

# Developing HIV Assisted Partner Notification Services Tailored to Mexican Key Populations: A Qualitative Approach

**Heleen Vermandere**

National Institute of Public Health

**Santiago Aguilera-Mijares**

National Institute of Public Health

**Liliane Martínez-Vargas**

National Institute of Public Health

**M. Arantxa Colchero**

National Institute of Public Health

**Sergio Bautista-Arredondo** (✉ [sbautista@insp.mx](mailto:sbautista@insp.mx))

National Institute of Public Health <https://orcid.org/0000-0001-8910-3011>

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## Research article

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## Abstract

**Background.** Assisted partner notification services (APNS) may increase HIV testing, early diagnosis, and treatment, but they are not formally implemented in Mexico, where the HIV epidemic is concentrated in men who have sex with men (MSM) and transwomen (TW).

**Methods.** We conducted semi-structured interviews to explore partner notification with MSM, TW and health care providers to identify the essential elements to include in the design and implementation of APNS directed to MSM and TW in Mexico City. Afterwards, brainstorm sessions were carried out to produce strategies for implementing APNS.

**Results.** Most participants reported experiences with informal partner notification, but not with APNS. Only one health care provider indicated assisting notification systematically. The main barriers for notifying mentioned by both MSM and TW included fear of (violent) reactions, discrimination and lacking contact information of casual partners. Participants thought it was easier notifying a formal partner, conditional of being well informed about HIV. Given current stigma and lack of awareness, it was suggested that APNS should be preceded by HIV awareness efforts, and be provided by counsellors or peers to mitigate potential rejection or violent reactions.

**Conclusions.** While APNS are not formally implemented in Mexico, all participants supported the service, indicating that APNS can enhance early HIV diagnosis in Mexico. Strategies to implement such services need to be flexible addressing the individual needs of participants, guaranteeing the safety of more vulnerable participants.

## Background

Early diagnosis is key to treat HIV successfully (1). It allows for early initiation of antiretroviral therapy (ART), which has been found to reduce the risk of HIV transmission (2), development of a non-AIDS-defining illness, progression to AIDS, or death (3). Knowledge of serological status has also been linked to a reduction in high-risk sexual behaviors (4). However, despite the expansion of HIV testing services over the last decades (5), diagnosis remains one of the most elusive targets worldwide (6) to reach the UNAIDS (Joint United Nations Program on HIV/AIDS) 90-90-90 goals for 2020 (7). In 2019, only 79% of people living with HIV knew their status, 78% of these were on ART, and 86% of these had viral suppression (8) — which is when HIV is sexually untransmittable (9) — as opposed to the 90% aimed for each indicator.

In order to undertake the challenge of scaling up HIV diagnosis, new approaches to improve the efficiency and coverage of HIV testing services are needed. This is particularly important given that those who are currently not tested are hard-to-reach key populations with recent infections, i.e. without physical complaints that lead to detection. HIV assisted partner notification services (APNS) have been strongly recommended by the World Health Organization as one such approach (10). APNS are services offered to inform partners of a person diagnosed with HIV that they are at risk of having HIV and should seek testing (11). A systematic review of RCTs concluded that APNS can increase HIV testing services uptake, which results in a higher proportion of HIV + people being diagnosed, and increases linkage to care; whereas reported social harm and adverse events due to the service have been rare (10). Sixty-seven countries worldwide (six in Latin America) included HIV APNS in their national policies, as of 2016 (12).

While APNS seem to have the potential to increase HIV testing, early diagnosis, and treatment, they have yet to be formally applied in the context of concentrated epidemics in low- and middle-income countries such as Mexico. In this Latin American country, national government guidelines stipulate that users testing HIV + should be informed about the importance of sharing their status with sexual partners, for them to be linked to health services (13); and that it is recommended to provide APNS during medical follow-up visits of HIV + patients (14). Yet despite this and some isolated efforts by civil society organizations to carry out APNS (15), this strategy has not been standardized and implemented systematically in all settings offering HIV testing.

To be effective, APNS would have to be tailored to the Mexican key populations—MSM and TW having the highest prevalence (16–19). A nation-wide study in 2011 found only 32% of HIV + MSM knew their diagnosis (17); another study in Mexico City, in 2012, found the same was true for only 26% of HIV + TW in sex partner meeting places (18). As a result, the HIV epidemic in Mexico is driven by undiagnosed and untreated key populations who continue to transmit the virus (20).

Both MSM and TW face the barrier of stigma and discrimination in Mexico, due to their sexual orientation and gender identity (21–23). The same applies to people living with HIV (24), meaning that the need for confidentiality in APNS is of utmost importance, albeit services also need to be accommodated for differences in the underlying correlates of HIV risk and sexual health needs between MSM and TW (25).

The lack of APNS is a missed opportunity in the public health response to HIV in Mexico, given that they could significantly contribute to halt the epidemic by tracing down potentially infected partners of recently diagnosed men and women. This study therefore aims to evaluate the acceptability of APNS—given the importance of confidentiality and discretion regarding HIV diagnoses in Mexico—and to identify the essential elements to include in the design and implementation of APNS directed to MSM and TW in Mexico City, in order to inform policies in this context.

## Methods

### Data collection procedures

Semi-structured interviews were conducted with MSM and TW, using a guide to explore core themes, namely: their experience with partner notification of HIV diagnosis, the barriers and facilitators surrounding it, and their suggestions for APNS. In addition, interviews were carried out with health care providers to explore their experience with APNS, as well as their suggestions on how to implement them. The guidelines, developed for this study, are available as 'additional file'.

## Recruitment of participants

A criterion sampling was conducted to recruit MSM and TW in two non-governmental AIDS Service Organizations (ASO) in Mexico City. Inclusion criteria specified that participants be at least 18 years-old, self-identified TW, or men reporting at least one sexual encounter with another man in the previous 12 months. In addition, we aimed to balance the number of participants living with or without HIV among both MSM and TW. The organization's staff and research team screened for eligibility, explained the study, and scheduled an interview for those who expressed interest in participating. Afterward, snowball sampling was carried out, in which the staff used their personal networks to recruit participants, with the purpose of reaching the aforementioned balance between profiles of participants.

The staff also recruited health care providers from other community-based organizations and public health institutions offering HIV prevention services in Mexico City. To be eligible for the study, the health care providers needed at least one year of work experience in the HIV testing and counseling area.

## Data analysis

All interview audio-recordings were transcribed verbatim and uploaded into MAXQDA 11 Plus, a qualitative analysis software. Data underwent a qualitative content analysis (26), starting with the elaboration of a codebook based on the themes explored. Two researchers then carried out an intercoder agreement exercise: 10% of interviews were coded, seeking an agreement equal to or above 80%. Afterward, all data was coded and each coded segment was synthesized in order to identify categories.

The participant's quotes presented in this paper were translated from Spanish using the back-translation method, in order to obtain an English version that is equivalent to the source in meaning and in tone. This method first requires that a bilingual person translates into the target language, then a second bilingual person translates the material back into the original language, and this process is iterated to check for quality and make adjustments in the translation (27).

## Strategies for implementing APNS

Having identified the key components related to APNS, research team members and project partners (ASOs' staff and health care providers) conducted brainstorming sessions in order to develop prototype strategies for the efficient implementation of APNS directed at MSM and TW in Mexico.

## Results

Between January and March 2019, a total of twenty-eight interviews were conducted among twelve MSM, eleven TW, and five health care providers. MSM had an average age of 30 years and half of them were HIV+. TW were on average 43 years old and six of them were HIV+. Three health care providers worked in AIDS service organizations and two in public health services.

Other participant characteristics were identified throughout the interviews: some MSM were volunteers for AIDS service organizations, and some TW mentioned previous or current involvement with transactional sex, homelessness, substance abuse, or prison.

The following results present similarities and differences between MSM and TW; their quotes include the HIV status and identifier number of the participant. No differences were identified between HIV + and HIV- participants. Quotes of health care providers are indicated by HCP and their identifier number.

## Experiences

A total of nine MSM and three TW mentioned having experience with informal HIV partner notification, i.e. a notification process not guided by a health care provider (view Table 1). Four MSM reported having notified their partners, three had been notified, two had experienced both notifying and being notified, and three had no experience. Three TW had notified a partner, one of them indirectly though, by prison staff notifying on her behalf. One TW had been notified, one had experience in both directions, and six reported no experience (although two of them mentioned notifying a partner of a syphilis infection). Only three MSM and one TW were advised to notify by health care providers; one of both the MSM and TW was told that notification was optional. *"They also told me that if I don't want to say it [being HIV+] it's my right; I just had to use a condom from now on"* (+ TW17). Almost all HIV + participants had notified at least one partner (n = 5).

Table 1  
Participant's experience with informal HIV partner notification

	MSM	TW	Total
<b>HIV Status</b>			
HIV-	6	5	11
HIV+	6	6	12
<b>Notification experience</b>			
Notifying	4	3*	7
Being notified	3	1	5
Both	2	1	4
None	3	6**	9
*One TW notified indirectly by asking prison staff to inform her partner.			
**Two TW reported having notified their syphilis diagnosis to their partners.			

Some MSM and TW said that the informal partner notification happened at the beginning of a relationship and face to face. *"I told him that, well, if the couple thing can work, let's go ahead. So he mentioned that, well, he had an issue; and we arranged to meet, talked, and then he told me he was positive"* (-MSM6). In some cases, the partner who was notified was HIV+, which gave them confidence to notify. *"He [her HIV + partner] started telling me... that he took a medicine; and I said: 'This is the moment, he has told me now [his positive status]... I feel more trust', and I dared telling him [about her positive status]"* (+ TW17).

Others indicated that notification occurred during hospital admissions due to HIV symptoms. *"I said to him [while admitted in a hospital]: 'The thing is the nurse told me that I have HIV; so at that moment we both started crying'"* (+ TW13). One TW had an experience of an intervention resembling APNS: she shared that officials at the detention center notified her partners through a "program", with her authorization, after she was diagnosed, *"so the plague wouldn't spread more"* (+ TW15); adding that her partners were subsequently tested as well.

As for health care providers' experiences, some indicated they suggest newly HIV-diagnosed patients to share their status with partners potentially at risk. However, only one had heard about APN as a service and in his work it was standard practice to request consent for providers to invite patients' partners to get tested, and to provide users with tools on how to notify themselves. *"Our informed consent has a section where they can place the name of their sex partners and their phone number, and where they authorize or not if we can contact them to invite them to get tested... The psychologist can give them [patients] tools to share the diagnosis with their partners... The counselling providers are also trained to provide elements to the patient regarding 'how to share my diagnosis, who to share it with, what to do'... underlining the importance of the diagnosis being personal, being confidential"* (HCP18).

Other providers stated that, in addition to recommending notification, on a few occasions they have offered or have been requested to support patients during the notification process. As such, providers have employed different notification strategies: a) contacting the partner to offer HIV testing, with or without mentioning the patient; b) being present when the patient notifies a partner; and c) providing counselling to the patient and partner after the notification took place. *"On a few occasions, yes, I've had cases [requesting support for notification] ... A [trans] girl that, well, her husband didn't know... When she decided to take him to the clinic... she had told me: 'I will take him to keep me company, but you will do your job' [inviting him to get tested without revealing her diagnosis], right? So I had to speak to him..."* (HCP14).

## Barriers and facilitators

**Fear of reactions.** The fear of HIV stigma and people's negative reactions stood out as the main barrier for partner notification in MSM and TW. Most participants believed HIV stigma or "taboo" are still common and severe among Mexican society. *"Unfortunately, there's people that are still living with the taboo; and the taboo I think is the ugliest, because they feel that if you touch them, you've already infected them"* (+ TW17). Only one TW felt that *"stigma has reduced because you can't see it [AIDS symptoms]"* (-TW20).

Directly linked to stigma, both MSM and TW repeatedly underlined the fear of rejection as a major barrier to notify both formal and casual partners. *"He [my boyfriend] told me that his main fear was that, at the moment he would tell me, that I would ghost him"* (-MSM4). Another participant explained that the fear of rejection can lead to hiding the diagnosis: *"He [my boyfriend] told me: 'I was an asshole for not telling you [my HIV + status] from the beginning... perhaps it was like part of my denial... I was also really scared of how you would react'"* (-MSM7).

Most TW even added they do not merely fear rejection, but their partner's violent reactions to notification. *"I would kind of have that fear of, of them against me, you know? ... that if they turned out to be positive, they would attack me or do something"* (+ TW23). As confirmed by a health care provider: *"their reaction is violent [TW's male partners' reaction to notification]"* (HCP14). TW even spoke of murder as a reaction to notification. *"[A partner] may want to kill me"* (+ TW16); *"many people have been killed [for notifying]"* (+ TW17); and *"[he] wanted to kill her"* (-TW22). As opposed to TW, only a couple MSM mentioned violent reactions from partners: *"you don't know if he'll react in an aggressive way"* (-MSM12).

Another reaction that several TW and a few MSM participants were worried about is having their HIV + status publicly exposed. *"They will make it public for others, no? This person, don't get involved with her; she has AIDS now; watch out"* (-TW20). An MSM and a TW also pointed out that the fear of discovering or being accused of an infidelity could be an obstacle.

TW in general described more reactions from partners that could interfere with partner notification. One mentioned the fear of being blamed: “*you infected me*” (+ TW16); another expressed “*sex becomes something a lot more complicated*” (-TW23). Other emotions considered as obstacles were shame and “*guilt that maybe... I infected my partner*” (-TW23).

MSM and TW frequently identified disinformation as an important barrier or a reason to fear the partner’s reaction: unawareness is often the cause of HIV-related stigma and may, thereby, lead to misunderstandings and rejection. “*I told him and his reaction was: ‘Why you, why you?’ and he started crying ... and he was like: ‘No, it’s just that I don’t understand how this can happen to a person like you’... ‘I just don’t know anything about this subject [HIV]; it scares me a lot; and the truth is I, I’d rather, well, not get involved’*” (+ MSM9).

Knowing more about HIV transmission and its treatment continuum was thought as essential for increasing the acceptance of an HIV diagnosis. Participants argued it provides tools to the person notifying, for better communicating the message; and to the notified partner, to better understand its realistic implications without incurring in fears and negative reactions. “*I would’ve liked him to tell me in person and to tell me based on information, no? like: ‘Ok, look, I just found out I have HIV. You have to get tested... but the treatment is free; nothing will happen to you. If you have HIV, you won’t die... if you get undetectable, you don’t transmit the virus anymore; so the thing of ending up alone won’t happen either’*” (+ MSM9)

**Partner type.** Most TW and some MSM thought that having a formal partner is a relevant facilitator for notification. TW considered it necessary to notify formal partners, because they share their lives together, and trust and take care of each other. “*The partner that is already with her, the formal partner, I think would understand her, and support her in some way*” (+ TW25). MSM thought the beginning of a relationship helps, and that it is easier to notify a formal partner, because with them they have the “*sufficient foundation as to endure the problem*” (-MSM4). Regardless of the partner type, closeness and trust were pointed out by MSM and TW as helpful for partner notification.

At the same time, both MSM and TW identified having casual partners as an obstacle to notification. Both an MSM and a TW agreed they would not know which partners to notify because of the high number of partners and the uncertain time of exposure. “*You don’t know when you caught it [HIV infection]; I mean, how many [casual partners] from back then to inform*” (-MSM12). Participants also explained they often do not have these partners’ contact information, so they are not able to inform them. “*I don’t have a sexual partner that I see often... So no, no, because I don’t even have their information or how to contact them... I wouldn’t do it [notify them]*” (-MSM2). TW mentioned there is no need to notify occasional partners, especially in the case of sex work, for they might be put off from sex and there is no emotional attachment to them. “*With my informal partners I don’t have a reason why [to share an HIV diagnosis] ... I mean, it was only a sexual contact; I would never, never involve feelings at all with someone who is paying me*” (-TW24). However, one TW thought casual partners were easier to notify since those who engage in informal sexual encounters know it is inherently linked with elevated risk. “*I think the informal partner maybe knows it, knows it’s informal, no? And so, maybe, these people already take care of themselves, or are like cautious, as opposed to formal partners. So formal partners maybe already assume a certain risk*” (-TW23).

A couple of MSM believed social networks and dating apps may help find ex-partners they cannot contact anymore: “*If I see them again on Grindr, or on Instagram, or something like that, which is where we have contact, I could do it... send them a message like ‘Hey, this happened and this is my status’*” (-MSM2). Dating apps may aid notification, for they have “*a section where they [MSM] can put it [their HIV + status], and they put it*” (-MSM4). Getting tested regularly and keeping a record of the dates and results was also considered useful by one MSM, because then the person can have a better idea of whom else is at risk and notify them. “*If you keep count... and you’ve been getting tested, and they come out negative, and afterwards one comes out positive, then there you have the range now... then the person that infected you is within that parameter*” (+ MSM11). An additional facilitator brought up by an MSM was youth: “*the younger generations... assimilate it better [the HIV diagnosis]*” (-MSM7).

**Notification need.** A couple of MSM felt there was no HIV transmission risk and therefore no need to notify, due to them not looking sick, being on ART, and always using condoms. “*I had taken perfectly good care of myself with them [used condoms], so I didn’t have a reason to let them know*” (+ MSM9). Instead, a TW explained that being on ART may be a facilitator for notification, since “*once on a treatment, she can tell you: ‘Guess what? I do have that disease, but I’m also controlling this disease’*” (+ TW17). She additionally stated notification must be done when there was a risk of HIV transmission, adding that failing to do so may be punished by the law. “*If there is a risk from a condom breaking? Yes [it is good to notify]. Why? Because now I’m informing him there was a risk, and that risk, although it’s at 4% being undetectable, but it exists. Then you have to inform, so you don’t fall into the crime of hurting the health of another person; and you may even go to jail.*” (+ TW17)

Other barriers reported by TW included the indifference or willingness of others to transmit HIV: “*they say: ‘oh, I’m already infected, well now let them all get infected, I don’t care’; and they don’t protect themselves*” (-TW20); and the vulnerability conditions present in most TW, such as addictions and homelessness. “*Only a few of them [TW]... have said: ‘My partner told me’... because most are girls [who] lived alcoholism, drug addiction, staying on the streets, paying for a hotel; ... and they say: ‘but I don’t even know who infected me’*” (+ TW17).

While most participants mentioned several obstacles for APN, all of them pointed out its benefits and importance. They agreed that APNS could help people accept their diagnosis and overcome barriers for notification, helping them take better care of themselves and their partners. “*If they see a barrier or difficulty [to notify] ... to know there’s someone that helps us; I think it is very good; ... and maybe that will promote letting partners know, and that is prevention*” (-TW23).

## Suggestions for APNS

Participants stressed that in order for APN to work properly, more awareness regarding HIV prevention services and HIV in general is needed. One MSM even suggested HIV prevention campaigns for the general public. With regard to APNS, an online communication strategy was proposed to draw people’s attention to the service. Both MSM and TW also suggested that, before the notification moment, the partners could be invited to receive an HIV information and awareness talk, in order to invite them to get tested or to prepare them for their partner’s notification. “*Before notifying them [partners] ... first a talk for him:*

*'Look, you know this is HIV ... it is controlled with this'... Now once he had that talk [informing him about HIV]: 'You know what? Let's go to your partner...she was just diagnosed positive with HIV' (+ TW13).*

An MSM indicated the best moment to offer APNS is *"when it [HIV] is diagnosed"* (-MSM2). A TW felt the notification had to happen in a public health institution, for security reasons. *"It would be better in the hospital because... if that partner gets upset, well, there is a precedent too of who her partner was. And if something were to happen to her afterward, we know where to catch [him] or who he was."* (+ TW13).

As for the ideal providers for this service, participants suggested counsellors and peers — TW also mentioned *"professionals"*, or a multidisciplinary team. *"It would be very interesting if [in] most cases, it was between peers, no? ... Peers know what the situation is and how to approach that situation"* (-TW26). *"[About APNS] A psychologist, the medical provider, and a [peer] counsellor; sure... Ideally it would be at the same time, no? Like an interview sort of for informing, but at the same time for raising awareness, and at the same time for not stigmatizing... The medical part in which they inform there is nothing to fear if you take care of yourself, if your self-esteem is super cool; and that involves now the psychological part, and the part of, well, supporting, no? And at the end, well, a third party that tells you: 'Look, I live like this [with HIV], it's alright, I'm ok, and so can you"* (-TW24).

Some MSM and most TW said it would be important to have a health care provider that keeps them company during the whole notification process: *"mainly moral support for both persons"* (+ MSM1). However, a couple of MSM, who did not have experience being notified, indicated it would be unnecessary to have a health care provider accompany them during notification. *"The other person [being notified] could feel cornered... two people are summoning you to tell you you're probably sick... it can be taken as somehow a little more aggressive"* (-MSM8). Although most TW thought this service does not have to be differentiated between MSM and TW, they stressed that the presence of a provider is necessary to provide a safe environment for avoiding the danger from partner's violent reactions. *"The most ideal... is to take your partner to Condesa [Mexican HIV clinic] ... Because there will be someone that informs them what the disease is about; and, besides, help take care of her personal security"* (+ TW15).

Other MSM and TW instead suggested to provide the partner's contact information so a provider invites them to get tested, through a phone call or finding them in person, without revealing the user's identity. *"Maybe if one provided information about that person... and they [the providers] came to look for the person and say: ... 'We come to apply tests.' It would be something easy too, and you protect one [the user, by not revealing the identity] ... and the other [the partner] that was diagnosed now"* (+ TW13).

One MSM pointed out the usefulness of printed materials with recommendations on how to notify. *"Maybe there could exist like a brochure... of 'Five steps to tell you are HIV + to people you don't know'... and then you decide if you tell or not"* (-MSM12). In addition, the need to work on skills such as communication abilities, including speaking directly and calmly; and personality strengths, such as empathy, self-confidence, and emotional intelligence were mentioned: *"since I'm very self-confident... I could say it [the HIV diagnosis] directly without any problem... It's like I can manage my emotions a little more... when I'm speaking to someone, I'm like calm"* (-MSM2).

Finally, health care providers mentioned it would be important to start training staff for the risks that could arise during APNS. *"You need to have a staff who is fully trained to face the risks of assisted notification in different populations."* (HCP18). They also mentioned the importance of raising awareness and empowering the population for the benefits of APNS; by offering support without prejudice and through peers, especially for TW. *"The trans image has a lot of influence for transwomen to access not just the [HIV] test but other services."* (HCP14) One of them mentioned that civil society organizations could be the right ones to provide APNS. *"[They] could have a greater advantage... maybe users can see it as with more ... warmth"* (HCP27)

## Strategies for implementing APNS

Brainstorming sessions were held with research team members and health professionals with experience in counselling in order to outline strategies that promote the feasibility of implementing APNS.

Specifically, brainstorming sessions identified that although the hypothetical approach for implementing assisted notification services was well accepted, stigma and discrimination, as well as fear of violence associated with the notification process, are major barriers. Therefore, it was deemed important to continue strengthening actions towards mitigating stigma and discrimination associated with HIV. Similarly, HIV screening tests need to be promoted and health workers need training, both for the promotion of these services and for its execution. Hence, a three-step approach was outlined in order to achieve services that meet the needs and context of the study population:

- a. Strengthening actions to reduce HIV stigma and discrimination: Respondents reported that knowledge about HIV (transmission, importance of testing and treatment, U = U, etc.) may facilitate disclosure to partners. Therefore media campaigns were proposed, aiming to demystify HIV infection through evidence-based information, using a TW-inclusive perspective (as opposed to campaigns generally focusing on MSM only).
- b. Promoting HIV screening tests: Further efforts are needed to promote HIV testing, as fear of the result persists and diagnostic testing is often seen as verification tool rather than prevention. Group discussions among key populations are proposed to educate and raise awareness on the importance of early diagnosis and treatment. Another key component identified was to continue training for health professionals, focusing on all the implications of a diagnosis of HIV infection in order to ensure inclusive pre-counseling.
- c. Promoting and offering assisted partner notification services: APNS need to be promoted as they are not well known, even among health professionals. Workshops can be organized with them during which hypothetical notification scenarios are presented and evaluated. However, a distinction should be made between the various levels of need for assistance: while some participants indicated that they would prefer a health professional sharing their status with their partner, others just wanted them to be present to support them during the discussion with their partner. A third group of participants only requested some guiding, by e.g. brochures, on how to deliver such a message but they did not expect a health worker to be present while disclosing their status to partners. Furthermore, it is also important to acknowledge that a patient might want to give a message related with HIV only, while another

patient wants to include messages aiming at diminishing stigma or even angry, violent reactions. As such, the profile of the person responsible for providing the service - whether he or she is a medical doctor, psychologist/counselor or a peer – might differ among patients and needs to be well identified. It might also be useful to include instruments that help determine the risk to which the person notifying might be exposed and to take the required safety measures.

## Discussion

Most MSM and TW had not heard about APNS before and they are not a standard practice in Mexico. Regardless, many participants had experience with informal HIV partner notification, which was often opportunistic, i.e. triggered by a certain situation, like the start of a relationship or HIV/AIDS-related hospitalizations. The former limits notification to formal partners and the latter to the advanced stages of the disease, both meaning not all partners are notified in time. Since APNS should be offered standardly after the diagnosis of HIV, rather than be triggered by external situations, they can improve the timely notification of both formal and casual partners. This could in turn lead to timely HIV testing and diagnosis which is much needed in Mexico, where, in 2018, 11,000 new HIV cases occurred, late linkage to care was calculated at 40% (28), and the HIV mortality rate amounted to 4 deaths per 100,000 population (29). In addition, given that notification is already happening, although in an informal manner, it is important to offer tools to ensure that it happens in a safe and trustworthy environment and that the information given is reliable and not discriminatory. APNS could fill in this gap and not only lead to more notifications but also to better informed partners.

The main barrier for partner notification was the fear of negative consequences associated with HIV-related stigma. A study in Australia similarly reported that, because of prevailing HIV stigma, most MSM were very selective about who they disclosed their status to, often only telling partners perceived at risk (30). Nevertheless, since most participants in our study had experiences with informal partner notification despite stigma concerns, Mexican health care institutions could use this willingness to share an HIV diagnosis with partners and provide professional services that help avoid or mitigate stigma's consequences. As such, more partners might be notified in time. However, services do need to be adapted to the needs of the target groups. This was also concluded by a study among black or Latino MSM and TW that used APNS in North Carolina (USA): they worried about stigma and privacy, and generally perceived the service as aggressive, but empathy, choice, autonomy, and support with navigating services led to positive experiences (31). Accordingly, education and awareness campaigns to eliminate HIV-related stigma are an important first step to prepare the ground for APNS.

Another important aspect to highlight was the concern about partner's violent reactions, which was often a significant barrier for notification, especially among TW. Several studies have confirmed that LGBT people (trans in particular) tend to experience more verbal or physical partner violence, compared to heterosexuals (32, 33). Estimating patients' vulnerability will be important to ensure that APNS can mitigate aggressive or harmful reactions towards the patient.

Stigma and other barriers for notification represent challenges for the implementation of APNS, but notification facilitators could leverage the difficulties. One important facilitator is the positive perception regarding APNS, because, notwithstanding the barriers, our participants believed this service would have benefits and often expressed they are important and acceptable. Nevertheless, a study that implemented a partner notification model among HIV + MSM and TW in Tijuana, Mexico—made available after our data was collected—reported a lower than expected partner notification uptake, due to problems identifying HIV patients willing to participate, obtaining reliable partner contact information, and engaging notified partners. Still, they recruited 36 patients who listed 115 sexual partners for either provider (i.e. providers notify partners; 94%) or patient referral (i.e. patients notify partners; 6%); 70% of those listed were notified and 76% of those notified agreed to be screened (34). For increasing the acceptance of APNS and subsequent notification of partners, one strategy that significantly worked among MSM in Australia was the use of opt-out referral (i.e. all users diagnosed with HIV are referred to APNS unless they decline it) instead of opt-in referral (i.e. users are offered the referral) (35). As for overcoming the difficulty of contacting casual partners, one option recommended by other studies—and suggested by MSM in our findings as well—is geosocial networking app-based notification, which MSM have shown high willingness to use, particularly with an anonymous setting (36–38). Finally, a last consideration for the implementation of APNS in Mexico is that most of the states' criminal codes contemplate putting others at risk for infection as a crime (39); APNS should be implemented in all HIV/AIDS services to help avoiding potential legal cases.

There are some limitations to this study. First, we focused on MSM and TW in Mexico City, so factors pertaining partner notification may differ in other high-risk groups and geographic locations. Second, selecting participants at ASOs means we did not reach those without the willingness to attend such services, who could have different views on APNS. We nonetheless reached saturation in the explored topics and believe these results are transferrable to similar contexts.

## Conclusions

Implementing APNS for MSM and TW in Mexico is feasible if properly designed. Despite the concerns informants voiced regarding partner notification, all participants saw APNS as beneficial, which could increase their acceptance likelihood if implemented. However, when designing APNS, strategies may need to be flexible, allowing for a more personalised approach, and addressing differential needs and vulnerabilities. Also, professionally executed services are necessary to help mitigate obstacles like lack of awareness regarding HIV, fear of rejection or even violent reactions. Finally, APNS should be implemented along with other strategies aimed to increase HIV knowledge, and to reduce stigma and discrimination.

## Declarations

**Ethics approval and consent to participate**

All participants provided written informed consent—in which confidentiality was stressed—prior to their involvement. The Institutional Review Board (Ethics Committee) at the Mexican National Institute of Public Health (IPF Code 36278019) approved the study. Participants were compensated for transportation costs.

### Consent for publication

Not applicable

### Availability of data and materials

The datasets used and analysed during the current study are available from the corresponding author on reasonable request.

### Competing interests

The authors declare that they have no competing interests

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### Authors' contributions

HV: assisted with data analysis, interpretation of the data, and drafting of the manuscript

SAM: carried out data analysis, assisted with interpretation of the data and drafted the manuscript

LMV: carried out data collection and analysis, assisted with interpretation of the data and critically reviewed the manuscript

MAC: participated in the conception and design of the study, helped with interpretation of the data and critically reviewed the manuscript

SBA: participated in the conception and design of the study, helped with interpretation of the data and critically reviewed the manuscript

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### Data and material availability

The data supporting the conclusions of this article are included within the article.

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