for improving partner testing for HIV. In case a participant did not understand the question or the interviewer was not clear on what was shared, appropriate probes were used and information was debriefed for participant validation.

Data entry and analysis

Quantitative

Data entry and analysis was performed using EpiData software (v. 3.1 for data entry and v. 2.2.2.178 for data analysis, EpiData Association, Odense, Denmark). Variables were summarised using means (standard deviation) or medians (interquartile range [IQR]) or frequencies and percentages, as applicable. The association of partner testing with the sociodemographic and clinical characteristics of the index cases was examined using the χ^2 test, and unadjusted relative risks (RR) with 95% confidence intervals (CI) were calculated. As there was a lot of information missing from the data set, we considered it was prudent not to perform a multivariate analysis.

Qualitative

Audio-recorded interviews were transcribed verbatim on the same day by KS. A descriptive content analysis by manual coding was performed by two independent, trained researchers (KS and ARD) to generate categories or themes. These were reviewed by AMVK to avoid subjective bias and strengthen interpretive credibility. Any disagreements were resolved through discussion.

RESULTS

Partner HIV testing and serodiscordance

Of the 4381 PLHIV registered for care during 2011–2015, 497 were excluded because they were not mar-

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KEY WORDS

HIV testing; mixed-methods; operational research; partner testing; PLHIV; serodiscordant couples

TABLE 1 Sociodemographic characteristics of married PLHIV registered in selected ART centres in Gujarat, India, 2011–2015

Variable	Centre 1 n (%)	Centre 2 n (%)	Centre 3 n (%)	Centre 4 n (%)	Total n (%)
Total	505 (100)	784 (100)	1490 (100)	1105 (100)	3884 (100)
Sex					
Male	324 (64)	480 (61)	847 (57)	673 (61)	2324 (60)
Female	181 (36)	304 (39)	643 (43)	432 (39)	1560 (40)
Age, years					
≤25	52 (10)	71 (9)	166 (11)	61 (6)	350 (9)
26–35	141 (28)	212 (27)	420 (28)	296 (27)	1069 (27)
36–45	116 (23)	211 (26)	391 (26)	267 (24)	985 (25)
46–55	44 (9)	85 (11)	221 (15)	104 (9)	454 (12)
>55	24 (5)	35 (5)	107 (8)	47 (4)	213 (6)
Missing	128 (25)	170 (22)	185 (12)	330 (30)	813 (21)
Caste					
General	89 (18)	227 (29)	463 (31)	197 (18)	976 (25)
SC/ST	68 (14)	165 (21)	286 (19)	59 (5)	578 (15)
OBC	220 (44)	133 (17)	514 (35)	276 (25)	1143 (29)
Others	0 (0)	47 (6)	35 (2)	225 (20)	307 (8)
Missing	128 (25)	212 (27)	192 (13)	348 (32)	880 (23)
Education					
Illiterate	255 (50)	168 (21)	341 (23)	438 (40)	1202 (31)
Primary	169 (34)	306 (39)	470 (32)	332 (30)	1277 (33)
Secondary	64 (13)	245 (31)	571 (38)	299 (27)	1179 (30)
College	17 (3)	61 (8)	107 (7)	36 (3)	221 (6)
Missing	0	4 (1)	1 (0)	0	5 (0)
Occupation					
Professional	13 (3)	14 (2)	30 (2)	10 (1)	67 (2)
Skilled	136 (27)	203 (26)	359 (24)	218 (20)	916 (24)
Semi-skilled	87 (17)	196 (25)	422 (28)	289 (26)	994 (26)
Unemployed	141 (28)	187 (24)	491 (33)	230 (21)	1049 (27)
Missing	128 (25)	184 (23)	188 (13)	358 (32)	858 (21)

PLHIV = people living with the human immunodeficiency virus; ART = antiretroviral therapy; SC/ST = scheduled caste/scheduled tribe; OBC = other backward classes.

ried or were widowed or divorced from their partner at the time of enrolment. Of the remaining 3884 PLHIV with partners (spouses) eligible for further analysis, 1279 (33%) did not have their partners tested for HIV. Of the 2605 PLHIV whose partners were tested, 1019 (39%) were living in a serodiscordant relationship. Of the 3068 PLHIV assessed as eligible for ART at the time of enrolment, 2819 (92%) were initiated on ART.

Sociodemographic characteristics

The mean age of the index PLHIV was 38 years; 60% were male. The mean ages of the spouses of the male and female PLHIV were respectively 35 and 39 years. Nearly one third of the PLHIV were illiterate, and the median monthly household income was 4000 Indian rupees (INR) (~US\$65). Information on age, caste and/or occupation was missing for approximately one fifth of the study population (Table 1). For reasons of confidentiality, the identity of the ART centres is masked in the results.

Clinical characteristics

The majority of the PLHIV attended the HIV testing centre voluntarily (self-referral, 44%), followed by referral from government health-care providers (39%), private health-care providers (15%) and targeted intervention sites (2%), which care for key populations such as men having sex with men (MSM), female sex workers (FSW) and injecting drug users (IDU) (Table 2). Of the total PLHIV, 1065 (27%) were at WHO clinical stages 3 or 4, and 69% had CD4 counts < 350 cells/mm³. Approximately one fifth of the

PLHIV (21%) had at least one opportunistic infection, including sexually transmitted illnesses (4%), at the time of enrolment (Table 2). While the sociodemographic characteristics were similar across all four ART centres, the clinical profile of the PLHIV varied across the centres by entry point (referral) for HIV testing, WHO clinical staging, CD4 counts and assessments for opportunistic infection and data on behavioural characteristics.

Factors associated with non-testing of partners

Index PLHIV who were male, older (age ≥ 26 years), illiterate, had a professional occupation, with a history of alcohol and tobacco use, who belonged to key populations (MSM, FSW, IDU), were at WHO clinical stage 3 or 4 or had a CD4 count < 350 cells/mm³, and were incapacitated to work (ambulatory or bedridden), were less likely to have their partners tested for HIV. There were significant differences between ART centres in partner testing (Tables 3 and 4).

Facilitators to partner HIV testing

In the interviews, the health-care providers listed the following facilitators for partner HIV testing: increased access to HIV testing through decentralised testing under the NACP, direct access to HIV counselling and testing without the need to stand in the general out-patient queue, availability of free services, counselling services offered by multiple stakeholders including peer educators and non-governmental organisation (NGO) staff, travel reimbursement and positive patient attitudes.

TABLE 2 Clinical and behavioural characteristics of married PLHIV registered in selected ART centres in Gujarat, India, 2011–2015

Variable	Centre 1 n (%)	Centre 2 n (%)	Centre 3 n (%)	Centre 4 n (%)	Total n (%)
Total	505 (100)	784 (100)	1490 (100)	1105 (100)	3884 (100)
Entry point					
Self-referral	494 (98)	414 (53)	486 (33)	318 (29)	1712 (44)
Targeted intervention*	1 (0)	24 (3)	31 (2)	14 (1)	70 (2)
Private provider	0	114 (14)	190 (13)	263 (24)	567 (15)
Public provider	10 (2)	232 (30)	783 (53)	503 (45)	1528 (39)
Missing	0	0	0	7 (1)	7 (0)
WHO stage					
1	112 (22)	344 (44)	1199 (81)	677 (61)	2332 (60)
2	171 (34)	195 (25)	46 (3)	41 (4)	453 (12)
3	165 (33)	195 (25)	110 (7)	274 (25)	744 (19)
4	57 (11)	50 (6)	101 (7)	113 (10)	321 (8)
Missing	0	0	34 (2)	0	34 (1)
Functional status					
Working	468 (93)	731 (93)	1415 (95)	895 (81)	3509 (90)
Ambulatory	17 (3)	21 (3)	30 (2)	139 (13)	207 (5)
Bedridden	20 (4)	32 (4)	44 (3)	71 (6)	167 (4)
Missing	0	0	1 (0)	0	1 (0)
Tuberculosis					
No	399 (79)	612 (78)	367 (25)	1085 (98)	2463 (63)
Yes	104 (21)	171 (22)	130 (9)	20 (2)	425 (11)
Missing	2 (0)	1 (0)	993 (67)	0	996 (26)
Alcohol use					
No	354 (70)	1 (0)	0	676 (61)	1031 (27)
Yes	127 (25)	0	0	209 (19)	336 (9)
Missing	24 (5)	783 (100)	1490 (100)	220 (20)	2517 (64)
Tobacco use					
Ever user	253 (50)	1 (0)	0	597 (54)	851 (22)
Non user	228 (45)	0	0	290 (26)	518 (13)
Missing	24 (5)	783 (100)	1490 (100)	218 (20)	2515 (65)
Hepatitis B					
No	503 (100)	1 (0)	731 (49)	157 (14)	1392 (36)
Yes	2 (0)	2 (0)	36 (2)	22 (2)	62 (2)
Missing	0	781 (100)	723 (49)	926 (84)	2430 (62)
Opportunistic infection					
No	348 (69)	474 (61)	150 (10)	1076 (97)	2048 (53)
Yes	151 (30)	310 (39)	60 (4)	29 (3)	550 (14)
Missing	6 (1)	0	1280 (86)	0	1286 (33)
CD4 count, cells/mm ³					
<350	335 (66)	511 (65)	1034 (69)	801 (72)	2681 (69)
≥350	145 (29)	253 (32)	431 (29)	298 (27)	1127 (29)
Missing	25 (5)	20 (3)	25 (2)	6 (1)	76 (2)

*Targeted intervention to prevent HIV among key populations such as intravenous drug users, men having sex with men, female sex workers. PLHIV = people living with the human immunodeficiency virus; ART = antiretroviral therapy; WHO = World Health Organization.

Challenges to partner testing

From the transcripts, challenges were coded under 17 codes grouped into six categories. These, along with suggestions provided by the respondents to address the challenges in partner testing, are listed in Table 5 and are briefly described below.

Category I: stigma and fear of discrimination

In the view of health-care providers, non-disclosure of HIV status to partners was the main barrier to testing, which in turn was ascribed to the fear of marital discord or dissolution, fear of being shamed for practising immoral sexual behaviour and fear of stigma and discrimination among family members. Providers corroborated this with the patient's behaviour of preferring not to seek

care from a nearby ART centre, even if it meant travelling long distances. Providers mentioned that during repeated counselling for disclosure and partner testing, some PLHIV showed anger and resentment and even threatened to discontinue treatment. The health-care providers observed that both PLHIV and their partners felt that HIV testing was not necessary until they became sick.

Category II: sex and age dynamics

According to the health-care providers, male PLHIV tended to visit the health facility on their own, without being accompanied by others. If asked by their partners, some male PLHIV would prevaricate, stating that they were seeking care for diarrhoea or fever, and would not disclose the real reason. Given the male domi-

TABLE 3 Sociodemographic characteristics of index PLHIV associated with partner testing in selected ART centres in Gujarat, India, 2011–2015

Variable	Total	Partner not tested for HIV %	Unadjusted RR	95%CI
Sex				
Male	2324	35.6	1.2	1.1–1.4
Female	1560	28.9	1.0	Ref
Age, years				
≤25	350	20.9	1.0	Ref
26–35	1069	26.2	1.3	1.0–1.6
36–45	985	31.9	1.5	1.2–1.9
46–55	454	33.9	1.6	1.3–2.1
>55	213	42.7	2.1	1.6–2.7
Education				
Illiterate	1202	35.9	1.4	1.1–1.8
Primary	1277	31.9	1.2	1.0–1.6
Secondary	1179	32.3	1.3	1.0–1.6
College	221	25.8	1.0	Ref
Occupation				
Unemployed	1049	24.2	0.6	0.5–0.9
Semi-skilled	994	34.5	0.9	0.7–1.2
Skilled	916	28.1	0.7	0.5–1.0
Professional	67	38.8	1.0	Ref
Caste				
General	976	28.5	1.0	Ref
SC/ST	578	25.1	0.9	0.7–1.1
OBC	1143	28.3	1.0	0.9–1.1
Others	307	45.0	1.6	1.4–1.9
Year of registration				
2011	432	41.4	1.2	1.1–1.4
2012	784	33.8	1.0	0.9–1.1
2013	853	31.9	1.0	0.8–1.1
2014	857	28.0	0.8	0.7–0.9
2015	958	30.7	1.0	Ref

PLHIV = people living with the human immunodeficiency virus; ART = antiretroviral therapy; RR = relative risk; CI = confidence interval; Ref = reference category; SC = scheduled caste; ST = scheduled tribe; OBC = other backward classes.

nance within the Indian family context, this is usually not probed further by the partners. In contrast, female PLHIV were mostly accompanied by parents or in-laws for support, and this often helped in disclosure to family members, and eventually partner testing for HIV. One counsellor, however, mentioned that male dominance could work in favour of partner testing. Health-care providers stated that young PLHIV in couples were more likely than older PLHIV in couples to explain their status to their partners and bring them for testing.

Category III: high-risk groups, migrants

The health-care providers specifically mentioned challenges related to key populations—especially MSM—who are afraid to disclose their status to family members, as this would also be likely to disclose their sexual orientation. Migrants were another challenging group mentioned by the health-care providers. The spouses (especially females) of migrants often do not live with them and are often unaware of where to be tested. Even if they did know, they lacked the decision-making ability within the family and it was thus a challenge for them to visit the health facility for testing.

Category IV: missed opportunities

The health-care providers noted that spouses of very ill PLHIV who died soon after admission to hospital were often not con-

tacted and were thus more likely to miss HIV testing. In contrast, one counsellor stated that the partners of ill PLHIV were more likely to undergo testing for HIV as they had directly witnessed the effects of delayed diagnosis and treatment, especially if they had accompanied the index case to hospital.

Category V: social and legal factors

Illiteracy, especially a lack of health literacy, was reported to be another barrier to partner testing. Among illiterate PLHIV, lack of awareness regarding the disease, the benefits of testing, the harms of delaying testing and the location of the testing centre within a large multi-specialty hospital were reported as barriers to partner testing.

For the literate PLHIV, it was more a sense of shame among family members that prevented them from disclosure. These PLHIV preferred to have their partners undergo testing in the private health sector under the pretext of a 'routine blood test for haemoglobin'. They were afraid that bringing their partner for testing in a government hospital could lead to accidental disclosure of their HIV status and their hidden infidelities.

Health-care providers were not in agreement about the law on disclosure. One ART medical officer stated that the law mandates them to disclose the HIV status of index cases to their spouses, while one of the care coordinators was of the opinion that with-

TABLE 4 Clinical and behavioural characteristics of index PLHIV associated with partner testing for HIV in selected ART centres in Gujarat, India, 2011–2015

Variable	Total	Partner not tested for HIV %	Unadjusted RR	95%CI
Alcohol use				
Yes	336	50.3	1.3	1.1–1.5
No	1031	39.0	1.0	Ref
Tobacco use				
Yes	851	39.6	4.9	3.3–7.3
No	518	8.1	1.0	Ref
High-risk behaviour				
Yes	92	52.2	1.6	1.3–2.0
No	3537	32.5	1.0	Ref
WHO stage				
1	2332	31.4	1.0	Ref
2	453	24.9	0.8	0.7–0.9
3	744	38.6	1.2	1.1–1.4
4	321	42.4	1.4	1.2–1.6
CD4 count, <350 cells/mm³				
Yes	2681	34.3	1.2	1.1–1.3
No	1127	28.5	1.0	Ref
ART status				
On ART	2819	29.6	1.0	0.8–1.2
Not on ART	249	30.9	1.0	Ref
Functional status				
Working	3509	30.2	1.0	Ref
Ambulatory	207	58.5	1.9	1.7–2.2
Bedridden	167	59.3	2.0	1.7–2.3
Tuberculosis				
Yes	425	29.4	0.8	0.7–0.9
No	2463	36.5	1.0	Ref
Hepatitis B				
Yes	62	35.5	1.6	1.1–2.2
No	1392	22.8	1.0	Ref
Pregnant				
Yes	157	19.1	0.6	0.5–9.9
No	2149	29.7	1.0	Ref
Entry point				
Self-referral	1712	22.8	1.0	Ref
Targeted intervention*	70	55.7	2.4	2.0–3.1
Private provider	567	34.0	1.5	1.3–1.7
Public provider	1528	42.5	1.9	1.7–2.1
Centre effect				
Centre 1	505	12.1	0.4	0.3–0.6
Centre 2	784	18.5	0.7	0.6–0.8
Centre 3	1490	59.6	2.2	2.0–2.4
Centre 4	1105	27.8	1.0	Ref

*Targeted intervention to prevent HIV among key populations such as intravenous drug users, men having sex with men, female sex workers.

PLHIV = people living with the human immunodeficiency virus; ART = antiretroviral therapy; RR = relative risk; CI = confidence interval; Ref = reference; WHO = World Health Organization.

out the consent of the index case, disclosure to family members is illegal.

Category VI: influence of NGOs and peer educators

While the NGOs and peer educators were mostly appreciated by the health-care providers for their aid in facilitating the process of HIV care and support through counselling and home visits, and linking PLHIV to other social welfare benefits, several expressed concern that some peer educators were not knowledgeable enough to handle challenging PLHIV and may even misguide them.

DISCUSSION

This is the first study from India to systematically examine the magnitude of partner HIV testing and factors that influence it. Nearly two thirds of the index PLHIV had their partners tested for HIV. This is much higher than a recent report from Nigeria, in which only 24% had their partners tested.¹⁷ This could be due to factors such as availability of decentralised, free HIV testing services at every health facility, multiple counselling opportunities provided by a multidisciplinary team and support through NGOs

TABLE 5 Challenges in partner testing and suggestions to address them as perceived by health-care providers from selected ART centres, Gujarat, India, 2016

Challenges	Suggested solutions
<p>Category I: Stigma and fear of discrimination</p> <p>'The patient thinks that if they take drugs from their nearby village some known people might come to know his status. That's why, even if it takes 30 min to 1 h travel also, people prefer to come to the main ART centres.' Statement of a PLHIV quoted by a male counsellor.</p> <p>'If I tell my wife she will leave and go to her mother's home then what will happen to my children; who will take care of the children?' Statement of PLHIV quoted by health-care provider.</p>	<p>Partners who choose to be tested in distant facilities should be honoured and have their travel charges reimbursed by the government</p> <p>Repeated counselling and motivation using positive examples from peers required to promote partner testing</p>
<p>Category II: Sex and age dynamics</p> <p>'In case of males, what happens; he comes alone and he says he went to get drugs for diarrhoea, like that he escapes by saying some proxy reasons.' Male ART counsellor.</p> <p>'This is a male dominant country. If he wants he will get his wife and test his wife. If we come across female PLHIV we face many challenges.' Male ART counsellor.</p> <p>'Females get convinced easily. They also have a fear in their mind that if they (partners) come to know later through somebody else, they will throw me from home. This is bad. He will leave me. For that, it is better now itself I will tell him.' Female ART counsellor.</p>	<p>Counselling needs to be gender-sensitive</p>
<p>Category III: High-risk groups, migrants</p> <p>'They will feel very afraid that their family members will come to know his behaviour of MSM, and his wife will leave him and go. They have one more distress of their MSM behaviour also will be disclosed and if they got infection from their friend they also will be caught.' Female ART counsellor</p> <p>'Those people who can understand in the native places are old ones, they don't know about what is this illness for what this testing is done whether it is for his wife or children, what should be done.' Male ART counsellor, quotes related to testing among partners of migrant PLHIV.</p>	<p>The health system should target these high-risk PLHIV and support them to facilitate appropriate disclosure to their spouses</p> <p>Counselling for the spouse (spouse of the PLHIV who has remained in their place of origin) and family members by telephone and provision of information about the nearest HIV testing centre and the need for testing</p>
<p>Category IV: Missed opportunities</p> <p>'If the patient himself is died then that whole family is left out from outreach work. Spouse had died and now after 4 or 5 years, the spouse of the patient encounter some problems and then got tested found to be positive.' ART medical officer.</p> <p>'The database has to be maintained for partner testing also; actually in our centre we did like this to improve partner testing. In fact we created one WhatsApp group between the ICTC and ART centres. The line list of those partners not tested for HIV is updated frequently; hence by going through this list when the patient comes for a follow-up visit we target them intensively to bring their partner for testing through intensive counselling.' ART counsellor.</p>	<p>There should be a mechanism of community outreach for tracing the family members of PLHIV who have died</p> <p>To avoid missing partners from testing there should be good coordination between the ART centre and the ICTC; they should jointly track the partners using modern technology</p>
<p>Category V: Social and legal factors</p> <p>'I'm doing this much work. I can eat well this much. Never had I got even a headache. Then for what I will get the test?' Statement of a PLHIV partner quoted by a health-care provider.</p> <p>'She is not having any problem. I'm fine, then why she needs testing? If my CD4 count is normal then my wife wouldn't have affected hence there is no need for testing for her.' Statements from PLHIV quoted by health-care provider.</p> <p>'Definitely the difference is there. If the PLHIV is illiterate, they will not know anything. Everything they will be hearing for the first time. From the initial period, they will be worrying, where I will go, I have to wander here and there, I have to keep asking everybody on the way, and they will tell you go here you go there.' ART medical officer.</p>	<p>The counsellors need to spend a long time with illiterate patients to better explain to them. There is also a need for pictorial sign boards, which are illiterate-friendly, within the tertiary care facilities</p>
<p>Category VI: Influence of NGOs and peer educators</p> <p>'In contrast to this, what these peer educators do is "there is no necessity for disclosure. You take these precautions your wife will not get affected. Don't keep telling to everyone." If they don't say like this and tell the MSM, "Nothing will happen, you immediately tell your status to your wife. She will not leave you." Like this if they tell positively and make them understand and motivate it will happen'. ART counsellor.</p>	<p>NGO staffs and peer educators should be trained adequately and be engaged in development of information, education and communication material, including motivational videos, which could be played at ART centres</p>

ART = antiretroviral therapy; PLHIV = people living with human immunodeficiency virus; MSM = males having sex with males; ICTC = Integrated Counselling and Testing Centre; NGO = nongovernmental organisation.

and peer-educators. During the interviews the counsellors mentioned that they recorded the HIV status of the partners of the PLHIV as 'unknown' unless there was clear documentation of HIV test results from an accredited health facility. This practice might have marginally underestimated the prevalence of partner testing.

Among the couples who were tested in our study, about 40% were serodiscordant. This is similar to a previous study from the same state,¹⁸ although marginally different from a study from Delhi (55% discordance)¹⁹ and vastly different from a nationally representative National Family Health Survey (76% discordance).²⁰

Globally, the stated barriers to disclosure and testing are fear of marital disruption, social stigma, fear of being considered unfaithful upon disclosure of HIV status and worry about coping with a positive diagnosis.^{10–12,21} Some of these reasons, especially fear of marital discord and dissolution, were cited as key barriers in our study. In addition, partner non-testing was more likely among index PLHIV who were male, of older age, at an advanced stage of immune deficiency and who came from key at-risk populations such as MSM. These findings were confirmed during the interviews with the providers, who provided additional insights into the challenges of partner testing and who suggested solutions for improving testing. Male dominance in decision making within the Indian family context was mostly a barrier to partner testing, although on occasion it was a facilitator.

The lack of risk perception was another factor identified by health-care providers for partner non-testing. This was attributed to a lack of awareness about HIV disease, the benefits of testing and the harms of non-testing. Several social and legal issues were also noted to influence partner disclosure and testing. Non-testing of partners was particularly noted among migrants (often male) in industrialised settings, as the partners lived far away from the index PLHIV and were not aware about the need for HIV testing and the location of the testing centres. Another study has shown that male migrants have a higher risk of contracting HIV and thus provide an opportunity for primary prevention and prevention of transmission to their spouses.²⁰ The Indian penal code requires health-care providers to disclose HIV status to the legal spouses of PLHIV, and there was some confusion among the health-care providers in understanding this law.

This study has several strengths. First, we employed a mixed-method design. The quantitative and qualitative components validated and complemented each other to capture the complete picture of the issue. Second, the study was conducted using routinely collected data from programmatic settings, and thus reflects realities on the ground. Third, the large sample size minimised the effect of random variation on study results. Finally, we adhered to the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines and the consolidated criteria for reporting qualitative research (COREQ) guidelines for reporting the quantitative and qualitative components, respectively.^{22,23}

This study had some limitations. First, as we relied on routine programme data from multiple centres, data quality was variable. Data for key variables were missing for a large number of PLHIV, precluding the conduct of robust and adjusted analysis. Second, the ART centres included in this study were situated in tertiary care medical college teaching hospitals. The level of training and monitoring among the health-care providers working in these institutions will be different from other peripheral and link ART centres. The findings of this study should thus be generalised with caution. Third, the study results represent the perceptions of the health-care providers and not those of the patients or their partners. This needs further research. Fourth, the term 'partner' in

our study denotes legal spouses of PLHIV living in stable, marital relationships. The findings of the current study cannot therefore be generalised to other partners of PLHIV outside marriage. Nevertheless, as such persons constitute only 8.2% of all PLHIV, this is unlikely to change the overall results of the study.

Several suggestions were provided by the health-care providers to improve partner testing. First, an enhanced tracking mechanism for PLHIV whose partners are not tested needs to be instituted, particularly for vulnerable subgroups of PLHIV, such as partners of migrants, MSM, illiterates and those who present at a late stage of illness. Measures described elsewhere, such as providing preferential treatment for couples (fast-tracked provision of services) when they come to test for HIV together at the health facilities, may improve partner testing. Couple-oriented counselling among pregnant Indian women has shown increased levels of partner testing.²⁴

Second, peer-educators with roots in the community should be utilised effectively through training and supportive supervision. The more challenging PLHIV who display high levels of resentment and/or rudeness should be approached by trained care coordinators and peer educators through house visits. Resistant PLHIV could be motivated using 'expert couples' (couples who have tested together and had positive outcomes) and their testimonies. Third, all index PLHIV living in serodiscordant relationships should be started on ART, irrespective of CD4 count, given the effectiveness of ART in preventing transmission. Considering the many challenges related to disclosure and partner non-testing, however, many people may not be identified as living in a serodiscordant relationship. As a public health approach, we therefore recommend that the NACP in India consider moving towards the recent WHO recommendation of 'test and treat', whereby all PLHIV are started on ART irrespective of CD4 count and clinical stage.²⁵

In conclusion, about one third of the PLHIV did not have their partners tested for HIV. Several factors associated with non-testing of partners were identified and solutions explored. These need to be implemented urgently if we are to achieve the 90–90–90 targets and end HIV.²⁶

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Contexte : Quatre centres du traitement antirétroviral (TAR) sélectionnés de l'état de Gujarat, qui compte pour 8% du poids du virus de l'immunodéficience humaine (VIH) en Inde.

Objective : Nous avons voulu 1) évaluer la proportion de personnes vivant avec le VIH (PVIH) dont les partenaires n'ont pas été testés pour le VIH ; 2) évaluer les caractéristiques sociodémographiques et cliniques du cas index associées au test du partenaire ; et 3) comprendre les facilitateurs et les contraintes perçus au test du partenaire et faire des suggestions pour améliorer les tests du point de vue des prestataires de soins de santé.

Schéma à plusieurs méthodes : La phase quantitative a impliqué de retrouver dans les archives du programme les PVIH mariés enrôlés entre 2011 et 2015 ; la phase qualitative a ensuite consisté en entretiens avec des informateurs clés.

Marco de referencia: Cuatro centros de tratamiento antirretrovírico (TAR) en el estado de Guyarat, que representa el 8% de la carga de morbilidad por el virus de la inmunodeficiencia humana (VIH) de la India.

Objetivos: 1) Examinar la proporción de personas positivas frente al VIH cuyas parejas no cuentan con la prueba diagnóstica del VIH; 2) analizar las características socioeconómicas y clínicas del caso inicial que se relacionan con la práctica de la prueba diagnóstica en la pareja; y 3) comprender los elementos facilitadores y los obstáculos percibidos a la prueba del VIH en las parejas y las propuestas encaminadas a mejorar su utilización, desde el punto de vista de los profesionales de salud.

Métodos: Se aplicó un modelo de métodos mixtos con una etapa inicial cuantitativa, que comportó el examen de los registros del programa de las personas positivas frente al VIH casadas inscritas del 2011 al 2015, seguida por una etapa cualitativa durante la cual se realizaron entrevistas a informantes clave.

Résultats : Sur 3884 PVIH mariés, 1279 (33%) n'ont pas fait tester leurs partenaires pour le VIH. Les facteurs comme le fait que le cas index soit un homme, illettré, d'âge >25 ans, appartenant à des populations clés, utilisant des drogues, étant à un stade avancé de la maladie, ont été plus susceptibles d'être associés à l'absence de test du partenaire. Le non divulgation du statut VIH (due à la peur d'une discorde maritale) et le manque de connaissances et de perception des risques ont été les obstacles majeurs au test.

Conclusion : Un tiers des PVIH n'ont pas fait tester leurs partenaires pour le VIH. Plusieurs facteurs associés à l'absence de test des partenaires ont été identifiés et des solutions ont été recherchées. Elles doivent être mises en œuvre d'urgence si nous voulons atteindre les cibles de 90–90–90 et mettre fin au VIH.

Resultados: De las 3884 personas positivas frente al VIH casadas, 1279 parejas no contaban con la prueba del VIH (33%). Las características del caso inicial que se asociaron con mayor frecuencia a la falta de prueba diagnóstica de la pareja fueron el sexo masculino, el analfabetismo, la edad más de 25 años, el hecho de pertenecer a una población clave, el consumo de sustancias psicoactivas y un estadio clínico avanzado de la enfermedad. Los principales obstáculos a la práctica de las pruebas fueron la negativa a divulgar su situación frente al VIH (por temor a una discordia conyugal) y la falta de sensibilización y percepción de los riesgos.

Conclusión: En un tercio de las personas positivas frente al VIH, no se había practicado a su pareja la prueba diagnóstica de la infección. Se reconocieron diversos factores vinculados con esta situación y se analizaron las soluciones. La aplicación de estas medidas es urgente con el fin de cumplir con las metas 90–90–90 y eliminar la infección por el VIH.

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