

Erectile dysfunction and mobile phone applications: Quality, content and adherence to European Association guidelines on male sexual dysfunction

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Summary

Introduction: Nowadays numerous mobile health applications (MHA) have been developed to assist and simplify the life of patients affected by erectile dysfunction (ED), however the scientific quality and the adherence to guidelines are not yet addressed and solved.

Materials and methods: On 17 January 2022, we conducted a search in the Apple App Store and Google Play Store. We reviewed all mobile apps from iTunes App Store and Google Play Store for ED and evaluated different aspects as well as their usage in screening, prevention, management, and their adherence to EAU guidelines.

Results: A total of 18 apps were reviewed. All apps are geared towards the patient and provide information about diagnoses and treatment of ED.

Conclusions: MHA represent an integral part of patients' lives, and apps providing services for male sexual dysfunction are constantly increasing. Despite this the overall quality is still low. Although many of these devices are useful in ED, the problems of scientific validation, content, and quality are not yet solved. Further work is needed to improve the quality of apps and developing new accessible, user designed, and high-quality apps.

KEY WORDS: App; e-health; Mobile phone; Erectile dysfunction; MARS.

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INTRODUCTION

Erectile Dysfunction (ED) is defined as the inability to achieve or maintain an erection sufficient for satisfactory sexual performance with high impact on the quality of life (QoL) (1). The prevalence ranges from 3% to 76.5%, and increases with age, affecting over 50% of men aged 40-70 years, with a negative effect on QoL of affected men and their sexual partners (2). ED is generally related to cardiovascular disease, diabetes mellitus, hyperlipidemia, and hypertension, among other disorders (3-9). Many options are currently available for ED treatment: lifestyle changes, medical and surgical treatments or their combination (10). Mobile applications (apps) have grown expo-

entially in recent years and become a more popular tool to support health behavior and to access health information for patients (11). In the last years numerous mobile health applications (MHA) have been developed, including in urological and andrological fields, aimed to simplify and assist the lives of patients (12, 13). Nowadays more than thousands MHA are available for mobile devices, but assessment of their quality is still a problem (14).

Instruments for the assessment of the quality and content of MHA are highly needed, and one of the most used tools is *Mobile Application Rating Scale* (MARS). MARS has been used in the evaluation of a variety of health apps including depression, urinary incontinence, menstrual cycle and other (16, 17).

Several apps have been developed for assessing and management of ED. These represent an important tool for patients. However, despite their potential utility, much effort must be made regarding the quality, the validation, and the adherence to guidelines.

To the best of our knowledge, there are no studies reporting the quality of apps for ED and their adherence to guidelines.

The aim of this study is to give an overview of apps for ED, currently available on the market to evaluate the quality and the adherence to guidelines.

MATERIAL AND METHODS

Search strategy

On 17 January 2022 we conducted a search in *Google Play Store* for Android phones and *Apple App Store* for iPhones with the keywords 'erectile dysfunction' and 'impotence' using the search tab. We used a wide array of keywords because *Google Play Store* and *Apple App Store* search strategy is based on finding keywords in the title, app descriptions and tags. Other searches of information provided in books or other formats were excluded.

Two authors (GMF, LC) screened separately in *App Store* and *Google Play Store* apps during the search by reading the title and description in the app store. A third author (MA)

Table 1.
App characteristics.

Name of application	Android/Apple/Both	Download	Producer	Category	Focus
E.D. Therapy Meditation	Apple	n.a.	Ninja Chemist LLC	Health & wellness	Treatment
IIEF-5 Erectile Dysfunction	Apple	n.a.	Putu Angga Risky Raharja	Medicine	Test
iDi - Erectile dysfunction	Apple	n.a.	Back2Medical	Medicine	Diagnosis, Informative, Test
myED - impotence IIEF-5 test	Apple	n.a.	Prognosis Pte Ltd	Medicine	Test
SMART SAA	Apple	n.a.	PERGALI LTD	Health & wellness	Informative, Test
Morning Glory Tracker	Apple	n.a.	Roman Health Medical LLC	Health & wellness	Diary of morning erection
Men Sexual Health	Android	> 10000	GangareBoy	Health & fitness	Informative
Erectile dysfunction self-test	Android	1000	R L fellner	Health & fitness	Informative, Test
Erectile dysfunction cure yoga	Android	10000	Dr. Zio	Health & fitness	Treatment
Erectile dysfunction treatment	Android	1000	Maftal almafary	Health & fitness	Information, Treatment
Erectile dysfunction treatment	Android	5000	Revolxa inc.	Medicine	Information, Risk factors, Treatment
Erectile dysfunction remedy 2021	Android	100	Maftal almafary	Instruction	Information, Risk factors, Treatment
Erectile dysfunction remedies	Android	5000	StatesApps	Health & fitness	Treatment
Home remedies	Android	100000	Cutepad studio	Medicine	Treatment
Erectile dysfunction questionnaire	Android	1000	Funny psychology	Entertainment	Test
Erection test	Android	1000	Dr. kareem zaher	Health & fitness	Test
IIEF-5 for erectile dysfunction	Android	500	imedical apps	Health & fitness	Test
Herbal cure	Android	100000	NovaRadix	Medicine	Treatment

resolved any discrepancies. At the beginning all apps were reported in Excel form and after they were screened according to the exclusion criteria. A total of 493 apps were found by our search, 467 of them were from the *Google Play Store* (Android) and 26 of them were from the *Apple App Store* (iOS). Of the total, 409 apps were screened after removing duplicates and paid apps. Of the total screened apps, 343 apps met excluding criteria and were removed. In total, 66 apps were eligible for the final evaluation and were downloaded. Finally, 18 apps were included in the final review after removing 48 apps that met exclusion criteria after download. A flow diagram based on the PRISMA statement (Figure 1) was included for the selected apps. Table 1 shows the analyzed apps characteristics. The 18 erectile dysfunction apps were evaluated by four members of the research team on a 5-point Likert scale based on MARS characteristics.

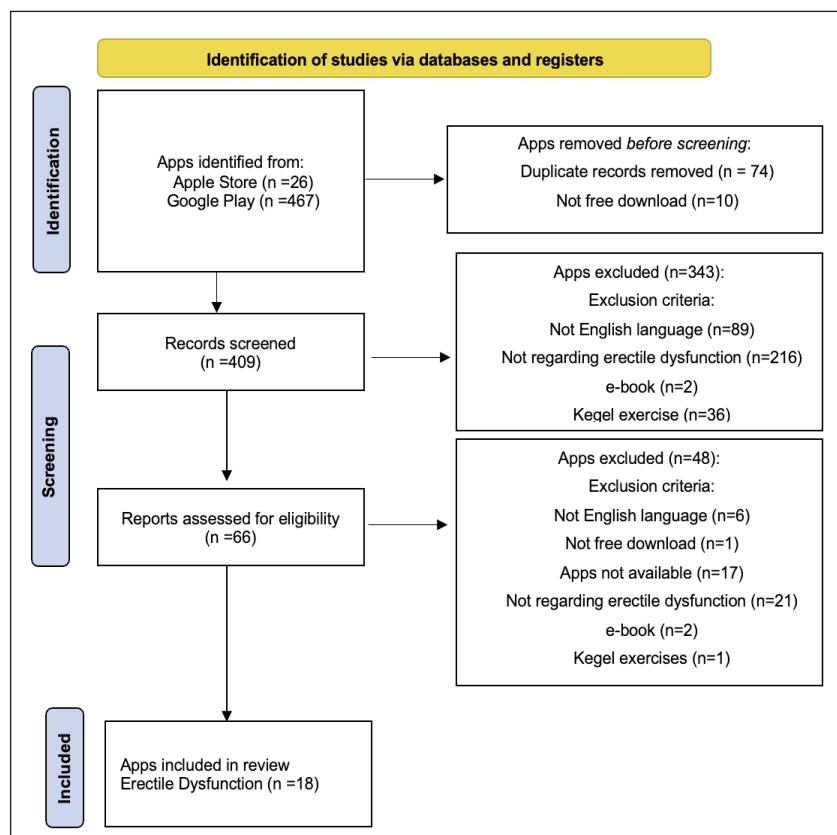
App inclusion criteria

We included in the analysis all apps regarding ED providing a service to patients.

The apps are geared to patients, in English, and free to download. Apps not specifically focused on ED, apps not allowing access to all users and those not available in English were excluded. Then all reviewers downloaded and installed the apps on their personal mobile device.

They interacted for fifteen minutes with each app to explore its features before

completing the MARS and evaluated their adherence to EAU guidelines. To assess apps, they were downloaded to either an Android (*Huawei p20 lite*) or iPhone (*iPhone 13 pro*). If apps were available in both app stores, the iPhone version was assessed.

Figure 1.
PRISMA.

Data extraction

We conducted a data extraction using a predefined Excel form. On 17 January 2022 reviewers discussed methods of recording data to ensure standardized modality. The following data were extracted from MHA: title, language, customers, costs, source (*Google Play Store* or *Apple App Store*), field/disease, rating/feedback from the users, service provided.

Assessment of app quality

Apps' quality was assessed using the MARS, which showed a very acceptable reliability and validity (12). MARS is a multidimensional instrument of 23 structured questions evaluating engagement, functionality, esthetics, information, app subjective quality, and app-specific (17). The scale is composed of 19 items grouped in four categories of perceived app quality: engagement (five items assessing the extent to which the app engages target users); functionality (four items assessing how easy the app is to navigate and the overall app performance); aesthetics (three items assessing visual appearance and style); information (seven items assessing accuracy, quality, and quantity of the app), and 1 category of subjective quality. Each category score is the mean of the different items, rated on a 5-point Likert-type scale (from 1 = inadequate to 5 = excellent) within its category.

The overall quality score was calculated by taking the mean of the 4 app quality category scores, with a final score ranging from 0 to 5.

A score of between 1 and 2/5 is considered as 'poor' quality, while 3/5 is 'acceptable' and at least 4/5 is 'good' quality. If scores differed by a single point, the mean of the two ratings was used, with any scores differing by more than a single point being resolved through discussion and consensus agreement between reviewers. Mean scores were calculated for each domain and an overall quality

score was calculated based on the aggregated mean values for each of the four domains. The mean score for subjective quality was also calculated (15).

Assessment of app adherence to EAU guidelines

We create an adherence checklist of five items (definition, physiopathology, diagnosis, risk factors and treatment) based on section 5 of the EAU guidelines of ED. Two independent reviewers coded separately apps for their adherence to EAU guidelines. Both raters were resident in urology with experience in male sexual dysfunction.

According to criteria used in similar studies, raters gave each app a score from 0 to 3 for each of the five items.

A score of "0" indicated no adherence to guidelines.

A score of "1" indicated a weak adherence. A score of "2" indicated a partial or moderate adherence. A score of "3" indicated strong adherence. Where coding scores differed by 1 point, the average of the two ratings was taken. If there was a greater than 1-point discrepancy, a third author (a full professor) reviewed apps and resolved the discrepancy. The possible score on the checklist ranged from 0 to 15 for each app. To facilitate evaluation, adherence to the checklist was arbitrarily considered low with a total score ranging from 0 to 5, medium (6-10), and high (11-15) (18, 19).

RESULTS

Out of the 18 apps included in the final analysis, 6 from the Apple store and 12 from the Google play store, had limited functionality: 6 of them offered IIEF-5 tests, the other 12 ones offered information about symptoms, diagnosis and treatment, including tools for nutraceutical treatments. In particular, 8 apps (44.4%) included information about treatment options; 1 of them (5.6%) specifically gave information about diagnosis; 7 (38.9%) were overall informative apps, some of them mentioning risk factors. Data about

downloads were available for 12 apps out of the 18 reviewed.

Downloads were not

available for MHA presented in the Apple App Store. The most downloaded apps were Home remedies (*Android*) and Herbal cure (*Android*), of which 100000 downloads were reported. All the apps were planned to be used by patients. No information about MHA rating was available.

MARS scale scores are represented in Table 2.

Engagement

The score in this section was based on a 5-point Likert scale in 5 subscales (*Entertainment, Interest, Customization, Interactivity and Target-*

Table 2.
MARS scale scores.

Name of application	Engagement (section A)	Functionality (section B)	Aesthetics (section C)	Information (section D)	Mean (A+B+C+D)	App subjective quality (section E)
ED test - risk calculator of erectile dysfunction	2.6	2.75	3	1.67	2.5	1.5
IIEF-5 Erectile Dysfunction	1	2.75	1.67	2.71	2.03	1.75
iDi - Erectile dysfunction	4	3.75	3	2.71	3.36	2.75
myED - impotence IIEF-5 test	2	3.5	2.67	2.8	2.74	2.25
SMART SAA	3.6	3.75	3	3.6	3.49	2.75
Morning Glory Tracker	1	1.5	1	1.4	1.22	1.25
Men Sexual Health	3	4	3	2	3	2
Erectile dysfunction self-test	2	3.75	3.66	3	3.10	2.75
Erectile dysfunction cure yoga	2	3.50	3.33	2.86	2.92	2.75
Erectile dysfunction treatment	2	3.5	3.33	2.43	2.82	2
Erectile dysfunction treatment	3	3.75	3.33	3	3.27	2.25
Erectile dysfunction remedy 2021	2	3.5	3.33	2.43	2.82	2
Erectile dysfunction remedies	1.2	4.25	1	1.43	1.97	1.25
Home remedies	3	3.5	2.66	1.85	2.75	1.75
Erectile dysfunction questionnaire	1.4	2.5	2	1.14	1.76	1.25
Erection test	1.2	2.5	2.66	1.43	1.95	1.75
iief-5 for erectile dysfunction	1.4	2.5	2	1.43	1.84	1.25
Herbal cure	1.2	3.5	1	1.85	2.14	1.75

group). The mean score was 2.09. Scores ranged from 1 to 4 out of 5. The “iDi - Erectile dysfunction” app (iOS) produced by *Back2medical* received the highest score for the engagement. This app contains tips for ED self-diagnosis and management, information and a follow-up form that helps the patient to keep track of his eventual improvements.

Functionality

The score of the functionality section was based on a 5-point Likert scale in 4 subscales (Performance, Ease of use, Navigation and Gestural design) and the mean score was 3.26. Scores ranged from 1.5 to 4.25. The “Erectile Dysfunction Remedies” app (Android) produced by *StatesApps* achieved the maximum score. This app contains home remedies for ED.

Aesthetics

The aesthetics section was formed by a 5-point Likert scale in 3 subscales (*Layout, Graphics, Visual Appeal*) and the average score was 2.54. Scores ranged from 1 to 3.66 out of 5. The “Erectile Dysfunction Self-test” app (Android) developed by *RL Fellner* and designed to self-screen ED and to give tips and info about ED-risk and prostate enlargement, reached the maximum aesthetics score.

Information

The information section was formed by a 5-point Likert scale in 7 subscales and the mean score was 2.21. Score ranged from 1.14 to 3.6. The SMART SAA app (iOS) developed by PERGALI LTD achieved the highest score.

This app offers the IIEF-5 test and other questionnaires, informative tips and advice to manage ED and other sexual conditions. It is produced by the *Sexual Advice Association*, a charitable organization created to help improve the sexual health and wellbeing of men and women.

Subjective quality

The subjective quality section consisted of 4 items. The mean score was 1.94, with scores ranging from 1.25 to 2.75. The “iDi - Erectile dysfunction”, “SMART SAA”, “Erectile Dysfunction self-test”, “Erectile dysfunction cure yoga” reached the maximum score.

EAU adherence checklist

We evaluated the EAU guidelines adherence in 13 apps. Five apps were not analyzed because they represent a IIEF-5 test, a validated diagnostic tool consisting of five selected items to clearly discriminate between subjects with and without ED. EAU adherence scores are represented in Table 3.

The ED definition was reported in 10 (76.9%) apps, the score ranged

from 0 to 3 (mean 1.8); physiopathology was reported in 9 (69.2%) apps, the score ranged from 0 to 2 (mean 1.1); risk factors were reported in 10 (76.9%) apps, the score ranged from 0 to 3 (mean 1.7); diagnosis was reported in 8 (61.5%), the score range from 0 to 2 (mean 0.61); treatment was reported in 11 (84.6%), the score ranged from 0 to 3 (mean 1.2). The overall score ranged from 0 to 12 (mean 4.92). The highest score was reported by “Erectile dysfunction treatment” (Android) produced by *Revolxa inc.* that mainly contains information about erectile dysfunction risk factors, diagnosis and treatment. The maximum definition score of 3 was only reached by three apps out of thirteen, while none of the apps achieved 3 in physiopathology and diagnosis. Finally, only three apps and two apps out of the thirteen evaluated, scored 3 respectively in risk factors and treatment.

DISCUSSION

Nowadays many studies focus on the evaluation of medical apps in order to understand whether the developers use a validated scientific approach to their creation (20-22). Although a standardized evaluation method does not exist, a reasonable way to qualify those apps is to combine different scores. This is the reason why in the present study we decided to pursue such an approach for the evaluation of erectile dysfunction apps. To the best of our knowledge this is the first study reviewing the currently available MHA for ED, reporting either an assessment of quality, and the adherence to EAU guidelines. The most important findings in our study is that at the present time MHA for ED have poor quality and highlight low adherence to EAU guidelines. First of all we evaluated the quality of the apps using the MARS. The mean scores of the four categories were dramatically low. In particular the “Engagement” and the “Information” scores were lowest 2.09 and 2.21 respectively.

Engagement assessed the design and interest of the app and software functionality.

Information assessed accuracy, quality, credibility of the source and evidence basis of information presented in the apps. On the other hand Functionality mean score was

Table 3.
EAU adherence checklist scores.

Name of application	Definition (0-3)	Physiopathology (0-3)	Risk factors (0-3)	Diagnosis (0-3)	Treatment (0-3)
iDi - Erectile dysfunction	3	1	2	0	3
myED - impotence IIEF-5 test	1	n.a.	2	1	n.a.
SMART SAA	2	0	1	0	1
Morning Glory Tracker	0	0	0	0	0
Men Sexual Health	2	1	1	0	1
Erectile dysfunction self-test	2	2	2	2	n.a.
Erectile dysfunction cure yoga	n.a.	n.a.	n.a.	n.a.	1
Erectile dysfunction treatment	3	2	3	n.a.	1
Erectile dysfunction treatment	2	2	3	2	3
Erectile dysfunction remedy 2021	3	2	3	n.a.	1
Erectile dysfunction remedies	0	0	0	0	1
Home remedies	n.a.	n.a.	n.a.	n.a.	1
Herbal cure	n.a.	n.a.	n.a.	n.a.	1

the best performance among all categories (3.26). Functionality assessed how easy the app and the overall app performance. The same results were reported by O'Connor *et al.* which evaluated the quality of mobile apps supporting lifestyle changes following a *transitory ischemic attack* (TIA) or 'minor' stroke. This suggested that MHA were designed and developed in particular for their usability and not to assist, inform and educate patients. MHA were developed only for commercial use, without supporting of healthcare (23). This is due to a lack of scientific validation of MHA, indicating the necessity to develop high-quality apps and to improve the existing ones. Giunti *et al.* showed in their paper an evident absence of health professionals in the development of healthcare apps. Apps are mostly developed by non-health professionals who are creative and skilled in design but lack scientific knowledge (24). Our study demonstrates that MHA for ED lacked quality and most of all did not report to the patients what EAU guidelines suggest. Our results confirm and corroborate findings of other studies that analyze MHA in different clinical and surgical tools. There is a wide range of products not developed in collaboration with healthcare professionals or according to guidelines. To support this idea, each app underwent a EAU guidelines adherence test in order to assess the scientificity of those. Interestingly the mean score was 4.92 out of 12. Only four (30.7%) apps had medium adherence and only one app (7.69%) high adherence respectively. The highest adherence was reported in ED definition although definition has been adequately reported only in three apps. This is a point highlighting the lack of scientific validation of these products. In fact ED definition is reported in several scientific papers and widely available on the internet. "Erectile dysfunction treatment" (Android) produced by *Revolxa Inc.* is the app with the highest guideline adherence. This is not surprising because *Revolxa Inc.* produces many MHA in different medical fields. Regarding treatment our data were in line with the results of Vagger *et al.* in a study about urinary tract infections apps. As shown MHA about treatment of urinary tract infections were deficient in these information. In our study the overall treatment median score according to EAU guidelines was 1.2 and only two apps reported a score of 3 points. Nowadays treatment regimens available for ED include psychotherapy, sex therapy, oral pharmacological agents, androgen replacement therapy, intraurethral therapy, intracavernosal injections, vacuum devices, and surgery. Herbal supplements are widely used, but often lack rigorous scientific evidence of their efficacy. Four apps suggest use of natural products in ED treatments but many of these are non common and showed poor scientific evidence (garlic, carrots, promenade juice), while only ginseng reported several scientific evidence. Balasubramanian *et al.* in a recent meta-analysis reported the most popular erectile dysfunction supplements available on online marketplaces. Ginseng is the most popular followed by L-arginine, and Tongkat ali. None of the supplements reported by apps analyzed are present in this list. Furthermore, ginseng and L-arginine as shown by Borrelli *et al.* are the only two supplements as an effective efficacy in ED treatment (25). The search strategy also reported several apps

suggesting Kegel exercise in ED treatments. Published studies reported that these exercises to improve pelvic floor muscle could be useful as first line treatment of ED. Contractions of the ischiocavernosus and bulbocavernosus muscles (two muscles which are part of pelvic floor) seem to increase the intracavernous pressure, influencing penile rigidity, and compresses the deep dorsal vein of the penis preventing the outflow of blood from penis (26). Although in literature many studies have been published, currently guidelines do not report pelvic floor exercises as treatment in ED management. Another important point is that despite the high numbers of downloads any MHA has a rating. Many factors influenced the download of MHA, and no studies have been published about the mechanism that generated the rating (27). Strengths of our study include: the first study which examines the content, the quality, and the adherence to EAU guidelines; the rigorous approach in search strategy, screening, and analysis; the test among the reviewers regarding MARS scale use before initiation of the study. The limitations are related to: the reproducibility by different users due to the working method of *App Store* and *Google Play Store* (the visibility of apps depends on the device and on the country where the search is performed); the exclusion of paid applications; guidelines are developed for healthcare and not for patients; the high proliferation of MHA. Our study shows that there are a multitude of inaccurate apps resulting from a search in a store even when using appropriate terminology, so patients searching for health information must choose and discern the quality on their own. An ideal MHA must be based on scientific evidence, be simple and intuitive to use. MHA should provide correct and simple information about disease, make the individual confident to change behavior, inform patients about their progress, and provide adequate information about treatments.

CONCLUSIONS

The use of MHA for ED is a new and unexplored topic, with much potential for future investigation. MHA are now an integral part of patients' lives, from year to year, the number of apps that provide services for male sexual dysfunction is constantly increasing, but the overall quality is still low. Although many of these devices are useful in ED, the problems of scientific validation, content, and quality are not yet solved. Further work is needed to improve the quality of apps and developing new accessible, user designed, and high-quality apps.

REFERENCES

- Deng W, Bivalacqua TJ, Hellstrom WJG, Kadowitz PJ. Gene and stem cell therapy for erectile dysfunction. *Int J Impot Res.* 2005; 17(Suppl 1):S57-63.
- Çayan S, Kendirci M, Yaman Ö, *et al.* Prevalence of erectile dysfunction in men over 40 years of age in Turkey: Results from the Turkish Society of Andrology Male Sexual Health Study Group. *Turk J Urol.* 2017; 43:122-9.
- Mirone V, Napolitano L, D'Emmanuele di Villa Bianca R, *et al.* A new original nutraceutical formulation ameliorates the effect of

Tadalafil on clinical score and cGMP accumulation. *Arch Ital Urol Androl.* 2021; 93:221-6.

4. Romano L, Granata L, Fusco F, et al. Sexual Dysfunction in Patients With Chronic Gastrointestinal and Liver Diseases: A neglected Issue. *Sex Med Rev.* 2021; S2050-0521(21)00039-1.

5. Romano L, Pellegrino R, Sciorio C, et al. Erectile and sexual dysfunction in male and female patients with celiac disease: A cross-sectional observational study. *Andrology.* 2022; Apr 14.

6. Creta M, Celentano G, Napolitano L, et al. Inhibition of androgen signalling improves the outcomes of therapies for bladder cancer: results from a systematic review of preclinical and clinical evidence and meta-analysis of clinical studies. *Diagn (Basel).* 2021; 11:351.

7. Napolitano L, Barone B, Crocetto F, et al. The COVID-19 pandemic: Is It a wolf consuming fertility? *Int J Fertil Steril.* 2020; 14:159-60.

8. Stanzione A, Creta M, Imbriaco M, et al. Attitudes and perceptions towards multiparametric magnetic resonance imaging of the prostate: A national survey among Italian urologists. *Arch Ital Urol Androl.* 2020; 92:292-296.

9. Verze P, Arcaniolo D, Imbimbo C, et al. General and sex profile of women with partner affected by premature ejaculation: results of a large observational, non-interventional, cross-sectional, epidemiological study (IPER-F). *Andrology.* 2018; 6:714-9.

10. Krzastek SC, Bopp J, Smith RP, Kovac JR. Recent advances in the understanding and management of erectile dysfunction. *F1000Research.* 2019; 8:F1000 Faculty Rev-102.

11. Zhao J, Freeman B, Li M. Can mobile phone apps influence people's health behavior change? An evidence review. *J Med Internet Res.* 2016; 18:e287.

12. Martín-Martín J, Muro-Culebras A, Roldán-Jiménez C, et al. Evaluation of Android and Apple store depression applications based on mobile application rating scale. *Int J Environ Res Public Health.* 2021; 18:12505.

13. Mirone V, Creta M, Capece M, et al. Telementoring for communication between residents and faculty physicians: Results from a survey on attitudes and perceptions in an academic tertiary urology referral department in Italy. *Arch Ital Urol Androl.* 2021; 93:450-4.

14. Areean PA, Hallgren KA, Jordan JT, et al. The Use and Effectiveness of Mobile Apps for Depression: Results From a Fully Remote Clinical Trial. *J Med Internet Res.* 2016; 18:e330.

15. Dantas LO, Carvalho C, Santos BL de J, et al. Mobile health technologies for the management of urinary incontinence: A systematic review of online stores in Brazil. *Braz J Phys Ther.* 2021; 25:387-95.

16. Moglia ML, Nguyen HV, Chyjek K, et al. Evaluation of smartphone menstrual cycle tracking applications using an adapted APPLICATIONS scoring system. *Obstet Gynecol.* 2016; 127:1153-60.

17. Stoyanov SR, Hides L, Kavanagh DJ, et al. Mobile app rating scale: a new tool for assessing the quality of health mobile apps. *JMIR MHealth UHealth.* 2015; 3:e27.

18. Vaggers S, Puri P, Wagenlehner F, Somani BK. A Content analysis of mobile phone applications for the diagnosis, treatment, and prevention of urinary tract infections, and their compliance with European Association of Urology guidelines on urological infections. *Eur Urol Focus.* 2021; 7:198-204.

19. Rajani NB, Weth D, Mastellos N, Filippidis FT. Adherence of popular smoking cessation mobile applications to evidence-based guidelines. *BMC Public Health.* 2019; 19:743.

20. Trecca EMC, Lonigro A, Gelardi M, et al. Mobile applications in

otolaryngology: a systematic review of the literature, Apple app store and the Google play store. *Ann Otol Rhinol Laryngol.* 2021; 130:78-91.

21. Dantas LO, Carvalho C, Prando BC, et al. Mobile health technologies for the management of rheumatic diseases: a systematic review of online stores in Brazil. *Clin Rheumatol.* 2021; 40:2601-9.

22. Vega M, McKay ER, Halani PK. Evaluation of mobile applications for patients with fecal incontinence using a modified APPLICATIONS scoring system. *Int Urogynecology J.* 2021; 32:2529-36.

23. O'Connor SR, Kee F, Thompson DR, et al. A review of the quality and content of mobile apps to support lifestyle modifications following a transient ischaemic attack or «minor» stroke. *Digit Health.* 2021; 7:20552076211065270.

24. Giunti G, Giunta DH, Guisado-Fernandez E, et al. A biopsy of Breast Cancer mobile applications: state of the practice review. *Int J Med Inf.* 2018; 110:1-9.

25. Balasubramanian A, Thirumavalavan N, Srivatsav A, et al. An analysis of popular online erectile dysfunction supplements. *J Sex Med.* 2019; 16:843-52.

26. Dorey G, Speakman M, Feneley R, et al. Randomised controlled trial of pelvic floor muscle exercises and manometric biofeedback for erectile dysfunction. *Br J Gen Pract J R Coll Gen Pract.* 2004; 54:819-25.

27. Biswas M, Tania MH, Kaiser MS, et al. ACCU3RATE: A mobile health application rating scale based on user reviews. *PloS One.* 2021; 16:e0258050.

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