

Barriers to healthcare services for migrants living with HIV in Spain

Patricia Ndumbi (1,2), J. del Romero (3), F. Pulido (4), M. Velasco Arribas (5), F. Dronda (6), J. Ramón Blanco Ramos (7), P. García de Olalla (8, 9), I. Ocaña (10), J. Belda-Ibañez (11), J. del Amo (2, 9), D. Álvarez-del Arco (2,9, 12) and the aMASE research group.

Affiliations:

1. European Programme for Intervention Epidemiology (EPIET)
2. National Center of Epidemiology, Instituto de Salud Carlos III, Madrid, Spain.
3. Centro Sanitario Sandoval. Madrid
4. Hospital Universitario Doce de Octubre. Universidad Complutense de Madrid, i+12. Madrid
5. Hospital Universitario Fundación Alcorcón. Madrid
6. Hospital Universitario Ramón y Cajal. Madrid
7. Hospital San Pedro - CIBIR. Logroño
8. Agencia de Salud Pública de Barcelona. Barcelona
9. Biomedical Research Network on Epidemiology and Public Health (Ciberesp).
10. Hospital de la Vall d'Hebron. Barcelona
11. Centros de Información y Prevención del Sida de Alicante. Alicante
12. Universidad Complutense de Madrid. Faculty of Political Science and Sociology. Madrid

Correspondence: Patricia Ndumbi, Instituto de Salud Carlos III, Centro Nacional de Epidemiología, Avda. Monforte de Lemos, 5, 28029 Madrid, España, tel: +34 91 8222196, fax: +34 91 387 7515, e-mail: patricia.ndumbi@mail.mcgill.ca

Words account: 2549

ABSTRACT

Background: In Spain, migrants are disproportionately affected by HIV and experience high rates of late diagnosis. We investigated barriers to health care access among migrants living with HIV (MLWH) in Spain.

Methods: Cross sectional electronic survey of 765 adult HIV-positive migrants recruited within 18 health care settings between July 2013 and July 2015. We collected epidemiological, demographic, behavioral and clinical data. We estimated the prevalence and risk factors of self-reported barriers to health care using multivariable logistic regression.

Results: Of those surveyed, 672 (88%) had information on health care access barriers: 23% were women, 63% from Latin America & Caribbean, 14% from Sub-Saharan Africa and 15% had an irregular immigration status. Men were more likely to report barriers than women (24% vs. 14%, $p=0.009$). The main barriers were: lengthy waiting times for an appointment (9%) or in the clinic (7%) and lack of a health card (7%). Having an irregular immigration status was a risk factor for experiencing barriers for both men (OR: 4.0 [95%CI: 2.2-7.2]) and women (OR: 10.5 [95%CI: 3.1-34.8]). Men who experienced racial stigma (OR: 3.1 [95%CI: 1.9-5.1]) or food insecurity (OR: 2.1 [95%CI: 1.2-3.4]) were more likely to report barriers. Women who delayed treatment due to medication costs (6.3 [95%CI: 1.3-30.8]) or had a university degree (OR: 5.8 [95%CI: 1.3-25.1]) were more likely to report barriers.

Conclusion: Healthcare barriers were present in 1 in 5 MLWH, were more common in men and were associated to legal entitlement to access care, perceived stigma and financial constraints.

Key words: HIV, Transients and Migrants, Undocumented migrants, Health Care, Spain

INTRODUCTION

Migrants accounted for 37% of the 29,747 new HIV diagnoses reported in the European Union/European Economic Area (EU/EEA) by the European Centre for Disease prevention and Control (ECDC) in 2015; and most of them (13%) were from Sub-Saharan Africa (SSA)¹. The disproportionate burden of HIV infection experienced by migrants in Europe also shapes the Spanish HIV epidemic: 30% (n=1,037) of the 3,428 new diagnoses reported in 2015 by the Spanish Surveillance Information System on new HIV diagnosis (SINIVIH) occurred in migrants, 237 (23%) of which were migrant women². Furthermore, in Spain people from Latin America and the Caribbean (LAC) not only account for the majority of the migrant population (37%)³, but are also the most relevant group among newly diagnosed HIV+ migrants (53%)². Late HIV diagnosis is more frequent among migrants than among Spaniards², and this not only has a negative impact on the patient's clinical outcomes, but can also lead to increased HIV transmission rates within the community^{4, 5}. Several studies have shown how late HIV diagnosis among migrants is related to the presence of barriers to access of health promotion and health care services, including HIV testing, treatment and prevention⁶. Migrants may be differently affected by health care barriers depending on their demographic profile (gender, country of origin, sexual orientation, etc.)^{2, 7} and on the socioeconomic vulnerabilities they experience⁸. These barriers might be larger for men and for migrants from non-Spanish speaking countries. In Spain, for instance, high rates of health care barriers resulting in delayed HIV diagnosis occur among SSA migrants⁷ while among people from LAC healthcare access challenges are reflected in an increased use of emergency services compared to native Spaniards⁹.

Cultural differences, poverty, uncertainty about health entitlements, lack of understanding of the healthcare system and fear of discrimination can all contribute to healthcare barriers¹⁰. These barriers can occur at the patient level (sex, age, education, income, immigration status, personal health practices, etc.), the healthcare provider level (cultural sensitivity and

competence, communication style, bilingualism, etc.) and the health system level (health policy, referrals, opening hours, waiting times, etc.)^{10, 11}.

Gender differences often influence healthcare access, especially among migrants: male migrants are often seeking care only in case of emergency¹², while female migrants are more likely to seek care via antenatal and child services¹³.

Research examining barriers to healthcare services among HIV-positive migrants population in Spain is scarce^{6, 11}. The current study aims to describe the nature and the prevalence of self-perceived barriers to access healthcare for migrants living with HIV (MLWH) in Spain, and assess risk factors associated with these barriers, while exploring gender differences.

METHODS

aMASE

The *advancing Migrant Access to health Services in Europe* (aMASE) study is a research project conducted within the European Network of Excellence for HIV cohort studies (EuroCoord). aMASE took place in 57 HIV clinics and hospitals across 9 EU countries and its methodological design has been previously described¹⁴. This paper focuses on the Spanish results of the study (aMASE-Spain).

aMASE-Spain

A cross sectional electronic survey was conducted in 18 HIV clinics and hospitals across 7 Spanish regions, between July 2013 and July 2015. Participating sites are listed in the Annex (Annex 1). The research staff in each site identified and recruited eligible subjects among their HIV-positive patients who fulfilled the following criteria: (1) diagnosed within 5 years of the study date, (2) aged ≥ 18 years, (3) foreign-born, (4) resident in Spain for a minimum of 6 months and (5) able to complete, either alone or with assistance, a computer-assisted self-interview (CASI) in any of the 15 available languages (Amharic, Arabic, Dutch, English,

French, German, Greek, Italian, Polish, Portuguese, Russian, Turkish, Tigrinya, Spanish, and Somali).

Sample size

An overall effective sample size of 1600 individuals was pre-determined at the EU-level for the entire aMASE study¹⁴. In Spain 765 participants were recruited, which exceeded the minimum sample size required (N=100) for the country. Using post-hoc analyses we were able to determine that this sample size would provide a precision within 3.7% for our main estimate of interest.

Sampling strategy

Interested sites with the ability to recruit at least 40 migrants for the study, and with sufficient financial and human resources to conduct the survey, were invited to participate. A convenience sampling strategy was used to recruit study participants: eligible patients attending participating clinics were approached by research team members and invited to participate in the survey.

Data collection

We used two questionnaires: a self-administrated Patient Questionnaire (PTQ) (with socio-economic, epidemiological, clinical, behavioural, migratory and health services use data); and a Clinical Data Questionnaire (CDQ) completed by clinicians (CD4 count, viral load, HIV virus subtype). Both questionnaires were linked using an anonymous patient study number.

Statistical analysis

The primary outcome variable was defined by the presence of at least one self-reported barrier to healthcare services ("Barriers in access to healthcare services"). Explanatory variables included sociodemographic and clinical characteristics such as: age, geographic origin, education, employment, income, HIV transmission route, immigration status (irregular immigrants were defined as: asylum seekers, refugees and undocumented migrants), late diagnosis (CD4 count <350 cells/mm³ at the time of diagnosis), perceived HIV stigma,

perceived race stigma, perceived sexuality stigma, late diagnosis, AIDS at presentation, difficulty accessing food and delayed medical treatment due to medication costs.

Separate analyses were carried out for men and women, since gender was conceptualized as an effect modifier for access to care¹³. We calculated frequencies for categorical variables and median and interquartile range (IQR) for continuous ones. Bivariate associations between exposure variables and the variable of interest were calculated. Risk factors for health care barriers were identified through logistic regression. Variables with a P-value lower than 0.10 in bivariate analysis were used to fit multivariable models for both men and women. We constructed the final model through a forward procedure and the best model was selected comparing maximum likelihood values. We calculated odds ratios (ORs) with their 95% confidence intervals (95% CI) for each variable included in the final model. Statistical significance was evaluated using the Wald test and all analyses were performed using STATA software (Version 14.0, College Station, Texas).

Ethical committee clearance

The study received approval from the Ethics Committee of Carlos III Spanish Health Institute and from some of the ethics boards of the hospitals/clinics conducting the study. All participants consented to take part in the study.

RESULTS

Socio-demographic and clinical characteristics

In total 775 individuals were interviewed. We excluded 93 (12%) individuals who had no information on the primary outcome of interest. We also excluded 10 (1%) transgender individuals because their number was too small to include in a stratified analysis and draw meaningful conclusions. Table 1 summarizes the socio-demographic characteristics of the 672 participants included in the analysis. Among those, 154 (23%) were female and 410 (61%) self-identified as men who have sex with men (MSM). Among women, 50% were from

LAC and 31% from SSA, while among men, 66% were from LAC and 11% from Western Europe. Non-regular migrants constituted 15% of the sample; this proportion was higher among women (21%) and people from SSA (33%). Migrants from SSA were more likely to be diagnosed late (65%) and among LAC men, 74% identified themselves as MSM (data not shown).

Self-perceived barriers to healthcare access

One in five participants reported experiencing at least one barrier to accessing health care in Spain (22%) (Table 2). Men (24%) were more likely to report barriers than women (14%). The top three self-perceived barriers to accessing healthcare were the same in males and females: waiting time for an appointment, lacking a health card and waiting times in clinic. Barriers were more common among migrants from SSA (27%) and in those from other geographical origins (North Africa, North America, Asia and Oceania) (36%), compared to the rest of the participants, notably Spanish speaking migrants. Migrants from these first two groups, mostly experienced barriers related to language, waiting time in the clinic and difficulty finding a general practitioner (GP) (data not shown). Finally, rate of self-perceived barriers to healthcare was highest among persons who inject drugs (PWID) (38%) compared to heterosexuals (HTX) (18%) and MSM (24%). Migrants who inject drugs were more likely to perceive waiting time for appointment (14%) and uncertainty towards health entitlements (24%) as barriers to healthcare access (data not shown).

Determinants of barriers to healthcare access

Univariate analysis determinants of barriers to health care access for men and women are presented in Table 3. Among women, healthcare access barriers were more likely to be perceived in those with university education, an irregular immigration status and medication delay due to treatment cost. Among men, barriers were associated with being from SSA, having a primary or university education, not earning their own wage, having an irregular immigration status, experiencing difficulties accessing food, delaying medical treatment due to medication costs and being stigmatized for their race, sexuality or HIV-positive status.

Overall 14% of women and 25% of men who reported barriers to healthcare were diagnosed late for HIV (CD4 count at diagnosis <350 cells/mm³).

The multivariable logistic analysis (Table 4) shows the adjusted risk factors associated with barriers to health care access. For women, these risk factors included: having an irregular immigration status; having a university degree and delaying non-HIV medical treatment due to medication costs. Among men we identified the following risk factors: irregular immigration status, difficulty accessing food and experiencing racial stigma.

DISCUSSION

In this study, we found that approximately 1 in 7 migrant women and 1 in 4 migrant men living with HIV in Spain, and already linked to HIV care, reported having previously experienced at least one barrier to access health care. The nature, the prevalence and the risk factors of these barriers are different among men and women and reflect the extreme social and economic vulnerability experienced by a relevant proportion of HIV positive migrants living in Spain.

We found that HIV positive migrant men living in Spain were more likely to report healthcare barriers compared to women. This finding is in accordance with results from a study conducted in the United Kingdom by Burns et al.⁸. The limited engagement of men in healthcare may reflect their propensity to perceive physicians as emergency care providers rather than continuous care providers, thus only seeking help for complex health issues^{12, 15}. On the other hand, women's entry into the healthcare system is facilitated by their role as caregiver accompanying relatives or through reproductive and child health care services¹⁶. Despite benefiting from this 'front door' into the healthcare system, women often face other types of barriers that hinder their access to care. For instance, a study by Guionnet et al. reported that HIV-positive migrant women living in Spain often perceived their condition as lethal and financially unaffordable¹⁷ even though HIV combination antiretroviral therapy

(cART) is free for all people living with HIV residing in Spain, regardless of their legal status¹⁸. This could either reflect migrant women's limited knowledge of their healthcare entitlements or them prioritizing their work and providing for their families over attending clinic visits during working hours^{19, 20}.

Several structural barriers to care were identified in this study. Extended waiting times for appointment and during clinic visits were the most commonly reported barriers for both male and female migrants. Although the sample size for women was small, these results support previous work that has been done in this area²¹ and suggest that the rigid schedules of healthcare centers do not fit migrants' demanding work conditions and timetables. This was corroborated in studies showing that migrants perceive occupational strains linked to job insecurity and inflexible work shifts as a major impediment to their health, and are often unable to access care during work hours due to fear of losing their employment^{20, 22}. In our study, we also found that migrants from SSA were more likely to experience barriers, especially language barriers, which could eventually exacerbate their social exclusion and lead to their inability to understand the healthcare system and their healthcare rights entitlements²³. On the other hand migrants from LAC, who are native Spanish speakers, did not report any language barrier.

We identified gender specific determinants of healthcare barriers. For women, education and financial considerations were specific risk factors for barriers. We found that women with a university degree were more likely to experience barriers to healthcare and were also less likely to have children, which may cause them to under use antenatal services²⁴. Highly educated migrant Ecuadorian women who had to accept jobs for which they are over qualified have been reported to experience poor mental health outcomes²⁵, which combined with financial strains and occupational dissatisfaction may exacerbate pre-existing healthcare barriers. Women who delayed non-HIV treatments due to financial restrictions were also more likely to report healthcare barriers, thus highlighting a subgroup of women who are

particularly vulnerable as they generally earn less income and have a lower rate of employment than men^{26,27}. Men-specific risk factors included difficulty accessing food and racial stigma. Limited food access has been previously associated with low health prioritization and an increased need to focus on food and housing procurement²⁸. Furthermore, in those living with HIV, food insecurity is also a risk factor for treatment interruption, morbidity and mortality^{29,30}. As for racial stigma, this is a well-documented risk factor for disparities in health access^{31,32}. In people at risk of or living with HIV, perceived racial stigma has been associated with healthcare barriers such as: lower trust in healthcare provider, higher likelihood of missing medical appointments, fear of HIV testing and lower adherence to cART^{33,34}.

In both migrant men and women, having an irregular immigration status was the main risk factor for experiencing barriers. In 2012, Spain revoked free and universal access to the healthcare system for undocumented migrants, with some exceptions such as for conditions of public health relevance which include HIV infections^{35,36}. Although these rights were partly returned in late 2015, irregular migrants are still denied access to the health card¹⁸. National policies restricting health care access for undocumented migrants have an important negative impact on migrant health as has been widely acknowledged by ECDC and WHO^{22,37}. HIV-positive migrants are particularly vulnerable due to HIV social stigma and the chronic nature of the infection, which requires life-long treatment and care^{38, 39}. Governments should guarantee free access to healthcare system regardless of migrants' legal status in order to ensure the timely access to treatment, thus resulting in better clinical outcomes for the patient and decreased HIV transmission at community level³⁹. Restricting health care access for undocumented migrants not only hampers public health measures, but also goes against the fundamental principles of equity in healthcare access outlined in the international human rights laws which have been ratified by all EU/EEA countries³⁹. Facilitating healthcare access to undocumented immigrants is therefore a human rights obligation.

We would like to acknowledge some study limitations. Firstly, the recruitment of our sample from HIV health facilities has led to an underrepresentation of the most vulnerable patients who still have not accessed the healthcare system, or are still unaware of their HIV status. It is expected that barriers would be more extreme in this group. Secondly, there may have been an information bias due to the sensitivity of the information collected (eg: legal status, sexual orientation etc.) which we minimized through the migrant-friendly nature of the recruiting centres and by privacy provided by self-reporting to electronic questionnaires. Thirdly, we could not compare the prevalence or effect of barriers between immigrants and native Spaniards, due to the lack of a control group. Finally, due to insufficient sample size, our analysis among women is underpowered, which may lead to imprecision in our estimates within this group. Sample size restriction also made it difficult to assess the risk factors for healthcare barriers according to specific geographical origins. In spite of this limitation, we have chosen to stratify findings by sex given that findings show clear gender differences that would otherwise become invisible.

Nonetheless, the current findings indicate that barriers to healthcare are common among HIV-positive migrants living in Spain linked to care. Defining and understanding these barriers is therefore key to the development of policies and effective care programs tailored to reach HIV-positive migrants. New health strategies should aim to reduce structural barriers to healthcare access, especially for vulnerable groups such as undocumented migrants. This is also crucial for achieving UNAIDS 90–90–90 targets with the ultimate goal to control the HIV epidemic by 2020⁴⁰.

ACKNOWLEDGEMENTS

Funding: This work is part of aMASE (Advancing Migrant Access to Health Services in Europe) which was funded by the European Union's Seventh Framework Programme for research, technological development and demonstration under EuroCoord grant agreement

n° 260694. This work has been supported by the Spanish Medical Fund Research (PI12/02134) and Spanish Network of Excellence on HIV (RD12/0017/0018, RD16CIII/0002/0006). This research would not have been possible without the collaboration of the patients, physicians, nurses, data managers and researchers who have taken part in this project.

CONFLICTS OF INTERESTS

None declared.

KEY POINTS

- 1 in 5 HIV-positive migrant living in Spain and linked to care experience barriers to healthcare access.
- HIV-positive male migrants are more likely to report barriers than their female counterpart.
- Having an irregular immigration status was the main risk factor for experiencing barriers in both male and female HIV-positive migrants.
- New health policies and strategies should aim to reduce structural barriers to healthcare access in HIV-positive migrants.

REFERENCES

1. European Centre for Disease prevention and Control. HIV/AIDS surveillance in Europe 2015, 2015. Available at: http://www.euro.who.int/__data/assets/pdf_file/0019/324370/HIV-AIDS-surveillance-Europe-2015.pdf?ua=1 (1 January 2017, date last accessed).
2. Área de Vigilancia de VIH y Comportamientos de Riesgo. Vigilancia Epidemiológica del VIH y sida en España: Sistema de Información sobre Nuevos Diagnósticos de VIH y Registro Nacional de Casos de Sida. Plan Nacional Sobre el SIDA, 2016. Available at:

https://www.msssi.gob.es/ciudadanos/enfLesiones/enfTransmisibles/sida/vigilancia/InformeV IH_SIDA_2016.pdf (1 January 2017, date last accessed).

3. Instituto Nacional de Estadística. Cifras de población residente en España, 2017. Available at: <http://www.ine.es/> (1 January 2017, date last accessed).
4. Cohen MS, Chen YQ, McCauley M, Gamble T, Hosseinipour MC, Kumarasamy N, et al. Prevention of HIV-1 infection with early antiretroviral therapy. *The New England journal of medicine*. 2011;365(6):493-505.
5. Mocroft A, Lundgren JD, Sabin ML, Monforte A, Brockmeyer N, Casabona J, et al. Risk factors and outcomes for late presentation for HIV-positive persons in Europe: results from the Collaboration of Observational HIV Epidemiological Research Europe Study (COHERE). *PLoS medicine*. 2013;10(9):e1001510.
6. Alvarez-del Arco D, Monge S, Azcoaga A, Rio I, Hernando V, Gonzalez C, et al. HIV testing and counselling for migrant populations living in high-income countries: a systematic review. *European journal of public health*. 2013;23(6):1039-45.
7. Monge S, Alejos B, Dronda F, Del Romero J, Iribarren JA, Pulido F, et al. Inequalities in HIV disease management and progression in migrants from Latin America and sub-Saharan Africa living in Spain. *HIV medicine*. 2013;14(5):273-83.
8. Burns FM, Imrie JY, Nazroo J, Johnson AM, Fenton KA. Why the(y) wait? Key informant understandings of factors contributing to late presentation and poor utilization of HIV health and social care services by African migrants in Britain. *AIDS care*. 2007;19(1):102-8.
9. Muñoz-de Bustillo R, Anton Perez JI. Use of public health services by Latin American immigrants in Spain. *Salud publica de Mexico*. 2010;52(4):357-63.
10. Scheppers E, van Dongen E, Dekker J, Geertzen J, Dekker J. Potential barriers to the use of health services among ethnic minorities: a review. *Family practice*. 2006;23(3):325-48.
11. Deblonde J, De Koker P, Hamers FF, Fontaine J, Luchters S, Temmerman M. Barriers to HIV testing in Europe: a systematic review. *European journal of public health*. 2010;20(4):422-32.

12. European Commission. The state of men's health in Europe. Extended report, 2011.
Available at:
http://ec.europa.eu/health/sites/health/files/population_groups/docs/men_health_extended_en.pdf (1 January 2017, date last accessed)
13. Bertakis KD, Azari R, Helms LJ, Callahan EJ, Robbins JA. Gender differences in the utilization of health care services. *The Journal of family practice*. 2000;49(2):147-52.
14. Fakoya I, Alvarez-Del Arco D, Monge S, Copas AJ, Gennotte AF, Volny-Anne A, et al. Advancing Migrant Access to Health Services in Europe (AMASE): Protocol for a Cross-sectional Study. *JMIR research protocols*. 2016;5(2):e74.
15. Ravenell JE, Whitaker EE, Johnson WE, Jr. According to him: barriers to healthcare among African-American men. *Journal of the National Medical Association*. 2008;100(10):1153-60.
16. ACOG. ACOG Committee Opinion. Number 335, May 2006: The initial reproductive health visit. *Obstetrics and gynecology*. 2006;107(5):1215-9.
17. Guionnet A, Navaza B, Pizarro de la Fuente B, Perez-Elias MJ, Dronda F, Lopez-Velez R, et al. Immigrant women living with HIV in Spain: a qualitative approach to encourage medical follow-up. *BMC public health*. 2014;14:1115.
18. Ministerio de la Presidencia y Para las Administraciones Territoriales. Boletín Oficial del Estado, 2016. Available at: http://www.boe.es/diario_boe/txt.php?id=BOE-A-2016-7904 (1 March 2017, date last accessed)
19. Gagnon AJ, Carnevale F, Mehta P, Rousseau H, Stewart DE. Developing population interventions with migrant women for maternal-child health: a focused ethnography. *BMC Public Health*. 2013;13:471.
20. Roura M, Bisoffi F, Navaza B, Pool R. "Carrying Ibuprofen in the Bag": Priority Health Concerns of Latin American Migrants in Spain - A Participatory Qualitative Study. *PLoS One*. 2015;10(8):e0136315.
21. Eurofound. Employment and working conditions of migrant workers-Spain, 2007.
Available at: <http://www.eurofound.europa.eu/observatories/eurwork/comparative->

information/national-contributions/spain/employment-and-working-conditions-of-migrant-workers-spain (1 January 2017, date last accessed)

22. Hacker K, Anies M, Folb BL, Zallman L. Barriers to health care for undocumented immigrants: a literature review. *Risk Manag Healthc Policy*. 2015;8:175-83.
23. Navaza B, Guionnet A, Navarro M, Estevez L, Perez-Molina JA, Lopez-Velez R. Reluctance to do blood testing limits HIV diagnosis and appropriate health care of sub-Saharan African migrants living in Spain. *AIDS Behav*. 2012;16(1):30-5.
24. Sobrino-Vegas P, Rodriguez-Urrego J, Berenguer J, Caro-Murillo AM, Blanco JR, Viciano P, et al. Educational gradient in HIV diagnosis delay, mortality, antiretroviral treatment initiation and response in a country with universal health care. *Antiviral therapy*. 2012;17(1):1-8.
25. Del Amo J, Jarrin I, Garcia-Fulgueiras A, Ibanez-Rojo V, Alvarez D, Rodriguez-Arenas MA, et al. Mental health in Ecuadorian migrants from a population-based survey: the importance of social determinants and gender roles. *Social psychiatry and psychiatric epidemiology*. 2011;46(11):1143-52.
26. Delara M. Social Determinants of Immigrant Women's Mental Health. *Advances in Public Health*. 2016;2016:11.
27. Stevens PE, Keigher SM. Systemic barriers to health care access for U.S. women with HIV: the role of cost and insurance. *Int J Health Serv*. 2009;39(2):225-43.
28. Kushel MB, Gupta R, Gee L, Haas JS. Housing instability and food insecurity as barriers to health care among low-income Americans. *J Gen Intern Med*. 2006;21(1):71-7.
29. UNAIDS. HIV, food security and nutrition. *UNAIDS Policy Brief*. 2008.
30. Weiser SD, Fernandes KA, Brandson EK, Lima VD, Anema A, Bangsberg DR, et al. The association between food insecurity and mortality among HIV-infected individuals on HAART. *J Acquir Immune Defic Syndr*. 2009;52(3):342-9.
31. Agudelo-Suarez AA, Ronda-Perez E, Gil-Gonzalez D, Vives-Cases C, Garcia AM, Ruiz-Frutos C, et al. The effect of perceived discrimination on the health of immigrant workers in Spain. *BMC Public Health*. 2011;11:652.

32. Williams DR, Sternthal M. Understanding racial-ethnic disparities in health: sociological contributions. *J Health Soc Behav.* 2010;51 Suppl:S15-27.
33. Earnshaw VA, Bogart LM, Dovidio JF, Williams DR. Stigma and racial/ethnic HIV disparities: moving toward resilience. *Am Psychol.* 2013;68(4):225-36.
34. Fakoya I, Reynolds R, Caswell G, Shiripinda I. Barriers to HIV testing for migrant black Africans in Western Europe. *HIV Med.* 2008;9 Suppl 2:23-5.
35. Perez-Molina JA, Pulido Ortega F. [Assessment of the impact of the new health legislation on illegal immigrants in Spain: the case of human immunodeficiency virus infection]. *Enferm Infecc Microbiol Clin.* 2012;30(8):472-8.
36. Ministerio de Sanidad, Servicios Sociales e Igualdad. Boletín Oficial del Estado - Legislación Consolidada, 2012. Available at: http://www.msssi.gob.es/profesionales/prestacionesSanitarias/CarteraDeServicios/docs/RDL_16_2012.pdf (1 January 2017, date last accessed).
37. Suess A, Ruiz Perez I, Ruiz Azarola A, March Cerda JC. The right of access to health care for undocumented migrants: a revision of comparative analysis in the European context. *Eur J Public Health.* 2014;24(5):712-20.
38. Dang BN, Giordano TP, Kim JH. Sociocultural and structural barriers to care among undocumented Latino immigrants with HIV infection. *J Immigr Minor Health.* 2012;14(1):124-31.
39. Deblonde J, Sasse A, Del Amo J, Burns F, Delpech V, Cowan S, et al. Restricted access to antiretroviral treatment for undocumented migrants: a bottle neck to control the HIV epidemic in the EU/EEA. *BMC Public Health.* 2015;15:1228.
40. UNAIDS. 90–90–90 - An ambitious treatment target to help end the AIDS epidemic, 2016. Available at: http://www.unaids.org/sites/default/files/media_asset/90-90-90_en_0.pdf (1 January 2017, date last accessed).

TABLES

Table 1: Descriptive characteristics of the study participants by sex

Characteristics	Female (N=153)	Male (N=519)	Total (N=672)
Age (years)			
Age (median, IQR)	35[29-42]	35[29-42]	35[29-42]
Geographical origin			
Western Europe	6 (4%)	58 (11%)	64 (10%)
Central & Eastern Europe	19 (12%)	37 (7%)	56 (8%)
Sub-Saharan Africa	47 (31%)	45 (9%)	92 (14%)
Latin Am. and the Caribbean	76 (50%)	345 (66%)	421 (63%)
Others	5 (3%)	34 (7%)	39 (6%)
Education			
Primary	41 (27%)	59 (11%)	100 (15%)
Secondary	80 (52%)	224 (43%)	304 (45%)
University	32 (21%)	236 (45%)	268 (40%)
Employment			
Working	69 (45%)	297 (57%)	366 (54%)
Unemployed	52 (34%)	155 (30%)	207 (31%)
Other	32 (21%)	67 (13%)	99 (15%)
Income			
Above minimum wage	18 (12%)	196 (38%)	214 (32%)
Minimum wage	24 (16%)	94 (18%)	118 (18%)
Below minimum wage	52 (34%)	108 (21%)	160 (24%)
Do not earn own wage	47 (31%)	99 (19%)	146 (22%)
Unknown	12 (8%)	22 (4%)	34 (5%)
Immigration status			
National/Residents	121 (79%)	452 (87%)	573 (85%)
Irregular	32 (21%)	67 (13%)	99 (15%)
Transmission mode			
Heterosexual	150 (98%)	91 (18%)	241 (36%)
Men who have sex with men	-	410 (79%)	410 (61%)
Injecting drug users	3 (2%)	18 (3%)	21 (3%)
Late HIV diagnosis			
Yes	83 (54%)	191 (37%)	274 (41%)
No	66 (43%)	290 (56%)	356 (53%)
Unknown	4 (3%)	38 (7%)	42 (6%)

Perceived discrimination based on HIV stigma			
Yes	17 (11%)	46 (9%)	63 (9%)
No	131 (86%)	470 (90%)	601 (89%)
Unknown	5 (3%)	3 (1%)	8 (1%)
Perceived discrimination based on race stigma			
Yes	33 (21%)	132 (25%)	165 (24%)
No	119 (78%)	383 (74%)	502 (75%)
Unknown	1 (1%)	4 (1%)	5 (1%)
Perceived discrimination based on sexual orientation			
Yes	2 (1%)	82 (16%)	84 (13%)
No	150 (98%)	433 (83%)	583 (87%)
Unknown	1 (1%)	4 (1%)	5 (1%)
Forced sex			
Yes	28 (18%)	45 (9%)	73 (11%)
No	118 (77%)	466 (90%)	584 (87%)
Unknown	7 (5%)	8 (1%)	15 (2%)
Delayed medication due to cost			
No	11 (7%)	26 (5%)	37 (6%)
Yes	142 (93%)	493 (95%)	635 (94%)
Difficulty accessing food			
Yes	44 (29%)	120 (23%)	164 (24%)
No	106 (69%)	388 (75%)	494 (74%)
Unknown	3 (2%)	11 (2%)	14 (2%)

Table 2: Prevalence of self-perceived barriers to health care access by sex

Barriers	Female (N=153)	Male (N=519)	Total (N=672)	<i>P-value</i>
Barriers to healthcare*	22 (14.4%)	126 (24.3%)	148 (22%)	0.009
Types of barriers				
Waiting time for appointment	9 (5.9%)	49 (9.4%)	58 (8.6%)	0.168
No health card	6 (3.9%)	43 (8.3%)	49 (7.3%)	0.068
Waiting time in clinic	10 (6.5%)	39 (7.5%)	49 (7.3%)	0.682
Unsure health rights	1 (0.7%)	22 (4.2%)	23 (3.4%)	0.032
Language barriers	4 (2.6%)	16 (3.1%)	20 (3%)	0.764
Opening hours	1 (0.7%)	11 (2.1%)	12 (1.8%)	0.229
Confidentiality	-	8 (1.5%)	8 (1.2%)	0.122
Other	1 (0.7%)	4 (0.8%)	5 (0.7%)	0.882
Difficulty finding GP	-	2 (0.4%)	2 (0.3%)	0.442

***At least one barrier to access health care**

**Table 3: Prevalence and risk factors of barriers to access healthcare services by sex
(Univariable analysis)**

Sociodemographic characteristics	Female (n=153)		Male (N=519)	
	Prevalence [n (%)]	[OR (95%CI)]	Prevalence [n (%)]	Male [OR (95%CI)]
Total prevalence	22 (14%)		126 (24%)	
Age <i>p-value</i>	0.921		0.132	
18-30 years	7 (32%)	1	43 (34%)	1
31-40 years	8 (36%)	0.80 (0.27-2.39)	53 (42%)	0.94 (0.59-1.51)
≥41 years	7 (32%)	0.90 (0.29-2.81)	30 (24%)	0.61 (0.36-1.04)
Geographic origin <i>p-value</i>	0.990		0.013	
Latin America & Caribbean (LAC)	12 (16%)	1	73 (21%)	1
Central and Eastern (CEE)	3 (16%)	1.00 (0.25-3.97)	7 (19%)	0.87 (0.37-2.06)
Sub-Saharan Africa (SSA)	7 (15%)	0.93 (0.34-2.57)	18 (40%)	2.48 (1.30-4.76)
Western Europe (WE)	-	-	14 (24%)	1.19 (0.62-2.28)
Others	-	-	14 (41%)	2.61 (1.27-5.41)
Education <i>p-value</i>	0.041		0.001	
Primary or none	6 (15%)	1	18 (31%)	1
Secondary	7 (9%)	0.56 (0.17-1.79)	37 (17%)	0.45 (0.23-0.87)
University	9 (28%)	2.28 (0.72-7.27)	71 (30%)	0.98 (0.53-1.82)
Employment <i>p-value</i>	0.386		0.000	
Working	7 (10%)	1	60 (20%)	1
Unemployed	9 (17%)	1.85 (0.64-5.35)	36 (23%)	1.19 (0.75-1.91)
Other (Student, Retired, etc.)	6 (19%)	2.04 (0.63-6.67)	30 (45%)	3.2 (1.83-5.6)
Income <i>p-value</i>	0.205		0.002	
Above minimum wage	1 (6%)	1	36 (18%)	1
Minimum wage	1 (4%)	0.74 (0.04-12.67)	20 (21%)	1.2 (0.65-2.22)
Below minimum wage	8 (15%)	3.09 (0.36-26.61)	24 (22%)	1.27 (0.71-2.27)
Do not earn own wage	9 (19%)	4.03 (0.47-34.34)	40 (40%)	3.01 (1.76-5.17)
Unknown	3 (25%)	5.67 (0.51-62.66)	6 (27%)	1.67 (0.61-4.56)
Immigration status <i>p-value</i>	0.001		0.000	
National/Resident	11 (9%)	1	91 (20%)	1
Irregular	11 (34%)	5.23 (2.01-13.6)	35 (52%)	4.34 (2.55-7.38)
HIV transmission route <i>p-value</i>	0.403		0.374	
Heterosexual	21 (14%)	1	22 (24%)	1
Men who have sex with men	-	-	97 (24%)	0.97 (0.57-1.65)
Injecting drug users	1 (33%)	3.07 (0.27-35.39)	7 (39%)	1.99 (0.69-5.77)
Difficulty accessing food <i>p-value</i>	0.082		0.000	
No	12 (11%)	1	76 (20%)	1
Yes	10 (23%)	2.30 (0.91-5.82)	45 (38%)	2.46 (1.58-3.85)
Perceived <i>p-value</i>	0.313		0.000	

discrimination based on HIV stigma				
No	18 (14%)	1	102 (22%)	1
Yes	4 (24%)	1.93 (0.56-6.58)	23 (50%)	3.61 (1.94-6.69)
Perceived discrimination based on race stigma	<i>p-value</i>	0.087		0.000
No	14 (12%)	1	71 (19%)	1
Yes	8 (24%)	2.40 (0.91-6.34)	54 (41%)	3.04 (1.97-4.68)
Perceived discrimination based on sexual orientation	<i>p-value</i>	0.231		0.001
No	21 (14%)	1	94 (22%)	1
Yes	1 (50%)	6.14 (0.37-102.02)	32 (39%)	3.04 (1.97-4.68)
Forced sex	<i>p-value</i>	0.826		0.037
No	15 (13%)	1	108 (23%)	1
Yes	4 (14%)	1.14 (0.35-3.76)	17 (38%)	2.01 (1.06-3.82)
Delayed medication (medication cost)	<i>p-value</i>	0.043		0.013
No	18 (13%)	1	114 (23%)	1
Yes	4 (36%)	3.94 (1.05-14.8)	12 (46%)	2.85 (1.28-6.33)

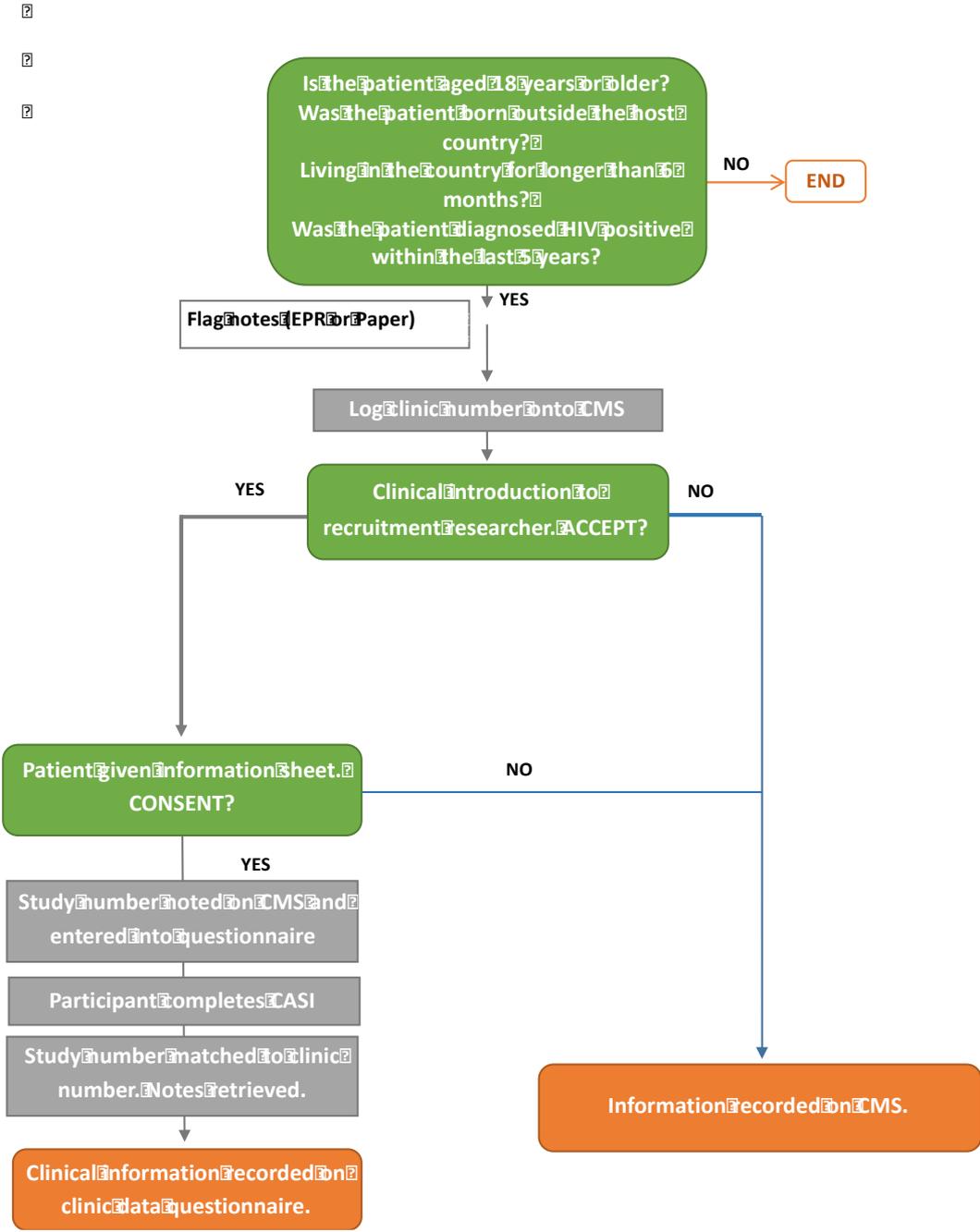
Table 4: Factors associated with barriers in access to healthcare services among women and men (adjusted model)

Variables	Women	Men
	OR [95% CI]	OR [95% CI]
Immigration status		
National/resident	1	1
Irregular	10.5 [3.1-34.8]	4 [2.2-7.2]
Education		
Primary or none	1	1
Secondary	0.7 [0.2-2.6]	0.7 [0.3-1.4]
University	5.8 [1.3-25.1]	1.7 [0.8-3.5]
Delayed medication (medication costs)		
No	1	-
Yes	6.3 [1.3-30.8]	-
Geographic origin		
Western Europe	-	1
Central and Eastern Europe	-	0.6 [0.2-1.8]
Sub-Saharan Africa	-	1.4 [0.5-3.6]
Latin America & Caribbean	-	0.6 [0.3-1.1]
Others	-	1.5 [0.6-4.2]
Difficulty accessing food		
No	-	1
Yes	-	2.1 [1.2-3.4]
Race stigma		
No	-	1
Yes	-	3.1 [1.9-5.1]

ANNEX 1. List of participating sites

Participant list	
Country Leads & Coordinators	Julia del Amo, Débora Álvarez
Centro Sanitario Sandoval	del Romero J, Rodríguez C, Vera M, Río I, Paredes V, Sanz N
Hospital Ramón y Cajal	Dronda F
Hospital de Alcorcón	Velasco Arribas M
Hospital de Sant Pau	Mateu MG, Gutierrez MM, Domingo P
Hospital del Mar	Knobel H, Pellicer T
Hospital Clínic	Fernández E, Ligeró MC, Robau M, Miró JM
Hospital de la Vall d'Hebron	Ocaña I, Burgos J
Unidad de ITS de Drassanes	Barberà MJ, Arando M
Hospital de Elche	Gutiérrez F, Masía M
Hospital San Pedro de La Rioja	Blanco JR
CIPS Alicante	Belda-Ibáñez J, Fernández García E, Zafra Espinosa T
Hospital de Poniente	Lopez Lirola A
Hospital La Fe	Salavert M, Montero M, Calabuig E, Cuellar S
Hospital Virgen del Rocío	Vinciana P, Palacios R
Hospital San Cecilio	García F, Peña A
Hospital Donosti	Iribarren JA, Aguado M
Hospital Doce de Octubre	Pulido F, Portillo A, Rubio R, Matarranz M, de Lagarde M, Bisbal O
Hospital Universitario Canarias	Gómez Sirvent JL

ANNEX 2. Flow diagram of patients' recruitment process



¹ CMS: Clinic Master Sheet • CASI: Computer Assisted Self- Interview • EPR: Electronic Patient Record (electronic registry of patients fulfilling inclusion criteria).

ANNEX 3: Healthcare barriers definitions

Waiting time for appointment	Time it takes to receive treatment after being referred to a healthcare provider
No health card	Not possessing a valid Spanish health card
Waiting time in clinic	Time it takes to be seen by a healthcare provider
Unsure health rights	Lack of knowledge about healthcare entitlements
Language barriers	Inability to communicate clearly with healthcare professionals due to linguistic barriers
Opening hours	Opening hours that are incompatible with work/personal schedule
Confidentiality	Fear that personal information will not be kept private
Difficulty finding GP	Difficulty finding a general practitioner