



OPEN A snapshot of the presence of HIV-related features in MSM social media dating apps in New Zealand

Wenjie Li^{1,2}✉, Dong Wu², Zhenzhen Xing² & Zhirui Chen²

The men who have sex with men (MSM) social media dating apps have emerged as a new channel for HIV prevention and education. However, there is a lack of clarity regarding the availability of specific HIV-related features on these apps, making it uncertain what features related to HIV are offered. This study provided a comprehensive overview of the existing HIV-related features of MSM social media dating apps in New Zealand by screening 39 apps, selected from a total of 1296 search results obtained from the Google Play Store and Apple App Store. The HIV-related features within these apps were categorized into 10 groups, including safety practices, HIV status, tribe Poz, where to get tested, last tested, test reminder, HIV/Sexual health information center, link to an outside organization, getting support from health practitioners, and search filters for HIV status, safety practice and tribe Poz, totaling 12 features. Results demonstrated that only about one-third of the apps contained HIV-related information but this ratio significantly increased during the last decade, suggesting a trend of normalization in incorporating such information in the apps. The safety practices and HIV status were identified as the two features most frequently incorporated into these apps and the underlying mechanisms were analyzed using the political economy of communication theory and the uses and gratifications theory. Overall, this study contributed to helping the stakeholders such as app developers, public health agencies, health practitioners and policymakers to make evidence-based decisions to incorporate and promote HIV prevention-related initiatives within the digital realm.

Keywords MSM, HIV-related features, Dating apps, HIV prevention

Abbreviations

AIDS	Acquired Immune Deficiency Syndrome
BB	Barebacking
BHOC	Building Healthy Online Communities
GPS	Global Positioning System
HIV	Human Immunodeficiency Virus
LGBT	Lesbian, Gay, Bisexual, and Transgender
MSM	Men who have Sex with Men
PEP	Post-Exposure Prophylaxis
PrEP	Pre-Exposure Prophylaxis
STI	Sexually Transmitted Infection
STD	Sexually Transmitted Disease
TasP	Treatment as Prevention

In New Zealand, MSM are disproportionately affected by HIV/AIDS. Although gay and bisexual men comprise only approximately 2.5% of the population, they face a risk of HIV infection that is 348 times greater than that of heterosexuals¹. These statistics highlight the disproportionate prevalence of HIV within the MSM community compared to other populations, underscoring the urgent need for targeted prevention strategies.

In recent years, some MSM social media dating apps have actively participated in HIV prevention efforts, offering a range of features aimed at reducing the transmission of the virus and promoting healthy sexual behaviors. Dating apps have emerged as a new channel for HIV prevention and education. With features such as HIV testing resources, status disclosure, educational content, and safe sex promotion^{2,3}, these apps can help reduce new HIV infections and promote healthier behaviour. For instance, Blued initiated an online campaign to promote HIV testing in Beijing by using the GPS-tracking capability of the app and sending one-time mass

¹School of Communication Studies, Auckland University of Technology, Auckland, New Zealand. ²School of Art Design and Media, Guangzhou Xinhua University, Guangzhou, China. ✉email: liwenjie_jessica@163.com

message via the app's private messaging function, which contributed to a dramatically increased overall number of HIV tests from 425 in 2014 to 7315 in 2017⁴.

Early studies demonstrated that about 64–91% of the MSM participants desired to obtain sexual health knowledge through an app^{5–8}. A study discovered that Black MSM commonly used dating apps to learn about PrEP (pre-exposure prophylaxis), while these platforms may serve as facilitators for the disclosure of PrEP and consequently assist in preventing the spread of HIV⁹. Recent study demonstrated that 77% of the survey participants were aware of HIV prevention features present in MSM dating apps and 61% of this group utilized one or more of these features¹⁰. Different dating apps offer different options for users to specify their sexual health profile, such as the disclosure of HIV status, the use of PrEP, having an undetectable viral load, being open to using condoms, and indicating the date of the most recent HIV and/or STI test¹⁰. Such HIV-related features can empower users to better appreciate their sexual health status. By providing options for disclosure, testing and prevention, dating apps can help promote safer sex practices, reduce stigma and discrimination, and ultimately contribute to the prevention and control of HIV.

Additionally, efforts by organizations such as Building Healthy Online Communities (BHOC) have further advanced these initiatives. BHOC partners with dating app and website owners to collaborate on health features and promote HIV and STI prevention, primarily in the US¹¹. The focus of BHOC has been on researching users' preferences regarding dating app features as well as usage, collaborating with public health professionals, and working with dating apps. Additionally, BHOC has gathered feedback from a diverse range of public health experts and researchers to inform its recommendations and advocacy efforts.

However, research remains limited on the evaluation of these apps among MSM for providing HIV-related prevention features. A systematic investigation is lacking to identify and categorize the available HIV-related features on these apps, which makes it harder for the evidence-based decision-making of the stakeholders such as app developers, public health agencies, health practitioners and policymakers to incorporate and promote HIV prevention-related initiatives within the digital realm. Thus, a comprehensive overview of the existing HIV-related features in MSM social media dating apps is needed to help stakeholders allocate resources more effectively and inform the development of policies that address the specific needs of MSM communities in relation to HIV prevention. Furthermore, there is a demonstrated widespread interest in the app-based HIV prevention initiatives across diverse demographics and geographic locations. The geographical scopes of the majority of previous research were limited to Australia, the United States and Asia¹², while little is known about similar research conducted in New Zealand. The geographical discrepancy raises concerns about the generalizability of those findings to New Zealand where the policy, environment, cultural, and societal context may significantly differ from other regions. Accordingly, this study offers a detailed overview of the existing HIV-related features of MSM social media dating apps in the New Zealand market. It aims to contribute to a better understanding of the MSM social media dating apps' ability to raise awareness about HIV/AIDS. Specific objectives of this study were to (1) evaluate the MSM social media dating apps available both in the Apple App Store and Google Play Store, (2) identify the MSM social media dating apps that contain HIV-related features, and (3) categorize those HIV-related features and identify which features are most frequently incorporated in the MSM social dating apps. Overall results from this study can guide the design and implementation of tailored interventions that effectively reach and engage MSM populations, ultimately leading to improved health outcomes.

Methodology

App selection and HIV-related features identification

To provide an overview of HIV-related features, we first needed to identify MSM social media dating apps used in New Zealand. Figure 1 shows the overall app selection process. The search strategy employed various iterations of keywords. Standard terms used to describe social media dating apps for MSM were chosen initially, which included 'gay', 'gay dating', 'gay social media dating', 'men who have sex with men', 'MSM', 'LGBT', 'homosexual', and 'bisexual'. Following the trial, it was found that some of the search keywords were too broad and mainly returned non-MSM social media dating apps. The final search phases used were refined as follows: 'gay', 'LGBT', 'homosexual', and 'bisexual'. Each keyword was searched in the Apple App Store and Google Play Store from May 25 to May 26, 2021, which was then filtered using the following inclusion and exclusion criteria.

APP inclusion and exclusion criteria

The MSM social media dating apps identified in the preceding phase were filtered using the following criteria:

1. The app had to be present on both the Apple Store and Google play Store.
2. The language must be English.
3. Only free apps were selected.
4. Apps were excluded if their target population was not the MSM community. Dating apps that do not actively target MSM users (subjects) were out of the scope of this study. The target population was inferred from the information provided by the developers, which includes the app name and description.
5. Apps were excluded if they could not be opened or logged in.
6. Duplicate results were excluded. The search terms used to find potential MSM dating apps had the potential to return the same results.
7. Versions that are alike (e.g., 'lite' or 'pro' versions) were not included. Instead, only the free version was counted.
8. Apps were excluded if their target population was not New Zealand app users.
9. In the Apple app Store, apps under the lifestyle and social networking categories were included.
10. In the Google play Store, apps under social /dating/lifestyle/communication categories were included.

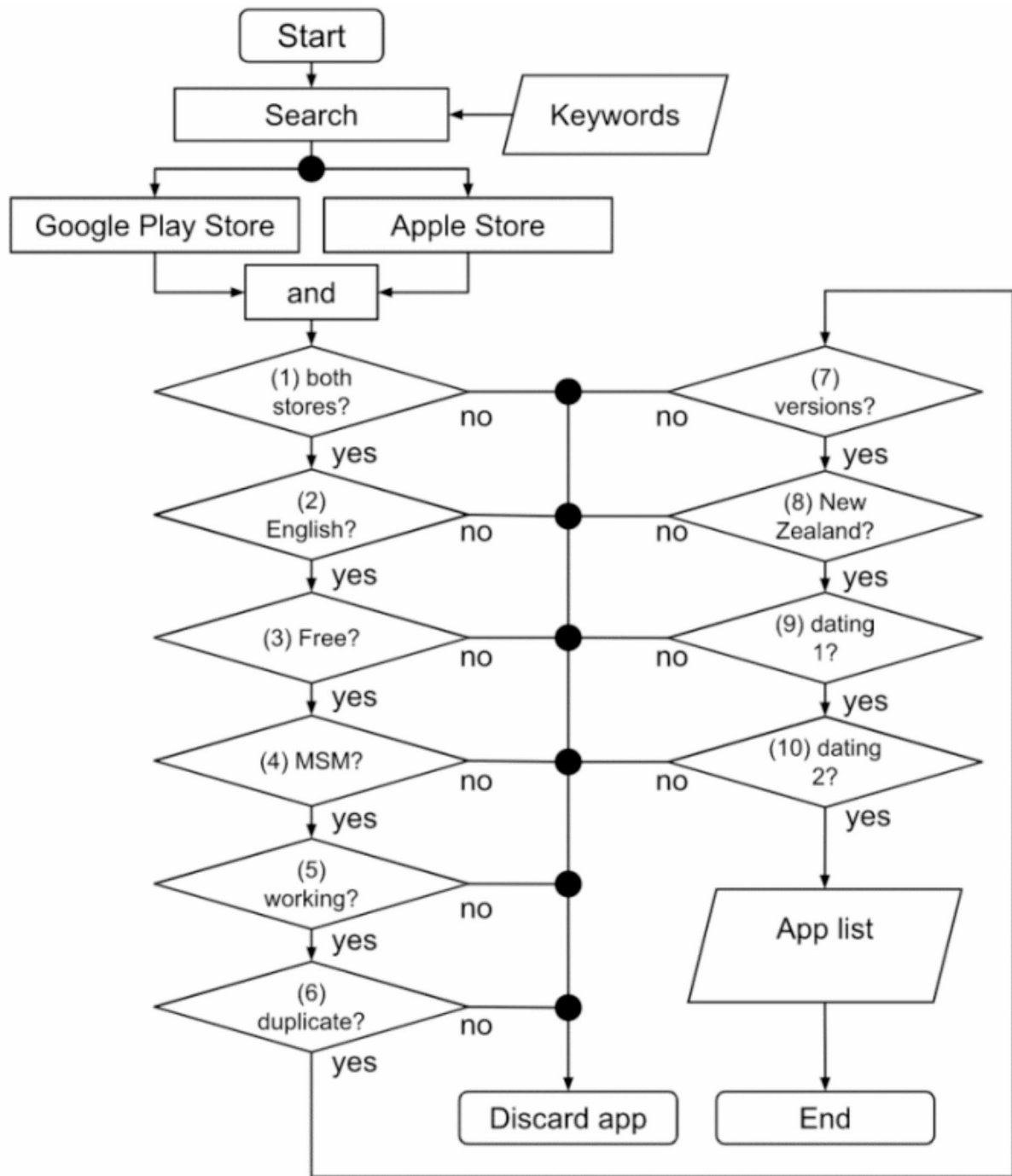


Fig. 1. Schematic for the apps selection process.

The availability of app on both stores

The first author was responsible for the data selection process. The data collected for this study was systematically tabulated to ensure accuracy and facilitate comprehensive analysis. The spreadsheet contains four tabs, each representing the results of a search using one of four key terms. Raw data, including app names and links, were entered into a structured tab, with each row representing an individual data point and each column corresponding to a specific variable under investigation. These variables include: App Name (the name of the app according to the developer), Category (the category in which the app was published in the store), Version (the version of the app at the time of the search), Rating (the app rating according to users), Review (the number of user reviews), Download (the number of downloads), and Description (the app description according to the developer). Data validation rules were applied to minimize entry errors, and any duplicates, inconsistencies, or outliers were flagged for further review. The results were consolidated into a summary tab, where columns were

marked as “Yes” or “No” based on the evaluation of the app name and description. For instance, “Gay Radar Live Video Dating Chat” was marked as “Yes,” whereas “Female Gay Dating, Lesbian Chat-Wonder” was marked as “No.” After removing apps that did not meet the criteria, the final list of eligible apps was established.

Totally 1296 apps were found using four keywords such as gay, LGBT, bisexual, and homosexual, among which 296 and 1000 apps were present on the Apple App Store and Google Play Store, respectively. On the Apple App Store, 119 app results under the searching keyword of “gay”, 104 app results under the searching keyword of “LGBT”, 56 app results under the searching keyword of “bisexual” and 17 app results under the searching keyword of “homosexual”. On the Google Play Store, 250 app results were found regardless of the keyword used. This demonstrated that each search term had a large number of results accessible. Generally, more apps were available through the Google Play Store than the Apple App Store. In the Apple App Store, the search term “gay” yielded the most results.

Since the results generated by the keywords could contain repetitions, it was necessary to apply the inclusion criteria to refine the final list. At this point, the 1296 combined results from the keywords did not accurately represent the number of apps because one app might appear on different keyword queries. For instance, a single app might lead to the results of four if it showed up on all queries.

The final Apple App Store list contained 112 apps. As shown in Fig. 2, the screening process was as follows: A total of 296 results were found on the Apple App Store while 233 apps were left after removing the duplicated results. One app was not available at the time of checking for detailed information, because it was removed from the app stores which is common. Apps might be withdrawn for many reasons, including actions made by the developer, failure to renew a developer account, and removal by the owner of the app store¹³. Consequently, 232 apps were left. Moreover, another 85 apps were excluded as they belonged to other categories instead of dating apps (Fig. 3). There were 147 apps under lifestyle and social networking in the Apple App Store. Some other apps were excluded from the list including one paid app, four non-social media dating apps, one app that was not targeted at New Zealand users, and 29 apps that were not targeted at MSM.

From the 1000 apps found on the Google Play Store, 429 duplicates and 1 unavailable app were removed (Fig. 2). Among the remaining 570 apps, 211 apps were excluded because they belonged to other categories such as Puzzle or News and Magazine (Fig. 3). Consequently, 359 apps were selected under the categories of social, dating, lifestyle and communication. Moreover, there were 4 paid apps, 25 apps that were in a language other than English, 35 non-social media dating apps, 2 apps that were not targeted at New Zealand users, and 40 not targeted at MSM apps. These should also be excluded according to the exclusion criteria, which eventually resulted in 253 apps on the final list.

Once the lists of apps from both app stores were obtained, it was necessary to combine them. The final list contained 44 MSM social media dating apps. The reason for combining both stores was to eliminate mobile operational bias. Apps from the Google Play Store could not be installed on Apple’s iPhones. Also, apps from the Apple App Store were not compatible with Google’s Android phones. Hence, an application exclusive to a single platform would not meet the criteria for widespread popularity. Keeping this in consideration, apps that were confined to a singular platform were consequently excluded. Accordingly, the two lists were combined into one which only included the apps featured in both lists.

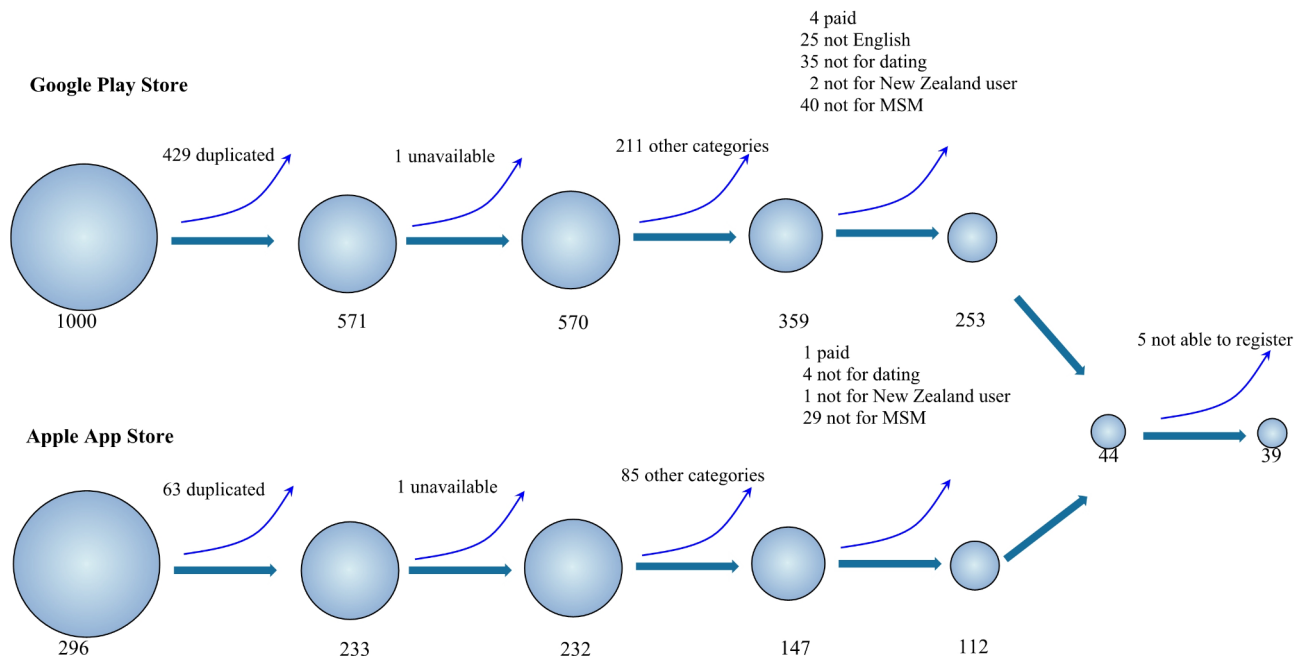


Fig. 2. Flowchart for the app screening process. The data represent the number of apps remaining after each screening step.

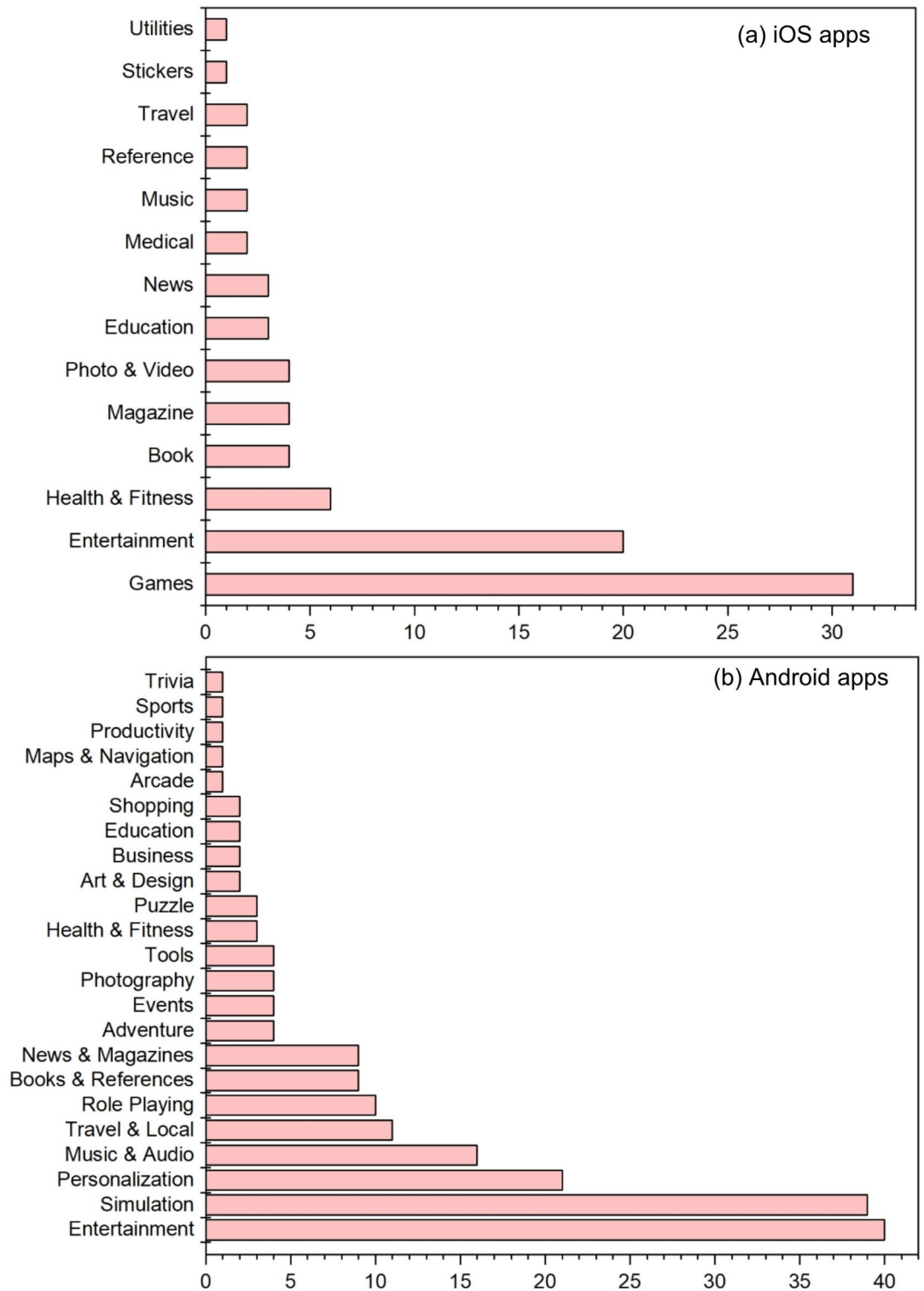


Fig. 3. Number of excluded (a) iOS and (b) Android apps under various categories.

These apps were then installed from the Google Play Store onto an Android smartphone. Given Android's significant global market share advantage over iOS, this platform likely represents the most widely used iteration of MSM dating apps¹⁴.

Additionally, it was not possible to create an account on 5 of the 44 MSM social media dating apps, because these apps were not updated for a long time or were even abandoned. Finally, 39 MSM social media dating apps were left for analysis. Then, the identification process started to check if the app contained any HIV-related

features. Every available section of the app was explored. Screenshots were taken when any HIV-related features were found.

Furthermore, descriptive statistics, including measures of central tendency, dispersion, and position, were used to summarize and organize the data, providing a clear and concise overview of the dataset's characteristics. These statistics helped to describe, display, and summarize the findings in a meaningful way, making it easier to understand patterns or trends and to compare them with other studies¹⁵.

Results

Apps that contained various HIV-related features

Table 1 showed a summary of what features were found on which app. It should be noted that apps were frequently updated by the developers, therefore, this research was limited to the specific versions listed in Table 1. A 'yes' (one) represented that the particular type of feature was found on the app, not how many times that kind of feature was found on the app. The last column showed the sum of types of features present on each app. The number of app HIV-related features ranged from 1 to 9. The last row showed the sum of types of features that appeared.

Results indicated that only 13 apps contained HIV-related features among the 39 examined apps and various MSM social media dating apps contained different HIV-related features (Table 1). The Adam4Adam, Grindr and Jack'd had the greatest total number of features ($n=9$). The next highest was the Scruff app, which contained 8 HIV-related features. Nearly half of those apps (six out of 13) had only one or two HIV-related features. The percentage of apps that contained the safety practice feature was 84.6% ($n=11$). Eight apps included the HIV status feature ($n=8$, 61.5%), six apps had the HIV/sexual health information center feature ($n=6$, 46.2%), six apps included links to a third-party website ($n=6$, 46.2%), five apps included the where to get tested feature, four apps included last tested date ($n=5$, 38.5%), four apps included the search filter of tribe ($n=4$, 30.8%), three apps included the get support from health practitioners feature ($n=3$, 23.1%), three apps included the search filter of safety practice ($n=3$, 23.1%), and three apps included the search filter of HIV status ($n=3$, 23.1%).

It was found that the most common functionality of HIV-related features within MSM social media dating apps was 'safety practice', followed by 'HIV status'. Several apps mixed safety practice and HIV status information together, under HIV status options for users, such as HIV negative, on PrEP. This might be attributed to the fact that safety practices and HIV status were just selection information displayed on the profile, which was relatively easy to deploy in apps. Nevertheless, these two HIV-related features were profile status information.

HIV-related features

Throughout this research, any mention of HIV prevention, service, testing, information on any level of complexity, and the HIV disclosure option was identified as an HIV-related feature. The identification of HIV-related features was applied to each of the 39 MSM social media dating apps. The HIV-related features within MSM social media dating apps focused on safety practices, HIV status, HIV/Sexual health information center, link to an outside organization, where to get tested, last tested, get support from health practitioners, tribe Poz, and search filters for HIV status / safety practice / tribe of Poz (Fig. 4).

Safety practice feature

There is no standard definition for a "safety practice" feature. In the context of HIV prevention in MSM social media dating apps, safety practices encompass various aspects such as condom use, PrEP, PEP, and TasP. Features that hint at any of these terms were categorized as safety practice feature.

Safety practice feature appeared in Adam4Adam, Gayroyal, Grindr, GROWLr, Hornet, Jack'd, Manhunt, MUSL, RealMen, ROMEO, and Scruff. For example, there were four options on the drop list of Adam4Adam such as 'select your practice', 'Protected', 'BB', 'I am on PrEP', and 'Depends' (Fig. 5a). Safety practice information usually exists as a drop-down menu option or as a separate option in users' profiles, which mainly contains two kinds of information as follows:

First, safe sex-related information on condom usage preference. 'BB/Bareback' means no condom usage, 'Protected' means using a condom, and 'Need discussion' means it can be discussed.

Second, HIV prevention method information such as PrEP and TasP. PrEP is the use of an HIV medicine on a daily basis to lower the chance of contracting HIV via intercourse or drug injection for persons who do not yet have HIV but are at risk of acquiring it¹⁶. Research has demonstrated that PrEP is efficacious in preventing HIV transmission^{17–21}. TasP refers to the consumption of HIV medicine to stop the transmission of HIV through sexual activities, which is regarded as the most effective means to control HIV transmission²². It is shown in various expressions such as 'I am on PrEP', 'I am taking PrEP', 'on PrEP', 'Pre-exposure prophylaxis (PrEP)', 'Treatment as Prevention', or 'TasP'.

HIV status feature

HIV status feature was found in Adam4Adam, Grindr, GROWLr, Hornet, Jack'd, Manhunt, RealMen, and Scruff. For instance, this happened on Jack'd as five options under the 'HIV status' drop list: 'Unset', 'Positive', 'Positive, Undetectable', 'Negative', and 'Let's discuss' (Fig. 5b).

Tribe of Poz feature

Grindr and Jack'd contained the tribe Poz feature. On Grindr, for instance, Poz is one of the multiple choices lists under 'Tribes' on Grindr (Fig. 5c). A tribe is a social grouping of homosexual males formed entirely on the basis of their body type, key physical attributes, or specific interests²³. Poz refers to someone who is HIV positive²⁴. HIV-positive users can utilize this option to connect and find community with other HIV-positive males, but

Features													
App	Safety Practice	HIV status	Tribe Poz	Where to get tested	Last tested	Test reminder	HIV/Sexual health information centre	Link to outside organisation	Get support from health practitioners	Search filter: Safety Practice	Search filter: HIV status	Search filter: Tribe Poz	Number of types of features
Adam4Adam ^a	Yes	Yes		Yes			Yes	Yes	Yes	Yes	Yes	Yes	9
Blued ^b							Yes						1
Beuronline ^c									Yes				1
Gayroyal ^d	Yes												1
Grindr ^e	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes				Yes	9
GROWLr ^f	Yes	Yes								Yes	Yes		4
Hornet ^g	Yes	Yes		Yes			Yes	Yes	Yes				6
Jackd ^h	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes				Yes	9
Manhunt ⁱ	Yes	Yes											2
MUSL ^j	Yes												1
RealMen ^k	Yes	Yes		Yes						Yes	Yes		5
ROMEOL ^l	Yes							Yes					2
Scruff ^m	Yes	Yes		Yes	Yes	Yes	Yes	Yes				Yes	8
Number of appeared features	11	8	2	5	4	3	6	6	3	3	3	4	

Table 1. HIV-related features contained in the MSM social media dating apps (New Zealand versions). App developer and versions: (a) A4A Network Inc, version: 4.6.2.6; (b) Blue City Holdings Co., Ltd., version: 3.7.2; (c) Studio Presse, version: 5.12.328; (d) 42pixels B.V., version: 1.2.3; (e) Grindr LLC, version: 7.10.0; (f) Initech, version: 16.3.2; (g) Hornet Networks Ltd., version: 7.3.0; (h) Perry Street Software, version: 6.4303; (i) MHNNext LLC, version: 2.7.3; (j) MUSL, version: 2; (k) RM Media GmbH, version: 1.0.9; (l) ROMEO B.V., version: 3.12.0; (m) Perry Street Software, version: 6.4303. Note: These are New Zealand versions. The feature may differ from other countries.

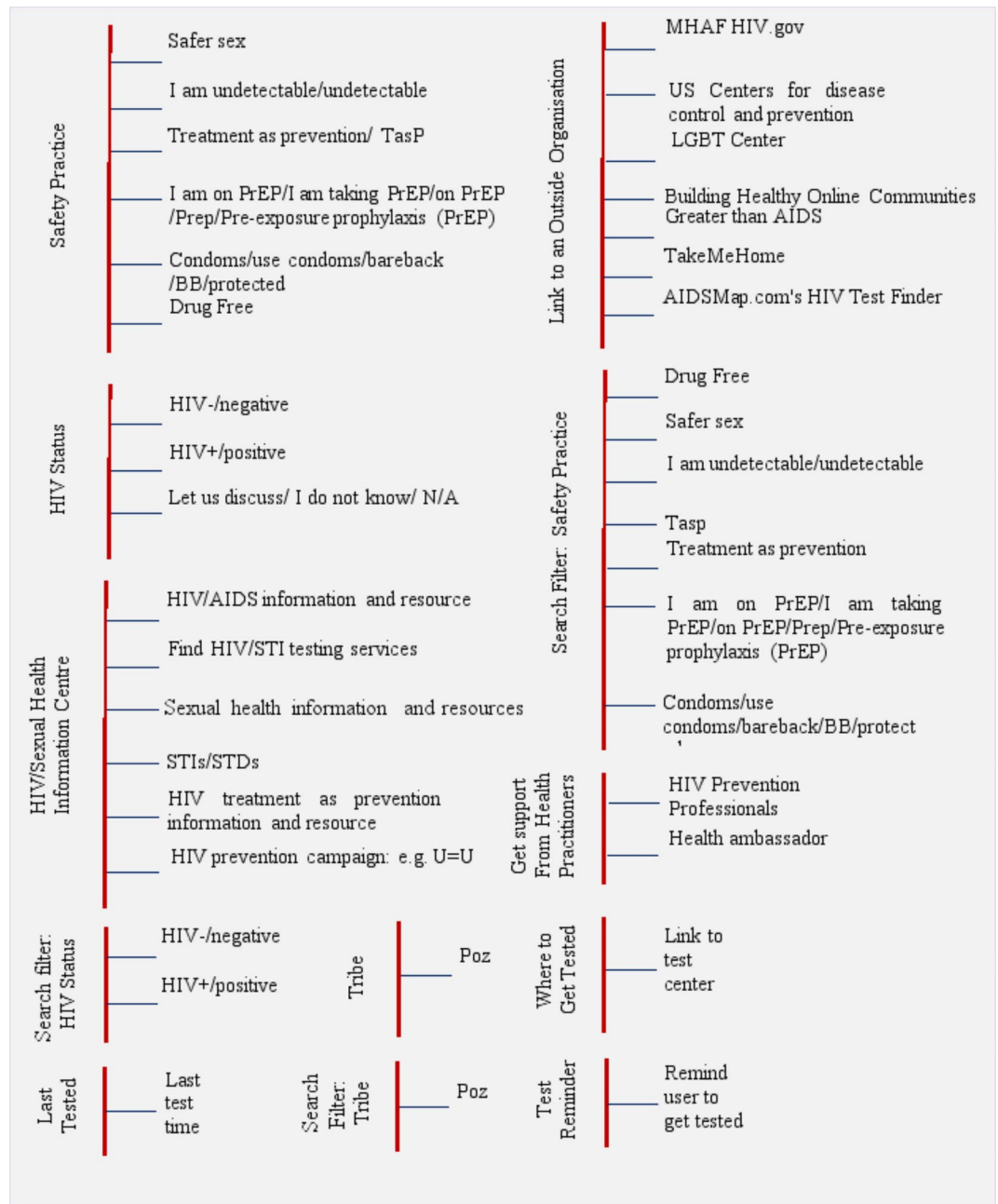


Fig. 4. Categorizations of features in the apps.

regardless of status, if the user is ‘Poz friendly’ or open to dating or having sex with anyone with HIV, they can also use this option²⁵.

HIV/sexual health information center feature

Adam4Adam, Blued, Grindr, Hornet, Jack’d, and Scruff all included a page or screen that presented information on HIV and sexual health. For example, this occurred as a Questions and Answers page in the HIV resource center on Blued (Fig. 5d). This is a screen occurs within the app where users can get various information regarding HIV or other sexual health information. The common information found on apps’ HIV/Sexual health information screens included but was not limited to what PrEP is and what HIV symptoms are.

Link to an outside organization feature

This feature can be found in Adam4Adam, Grindr, Hornet, Jack’d, ROMEO, and Scruff. For example, this appeared as a hyperlink to the HIV.gov website on Adam4Adam (Fig. 5e). HIV.gov is a website that provides information and resources pertaining to HIV/AIDS from the U.S. Department of Health and Human Services²². Users can click ‘HIV.gov’ and go to the HIV.gov’s official website. The apps provide a link to a third-party website that contains information on HIV prevention, sexual health information, HIV testing and MSM-related

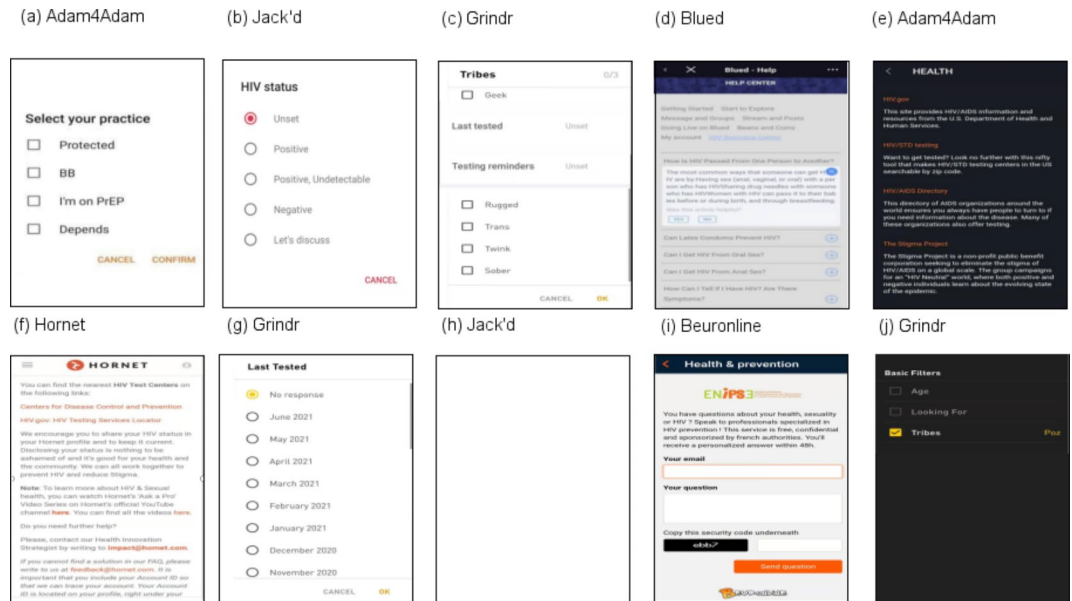


Fig. 5. Snapshots showing the operation interface for the features selection on representative apps from Android version apps.

services, such as the US CDC, TakeMeHome (a website designed by Building Healthy Online Communities and headquartered in the United States, where consumers can order a free HIV test kit and instructions delivered in a discreet box), and the Building Healthy Online Communities website. It is usually a hyperlink added to a paragraph of text. Clicking on the text in the app will redirect to a third-party website.

Where to get tested feature

Adam4Adam, Grindr, Hornet, Jack'd, and Scruff had a where to get tested feature. This feature offers users information about where they can do HIV tests. Users can find nearby HIV test centers based on their location. It was either presented under the user profile shown as 'where can I get tested', or it was found on the information center under the HIV testing or where can I get tested title, providing a hyperlink to 'testing resources', 'HIV testing services locator', or 'Greater Than AIDS' website. For instance, users could find the nearest HIV test centers on the provided hyperlinks, such as 'HIV Testing Services Locator' on Hornet (Fig. 5f).

Last tested feature

The last tested feature was found in Grindr, Jack'd, RealMen, and Scruff. On Grindr, it occurred as a dropdown list option under 'Last tested' (Fig. 5g). Users could choose when they did their last HIV test. Other than the time, there was also an option called 'no response'. Last tested is a feature that users can input when they last tested for HIV in their profiles. It is presented as a single choice in the dropdown list option or calendar display during scrolling. Users could put the information of the year and month only in some apps, while users can put the exact HIV test date in other apps.

Test reminder feature

Grindr, Jack'd, and Scruff offered the test reminder feature. The test reminder is a feature that users can set up a reminder to remind them to do an HIV test. Users can set a test reminder at intervals of months or choose to unset it. For example, on Jack'd, users can choose the time under 'Testing reminders' (Fig. 5h).

Get support from health practitioners feature

The 'Get support from health practitioners' feature was officially provided by -Adam4Adam, Beuronline, and Hornet. It is a feature that users can get support from verified health practitioners via MSM social media dating app. It is presented in two ways. One is a direct chat with a health practitioner (i.e., health specialist and health ambassador) within the app. A health ambassador is an individual who is open to having dialogues about sexual and mental health and sharing their personal experiences. When a user visits the profile of a health ambassador, they will be able to identify them by the badge and engage them in conversation about a wide range of health-related issues. However, health ambassadors are volunteers who share their personal stories from the front lines of healthcare rather than professionals who give medical advice²⁶. Another way to engage is by sending emails (Fig. 5i). If users have questions about their health, sexuality, or HIV, they can ask for help from professionals specialized in HIV prevention via email within the app. The app states that such service is free, confidential and sponsored by authorities. Users will receive a personalized answer within 48 hours after sending their questions within the app.

Search filter features: safety practice/HIV status/tribe Poz

The 'search filter' feature is another functionality within the application, which is different from the previously discussed features. The search filter feature in a mobile app serves as a tool that empowers users to tailor and narrow down their search results based on specific criteria. This functionality allows users to customize their search by applying filters such as safety practices, HIV status, and tribe of Poz. Each of these is counted as a separate feature in Table 1. Users can search for other users by inputting certain filters. It is usually a dropdown option. By utilizing these filters, users can more efficiently locate information relevant to their specific needs within the expansive pool of data. Search filter was found in Adam4Adam, Grindr, GROWLr, Jack'd, RealMen, and Scruff. Nonetheless, the search filter is presented differently on each app. On Grindr, for instance, users can look for Poz under 'basic filters of tribe' (Fig. 5j).

Fifty-eight occurrences of HIV-related features were identified across these 13 apps. It is important to note that this count represents the presence of each feature type, not the number of times each feature appears. For example, if an app includes multiple instances of the 'Link to an outside organization' feature, it is counted as a single occurrence. Consequently, each app could have a maximum of 12 different types of features. On average, the apps included 4.46 types of features (mean), with a median of 4 (the middle value when sorted). The mean of 4.46 and median of 4 are close, indicating that the distribution of feature types is somewhat symmetrical around the median.

The mode of the data contains of two values: 1 and 9, both appearing three times. The range of feature types across the apps is 8 (the difference between the maximum value of 9 and the minimum value of 1). The standard deviation is 3.38, indicating the dispersion of feature counts around the mean, and the variance is 11.44, which measures the spread of feature counts around the mean.

Quartile analysis showed that Q1 (25th percentile) is 1, Q2 (median or 50th percentile) is 4, and Q3 (75th percentile) is 8. The Interquartile Range (IQR), which is the range between Q1 and Q3, is 7. The range of 8 and an IQR of 7 highlight a considerable spread in the number of features across the apps.

The skewness of 0.30 indicates a slight positive skew, suggesting a longer tail on the right side of the distribution. The kurtosis of -1.56 points to a flatter distribution with fewer outliers compared to a normal distribution.

Discussion

Overall results demonstrated that the incorporation of HIV-related features into MSM social media dating apps remained uncommon, because only one third of the apps (13 out of 39 that were analyzed) contained HIV-related information. Viewed through a political economy lens, this disparity signals a potential tension between commercial objectives and public health goals. As commercial products, these apps are primarily designed to maximize user engagement so as to ensure their economic sustainability. However, this profit motive may limit the level of public health support they provide. This tension is evident in the substantial result of this study—the absence of HIV-related features in two-thirds of the apps examined. This lack of features may be the result of several contributing factors including technical constraints, a potential lack of awareness, social responsibility, or a lack of understanding among developers about the possible public health implications of their platforms, and the cost of adding features that support public health.

Nevertheless, based on the information available in the literature, the ratio of the apps incorporating HIV information considerably increased over the past decade. For example, only 17% of apps presented HIV or STD content in a study reported ten years ago²⁷. More recently, a study that evaluated the dissemination of health information to MSM in China found that 23% (10 out of 43) contained HIV/STD information²⁸. This suggests that MSM social dating apps are increasingly being used as tools for disseminating HIV/AIDS-related information, reflecting a growing recognition of the importance of addressing HIV-centric issues in this context. However, these observations should be interpreted with caution. Further research is necessary to confirm this trend and to better understand how these changes in app content might influence health outcomes and awareness among MSM. Such positive trend might be attributed to the fact that the media systems, encompassing digital platforms and dating apps, are dynamic, continually adapting to shifting societal, economic, and political landscapes²⁹. The present study revealed that the features most commonly related to HIV within MSM social media dating apps were 'safety practice' and 'HIV status'. This finding may be due to the ease of integrating these elements into user profiles, because the major information of these two features could be selected by the users from a dropdown option list instead of letting the users to input information by themselves. In this way, they pose minimal challenges to app development and maintenance, making them more widely incorporated into the apps. These features, while simple to implement, have profound implications for user communication and the exchange of health information within the app environment. The capacity for users to display and view 'safety practice' and 'HIV status' may streamline informed decision-making, fostering a climate of responsibility and transparency among users. The ubiquity of these features may also contribute to normalizing discussions surrounding HIV status and safe practices. This can play a pivotal role in counteracting the stigma that frequently accompanies these topics within MSM communities. Nonetheless, the prevalence of these features could also be indicative of user demand. Users may recognize the utility of these features in encouraging safer practices and elevating HIV awareness. Therefore, the widespread incorporation of 'safety practice' and 'HIV status' into these apps may reflect not only their easy implementation but also their perceived value to the user community.

Strengths, limitations and implications of this research

This research provides a comprehensive analysis of HIV-related features across a diverse range of MSM social media dating apps. By scrutinizing 39 apps from an initial pool of 1296 search results, it offers a nuanced understanding of HIV prevention features present in these platforms. Furthermore, the study systematically categorizes these features into 10 distinct groups, clarifying the most frequently included elements and their

implementation across various apps. This structured approach is instrumental for stakeholders seeking to identify key areas for improvement or future development.

However, several limitations were noted in this study. First, the research is restricted to MSM social media dating apps available in the New Zealand market. While this focus provides valuable insights for that region, it may affect the generalizability of the findings to other geographic areas with different cultural, societal, legal, and policy contexts. Additionally, the study only included English-language apps, which excludes non-English apps from the analysis. By excluding paid apps and features, the study may miss apps that offer more comprehensive or varied HIV-related content, limiting the understanding of how payment models might influence feature inclusion. Furthermore, the narrow scope of search terms used, specifically 'gay', 'bisexual', 'LGBT', and 'homosexual', may not capture the full spectrum of MSM social media dating apps, potentially affecting the wider applicability of the results. Lastly, since apps are frequently updated, the findings pertain only to the versions analyzed at the time of the research. Future updates may introduce new features or remove existing ones, potentially affecting the relevance of the findings.

Despite these limitations, the study offers critical support to public health efforts aimed at reducing HIV incidence in New Zealand by evaluating the potential role of MSM social media dating apps in HIV prevention. By identifying gaps and opportunities in the use of these platforms for health promotion, the research provides evidence-based insights that can inform the development of targeted digital interventions. These insights are particularly valuable for guiding policymakers and public health practitioners in designing strategies that leverage the widespread use of these apps within the MSM community, thereby enhancing the effectiveness of HIV prevention campaigns and contributing to a reduction in HIV rates in the region.

Conclusions

This study revealed that out of the 44 apps available on both Apple App Store and Google Play Store, only 13 of them contained HIV-related information. This indicates that the utilization of these apps as a channel for disseminating HIV/AIDS-related information remains relatively uncommon, as approximately two-thirds of the apps examined did not include such features. However, it is worth noting that the presence of HIV-related features had significantly increased compared to a decade ago based on the data obtained in this study and information available in the literature, pointing towards a trend of normalization in incorporating such information. This suggests that there was a growing recognition of the importance of addressing HIV/AIDS within the context of MSM social media dating apps. Furthermore, among the features analyzed, safety practices and HIV status were most widely adopted in the apps. This highlights the significance placed on promoting safe practices and creating awareness about HIV status among app users. It also suggests that these apps could serve as potential platforms for delivering crucial information and interventions related to HIV prevention and care.

Data availability

All data are available from the corresponding author on reasonable request.

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Author contributions

WJ.L conceived and designed the study, analyse and interpretate the data, wrote the manuscript; D.W. ZZ.X, ZR.C, contributed materials/analysis tools and revised the manuscript. All authors reviewed and approved the manuscript prior to submission.

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The authors declare no competing interests.

Additional information

Correspondence and requests for materials should be addressed to W.L.

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