RESEARCH

Crowdsourcing strategies to improve access to HIV pre-exposure prophylaxis in Australia, the Philippines, Thailand and China

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Abstract

Background Many Asian countries have yet to scale up HIV pre-exposure prophylaxis (PrEP). Crowdsourcing has a group of individuals solving a specific problem before sharing solutions with the public. This approach enhances community engagement and ownership of the solutions and can be used to generate culturally relevant solutions. We used crowdsourcing to seek innovative strategies to optimise PrEP access by increasing the uptake and effective use of PrEP. This study describes the experiences of crowdsourcing open calls in Australia, the Philippines, Thailand and China.

Methods Four crowdsourcing open calls were conducted between 2021–2023 in Australia, the Philippines, Thailand and China. All open calls entailed: 1) problem identification; 2) committee formation with local groups; 3) community engagement for idea submission (e.g., texts, posters, pitches); 4) evaluation of submissions; 5) awarding incentives to finalists; and 6) solution dissemination via web and social media. We reported the number of total and high-quality submissions. We also identified themes across countries.

Results The Australian, Filipino, Thai and Chinese teams received 9, 22, 9 and 19 eligible submissions, respectively. A total of 3, 10, 7 and 8 submissions had a mean score of 6/10 or greater. Three common solutions emerged across all the finalist ideas: enhanced service access, optimising promotional campaigns, and person-centred promotional materials. The winning ideas from the Australian, Filipino, Thai and Chinese teams were an anonymous online PrEP service, a printed ready-to-wear garment to create awareness about PrEP, PrEP and HIV self-testing kit dispensing kiosks and a poster on PrEP effectiveness, respectively.

Conclusions Crowdsourcing was a promising and versatile tool for developing PrEP strategies in the Asia–Pacific region. Further evaluations via clinical trials can bridge the gap between idea generation and implementation, creating the empirical evidence that is pivotal for the policy adoption of these innovations.

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Open Access

Keywords Crowdsourcing, HIV, Pre-Exposure Prophylaxis, Implementation Science, Public Health, Preventive Medicine

Background

Approximately six million people were estimated to live with HIV in the Asia–Pacific region ((as defined by UNAIDS) in 2021, and only 76% of these people were aware of their HIV status [1]. Despite a 21% decrease in new HIV infections in Asia over the past decade, some Asian countries faced a dramatic increase in HIV infections [1]. For example, the Philippines saw a four-fold increase in new HIV cases from 2012 to 2021 [2, 3]. Similarly, China reported an approximately four-fold increase in new HIV cases from 2010 to 2021 [4, 5]. Key populations, including men who have sex with men (MSM), continued to face a disproportionately higher risk compared to the general population [5]. In contrast, Thailand witnessed a four-fold decline in new HIV cases from 2010 to 2021 [1]. Similarly, newly reported HIV infections were halved from 2012 to 2021 in Australia. However, the number of new HIV cases among Asian-born MSM increased by 54% from 2012 to 2019 before the COVID-19 pandemic [6].

To control the HIV epidemic, those at risk for HIV must be able to access effective prevention methods, including pre-exposure prophylaxis (PrEP), an antiretroviral medication-based prevention strategy that reduces the risk of HIV from sex by up to 99% and from injection drug use by at least 74% [7]. PrEP may be taken daily, "on-demand" (event-driven) or injected every two or six months, depending on the client's preference [8]. However, PrEP uptake in Australia, China, Thailand and the Philippines is low (Table S1) [9]. Strategies to improve PrEP access in these countries are warranted since they are at different stages of PrEP implementation and HIV epidemiology. A summary of the HIV epidemiology and PrEP-related information for each country can be found in Supplementary 1 and Table S1. To do this, new community-based strategies to facilitate the broader utilisation of PrEP are vital. One such emerging approach is the nationwide crowdsourcing calls for solutions.

Crowdsourcing has a group solving a specific problem and sharing solutions with the public [10, 11]. This approach has gained traction across numerous disciplines, including public health, where its implementation in HIV programs has demonstrated promise [12]. Some key advantages of crowdsourcing include expediency, cost-effectiveness [13], and its ability to overcome geographic and domain-specific knowledge limitations [14]. Crowdsourcing could potentially be used to improve HIV prevention, diagnosis, or treatment [12]. Crowdsourcing has facilitated innovative HIV prevention campaigns, such as a contest in China that generated over 500 novel ideas, leading to positive outcomes in real-world studies, such as increased HIV testing uptake, enhanced health knowledge, and increased condom use among key populations [15, 16]. These findings highlight the potential of crowdsourcing to enhance HIV programs and improve health outcomes for key populations.

Research gaps remain to be addressed despite the growing evidence supporting the use of crowdsourcing in HIV research. One significant gap is the lack of available information on the logistics and characteristics of crowdsourcing initiatives [17, 18], which hinders the ability to accurately interpret findings and replicate their success. A more detailed report on the precise mechanics of crowdsourcing efforts would contribute to a better understanding of the factors that drive the success of these initiatives [18, 19]. Additionally, while existing research provides insights into the benefits of crowdsourcing [16], it is crucial to describe the local conditions and contexts under which its use is most effective [19, 20].

Our crowdsourcing open calls aim to generate solutions to optimise PrEP access by increasing the uptake and effective use of PrEP in Australia, the Philippines, Thailand and China, leading to a reduction of HIV transmission in the Asia–Pacific region. This study describes the experiences of using crowdsourcing to enhance HIV prevention and control efforts in these four countries with different stages of PrEP implementation and HIV epidemiology.

Methods

The HOPE (Ending *H*IV Transmission by *O*ptimizing *P*rEP in *E*ast Asia) Network organised the open calls conducted in Australia, the Philippines, and Thailand (HOPE-endHIV.com). This network connects regional experts in Australia, the Philippines, and Thailand to reduce HIV transmission by optimising PrEP use in East Asia, including generating new knowledge and solutions to optimise PrEP utilisation and translating research and community insights into accessible PrEP programmes and policy development. The open call in China was conducted by the Social Entrepreneur to Spur Health (SESH), an organisational partner of the HOPE Network. Our four open calls were conducted based on the World Health Organisation's Crowdsourcing in Health practical guide [10] as follows: 1) identify problems; 2) set up

steering and/or organising committees; 3) engage the local community to submit their ideas to open calls; 4) evaluate submissions; 5) recognise finalists; and 6) share and implement solutions [21]. The local steering committee supervised the process and ensured adherence to the protocol, while the organising committee handled the daily crowdsourcing operations, from promotion to preparing entries for judging. All judges received a full description of the judging criteria and were asked to provide a single score for each submission, where higher scores refer to better quality. In this report, we summarised all the scores using a 10-point scale, with no exclusion criteria applied for lower scores. All open call processes, such as recruitment and evaluation processes were tailored to each country's unique HIV epidemiology, key populations, culture, healthcare system and PrEP policy. A summary of key aspects of this study is shown in Fig. 1, and a summary of each country's open call process is presented in Fig. 2. Below, we discuss in depth how each country conducted its crowdsourcing activities.

Australia

Our Australian open call aimed to increase awareness and uptake of PrEP among newly arrived Asian-born MSM. It was conducted between March and October 2022. The steering and organising committees comprised clinicians, researchers, end users, policymakers, and members of local organisations. The open call was promoted online through social media platforms (i.e., Facebook), as Facebook allowed for tailored advertising, enabling us to target MSM from Asia based on their profiles and interests. Additionally, we advertised our open call through local organisation email lists, group chats, websites, and Facebook fan pages between August and September 2022 in six languages (i.e., English, Thai, Chinese, Tagalog, Bahasa Indonesian and Vietnamese) [22]. We used a survey platform, Qualtrics (Qualtrics, Provo, UT), to receive submissions. The total advertising cost was 7,465 Australian dollars (AUD) (4,852 United State dollars (USD)). Each individual could submit multiple ideas. The social media plan and advertising materials can be found in Supplementary 2. We accepted either a 500-word message, an A-1 poster, a 3-min video, or audio recordings by an individual or a team in any of these six languages which the participants were familiar with (i.e., English, Chinese, Thai, Bahasa Indonesia, Hindi, Punjabi, Vietnamese, or Filipino/Tagalog). There were no restrictions on the gender, nationality, and age of participants. Nine steering and organising committee members judged the submissions on an Excel sheet. Each submission was assigned to 4-5 judges. The judging criteria included clarity of the idea, feasibility of implementation, innovation/creativity, and meaningful impact. Within one week



Fig. 1 A summary of key aspects of this study



Fig. 2 Summary of the Open Call Process in Australia, the Philippines, Thailand and China

after the result announcement, the finalists received electronic e-vouchers of 500 AUD (325 USD for the 1st prize), 250 AUD (160 USD for the 2nd prize), and 125

AUD (80 USD each for the 3rd and 4th prizes), respectively, and the result was announced via the open call website in October 2022 [22].

The Philippines

Our Philippines open call aimed to increase PrEP use among key populations, including MSM and trans women (TGW), conducted from October 5 to November 2, 2022. Our organising committee comprised eight project team members, while the steering committee consisted of six members, including clinicians, academics, and representatives from the Lesbian, Bisexual, trans, Queens and others (LGBTQ +) community. We promoted the call [23] and formed partnerships with key government agencies following a comprehensive social media plan (Supplementary 3). Because Filipinos are active users of social media-particularly Facebook-and many partner NGOs in this project rely heavily on Facebook for their health promotion efforts, we leveraged the platform to broaden our reach and tailor our messages to specific audiences based on their profiles and interests. We accepted submissions through email, online forms, and direct office submissions to ensure wide accessibility. The submission form consisted of a set of questions (Table S4). Entries underwent two screening stages: an initial eligibility check and a detailed evaluation. During the eligibility screening, the organising team reviewed the entries to see if they were developed by Filipinos, focused on increasing the uptake of PrEP, and, most importantly, whether the submission forms were completely and accurately filled out to provide sufficient information for a fair review. During the detailed evaluation, two judges from an expert panel (i.e., the steering committee and three additional experts) scored each entry, with the top ten entries shortlisted. The criteria for final evaluation included appropriateness, innovation, inclusivity, affordability, and potential effectiveness. The top three innovations were recognized during the designathon event with plaques and cash prizes of 80,000 PHP (Philippine peso) (1,425 USD), 40,000 PHP (710 USD), and 20,000 PHP (355 USD), respectively. Winners were notified via email, and their cash incentives were sent through bank transfers. The finalists were also featured on the HOPE Philippines' social media page [23].

Thailand

Our Thai open call aimed to improve PrEP access and optimise PrEP effectiveness in Thailand and was conducted from October 6 to December 22, 2023. The steering and organising committees included physicians, project implementers, academics, PrEP providers, PrEP users and funders. The open call was promoted in Thai via local community social media platforms (i.e., Facebook, which is the most popular social media network in Thailand with a wide user base) and contest-related websites. This campaign strategically targeted students from relevant academic institutions and individuals within networks focusing on health solutions. The submissions took various formats to showcase solutions related to promoting PrEP. Between October 6 and 31, 2023, applicants submitted team perspectives on PrEP, expressions of interest, and statements of purpose to participate in the contest without any limitation on word count. The organising committees reviewed the qualified submissions. The accepted applicants participated in a series of masterclasses, where they were provided with PrEPrelated information and the opportunity to interview key stakeholders (i.e., PrEP providers and users). Subsequently, the participants developed prototypes during a design thinking workshop using Lego presentations to outline the journeys of potential PrEP users through their proposed solutions. Video presentations of each prototype were showcased via Facebook and YouTube for a week to receive public opinions and feedback. The participants subsequently refined and finalised the prototype based on the feedback they received before delivering a final pitch to a judging panel. The judging criteria included feasibility, innovation, inclusion, impact, relevancy, and presentation. The five finalists received cash prizes of THB 70,000 Thai bath (THB) (1,960 USD), 40,000 THB (1,120 USD), 20,000 THB (520 USD) and 10,000 THB (280 USD each for the 4th and 5th prizes) and were announced and honoured during the award ceremony in December 2023. Additionally, online interactive sessions were offered to address participants' gueries. Additional details about this open call can be found in Supplementary 4.

China

The nationwide online China open call focused on soliciting submissions to enhance PrEP awareness, uptake, and adherence within at-risk populations (e.g., MSM, TGW, sex workers, injecting drug users), spanned from March to May 2021. The steering and organising committees and judging panel consisted of community-based organisation (CBO) members, healthcare professionals, and academics, who were selected based on their expertise in sexual health and crowdsourcing. Eligible submissions included a maximum of 300-word explanation with either text (i.e., concepts, slogans, short articles, <1000 characters), images (i.e., photographs, posters, logos, drawings), or multimedia content (i.e., <3-min videos or audio and HTML5 webpages). All announcements related to the open call (i.e., promotions, participating instructions, deadlines, prizes) were channelled through the social media platforms (i.e., WeChat Official Accounts Platform) of the holders and CBOs in different provinces, as the WeChat was one of the most used mobile application with near 1.4 billion monthly usage and it was widely used for officially information dissemination for

the CBOs in China [24]. The online submission survey was included in Supplementary 5. During the submission period, online assistant emails or chat messages were opened to all participants for inquiries. All submission entries were checked for relevancy and plagiarism. Each submission was evaluated by at least three independent judges. The assessment criteria included relevancy of the idea, feasibility to implement, aesthetic design, and elaboration of details. The award structure consists of a single first, second, and third prize, each accompanied by a monetary incentive of 2,000 Chinese Yuan (CNY) (280 USD), 1,000 CNY (140 USD), and 500 CNY (70 USD) respectively. Besides, a 6.9 USD incentive was awarded to 20 participants to encourage active engagement. All monetary incentives were delivered by bank transfer. The finalist was announced through public media channels.

Results

All countries received eligible submissions, successfully evaluated submissions and obtained finalists. Three themes emerged across all the finalist ideas from Australia, the Philippines, Thailand and China as follows: 1) enhanced service access, including an anonymous online PrEP service, community-based mobilisation algorithm, PrEP/HIV self-testing vending machine, PharmAssist for PrEP and mobile/web-based PrEP applications using artificial intelligent technology; 2) promotional campaigns, including project SHAFT (Sustainable HIV & AIDS Awareness through Fashion Tales) and social media campaign for Vietnamese MSM living in Australia; and 3) promotional materials, including posters on PrEP use, effectiveness, and comics on PrEP and other STIs (Fig. 3).

Australia

The advertisement via a social media platform (i.e., Facebook) reached 312,823 users, and 3,962 clicked on the open call post within two months of the call launch. We received 11 submissions, with nine submissions eligible for judging (Fig. 4). The submissions included text and infographics. Two submissions were excluded due to no relevant data. All submissions were in English. There were nine participants: three males, two females, and four participants who did not disclose their gender as male or female, with a mean age of 34. Six (67%) participants were born overseas. The median score for all submissions was 22.8/40 (Interquartile (IQR) =17.8, 24.8, range = 10.8, 26.8). The score sheets are shown in Supplementary 2. The summary of the top three finalist ideas is shown in Fig. 3, and the full submissions can be found in Supplementary 2. After the open call, all four finalist ideas were further developed during our face-to-face designathon in April 2023 [25]. The winning prototype from the designathon is undergoing testing in an ongoing clinical trial.

The Philippines

The project reached 322,506 people and generated 8,523 post engagements through Facebook within 28 days of the call launch. The call attracted 31 submissions, with initial screening resulting in 22 eligible entries (Fig. 4). Among the eligible submissions, 15 were from males and seven from females. The nine excluded submissions lacked sufficient information or were deemed irrelevant to the call's objectives. Eligible entries were randomly assigned to two judges for final evaluation, and the average of their scores was used to rank the entries. The median score for all submissions was 3.8/5 (IQR = 3.6, 4.0, range = 3.5, 4.4). The score sheets are shown in Supplementary 3. A brief description of the top three innovations is presented in Fig. 3, whereas the description of the rest of the finalists can be found in Supplementary 3.

Thailand

The campaign reached 13,000 people via Facebook and YouTube within 26 days. Nine out of 30 team submissions, with 2-4 members per team, including 11 males and 19 females, were selected (Fig. 4). Of those, 21 submissions were excluded as their statement of purpose failed to exhibit sufficient passion and commitment. Statements were expected to articulate the motivation for entering the competition, aiming to improve the effective use of PrEP and highlight the team's capabilities to deliver impactful solutions. After participants developed, presented and finalised a prototype and pitch, a panel of seven judges. The median score for all pitches was 75.2/100 (IQR = 60.1, 76.7, range = 58.9, 86.9). The score sheet can be found in Supplementary 4. A brief description of the top three finalist ideas is shown in Fig. 3, and the full submission is shown in Supplementary 4.

China

Four official online promotions were published in 81 days, with 3,696 audience reached. Nineteen of twentyone submissions were eligible, and they were submitted by eighteen participants. Most of the participants (17 out of 18) were reached through the announcements delivered by the holders and the CBOs on WeChat, with one participant being peer-referred. Among these participants, 14 were males, four were females, and their mean age was 26. Eight of them were students. All eligible submissions were independently evaluated by the judging panel (Fig. 4). Eight submissions were in text or slogans, two were videos, and the remaining nine were posters, photos, or comics. The judging panel selected five posters and one comic as the most distinguished contributions,





Fig. 4 The open call outputs from Australia, the Philippines, Thailand and China teams

with three also securing participating prizes. The median score for all submissions was 29.2/50 (IQR = 22.9, 34.1, range = 6.0, 40.2). The score sheets are shown in Supplementary 5. The top three innovations are described in Fig. 3, and original submissions are included in Supplementary 5. After the open call, the six revised outputs were delivered to Chinese PrEP users in a PrEP demonstration trial biweekly to test its preliminary effects on adherence enhancement further [26].

Discussion

This paper reported the experiences from implementing crowdsourcing calls to promote PrEP utilisation in Australia, the Philippines, Thailand and China. This study found the potential of crowdsourcing as a tool applicable across different countries, cultures, health systems, and HIV epidemics. Using crowdsourcing, we engaged communities to create and develop locally informed PrEP solutions. This paper contributes to the existing literature by showcasing real-world examples of crowdsourcing applications in developing strategies to end HIV transmission.

Crowdsourcing approaches helped engage key populations in four diverse settings and develop messages for locally tailored PrEP campaigns. Crowdsourcing meaningfully engaged communities to address persistent challenges (e.g., stigma and discrimination) encountered by vulnerable populations, such as people living with HIV and MSM in several countries [27–30]. A previous crowdsourcing open call in China was used to create a mobile messaging application to promote PrEP uptake among MSM in China [31]. We found no crowdsourcing open calls conducted to promote PrEP uptake in Australia, Thailand and The Philippines. By enabling collaborations with people from diverse backgrounds, experiences and skills and by encouraging community engagement, our crowdsourcing successfully engaged the community to generate PrEP solutions in a short period of time. Additionally, our crowdsourcing open calls were adapted to generate community-based solutions in diverse settings. In our study, we tailored each of the four open calls to align with the unique HIV epidemiology, key populations, cultural contexts, healthcare systems, and PrEP policies of each country. For example, in Australia, a multicultural country with a significant number of migrants, the key population we targeted was Asianborn MSM. To ensure inclusivity and accessibility, our open call was published in multiple languages, allowing individuals from overseas to fully understand the problem statement and participate effectively. In contrast, the key populations in Thailand, the Philippines, and China were predominantly native-born MSM and TGW. Thus, the advertising materials and submissions for these countries were presented only in the local language, reflecting the linguistic and cultural context of the participants. Additionally, the crowdsourcing approach, including evaluation criteria and recruitment strategy, was adapted to reflect each country's PrEP policy and healthcare

system. In Australia, where PrEP is widely available and integrated into healthcare services, the open call emphasized optimizing existing PrEP access. In countries like Thailand and the Philippines, where PrEP rollout is still developing, the open calls were designed to focus on innovative ways to increase PrEP awareness and uptake within the healthcare system. In China, the objectives of the open call were established to diminish stigma and enhance appropriate awareness among at-risk populations, emphasizing a focus on community engagement rather than contributing to the governmental healthcare system. Moreover, the products associated with the open call in China were designed to facilitate a mobile health intervention through a stepped-wedge trial, which underscored the well-developed characteristics of the products and their feasibility as intervention materials. These features formed the evaluation criteria. All the solutions obtained from our four open calls highlight the potential of crowdsourcing to solicit solutions to improve awareness, acceptance, and access to PrEP in each country, contributing to efforts to end HIV transmission.

Given the promising outcomes, the next logical step is determining how to scale up these innovations effectively [32]. The scale-up of these innovations can be facilitated in collaborative environments such as designathons [33]. These events cultivate creativity and teamwork and offer a framework to operationalise and implement these solutions in real-world contexts. As we bridge the gap between idea generation and implementation, clinical trials alongside economic evaluations are important to produce the empirical evidence pivotal for the policy adoption of these innovations [34]. Three ongoing clinical trials in China and Australia utilise communityderived interventions from crowdsourcing to achieve similar goals [26, 35, 36]. For our study's solution, the Australian team is in the process of implementing their community-based innovation in a randomized controlled trial, and the results will inform further improvements to the intervention. If proven effective, the innovation will be disseminated through partner community organizations and clinics, which are also part of the steering and organizing committee for our open call. This innovation could also be shared with newly-arrived Asian-born MSM as part of a sexual education package upon their arrival in the country, ensuring its long-term sustainability and integration into existing health systems. The Chinese team is currently conducting a Stepped Wedge Cluster Randomized Controlled Trial (SWCRT) in the centre and the southern biggest city of China to evaluate the effectiveness of the products generated from open call and co-creation groups. The outcomes of this trial are expected to furnish evidence supporting the innovative intervention strategy aimed at boosting sustained Page 9 of 12

adherence to PrEP among at-risk groups in China. These products will be progressively disseminated to SESH and its collaborated CBOs for broader sharing with individuals who have sought PrEP consultations, facilitating the usability and incorporation into community initiatives. In the Philippines, the partner non-governmental organisations (NGOs) have embedded the ideas as part of their existing advocacy and outreach activities. For instance, Project SHAFT has evolved into a QR-code-embedded gown that contains important information on PrEP and links clients to services. A partner NGO, Saving, Improving Lives (SAIL) Clinic, collaborated with the innovator of Project SHAFT-who hails from a fashion design school-in developing this gown. Other top innovators were presented during the research dissemination forum, where key decision-makers from the Ministry of Health and other relevant government agencies were present. The team is also currently securing another round of funding to include the other innovative ideas in discrete choice experiments. Regarding the open call in Thailand, a discrete choice experiment (DCE) will be conducted based on the solutions that emerged from PrEPower projects to explore preferences for different PrEP service ideas across various socioeconomic groups. DCEs facilitate a deeper comprehension of how individuals make decisions when confronted with various options. The result of this DCE will inform the design of service bundles for the real-world implementation of PrEP program and help establish tailored services for different regions in Thailand.

Alongside traditional next steps, the convergence of arts and sciences and popular culture emerges as a promising avenue to test and upscale PrEP, especially in the popular culture of countries in Southeast Asia like the Philippines. Beauty contests, deeply rooted in the social fabric of these countries, serve as social advancement, personal expression and development, and national recognition [37]. More significantly, these contests provide the often marginalised transgender community with platforms to express their identity, gain acceptance, and advocate for their rights. In the Philippines, these contests feature prominently in town fiestas (conceived initially as religious public festivals with various processions and activities to honour a patron saint) and public events, drawing large audiences and fostering broader acceptance of the transgender community. Given these events'widespread reach and high engagement, especially among key populations, they present a potentially useful platform for promoting PrEP. The inclusivity of these contests could foster PrEP awareness and acceptance. As a form of personal expression, fashion can be harnessed to raise awareness, combat stigma, and advocate for the acceptance of PrEP. Exploring these intersecting elements presents a new research area that can enhance our understanding of health equity within a broader cultural context, encouraging a more inclusive discourse on health promotion [38].

Challenges observed during crowdsourcing implementation included recruitment, social media management, quality of submissions, and the judging system. In the Philippines, recruitment via social media, especially for a short period (less than one month), was not optimal for reaching diverse participants and might have contributed to several similar submissions. Our data are consistent with research from the Special Programme for Research and Training in Tropical Disease (TDR) [10] suggesting that the promotion of diverse participants is one key driver of success for crowdsourcing activities. The open call in Thailand encountered a similar problem which was insufficient time for the online community to thoroughly review and provide feedback on the solutions. Additionally, we recognized that users hesitated to offer feedback on platforms like Facebook or YouTube due to concerns about their online identity being revealed, potentially hindering their willingness to express their opinions for fear of judgment. Meanwhile, social media management encountered some difficulties in Australia. Despite advertisements targeting Asian-born MSM in Australia, a multicultural country, some people reacted to the Facebook ads in a discriminatory way, which was a common risk for any online public campaign. Consequently, proactive measures were taken to maintain a positive campaign atmosphere. Additionally, to mitigate bias from judging, we selected judges from diverse backgrounds (i.e., clinicians, researchers, end users, policymakers, and members of local organisations) and at least three judges from different professions and a community member assessed each submission. We noted one scorecard from a local community judge with extreme scoring discrepancy (i.e., assigning one point for all rubrics for two submissions and 8–10 to another); this was removed from the judging process to ensure fairness and consistency.

This scorecard was completed by a judge from the local community. Lastly, some submitted entries were excluded due to irrelevance. This could be caused by inadequate and unclear instructions to participants from the start. Clearer communications, using guiding questions to frame details of entry, could benefit the implementation.

The main strength of our paper was that it presented details of how crowdsourcing was implemented in four different settings but with the same goal of improving access to PrEP. We showcase the success and challenges of implementation in these settings. Our study should be read in light of some limitations. First, there could be selection bias in excluding individuals who might not have access to or were not active on platforms used for recruitment. This could limit the diversity and representativeness of the submissions. Second, although efforts were made to advertise the open call in non-English languages in Australia, we did not receive any non-English submissions. This language bias could result in the underrepresentation of certain communities or individuals who were not proficient in the advertised languages. Third, we acknowledged the variations in participant engagement and response rates between countries because each open call targeted different populations and used different online platforms to recruit participants, due to each country's specific restrictions (e.g., Facebook is not allowed in China). Since our study did not include hypothesis testing, we did not compare the level of engagement or key characteristics between countries. Additionally, we did not conduct a detailed analysis of how the reach differed across distinct population groups or evaluate whether the distribution aligned with our initial expectations. This limitation highlights an important area for future research, where a more granular examination of platform-specific engagement could provide deeper insights into the effectiveness of targeted social media strategies. Finally, our findings were specific to the contexts of Australia, the Philippines, Thailand and China, but some of the principles shared could still apply to other contexts or populations with similar cultural, social, or healthcare contexts.

In conclusion, crowdsourcing is a promising and versatile tool for generating community-based solutions. Involving a diverse range of participants, including those who were part of the population to reach, enabled the generation of innovative ideas and solutions to increase the awareness and uptake of PrEP among specific populations. Using online platforms and strategic partnerships with key stakeholders was crucial in promoting the open call. This indicates the value of leveraging digital platforms and community networks to increase engagement and participation.

Abbreviations

AUD	Australian dollar
CBO	Community-based organisation
CHY	Chinese yuan
DCE	Discrete choice experiment
HIV	Human immunodeficiency virus
HOPE	Ending HIV transmission by Optimising Pre-exposure prophylaxis
	in East Asia.
IQR	Interquartile range
lgbtq +	Lesbian, gay, bisexual, transgender, queers and more
MSM	Men who have sex with men
NGO	Non-governmental organisation
PHP	Philippine peso
PrEP	Pre-exposure prophylaxis
RMB	Renminbi (Chinese Yuan)
SAIL	Saving, Improving Lives
SESH	Social Entrepreneur to Spur Health
SHAFT	Sustainable HIV & AIDS Awareness through Fashion Tales

STI	Sexually transmitted infection
SWCRT	Stepped Wedge Cluster Randomised Controlled Trial
TDR	Special Programme for Research and Training in Tropical Diseases
TGW	Transgender women
UNAIDS	Joint United Nations Program for HIV and AIDS
USD	United States dollar

Supplementary Information

The online version contains supplementary material available at https://doi. org/10.1186/s12879-025-11065-4.

Supplementary Material 1.

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Authors' contributions

JJO, JT and WTang conceived the ideas. WTi, AO, KT, ZY, NTC and JJO wrote the first draft of the manuscript. WTi revised and finalised the manuscript. WTi, AO, KT, ZY, NTC, JJO, JT, CL, YZ, AW and WTang contributed to the manuscript and approved the final version for submission.

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Data availability

The data supporting this study's findings are available from the corresponding author upon reasonable request.

During the preparation of this work the authors used ChatGPT to improve readability. After using this tool, the authors reviewed and edited the content as needed and take full responsibility for the content of the publication.

Declarations

Ethics approval and consent to participate

Each country had different funders and Institutional Review Boards (IRB). Some crowdsourcing open calls are organized as non-research programs

for several reasons. These include the preference of local communities to simplify and streamline participation procedures, enhancing the agency of the community over the research team, and focusing primarily on addressing community needs. Additionally, such initiatives operate within a framework of terms and conditions that clearly outline the rights and responsibilities of participants. Discussions with IRBs are conducted to determine the most appropriate ethical mechanism for assessing these activities [39]. For the Australian open call, ethics approval was obtained from the Alfred Hospital Ethics Committee, Melbourne, Australia (project number 266/22). The Philippines open call obtained ethics approval from the University of the Philippines Manila Research Ethics Board (2022-0282-01). All participants were provided with a participant information sheet, and informed consent was implied by submitting ideas. The IRB from the Faculty of Medicine at Chulalongkorn University granted an ethics waiver for the open call in Thailand, as the study involved no assigned harmful intervention, posed no risk to participants, and collected limited personal information. China's open call was granted an ethics waiver due to limited personal information solicitation and anonymous treatment, minimizing potential harm to participants.

Consent for publications

Not applicable.

Competing interests

The authors declare no competing interests.

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