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Increasing HIV screening in a secondary hospital emergency department in Brazil: searching for opportunities

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Abstract

Patients seeking emergency care have higher HIV prevalence than the general population, but HIV testing is often not offered in these settings, constituting missed opportunities for HIV testing. Semi structured interviews were conducted with emergency department health workers in a secondary hospital in Brazil. Interviews were recorded, transcribed, and analyzed for themes related to barriers and facilitators

to HIV testing in emergency departments (EDs) and strategies to implement HIV screening programs. Currently, most providers reported only offering HIV testing when suspecting that the health problem that motivated the patient to seek care could be HIV-related. Although some providers believed that EDs would not be appropriate to implement screening programs, acceptability of HIV screening programs in this setting was overall high, particularly among nurses. Barriers to increasing HIV testing in EDs included concerns about time, understaffing, and increased costs. The initial triage was identified as a leverage point to obtain consent for HIV screening. Advantages and limitations of HIV screening programs at initial triage, testing blood samples collected for other reasons, and for patients undergoing emergency surgical procedures are discussed. EDs in medium income countries constitute a potential scenario to implement HIV screening programs, and such programs may benefit from empowering nursing staff to that end.

Keywords: HIV Infections; Mass Screening; Emergency Healthcare; Implementation Science.

Resumo

Os pacientes que procuram atendimento de emergência têm maior prevalência de HIV do que a população em geral, mas o teste de HIV muitas vezes não é oferecido nesses ambientes, o que constitui oportunidades perdidas para o teste de HIV. Foram realizadas entrevistas semiestruturadas com profissionais de saúde do departamento de emergência em um hospital secundário no Brasil. As entrevistas foram gravadas, transcritas e analisadas quanto a temas relacionados a barreiras e facilitadores do teste de HIV em departamentos de emergência (EDs) e estratégias para implementar

programas de triagem de HIV. Atualmente, a maioria dos provedores relatou que só oferece testes de HIV quando suspeita que o problema de saúde que motivou o paciente a procurar atendimento pode estar relacionado ao HIV. Embora alguns provedores acreditassem que os departamentos de emergência não seriam apropriados para implementar programas de triagem, a aceitabilidade dos programas de triagem de HIV nesse ambiente foi, em geral, alta, especialmente entre os enfermeiros. As barreiras para aumentar os testes de HIV nos DEs incluíam preocupações com o tempo, falta de pessoal e aumento dos custos. A triagem inicial foi identificada como um ponto de alavancagem para obter o consentimento para a triagem de HIV. São discutidas as vantagens e as limitações dos programas de triagem de HIV na triagem inicial, no teste de amostras de sangue coletadas por outros motivos e para pacientes submetidos a procedimentos cirúrgicos de emergência. As salas de emergência em países de renda média constituem um cenário em potencial para a implementação de programas de triagem de HIV, e esses programas podem se beneficiar da capacitação da equipe de enfermagem para esse fim.

Palavras-chave: Infecções por HIV; Triagem em massa; Cuidados de saúde de emergência; Ciência da implementação.

Resumen

Los pacientes que acuden a urgencias presentan una prevalencia del VIH superior a la de la población general, pero a menudo no se ofrecen pruebas del VIH en estos entornos, lo que constituye una pérdida de oportunidades para realizarlas. Se realizaron entrevistas semiestructuradas a trabajadores sanitarios del servicio de urgencias de un hospital secundario de Brasil. Las entrevistas fueron grabadas, transcritas y analizadas

en busca de temas relacionados con las barreras y los facilitadores de las pruebas del VIH en los servicios de urgencias (SU) y las estrategias para implementar programas de cribado del VIH. En la actualidad, la mayoría de los proveedores informaron que sólo ofrecen la prueba del VIH cuando sospechan que el problema de salud que motivó al paciente a buscar atención podría estar relacionado con el VIH. Aunque algunos proveedores creían que los SUH no serían apropiados para implementar programas de cribado, la aceptación de los programas de cribado del VIH en este entorno era en general alta, especialmente entre las enfermeras. Los obstáculos para aumentar las pruebas del VIH en los SUH incluían la preocupación por el tiempo, la falta de personal y el aumento de los costes. El triaje inicial se identificó como un punto de apoyo para obtener el consentimiento para el cribado del VIH. Se discuten las ventajas y limitaciones de los programas de cribado del VIH en el triaje inicial, el análisis de muestras de sangre recogidas por otras razones, y para los pacientes sometidos a procedimientos quirúrgicos de emergencia. Los SUH de países de renta media constituyen un escenario potencial para implementar programas de cribado del VIH, y dichos programas pueden beneficiarse de la capacitación del personal de enfermería para tal fin.

Palabras clave: Infecciones por VIH; Detección masiva; Atención sanitaria de urgencia; Ciencia de la aplicación.

Introduction

Since 2006, the Centers for Disease Control and Prevention (CDC) recommends that individuals ages 13-64 years are screened for HIV at least once.¹ Following this

guidance, there has been considerable interest in developing HIV screening programs in several clinical settings, including emergency departments (EDs).¹ Patients presenting to EDs have higher HIV prevalence compared to the general population, making ED-based HIV screening potentially impactful, yet screening in this setting is uncommon.⁴

When an individual who presents indications for HIV testing accesses health services and is not offered HIV testing, this constitutes a “missed opportunity”.² Addressing missed opportunities to HIV testing is key to decreasing undiagnosed cases of HIV and improving HIV transmission control efforts.³ Early HIV diagnosis is crucial to early initiation of antiretroviral therapy (ART) and viral load control, which halts HIV transmission.^{2,3} Increased HIV testing can also link HIV-negative individuals to HIV prevention care, including pre-exposure prophylaxis (PrEP).⁴

Despite being a relatively uncommon practice, acceptability of HIV testing among patients in the ED is high, leading to high testing rates when offered.^{5,6} Therefore, EDs might play an important role in promoting early diagnosis of HIV and linking at-risk individuals to HIV prevention care, reducing HIV transmission, morbidity, mortality, and costs.^{7,5} However, there are several barriers to ED-based HIV testing, across different levels: patient, health workers and health system. Barriers at the patient level include low risk perception, lack of HIV knowledge, and fear of being diagnosed with HIV.⁸⁻¹⁰ At the health workers level: limited time, concerns that the patient may feel stigmatized against, and HIV stigma.⁸⁻¹⁰ At the health system level: costs and personnel restrictions.⁸⁻¹⁰ On the other hand, educational campaigns to raise HIV awareness and destigmatize HIV testing can facilitate HIV testing in EDs.⁸⁻¹⁰

However, most studies investigating strategies to promote HIV testing and missed opportunities in EDs were conducted in other countries, and little is known

about barriers and facilitators to HIV testing in EDs in Brazil. Brazil has pioneered provision of ART free-of-charge within its public health system since the mid 1990s, but late diagnosis remains an important barrier to achieving adequate levels of HIV treatment coverage.^{6,7} Therefore, understanding challenges to implementing HIV testing programs in various clinical settings can help future efforts to that could end the HIV epidemic in the country.

The present study intends to qualitatively examine barriers and facilitators to HIV testing and evaluate opportunities at the health worker and health system levels to implement HIV testing strategies in the ED of a secondary hospital in Brasilia, Brazil.

Methods

Semi-structured interviews were conducted with a convenience sample of healthcare workers in the ED of a secondary hospital in Brasília, Distrito Federal, in October 2020, including physicians, nurses and laboratory workers. Individuals were approached by a member of the research team in the ED, who explained the objectives and procedures of the study and screened interested individuals for eligibility. Individuals were eligible to participate if they were a health worker of the hospital laboratory or part of the ED internal medicine, general surgery, or orthopedics teams. After consent, interviews were conducted at the health workers own sector, at a private room, allowing for a rich description of the current HIV testing flow and their opinion about hypothetical increased HIV testing scenarios and its eventual consequences if were they implemented. Health workers were recruited until theoretical saturation.¹¹

The semi-structured interviews were developed using a thematic guide-script according to Fontanella et al.¹² Guided scripts organize qualitative interviews around key issues regarding the study objective, but also keep dynamicity and openness to free

association by participants. The semi-structured interviews discussed usual care offered (both medical and surgical) and processes related to HIV testing in the ED. We also explored three hypothetical scenarios of ED-based HIV testing: offering HIV testing at triage, screening blood samples drawn for other reasons, and offering HIV testing at patients waiting for urgent surgical procedures.

The Interviews lasted 10-30 minutes and were audio-recorded and transcribed. After careful reading of the transcripts, a codebook was elaborated inductively and deductively. This codebook was then improved based on coding of a sample of the transcriptions, allowing the final version to capture all relevant content. After consolidation of the codebook and coding of all interviews, we used the thematic analysis method described by Braun and Clarke¹³ to identify emergent themes in the interviews. Data analysis was done in Portuguese, and quotes were translated into English by bilingual researchers if included in the present report. Qualitative data were analyzed using Dedoose.

All participants provided written informed consent. The study protocol was approved by University of Brasilia Medical School Research Ethics committee (CAAE: 28761120.4.0000.5558). Per Brazil's research regulations participants were not compensated for their participation.

Results

Our sample consisted of 16 participants: two undergraduate-level laboratory personnel; three clinical laboratory technicians who also worked as phlebotomists; eight medical doctors (two orthopedic surgeons, three general surgeons, and three internal medicine physicians), and three ED nurses. We chose to not report participants' gender and age to maintain participants' identities confidential.

Qualitative analysis identified three main themes: functioning of the clinical laboratory, current HIV testing practices in the ED, and perceptions about increasing HIV testing in the ED. Participants also described main challenges and advantages of three specific screening approaches: screening patients at triage, offering testing for individuals who underwent blood draws for other reasons, and screening patients admitted to the hospital for urgent surgical procedures.

Laboratory functioning

Besides serving the ED and inpatient floor units, laboratory workers reported that the same clinical laboratory was also responsible for analyzing samples from outpatient and primary care clinics linked to the hospital. Participants reported that the clinical laboratory executed various tests, including rapid HIV tests. The laboratory was responsible for HIV testing of samples from the ED and other inpatient floor units, except from the obstetric center, where point-of-care tests were utilized. Point-of-care rapid HIV testing was also done at the surgical center for occupational exposures, administered by nursing staff. Point-of-care HIV tests were not available in the ED or other inpatient floor units. HIV testing samples from outpatient clinics and serology samples from the ED and inpatient units are drawn locally at the laboratory and later sent to a city-wide central laboratory for processing.

Local laboratory health workers reported that demand for rapid HIV testing demand was low, about 2-5 rapid tests out of 300 blood samples collected daily. All participants who worked in the clinical laboratory reported that serving both as urgency and elective laboratory and being understaffed and under-resourced were important challenges to proper functioning of the laboratory in general.

“But then comes the issue of insufficient staff, and the equipment issue, the lack of supplies. One thing that we emphasize here a lot regards the separation

between, if either we are lab for urgencies or elective. We're both. So, the ideal is to have a sector only for emergencies and another for elective samples. It doesn't happen this way. We have only one machine for each type of exam. It's all mixed. So, for example, when a physician asks, "Could you run this patient's test quicker?", we answer that we will release it within the time to run all other tests. Because from the time any sample arrives, we can't accumulate, so what we must do is to keep it running. We must keep releasing results all the time. But, of course, that patient that demanded urgency is going to be a bit delayed than if we had a specific machine for emergency care." (Subject 03, laboratory worker)

Positive rapid HIV tests were confirmed with a new test from another manufacturer before being released in the EHR. Most laboratory perceived the current HIV testing procedures system as adequate to meet current demands. However, one participant reported that increasing the offer of HIV tests would require additional equipment (e.g., for immunoassays that can test several samples at once) and personnel:

"If we did [HIV testing] through ELISA [enzyme-linked immunoassay], yes [we could expand testing]. The plate reader, we don't have any plate readers [for ELISA]. I guess that we could improve, create a new area of immunology. But considering the current conditions nowadays it's not possible to implement. Especially because of lack of staff." (Subject 03, laboratory worker)

Laboratory orders and test results are delivered through electronic health records (EHR). Rapid HIV test results are made available in two hours or less, but there

was no protocol or system to alert providers of critical results, such as HIV positive tests, so patients could be discharged without receiving their results.

“But there isn’t this proximity [with the attending physicians], neither this protocol. Which is, by the way, against [Brazil’s] law. The law requires us to inform [the provider]. And for HIV testing, in my opinion, we should, especially a first positive HIV test, no? It would be one thing if someone were getting another positive test for some reason, but if it is a first diagnosis, we should inform the physician.” (Subject 03, laboratory worker)

Current HIV testing practices in the ED

HIV testing requests were made exclusively by physicians. Generally, physicians would only order HIV tests if the patients’ clinical presentation indicated that they could be HIV-positive. Many physicians reported knowing “classic” risk behaviors associated with HIV transmission (i.e., condomless sex, injection drug use), but unless they believed the patients had other sexually transmitted diseases or immunosuppression, they would not order HIV tests. General and orthopedic surgeons reported that they would almost exclusively request HIV tests for patients in the ED due to occupational exposures:

“Look, [ordering HIV tests is] pretty rare. It’s not our routine. For ED patients, we don’t order it. Actually, I’ve never ordered. I think the only circumstance in the ED that we eventually request [an HIV test] is if there is an occupational accident. I don’t remember other situations besides [occupational accidents].” (Subject. 08, general surgeon physician)

If other professionals (i.e., nurses) believed there were indications for HIV testing, they would approach physicians and ask them to consider testing.

“We came and asked: “Doctor, don’t you think it would be interesting to order a HIV test for this patient?” But usually, most of the time, they have already ordered. During the medical exam, before the patient comes to us, sometimes because of the patient’s history, symptoms, they [the physicians] have already ordered and the patient comes to us with the request. There were few times that there wasn’t an order, that when had talked to the patient, we suspected it could be [HIV infection]” (Subject 14, nurse)

Some nurses advocated for more autonomy to order laboratory tests, including HIV tests, and most nurse participants reported that the physicians were in general receptive to nurses’ suggestions:

“I guess that, if we could order exams in general, not only HIV, it could make our work easier. But the medical staff are pretty receptive. Every time we need, not only for HIV, we talk with the doctor and he promptly orders [the tests] through the health records [EHR] and the laboratory [technician] comes and draws the blood” (Subject. 14, nurse)

Perceptions about increasing HIV testing in the ED

Most nurses and physicians were receptive to the idea of increasing testing in the ED, and several participants highlighted the potential of early HIV diagnosis leading to decreased transmission and mortality:

“Yes, that [ED screening for HIV] would be great. Because I’m with a 24-year-old patient in the ICU [intensive care unit], recently diagnosed with HIV. And,

that's awful, because he is in critical condition, only seven CD4+ T cells. (...)

It's sad. If someone could find out earlier, they would take the medication and live. Like having hypertension or diabetes. [other chronic diseases]" (Subject 12, internal medicine physician)

However, some participants perceived universal screening to not be feasible due to the large volume of patients seeking care and that the ED was working already at full capacity. Given existing challenges related to under-funding and under-staffing, incorporating HIV screening could be added strain and decrease the quality of care for patients seeking emergency care:

"We already have such a huge demand, no? And then one brings one more process [increased testing at initial triage], one more barrier. Perhaps it would interfere, increase, the congestion for patients. It would delay what already is pretty slow. So, I think for the patient it would be bad in this sense." (Subject 13, internal medicine physician)

Some participants concerned about insufficient resources to implement universal programs believed that a more focused approach based on certain clinical or demographic features (e.g., age, risk behaviors linked to HIV transmission, etc.) would be feasible.

"Or maybe if there was a protocol [for increased HIV testing] for some types of patients or those with certain clinical conditions, it would be easier [to implement]. Maybe we could determine a certain age range. And, at that age range, test everyone." (Subject 15, nurse)

However, a few providers also perceived ED to be not appropriate settings for screening programs, which should instead be implemented in primary care:

“No, I don’t think [there should be HIV testing in ED]. There is no reason to do widespread screening, nowadays, considering the literature, to do mass screening for HIV. So, it should be guided by the clinical presentation or those cases where there is high suspicion or behavior that justifies [ordering an HIV test]. And it is to be done at primary care.” (Subject 09, general surgeon physician)

There were still concerns about increased waiting times, challenges providing adequate HIV testing counseling and linking newly diagnosed patients to HIV care. The plethora of concerns and competing priorities, and overall lack of resources led even participants who were initially inclined to support HIV screening in the ED to become sceptic about the feasibility of implementing of such programs:

“I don’t know about [if we would have the necessary] resources, but I guess it would be valid [to implement HIV screening in the ED]. But we’re so used to the lack of pretty much everything, that we not even bother caring anymore.” (Subject 06, orthopedic surgeon physician)

Scenario 1: Increased testing at triage

Acceptability of HIV screening programs at initial triage was high among nursing staff, who were responsible for triaging patients in this ED. Most nurses believed it was feasible to offer rapid testing at triage since most patients would have to wait before being seen by the attending physician:

“Maybe we could offer [HIV testing] at the triage, like it’s offered in primary care: “Look, we’re offering rapid testing to HIV, syphilis, hepatitis. Are you interested in doing it? It’s just a drop [of blood], a really simple test”. I guess that would be interesting, to increase population diagnosis. Yes, I think it’s viable.” (Subject 14, nurse)

Nurses themselves and also physicians perceived nursing staff to be well-positioned to discuss HIV testing with patients in a non-judgmental way, making such conversation flow more naturally.

“I think it is easier for the patient talk to the nurses than to physicians. We already know that, it has been shown in several studies, right? Because I guess they sometimes feel more comfortable with the nurses. I guess if a nurse offered it like this: “Here we offer free HIV testing. Would you be interested?”. Anything like that. Then they would add to the triage note: “Patient authorizes”. There wouldn’t be any problem, we could even put in [the test] order.” (Subject 12, internal medicine physician)

However, considering existing under-staffing in the ED teams, additional resources would be needed to operationalize HIV screening programs at ED triage. For example, all laboratory technicians we interviewed believed that there were not enough rapid test kits available nor laboratory staff to administer them. Similarly, most nurses believed that an additional nurse technician specifically for performing rapid HIV testing would be needed to avoid disrupting the clinical workflow in the ED.

Scenario 2: Offering testing for patients who drew blood for other reasons

While orthopedic and general surgeons reported rarely ordering blood exams in the ED, the practice was common among internal medicine physicians. Regardless of the specialization, all physicians in our study were little receptive to the idea of automatically including HIV testing in blood samples drawn for other reasons. These professionals emphasized the categorial importance of informed consent for HIV testing and anticipated difficulties to discuss HIV screening in the ED when disconnected from the reason that led the patient to seek care.

“I think they [patients] would be more comfortable [being offered testing by nurses]. I guess that with the medical staff: “So, what about doing a HIV test?”. Then the patient: “What do you mean? Do you think my sore throat could be HIV?”. So, the physicians won’t do that. They won’t offer. (Subject 12, internal medicine physician)

To bypass these challenges, nurses reported that they could also discuss and obtain consent for HIV screening during triage, so physicians would not need to obtain consent for patients who previously authorized HIV testing. However, similarly to HIV screening at triage, laboratory workers were also concerned that existing rapid tests supplies would not be able to meet the added demand of routinely testing blood samples collected for other reasons.

Scenario 3: Testing patients undergoing surgical interventions

HIV testing in ED patients necessitating urgent surgical intervention scenario was well accepted by all orthopedic and general surgeons and nurses. In these cases, identifying undiagnosed HIV infections would be a secondary benefit of routine HIV testing, and the main argument for this strategy was additional protections for health

professionals. All orthopedic and general surgeons reported that incidents of occupational exposures were common. That way, should occupational exposures occur, the serological status of the patient would already be known, not only for HIV but also other bloodborne diseases:

“The same way that [testing] for COVID is done today, in the pre-operative evaluation, I think it must also be done [routine pre-operative HIV testing]. It is safer for the health worker and for the patient. Because it’s much easier to treat the patient [knowing their health status, so extra precautions would be taken] rather than being in the operation room and [after an occupational exposure]: “Oh, he [the patient] had hepatitis”. (Subject 15, nurse)

There were divergent opinions among surgeons about whether knowing that a patient lives with HIV should interfere in the level of precautions and use of protective gear. While some argued that the same amount of care should be taken independently of the serologic status of the patient, others reported that in practice additional precautions were taken when a patient is known to be living with HIV:

“I think so, I guess it changes [additional care when a patient is known to live with HIV]. When a patient is HIV infected, I think the team takes additional precautions. It shouldn’t be this way, but in practice it is what I see happening.” (Subject 10, general surgeon physician)

Regarding the potential ethical conflict of ordering HIV tests in a patient with acute suffering, in need of surgical intervention when HIV infection is not suspected, providers were in favor of normalizing testing. Many providers reported that it is already common practice to request testing for bloodborne diseases serologies before

elective interventions, and that some hospitals do not authorize elective surgical interventions unless the patient has a recent test or consents to being tested:

“Patients undergoing elective cardiac surgical procedures are all tested. Hepatitis, HIV, chagas, syphilis. Because there is the possibility of an [occupation exposure] during the procedure. Looking this way, I guess [testing] is valid. It would be valid to screen all patients undergoing emergency surgical procedures [for HIV].” (Subject 13, internal medicine physician)

Discussion

The present study described the current HIV testing procedures in a secondary hospital ED and identified opportunities to implement programs to promote HIV testing. Being an environment that is primarily focused on urgent health care needs¹⁷, as in other studies, our study identified several challenges regarding universal HIV screening in the ED. Aligned with previous research²⁰, participants in our study reported that introducing a screening program in services that are already strained could interfere with regular acute care offered in the ED. Additionally, similar to previous studies, issues such as limited time²¹, physical⁹ and human⁹ resources, lack of specific procedures to ensure proper delivery of test results and counseling²² and linking newly-diagnosed cases to care,²¹ and costs were also reported by participants.²³

There were also provider-level barriers, especially among physicians, who expressed hesitancy toward expanding screening programs and preventative care in the ED in the face of more urgent needs of patients seeking care in this setting.²⁴ Considering higher acceptability among nurses and that nursing staff

are already responsible for other forms of preventative care, nurse-led HIV screening in the ED may be promising. Indeed, previous successful experiences with HIV screening programs in EDs involved nurses obtaining consent, usually at triage, ordering the test,¹⁵ or even administering point-of-care rapid HIV tests themselves.¹⁴ In Brazil, nurses are legally allowed to order, execute and release the results of rapid HIV testing, as also requesting confirmation testing and providing referrals to treatment as part of local or national clinical protocols.^{26,27} However, such practices are usually conducted by primary care nurses, and to our knowledge there are no nurse-led ED screening programs in Brazil. Future ED-based screening programs should consider building upon primary care services that rely on nurses' autonomy to execute preventive tasks and HIV screening.²⁷

All ED patients pass through triage, creating opportunities to structure making ED-based HIV screening programs. For example, regardless of the screening strategy, patient consent, essential for HIV testing,²⁸ could be obtained by nurses during triage. Testing would then be conducted immediately at triage (i.e., rapid test administered by nurses), before medical evaluation,¹⁶ or at later stages in the subset of patients who draw blood for other reasons.¹⁵ Screening programs restricted to patients undergoing surgical procedures are likely to reach a substantially smaller subset of patients, and therefore, have limited population impact. Finally, in settings where staffing and equipment needs are impeditive for professional-led screening, ED patients could be offered HIV self-testing to be administered after consent during triage or taken home upon discharge.^{29,30}

Deciding between these screening strategies would depend on local equipment (e.g., immunoassay equipment) and human resources available. For example, in the hospital where we conducted our study, only rapid HIV tests were available, such that conducting additional serology exams in blood samples drawn for other reasons could

require substantial initial investment to purchase and implement automated immunoassay-based HIV testing.³¹

Regardless of the strategy, several participants reported that ED-based HIV screening could put additional strain on health services that are already struggling with insufficient financial and human resources. Therefore, future studies should evaluate the feasibility, efficacy, and cost-effectiveness of different HIV screening strategies in ED settings to ensure their sustainability. Moreover, screening programs must be integrated into the HER to ensure that newly-identified patients receive proper counseling and referral to HIV care.^{17-19,32} In non-universal screening scenarios, machine-learning algorithms can be used to identify patients most likely to benefit from HIV testing and, providers could be notified through integrated EHR.^{8,9}

As limitations of our study, we interviewed health care workers from only one hospital of the metropolitan region of a large urban center in Brazil, so our results may not be generalizable to other health services. Still, we believe that our study makes important contributions to the design and implementation of future HIV screening programs, especially given the dearth of studies examining screening programs in similar settings. Additionally, social desirability bias cannot be completely ruled out, despite our use of open-ended and non-judgmental language in the semi-structured interview guide so as to elicit honest answers.

Our study suggests that it is possible to expand HIV testing without substantially interfering in the functioning of the ED,

Conclusion

The present study described existing HIV testing practices in a secondary hospital from a medium income country and identified opportunities to implement HIV testing programs in this setting. Despite challenges to implementing HIV screening

programs in the ED, our study sheds light on potential strategies that could prove successful in increasing HIV testing without substantially interfering in the clinical workflow. To that end, nurse-led programs seem to be particularly promising, and should be further evaluated in future studies.

Disclosure statement

No potential conflict of interest was reported by the authors.

Authors' contributions:

All authors contributed to the study conception and design. Material preparation and analysis were performed by Rafael Jardim de Moura, Pablo Valente and Gustavo Adolfo Sierra Romero. Data collection was performed by Rafael Jardim de Moura. The first draft of the manuscript was written by Rafael Jardim de Moura and all authors commented on previous versions of the manuscript. All authors read and approved the final manuscript.

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