

"Internet+Nursing Service" Mobile Applications in China App store: Assessment of Functionality and Quality

Shuo Yuan, Min Liu, Yuqi Peng, Jinrui Hu, Bingyan Li, Xia Din, Lunfang Xie

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Shuo Yuan^{1, 2*}; Min Liu^{1*}; Yuqi Peng¹; Jinrui Hu¹; Bingyan Li¹; Xia Din³; Lunfang Xie¹

¹School of Nursing, Anhui Medical University Hefei, Anhui CN

²Anhui NO.2 Provincial People's Hospital? Dept of Cardiology II Hefei, Anhui CN

³Anhui NO.2 Provincial People's Hospital?Nursing Department Hefei, China CN

*these authors contributed equally

Corresponding Author:

Lunfang Xie

School of Nursing, Anhui Medical University

No. 81, Meishan Road, Shushan District

Hefei, Anhui

CN

Abstract

Background: As Chinese society ages and concern for health and quality of life grows, the demand for care services is increasing. The widespread use of Internet technology has greatly improved the convenience and efficiency of online services. As a result, the Chinese government has been implementing "Internet + Nursing Service" since 2019, with mobile Apps being the primary way for users to access these services. The quality of these Apps is closely related to user experience and the smooth use of services.

Objective: This study aims to evaluate the functionality, services, and quality of these Apps, identify weaknesses, and provide suggestions for improving service programs and the research, development, improvement, and maintenance of similar Apps.

Methods: In December 2022, two researchers searched for "Internet+Nursing Service" Apps using search criteria on the Kuchuan mobile App monitoring platform. After identifying the Apps to be included based on ranking criteria, they collected information such as developer, size, version number, number of downloads, user ratings, number and name of services. Five trained researchers independently evaluated the quality of the Apps using the uMARS-C, with the total uMARS-C score based on the average score of the five ratings.

Results: A total of 17 "Internet+Nursing Service" Apps were included. Of these, 12 (71%) had been downloaded more than 10,000 times; 10 (59%) had user ratings of 4 or higher; the median App size was 62.67MB (R=22.71-99.8, IQR46.73); 16 (94.1%) Apps provided surgical wound dressing exchange services; 4 (23.5%) covered first-tier cities; only 1 (5.9%) belonged to fourth-tier cities. The median total uMARS-C score was 3.88 (R=1.92~4.92, IQR0.48), which did not correlate with App store user ratings ($r=0.003$, $P=0.992$). The quality of most Apps (>60%) was average. Most Apps (>70%) were rated good or above (?4 points) in terms of information quality, layout, graphics, performance and ease of use; however, the vast majority of Apps (>80%) were rated fair or even poor (<4 points) in terms of credibility and demand.

Conclusions: "Internet+Nursing Service" Apps need to broaden their service coverage, increase service variety and further optimize their service structure. The overall quality of these Apps is generally poor. App developers should collaborate with medical professionals and communicate with target users before launching their products to ensure accurate content, complete functionality and good operation that meets user needs.

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Original Manuscript

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Shuo Yuan^{1,2*}; Min Liu^{1*}; Jingrui Hu¹; Bingyan Li¹; Yuqi Peng¹; Xia Din³; Lunfang Xie¹

¹School of Nursing, Anhui Medical University, Hefei, China.

²Anhui NO.2 Provincial People's Hospital □ Dept of Cardiology II, Hefei, China.

³Anhui NO.2 Provincial People's Hospital □ Nursing Department, Hefei, China.

*these authors contributed equally

Corresponding Author:

Lunfang Xie PhD

Postal address: School of Nursing, Anhui Medical University

No. 81, Meishan Road, Shushan District,

Hefei, Anhui

China

E-mail: 527548725@qq.com

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Conclusions: "Internet+Nursing Service" Apps need to broaden their service coverage, increase service variety and further optimize their service structure. The overall quality of these Apps is generally poor. App developers should collaborate with medical professionals and communicate with target users before launching their products to ensure accurate content, complete functionality and good operation that meets user needs.

Keywords: Mobile Phone; Mobile Applications; Home Care Services; Telemedicine; Nursing

Services

Introduction

As information technology continues to develop, the number of Internet users worldwide has reached 4.95 billion in 2022, including 1.067 billion in China, with an Internet penetration rate of 75.6%. The proportion of mobile phone users accessing the Internet has reached 99.6%[1]. Mobile Applications continue to grow steadily, with people using them for communication, shopping, office work and socializing. The field of Internet healthcare is becoming increasingly standardized and was the fastest-growing Application in terms of user scale in 2022. As of December 2022, the number of online medical users in China reached 363 million, an increase of 64.66 million compared to December 2021, accounting for 34.0% of all Internet users[1]. Mobile health Apps are the main medium for mobile health and the primary channel for users to obtain medical support and health information. In 2019, 65.9% of Internet users chose medical and health Apps for medical consultation when feeling unwell[2].

People are increasingly inclined to use healthcare Apps to manage their health due to their cost-effectiveness, convenience and speed in accessing health information[3-5], and ability to provide evidence-based health information for better health guidance[6]. There are several popular healthcare Apps in China. According to a report by Statista, as of December 2022, the most popular medical App in China was Ping An Good Doctor, a healthcare platform owned by the Ping An Insurance Group, with almost 23 million monthly active users [7]. The mobile portal provides real-time medical consultations, online Appointment booking, and a health-related discussion forum.

As people become more health-conscious, the demand for healthcare services is increasing. To alleviate the pressure on offline medical institutions and meet the needs of the public, China has launched “Internet + nursing service” [8]. This service is provided by registered nurses from fixed medical institutions and operates on an online Application, offline service model. It is designed to serve discharged patients or special populations with medical conditions and limited mobility[9]. Since 2019, “Internet + nursing service” organizations in China’s provinces and regions have been actively providing services to countless elderly people living at home, pregnant women, infants, and young children who have difficulty leaving their homes. The services have received unanimous positive reviews[10, 11]. This service mode integrates nursing service with Internet technology, using Internet information technology to break the spatial limitation of traditional medical treatment. It can meet the multi-level and personalized continuation of nursing care needs of service users, alleviate the social problem of difficulty in visiting the doctor, improve the quality of life of service users, and broaden the channels of communication between nurses and patients[12].

Patients place orders through an App, and managers dispatch orders based on various factors such as online nurses’ qualifications, professionalism, and distance. Platform nurses receive orders within a specified period of time and travel to patients’ homes to provide services including routine nursing operations such as intramuscular injections, intravenous injections, urinary catheterization, gastric tube insertion, and blood sample collection, as well as specialty care such as Peripherally Inserted Central Venous Catheters (PICC) medication exchange, wound stoma care, and neonatal examinations. By downloading high-quality “Internet + nursing service” mobile Apps, users can quickly access the care services they need without leaving their homes. However, low-quality Apps may not only affect the user experience but also make it impossible for users to obtain the care services they need.

As people become increasingly dependent on smartphones and Apps, they are also becoming more concerned about the quality of Apps. Users not only expect Apps to function properly but also have high expectations for their aesthetics, security, and personalization settings[13]. App quality issues can affect the user experience, determine whether users continue to use the App, and even lead to economic and property losses for both users and App development departments. Mobile health Apps

are a special type of App, and studies have shown that factors such as usability, navigability, accuracy of information, and security all affect the user's experience and evaluation of the App. If the App is of low quality, users may doubt its usefulness and effectiveness, which can even lead to users obtaining low-quality health services and generating erroneous health management concepts that affect their health beliefs and behaviors[6, 14, 15].

In recent years, various software development organizations have been paying more attention to improving App quality, but there are still deficiencies[16]. Currently, the quality of an App is mainly judged by checking user ratings and reviews on the App store, which usually pushes according to the number of downloads, rankings, and various types of data. However, the actual quality of Apps is uneven, and it is impossible to know whether their functions are comprehensive or their content is scientific through their page displays. Therefore, it is necessary to objectively evaluate the quality of medical and health Apps to identify shortcomings in their development, promote their continuous improvement, improve their Applicability, usage experience, and compliance, and allow users to use Apps that are of high quality, reasonably designed, and safe to use. There are various methods for evaluating the quality of medical Apps, also known as mHealth Applications. According to a study by Stoyanov et al[17], the quality of mHealth Applications is evaluated in different categories, including engagement, functionality, aesthetics, information quality, and subjective quality[18]. There are various methods for evaluating mHealth services, such as questionnaires, interviews, and observation [18]. A systematic review by Nouri et al. identified 7 main classes of assessment criteria for mHealth Apps: Design, Information/Content, Usability, Functionality, Ethical Issues, Security and Privacy, and User-perceived value [19]. These criteria can be used to assess the quality of a medical App.

Currently, most studies on "Internet+Nursing Service" focus on service effects[20-22], the establishment of service quality index systems[23], risk management strategies[24, 25], and the demand for services from various groups[26-28]. However, there is little attention paid to the quality of "Internet+Nursing Service" Apps and a lack of studies using evaluation tools to objectively evaluate their quality and functions. The aim of this study was to review which "Internet+Nursing Service" mobile Apps were available on China's App stores and evaluate their quality.

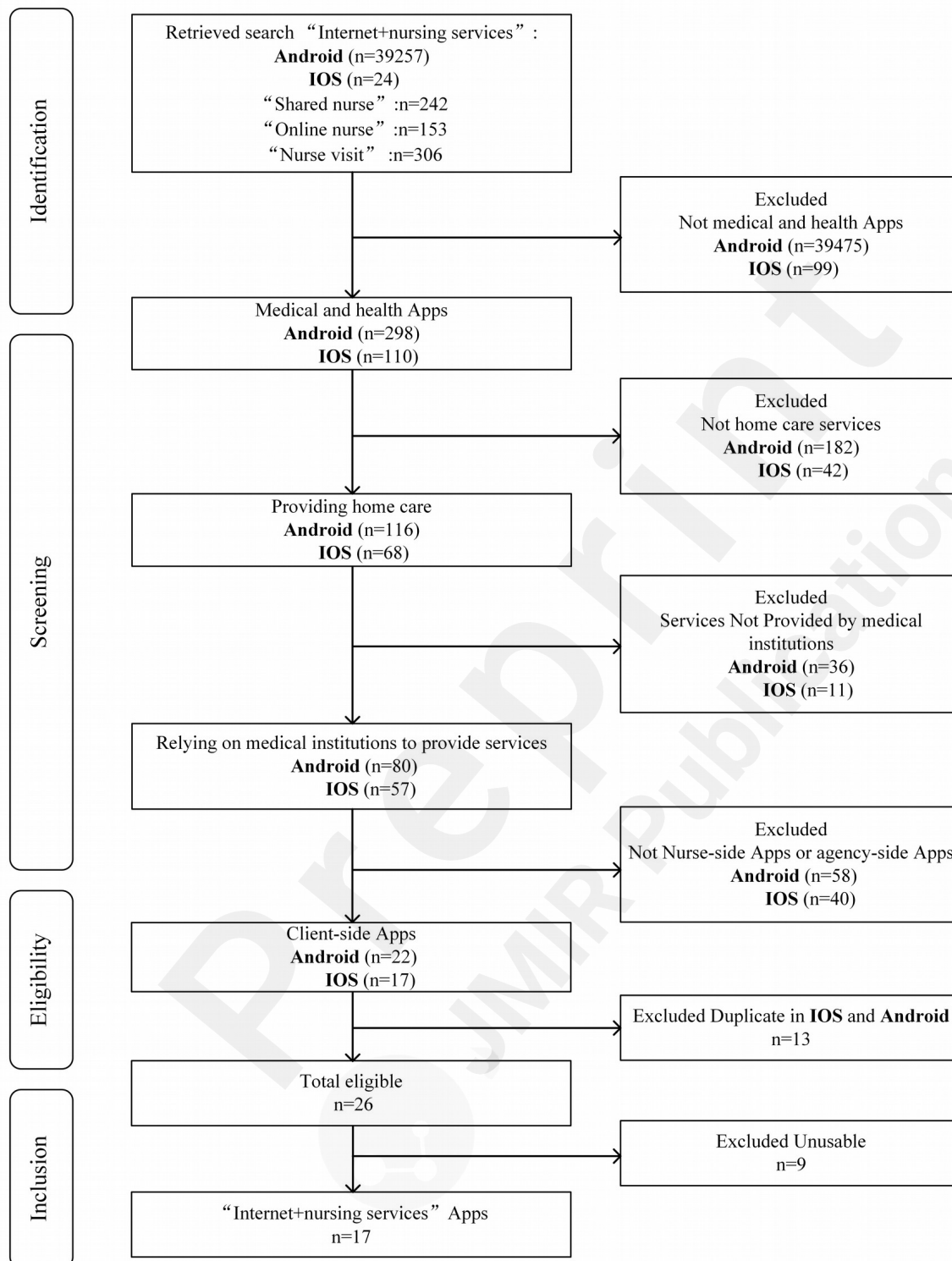
Methods

Selection of the "Internet+Nursing Service" Apps

We used the Kuchuan mobile App monitoring platform to monitor data from IOS and Android App stores. This platform provides real-time information about mobile App developers, the latest versions, and the number of downloads. Two researchers searched for Apps using keywords "Internet+Nursing Service", "Home Nursing", "Nurses at Home", "online nurse", and "shared nurse" as of December 1, 2022.

The inclusion criteria for the Apps were: (1) content includes home nursing service, (2) categorized as healthcare, (3) in Chinese, (4) free, and (5) functional. The exclusion criteria were: (1) non-user-side Apps, (2) old versions of the same App, (3) Apps with different names but the same content, and (4) duplicate Apps.

Two researchers independently screened the Apps based on their names, profiles, and display images. They then discussed their findings to finalize the list of evaluated Apps(Figure 1).

Figure 1: Flowchart of the selection of Apps.

Selection of a Standardized Rating Scale for Mobile Apps

We used the Chinese version of the User Version of Mobile App Rating Scale (uMARS-C), which had been authorized by the authors[29]. The uMARS was adapted from the widely used Mobile Application Rating Scale (MARS) for assessing Apps in mental health[30], rheumatology patient management[31], cancer risk assessment[32], and hospital registration[33]. The uMARS-C includes 14 objective items rated on a 5-point Likert scale, divided into 3 sections: engagement,

functionality, and information. Dimension scores were calculated by dividing the total entry score by the number of entries, and the uMARS-C total score was calculated by dividing the total dimension score by the number of dimensions. According to the rating scale, a uMARS-C total score of 1 indicates poor quality, 2 indicates inadequate, 3 indicates fair, 4 indicates good, and 5 indicates excellent.

The uMARS-C had good reliability and validity, with a Cronbach's α coefficient of 0.890 and dimension Cronbach's α coefficients ranging from 0.853 to 0.895. The test-retest reliability value was 0.967, the I-CVI ranged from 0.78 to 1.00, and the S-CVI/Ave was 0.969.

Process of Evaluating "Internet+Nursing Service" Apps

Before assessing the quality of the Apps, five researchers including 2 nurses with more than 5 years' service, 2 graduate nursing students, 1 professional computer with more than 7 years' service. Before the evaluation, we made sure that each researchers properly understood and were familiar with the uMARS-C scale. To ensure their understanding of the scale, they downloaded and assessed 2 mHealth Apps not included in the study. When there was a difference of more than 2 points in dimension scores or total scores, they discussed until reaching a consensus. The researchers then downloaded the final list of included Apps on IOS and Android smartphones. After downloading, they used each App for at least 10 minutes and independently evaluated its ease of use, performance, security, and settings using the uMARS-C. Basic App information was collected from the App store download page, including developer, size (MB), version number, number of downloads, user ratings (0 to 5), number and name of services, etc. Some App downloads were missing because the IOS App store did not provide this data. The researchers also graded the service coverage cities based on the categorized statistical service items according to the "Beijing Internet Home Care Service Item Catalog" (2022 edition) and the city class division in the "2022 China's City Business Attractiveness Ranking" published by DATAYICAI.

Statistical Analysis

Data Analysis

We used EpiData 3.1 for data entry and SPSS 24.0 for statistical analysis. Non-normally distributed measurement data were expressed as median and quartiles, while count data were expressed as the number of cases and percentage. The uMARS-C dimension scores for each App were averaged across the 5 raters, and the final scores were calculated using the scale formula.

Results

Characteristics of Selected Apps

Our search found a total of 39,982 Apps (iOS n=209; Android n=39,773). After initial screening based on the inclusion and exclusion criteria, we downloaded 26 Apps. After using them, we excluded 8 Apps that were not working properly, leaving a total of 17 Apps included in the study (Table 1, Multimedia Appendix 1). Of these 17 Apps, 4 (24%) were released by medical institutions and 13 (76%) by corporations (Table 2). Twelve (71%) had been downloaded more than 10,000 times, with Champion Nurse having the highest number of downloads at 37,321,776. The median App space occupied was 62.67 MB (R=22.71~99.8, IQR=46.73). App store user ratings ranged from 2.8 to 5.0, with 14 (82%) being rated 3.0 or higher and 10 (59%) being rated 4.0 or higher. In terms of service coverage, 4 (24%) of the "Internet+Nursing Service" Apps covered first-tier cities including Beijing, 8 (47%) covered new first-tier cities, 4 (24%) covered second-tier cities,

and 1 (6%) covered fourth-tier cities.

Table 2. Characteristics of the “Internet+nursing Service” Apps.

Characteristic	App (n=17), n (%)
Download count^a	
0-9,999	2(12)
10,000-99,999	7(41)
100,000-999,999	3(18)
1,000,000-9,999,999	1(6)
≥10,000,000	1(6)
Platform	
IOS□Android	13(76)
IOS	3(18)
Android	1(6)
User rating (stars)	
0-2.9	3(18)
3.0-3.9	3(18)
4.0-4.9	5(29)
5.0	6(35)
Developer	
Individual developer	8(47)
Corporation	9(53)
Number of services provided	
1-10	2(12)
11-20	9(53)
21-30	6(35)
Service coverage city class	
first-tier cities	4 (24)
new first-tier cities	8 (47)
second-tier cities	4 (24)
fourth-tier cities	1 (6)

^aDownload count for Android apps only

Categories of nursing services provided by Apps

The 17 Apps provided at-home nursing services, including intravenous injection, intramuscular injection, nebulized inhalation, and more. These services were classified into health assessment and guidance, clinical care, maternal and child care, traditional Chinese medicine nursing (TCM Nursing), specialty care, hospice care, and rehabilitation care. Services not in the catalog were classified as unclassified.

Among the Apps, 16 (94%) provided surgical wound dressing change services (Clinical Nursing category), 15 (88%) provided maintenance of peripherally inserted central catheters (PICC) (Specialty Nursing category), 14 (82%) provided maternal and infant nursing services (Maternal and

Infant Nursing category), and 10 (59%) provided TCM Nursing services (TCM Nursing category) and disease rehabilitation guidance (Rehabilitation Nursing category). Four (24%) Apps provided hospice care (Hospice category), 3 (18%) provided health assessment and guidance (Health Assessment and Guidance category), and only 1 (6%) App provided Gastrointestinal Decompression, Pre-visit Physical Examination, Conjunctival Capsule Irrigation, T-Tube Drainage Care, and family room services (Uncategorized Items).

Quality of the “Internet+Nursing Service” Apps

In our study, the uMARS-C scale's Cronbach's α coefficient was 0.871 and the dimension Cronbach's α coefficients ranged from 0.761 to 0.811. Based on uMARS-C scores, 1 (6%) of the 17 Apps was rated as poor, 11 (65%) as fair, 5 (29%) as good, and none as insufficient or excellent. The median total score for the “Internet+Nursing Service” category was 3.88 (R=1.92~4.92, IQR=0.48) (Figure 2), with Champion Nurse having the highest score of 4.92 and Health Wuhan having the lowest score of 1.92. There was no significant correlation between App store user ratings and total uMARS-C scores ($r=0.003$, $P=0.992$). The median information dimension score was 3.97 (R=1.86~5.00, IQR=0.44), the functionality dimension score was 3.95 (R=1.825~5.00, IQR=0.64), and the engagement dimension score was 3.80 (R=1.00~5.00, IQR=0.59) (Figure 3). A heat map comparing the scores of each entry in the uMARS-C scale for the 17 “Internet+Nursing Service” Apps showed that Health Wuhan scored below 3 points in most entries (Figure 4, Multimedia Appendix 2). Fourteen Apps (82%) scored below 4.0 points in the Credibility entry, indicating an average or poor level; 16 Apps (94%) scored below 4.0 points in the Demand entry. Fourteen Apps (82%) scored at a good or above level in the Quality of Information entry, and 12 Apps (71%) scored at a good or above level in the Layout, Graphics, Performance, and Ease of Use entries.

Figure 2: uMARS-C overall scores of the “Internet+Nursing Service” apps (n=17). Note: The bottom and top edge of the boxes represent the first and third quartiles; the lines within the boxes represent the medians; the crosses represent the means; and the ends of the bottom and top whiskers represent the minimum and maximum values.

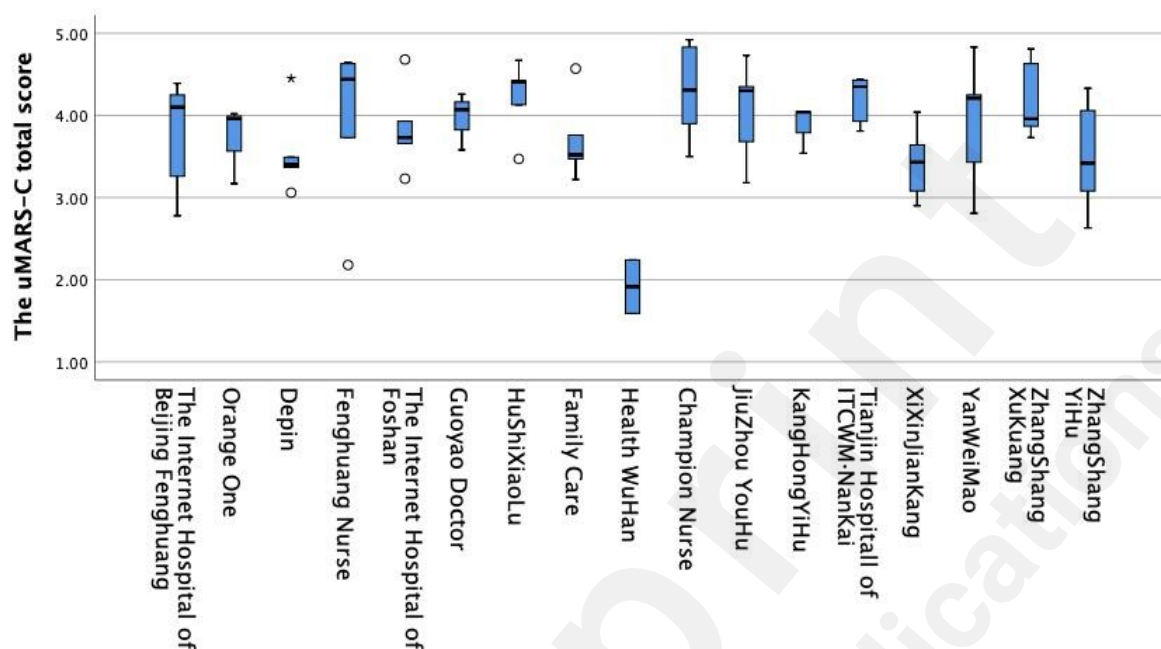
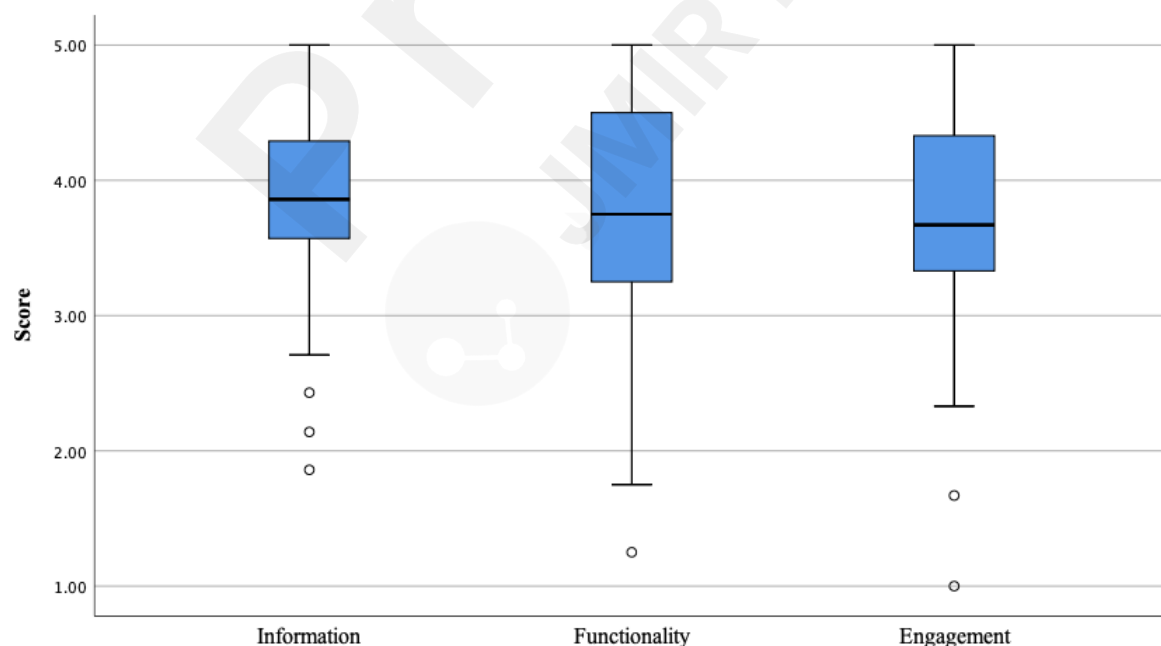


Figure 3: uMARS-C dimension scores of “Internet+Nursing Service” apps (n=17).



Discussion

Principal Results

As Internet technology continues to develop, all industries are integrating with the “Internet+” model to promote innovation and development [1]. Unlike other industries, “Internet+Nursing Service” is a medical service with the high professionalism, risk, and infallibility characteristic of the medical industry [25].

There are several risks associated with “Internet+Nursing Service” Apps. One of the risks is that technology barriers can prevent some patients from accessing telehealth services. This can include a lack of access to the internet or devices, or difficulty using the technology. Another risk is that there may be issues with insurance coverage for telehealth services, as well as regulatory obstacles that can limit the use of telehealth [34]. Therefore, it is necessary to strengthen supervision of “Internet+Nursing Service” Apps and strictly control all aspects. “Internet+Nursing Service” is human-centered and aims to improve health, so App design should fully consider user characteristics and needs. In this study, we downloaded and used “Internet+Nursing Service” Apps from the user’s perspective and rated them objectively based on our usage experience.

Most of the services provided by the Apps were concentrated in first-tier cities, new first-tier cities, and some second-tier cities, with only one fourth-tier city providing “Internet+Nursing Service”. The service scope has not yet covered remote areas and townships. Data from China’s seventh national census show that the current rural population is about 509.79 million, accounting for 36.11% of the total population. However, 80% of medical resources are concentrated in medium- and large-sized medical institutions in medium- and large-sized cities, leading to an imbalance between the demand for care and the supply of care resources for the grassroots population.

Providing high-quality nursing resources and services is key to improving the health and quality of life of people at the grassroots level. Medical institutions at all levels should actively promote the distribution of medical resources to enhance accessibility to basic medical and public health services. Therefore, “Internet+Nursing Service” Apps should integrate medical resources and promote a “hospital-community-family” three-tier linkage to bring professional nursing services into the homes of grassroots people. This would encourage more medical institutions to provide home care, expand the scope of services, make full use of medical resources, and address the imbalance between the supply and demand of medical resources.

Our study found that the current “Internet+Nursing Service” Apps provide a limited number of service programs, mostly routine care programs, with few special care programs such as psychological care, hospice care, and child care. Only 4 out of 17 Apps provided hospice care, and none provided psychological care services, despite high demand for these programs. One study found that 92.3% of the elderly population in urban and rural areas needed psychological comfort [35], and 10.32% of housebound elderly people believed that hospice care should be carried out [36]. As the concept of childbearing changes, people are pursuing more scientific and specialized childcare, and child health care and nursing have become more emphasized. Research has shown that providing nutritional guidance, growth and development guidance, and child psychological care to families of preterm infants through the “Internet+Nursing Service” platform could promote the growth and intellectual development of preterm infants [37]. Medical institutions in each region should have an in-depth understanding of the needs of service users and the characteristics of different groups of people. They should gradually expand the list of “Internet+Nursing Service” by taking into account the actual situation of medical institutions and local medical resources to optimize the structure of service items and meet the needs of service users.

The total quality scores of the 17 Apps ranged from 1.92 to 4.29, with 1 App rated as poor and 11 (65%) rated as average, indicating that the overall quality of “Internet+Nursing Service” Apps was not good. This may be related to the fact that App development engineers do not fully understand the

medical industry. Most “Internet+Nursing Service” Apps were developed by corporations, and the developers may not have taken into account the specificity of medical software before development. They may not have communicated well with medical staff during development or understood the content and characteristics of “Internet+Nursing Service”.

- 5 The process of target user evaluation not only strengthens the interaction between users and the software but also identifies weak points from user feedback that developers may have missed [38]. Our researchers also found that some Apps had problems such as crashing and inability to log in during use, which would affect the user experience. Therefore, R&D organizations need to conduct pre-market research and post-maintenance work to ensure the smooth operation of the platform.
- 10 From the heat map, it can be seen that most Apps scored at a good or above level in terms of Layout, Graphics, Performance, and Ease of Use entries. This indicates that most App development teams pay more attention to the visual effect, ease of use, and smoothness of their Apps. However, 14 Apps (82%) had an average score of less than 4.0 for credibility, and 16 Apps (94%) had an average score of less than 4.0 for demand, indicating an average or even poor performance in these areas. During
- 15 the evaluation, our researcher found that some App development teams did not clearly label the source or publisher information when publishing health science articles or videos. This may cause users to doubt the authenticity, authority, and reliability of the articles when reading them, affecting their ability to build health knowledge and manage their own health[39]. It is important to publish health science articles with scientific evidence and to clarify the source, author, time of publication, and Applicable population of standardized content to increase the credibility of the information. In
- 20 terms of meeting user needs, most current Apps provide health science literature in text form, with content mostly focused on introducing services, medical institutions, and healthcare experts. The content is published on the App and is not updated for a long time; some Apps have only 2-3 articles and cannot meet user needs. In addition to not meeting user needs in terms of service programs, there are also deficiencies in providing up-to-date and relevant health information.
- 25 App developers can improve the credibility of health science articles and videos by taking several steps. First, they should ensure that the information provided is based on scientific evidence and comes from reputable sources. This can be done by clearly labeling the source, author, time of publication, and Applicable population of the content. Second, they should regularly update the
- 30 content to ensure that it is current and relevant. Third, they should provide references or links to the original sources of information so that users can verify the accuracy of the information. By taking these steps, App developers can increase the credibility of their health science articles and videos and help users build their health knowledge and manage their own health.
- 35 Health science popularization should aim to provide basic concepts and knowledge in the field of health, with a focus on healthy lifestyles and behaviors. The content should be regularly updated to keep up with social hotspots, seasonal changes, and the occurrence of epidemics, to provide users with the most up-to-date and relevant information. To achieve this, App development teams should conduct market research to understand the needs and characteristics of their users, including their cultural level and reading habits. They should also keep track of social hotspots, seasonal changes,
- 40 and other factors to provide relevant health policies, basic medical knowledge, diet and exercise guidance, psychological guidance, and knowledge of disease prevention or first aid in daily life. In addition to providing information in graphic form, App developers can also use video or audio formats to present health science information from multiple angles, dimensions, and levels to meet the needs of users at different levels. By providing accurate and scientific health information in a
- 45 timely manner, App developers can help users improve their health knowledge and quality of life. Our study found no correlation between uMARS-C ratings and App store ratings, suggesting that App store ratings do not reflect the quality of Apps. This may be due to the small number of store ratings, differences in App store rating mechanisms, developer marketing strategies, or user preference favoritism. If the quality of Apps is judged solely based on App store ratings, it may lead
- 50 users to download low-quality Apps, affecting their usage experience and even causing them to

distrust care services. Additionally, healthcare professionals may be unable to accurately recommend high-quality Apps to patients or their families. This further demonstrates the necessity of evaluating the quality of “Internet+Nursing Service” Apps using objective rating scales.

5 Limitations

This study has several limitations. First, we only searched for “Internet+Nursing Service” Apps updated until December 1, 2022, and did not consistently track the uploads and downloads of related Apps. Second, we only used iPhone, Huawei, and Xiaomi phones for download evaluation and did not evaluate other systems such as Meizu, Samsung, and Windows phones. During App development, the development team may modify App functions for different systems due to differences in system algorithms, resulting in differences in App functions. Therefore, future research should take system differences into account and conduct more comprehensive quality evaluations of Apps for different systems. Third, there were only five researchers in this study and all were under the age of 30 with a high level of e-literacy, which may have introduced bias towards entries such as App ease of use during the evaluation process. However, older people, who are the main target of the service, have varying levels of e-literacy and may have different understandings and judgments of App ease of use. Therefore, future studies may consider including evaluators with different backgrounds and health literacy levels.

Conclusions

In this study, we used the uMARS-C to evaluate the quality of “Internet+Nursing Service” Apps. We found that the current service coverage of these Apps was concentrated in first-tier cities such as Beijing and Shanghai, new first-tier cities, and some second-tier cities, with a limited number of service items and a need to optimize the structure of service items. The quality evaluation results showed that the quality of Apps was not good, especially in terms of information credibility and meeting users’ needs. The scale scores did not correlate with App store scores. Therefore, “Internet+Nursing Service” App development teams need to pay attention to improving the quality of their Apps. Before releasing an App, they should fully understand the needs of their target users and the characteristics of this type of App, and communicate with relevant professionals in the field. They should also orient the release of health knowledge in the App towards user needs and improve its authority and readability. After releasing an App, it is necessary to maintain and update it to ensure its normal operation and timely updating of health education content.

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Conflicts of Interest

None declared.

40 Abbreviations

uMARS-C□the User Version of Mobile App Rating Scale-China

App□Application

R&D organizations: Research and Development organizations

TCM Nursing: traditional Chinese medicine nursing

Multimedia Appendix

Multimedia Appendix 1: [Details of the 17 “Internet+Nursing Service” Apps]

Multimedia Appendix 2: [Heatmap of the average scores per item and per app, from blue (worst score) to white (best score)]

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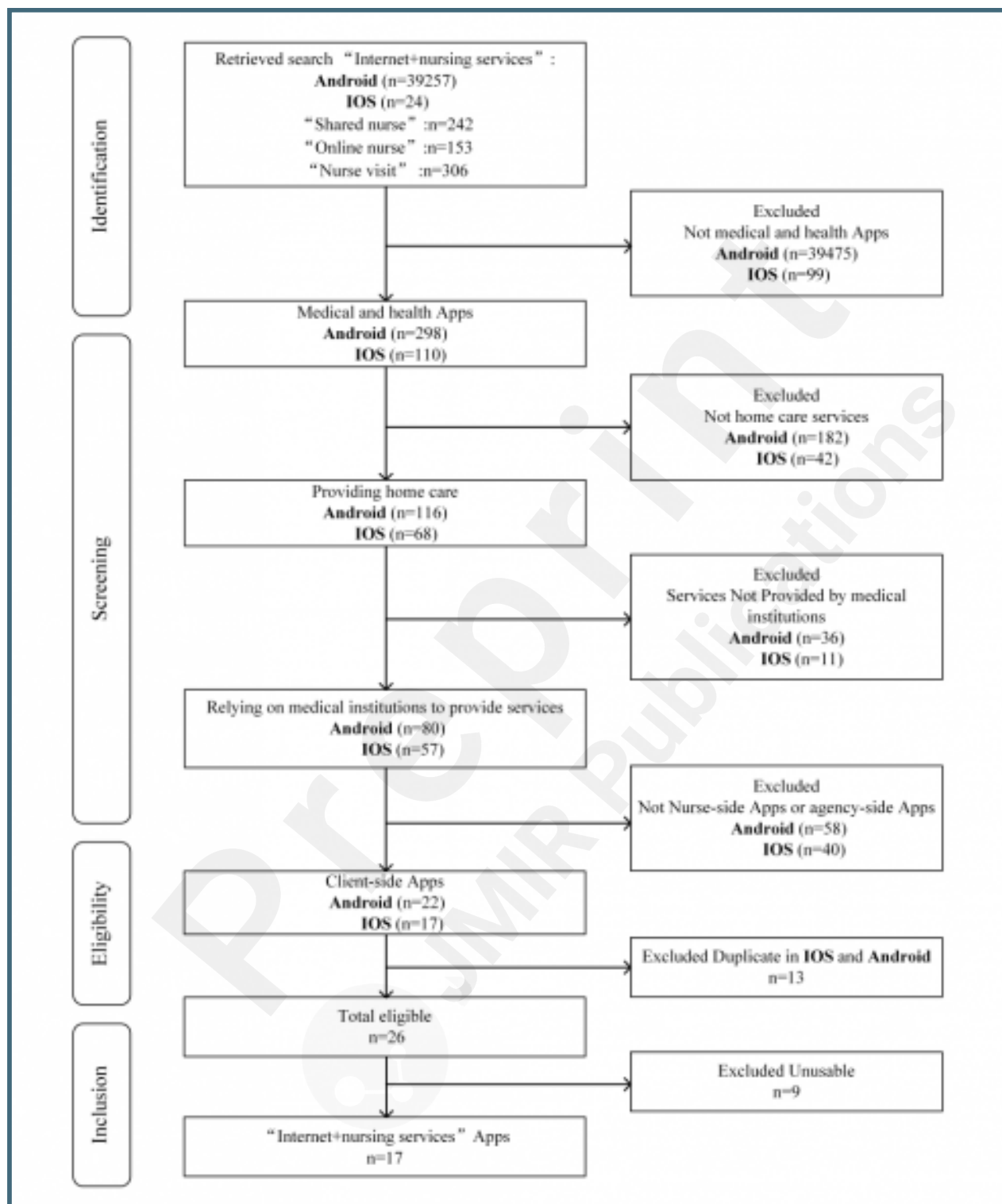
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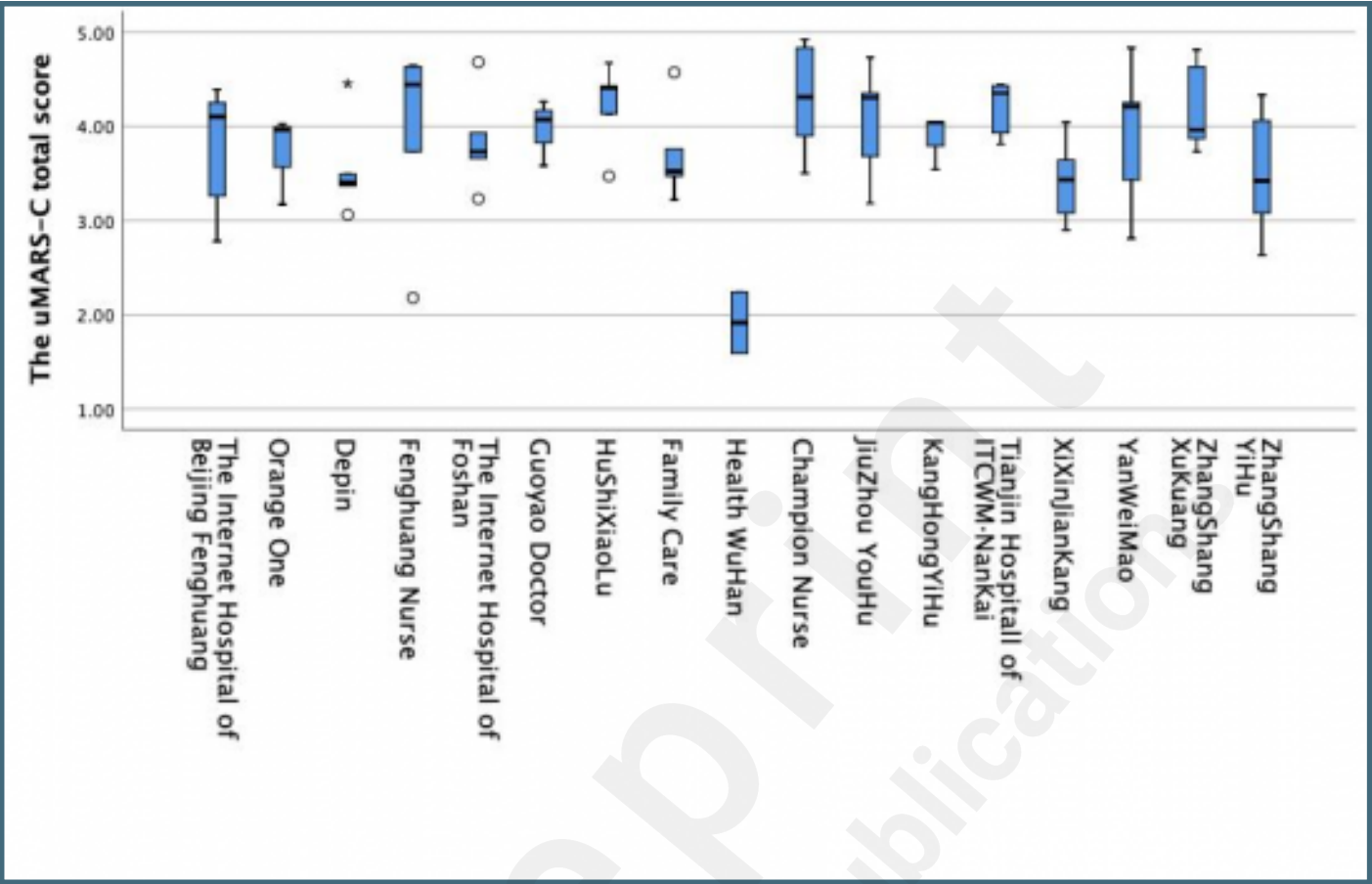
Supplementary Files

Figures

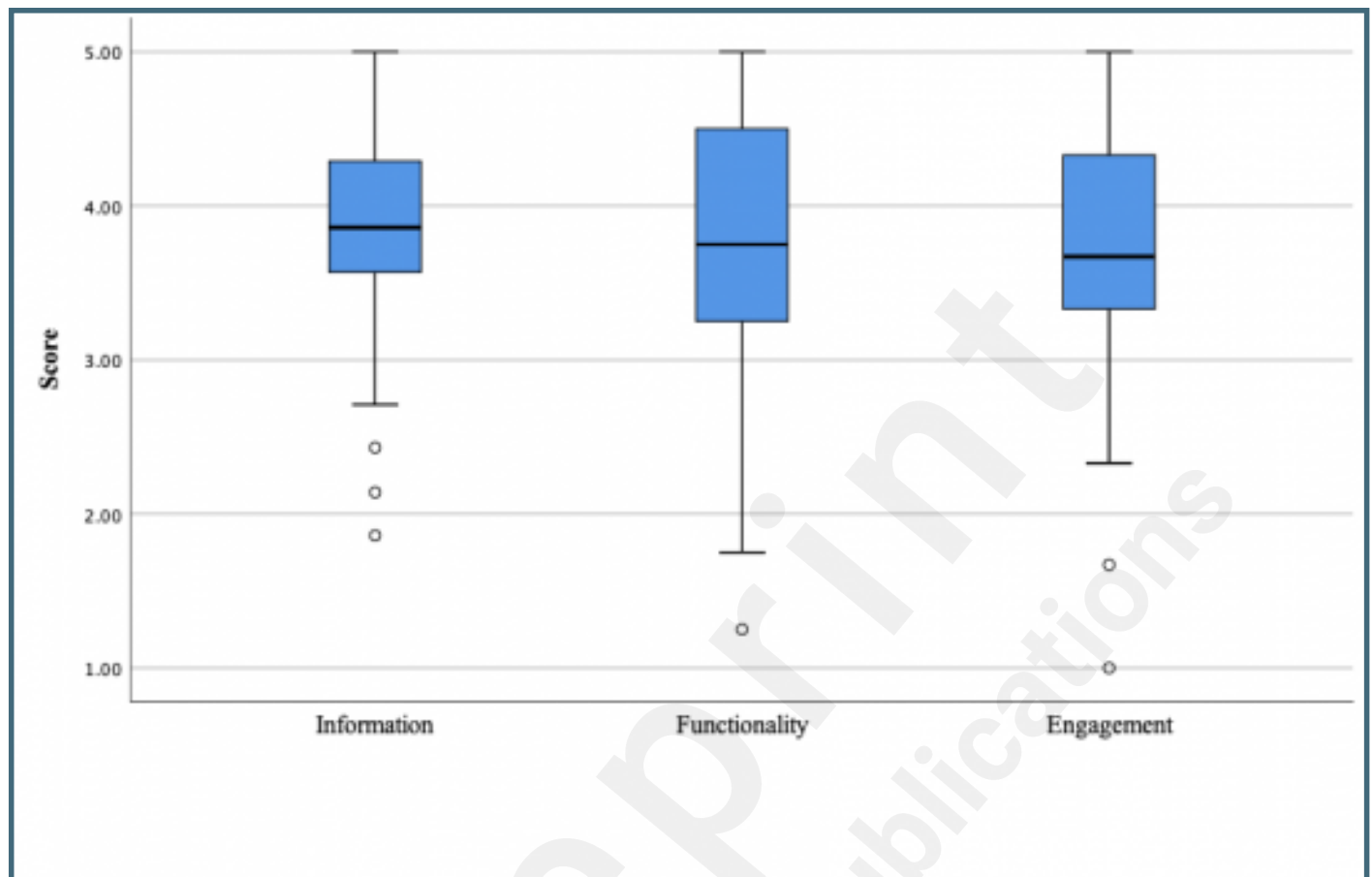
Flowchart of the selection of Apps.



uMARS-C overall scores of the “Internet+Nursing Service”apps (n=17).



uMARS-C dimension scores of “Internet+Nursing Service”apps (n=17).



Multimedia Appendixes

Details of the 17 “Internet+Nursing Service” Apps.

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Heatmap of the average scores per item and per app, from blue (worst score) to white (best score).

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