Οι εφαρμογές (Apps) στα smartphones ως εργαλεία βελτίωσης της θεραπευτικής φροντίδας των ασθενών

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02-09-2021

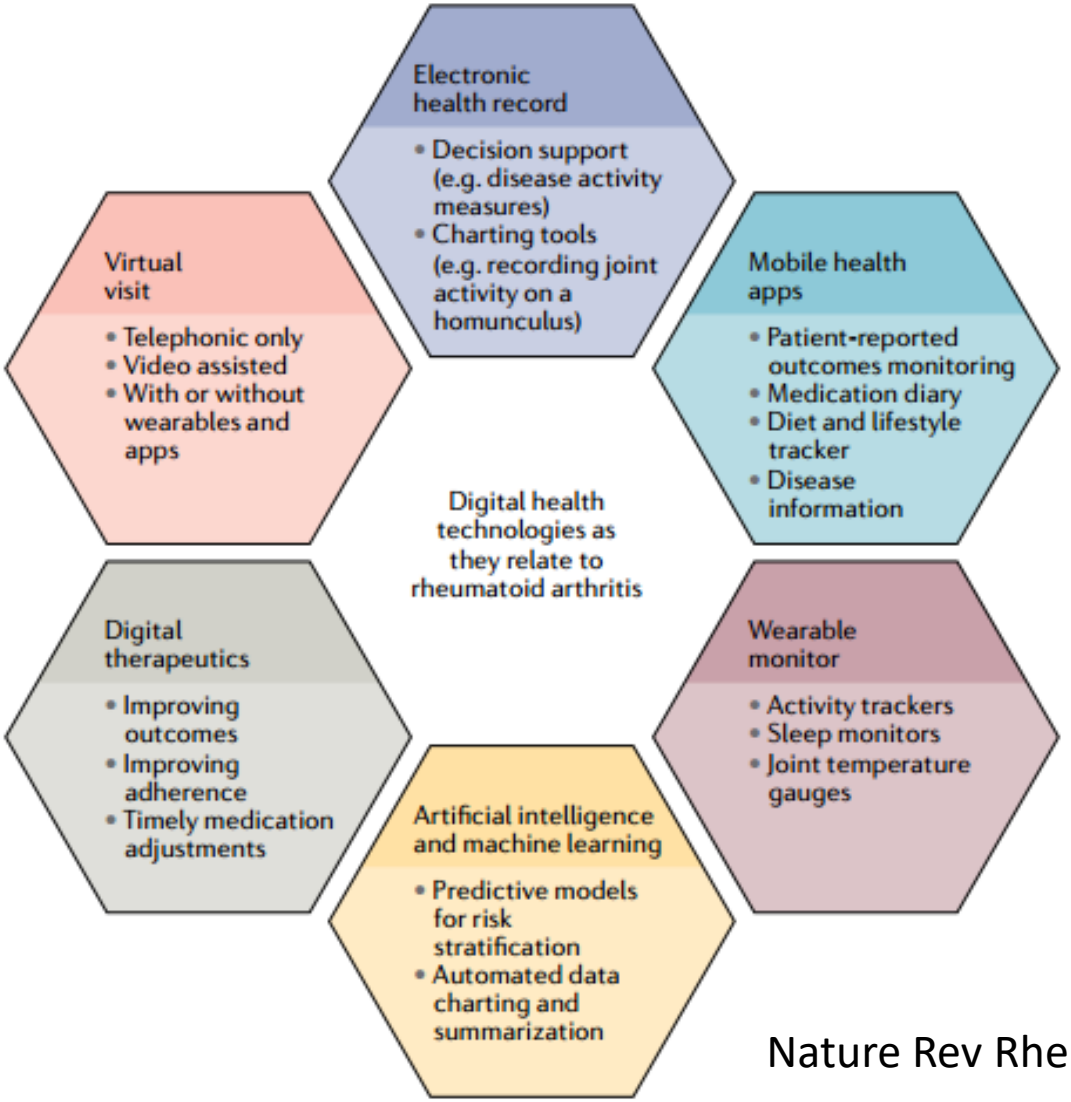
Σύγκρουση συμφερόντων

- Καμμία για αυτήν την παρουσίαση

Η σημασία της αυτοδιαχείρισης των ασθενών

Curr Rheumatol Rep (2021) 23: 2

Η ψηφιακή τεχνολογία στην υπηρεσία της ΡΑ



Nature Rev Rheum 2020(16):525

Fig. 1 | **Overview of digital health technologies as they relate to rheumatoid arthritis.** The potential implications of each technology for rheumatoid arthritis are listed as bullet points.

Χρησιμότητα των health apps στα RDs

- Αλλαγή στις πεποιθήσεις και συμπεριφορές του ασθενή
- Γνώση και δεξιότητες αυτοδιαχείρισης
- ελάττωση συμπεριφορών επικίνδυνων για την υγεία
- βελτίωση κλινικού αποτελέσματος (καλύτερη διαχείριση συμπτωμάτων-συμμόρφωση στην αγωγή, ελάττωση ενεργότητας νόσου
- αντικειμενική μέτρηση, καταγραφή και παρακολούθηση πληροφοριών υγείας (κίνηση, δραστηριότητα, ύπνος) με ελάχιστη προσπάθεια
- Αντιμετώπιση του διπόλου ελάττωση αριθμού ρευματολόγων-αύξηση ζήτησης υπηρεσιών
- Περιορισμός απαιτούμενων ιατρικών επισκέψεων

Rheum Dis Clin N Am-(2019)https://doi.org/10.1016/j.rdc.2019.01.011

Χρησιμότητες Health apps

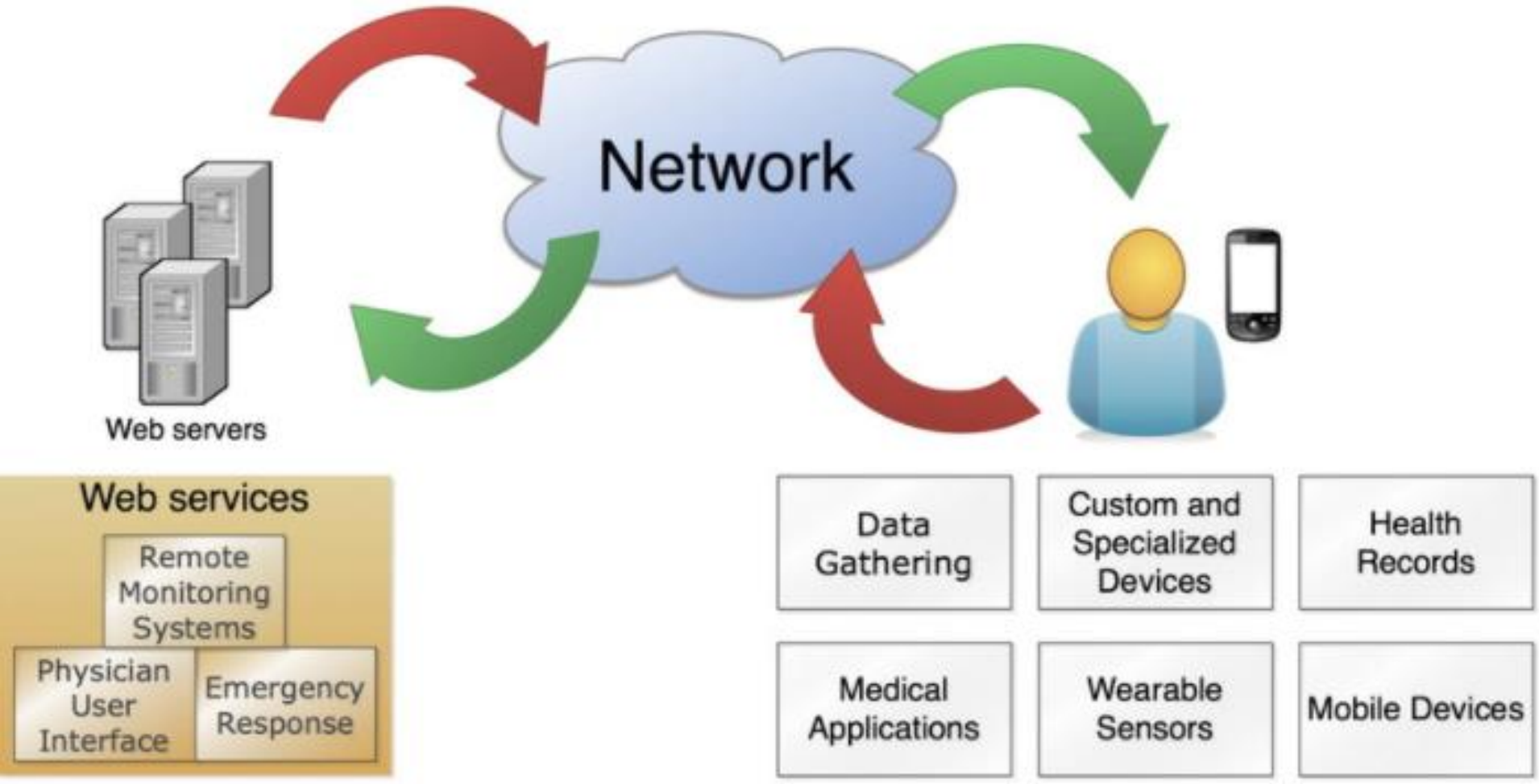
- **Patient care:** The aiding of patient care by increasing patient self-management via improving access to general disease information, collection of personal disease information and encouragement to improve one's behavior.

- **Research purposes:** The systematic collection of data for scientific research which could increase our understanding of differences between patients, possible disease triggers and concomitant symptoms

Int. J. Clin. Rheumatol. (2019) 14(1), 44-49

Table 1. Theoretical pros and cons of mHealth applications.	
Pros	**Cons**
mHealth for patient care	
Instruct: Improved self-management - Rx and visit reminders - lifestyle information and support - more insight in one's own health (e.g. early flare recognition, insight into positive behavioural effects) Inform: Better informed about health care options Peer support through social patient platform Support clinical communication - improving communication with health care workers - Inter visit disease activity recall	Becoming obsessive with self-control - Unwelcome reminders of disease - Incorrect sense of control over disease by simple life-style interventions - Over interpretation of data - Increased healthcare consumption through incorrect signals Risk of communication of unfunded information
mHealth for research purpose	
Data collection outside clinics - symptom pattern - comorbidities - concomitant symptoms - disease triggers - additional measurements via gadgets Overcome recall bias	Selection bias
General	
High prevalence of smartphones	Privacy issues Free-market instruments are not obliged to adhere to medical standards of quality

Τυπική αρχιτεκτονική μιας υπηρεσίας mhealth



J Biomed Inform 2015;56:265-72

Λειτουργικότητες Health apps

- **Inform:** Provide information in a variety of formats (text, photo, video).
- **Instruct:** Provide instructions to the user.
- **Record:** Capture user entered data.
- **Display**: Graphically display/output user entered data.
- **Guide**: Provide guidance based on user entered information, and may further offer a diagnosis, or recommend a consultation with a physician or a treatment.
- **Remind/Alert**: Provide reminders to the user.
- **Communicate**: Provide communication between healthcare providers and patient

Int. J. Clin. Rheumatol. (2019) 14(1), 44-49

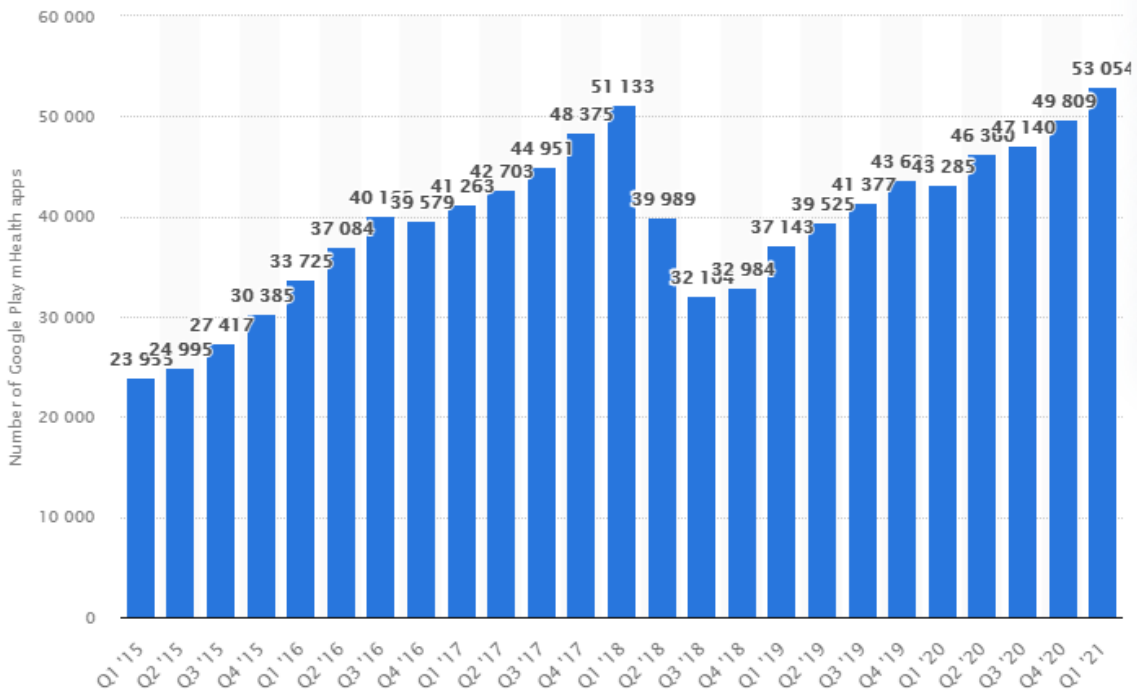
Αρχές που πρέπει να διέπουν τις Health apps

- Εύκολη λειτουργία (εγκατάσταση, φόρτωση, «τρέξιμο» app)
- Ιδιωτικότητα
- Ασφάλεια δεδομένων
- Χρήσιμο, ακριβές και αναβαθμιζόμενο περιεχόμενο
- Ευκολία στη χρήση

Nature Rev Rheum 2020(16):525

Ουκ ολίγες...

Number of mHealth apps available in the Google Play Store from 1st quarter 2015 to 1st quarter 2021



DOWNLOAD

PDF + XLS + PNG + PPT +

Source
→ Show sources information
→ Show publisher information

Release date
May 2021

Region
Worldwide

Survey time period
Q1 2015 to Q1 2021

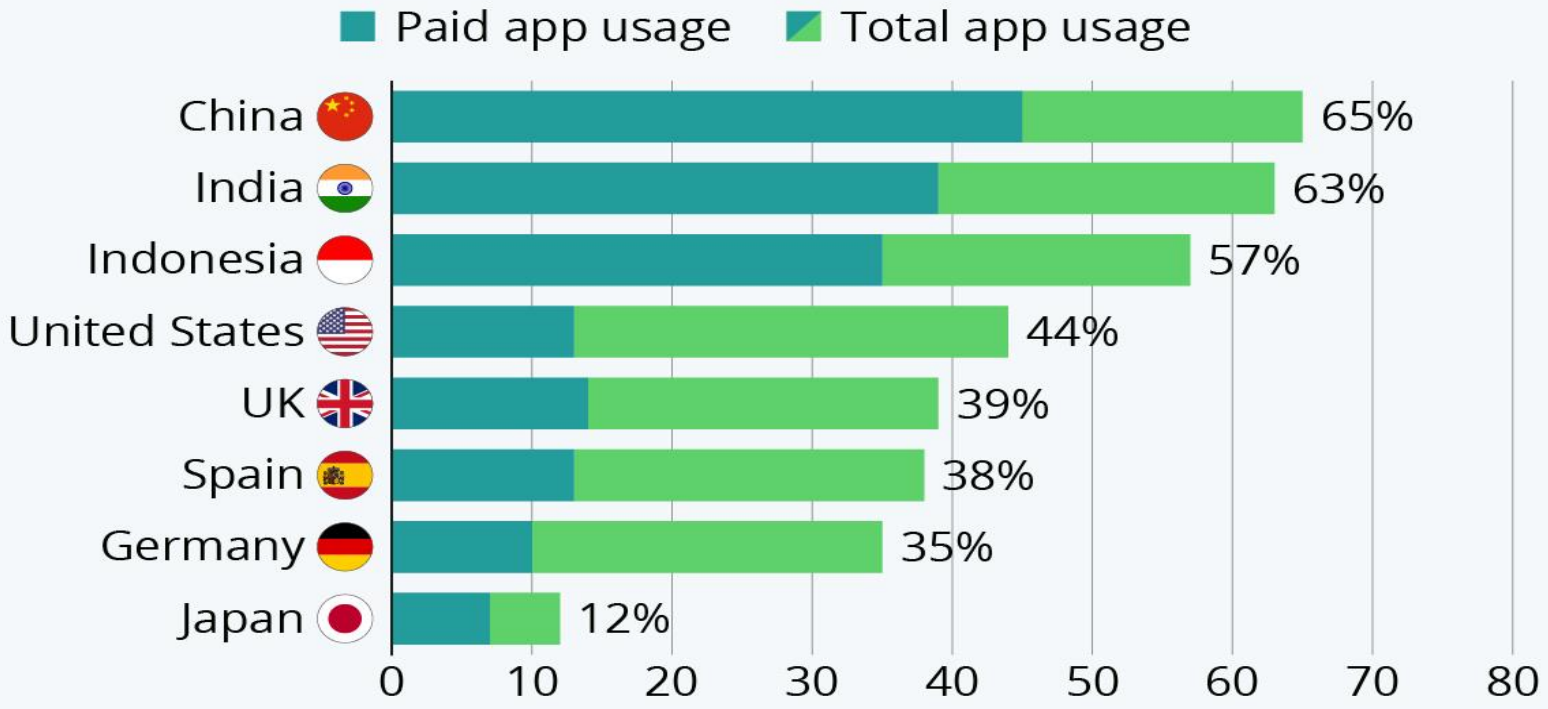
Special properties
category medical; excluding health & fitness

* 53979 iOS healthcare apps

https://www.statista.com/statistics/779919/health-apps-available-google-play-worldwide/

Where Health App Usage Is Most Common

Share of respondents in selected countries who had used a health app in the past 12 months

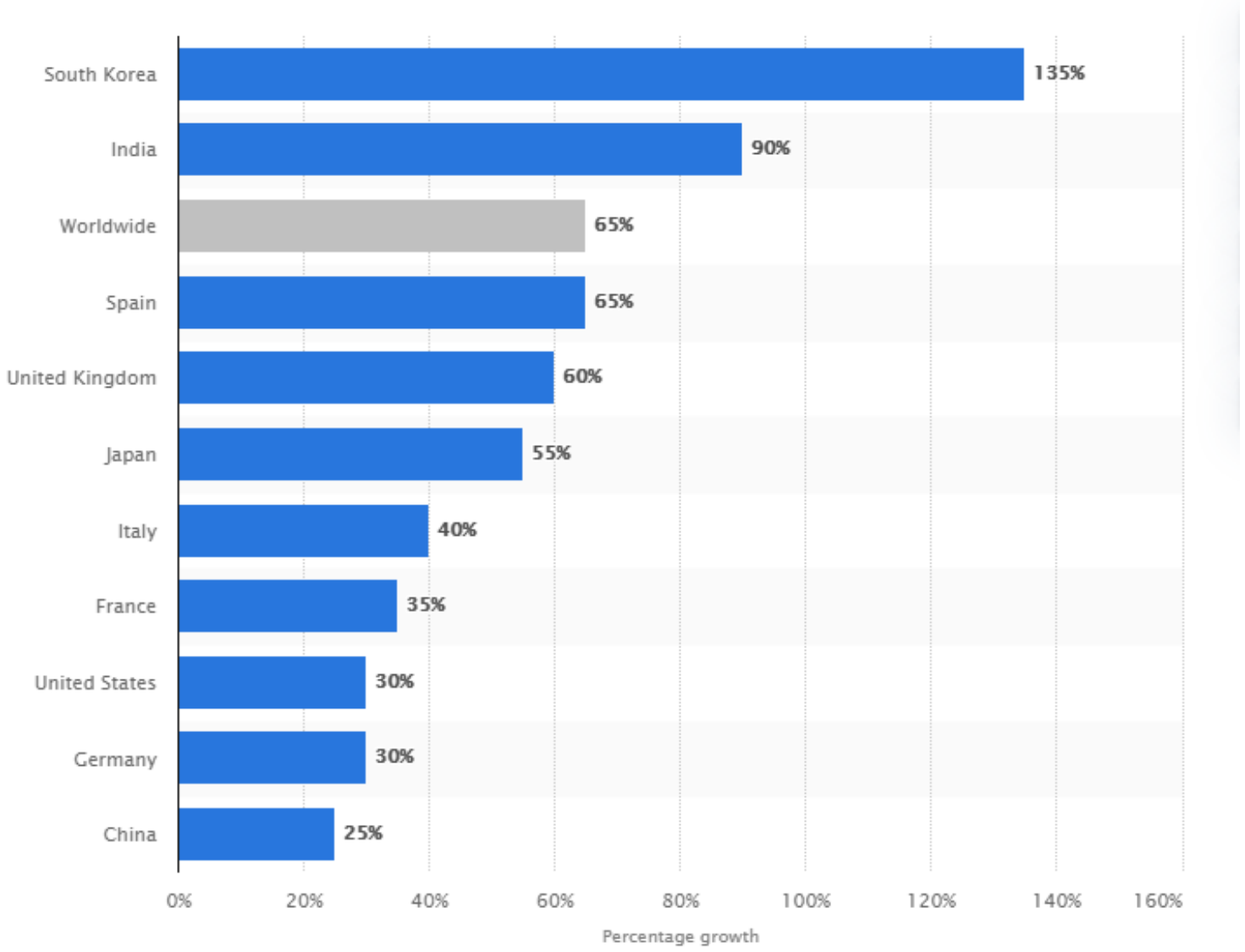


1,000-4,000 respondents per country surveyed in 2020

Source: Statista Global Consumer Survey

statista

Growth in the number of medical apps downloaded during the COVID-19 pandemic by country in 2020



https://www.statista.com/statistics/1181413/medical-app-downloads-growth-during-covid-pandemic-by-country/

Ποιοι ασθενείς είναι πιο πιθανοί χρήστες?

Table 2. Prediction model for using the RD-app

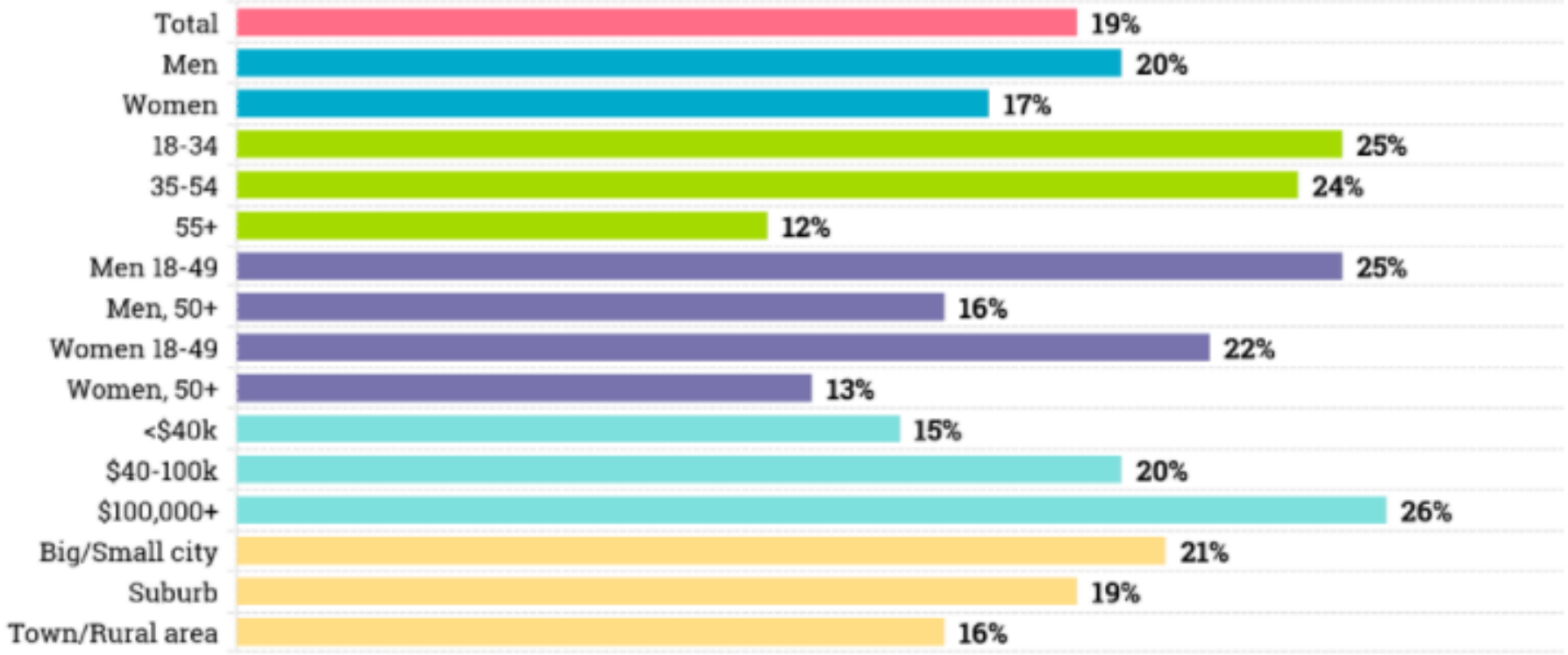
Used the RD-app	Uni variate			Multi variate		
	Coef.	95% CI	P value	Coef.	95% CI	P value
Age	-0.0008	-0.004-0.002	0.62			
Gender	0.11	0.008-0.22	0.03	0.09	0.01-0.20	0.1
Time since diagnosis	0.01	-0.03-0.06	0.60			
Employed	0.02	-0.08-0.12	0.42			
Education	-0.04	-0.16-0.07	0.42			
Self-efficacy	0.03	-0.29-0.09	0.31			
Expectations of RD-app	0.21	0.11-0.32	<0.001	0.20	0.10-0.31	<0.001
VAS global	-0.02	-0.05-0.0002	0.05			
SF-36 PCS	-0.003	-0.008-0.0005	0.08			
SF-36 MCS	-0.002	-0.008-0.002	0.25			
Partners in Health scale	-0.0005	-0.005-0.004	0.82			
No help needed	-0.11	-0.22- -0.007	0.03			

http://hdl.handle.net/1765/110269

Erasmus MC
Universitair Medisch Centrum Rotterdam

Percentage of US Adults Who Currently Use A Health App*

Sorted by Demographic Group, in November 2019



Published on MarketingCharts.com in January 2020 | Data Source: Gallup

Based on a survey of 1,015 US adults (18+) conducted in November 2019

**Figures show the percentage who currently track their health statistics using an app on their smartphone or tablet*

Table 1
Types of apps for patients with rheumatoid arthritis and their limitations

Mobile Application Type	Description	Limitations	Examples Available in 2019
Patient education	Provide information on rheumatoid arthritis and disease management	• Limited use • Education alone unlikely to improve patient outcomes	• ArthritisID (Arthritis Consumer Experts) • Rheumatoid Arthritis Treatment (Creative Live Apps)
Clinician tool	Clinical measurements, such as DAS, HAQ, Clinical Reference	• Unlikely to improve patient outcomes	• RheumaHelper (Modra Jagoda) • DAS Calculator (Greg Fiumara) • RAVE (DKBmed LLC)
Self-management	Measure variables, such as pain, medication use, sleep, mood, stiffness, diet, etc.	• Requires technology proficiency • Requires ongoing engagement with the app • Reporting fatigue	• Arthritis Power (Jeffrey Curtis), • LiveWithArthritis (eTreatMD), • TRACK and REACT (Arthritis Foundation)
Passive monitoring	Monitoring of behaviors through mobile device use, GPS, accelerometer, weather, etc.	• Newest technology with limited apps available • Limited variables that can be measured • May require additional wearables	• No RA or RMD related found Other examples • RADAR Passive RMT (The Hyve) • Ginger.io (company no longer using passive sensing)
Apps with gamification	Either add-on element or stand-alone app with gameplay element (rules of play, points, competition, etc) to improve RA	• No rheumatology apps in this space according to authors' knowledge • Research gap in negative elements of gamification	• No RA or RMD related found Other examples • Charity Miles • Pokémon Go (Niantic, Inc.)
Telemedicine	Rheumatologists meet with the patient over HIPAA-compliant app platform to deliver care	• Changes patient/physician rapport • No physical touch • Cannot collect clinician joint count or tender points	• No RA or RMD related found Other examples • Doctor on Demand • Teladoc • MDLive

Mobile Apps for Rheumatoid Arthritis

Opportunities and Challenges

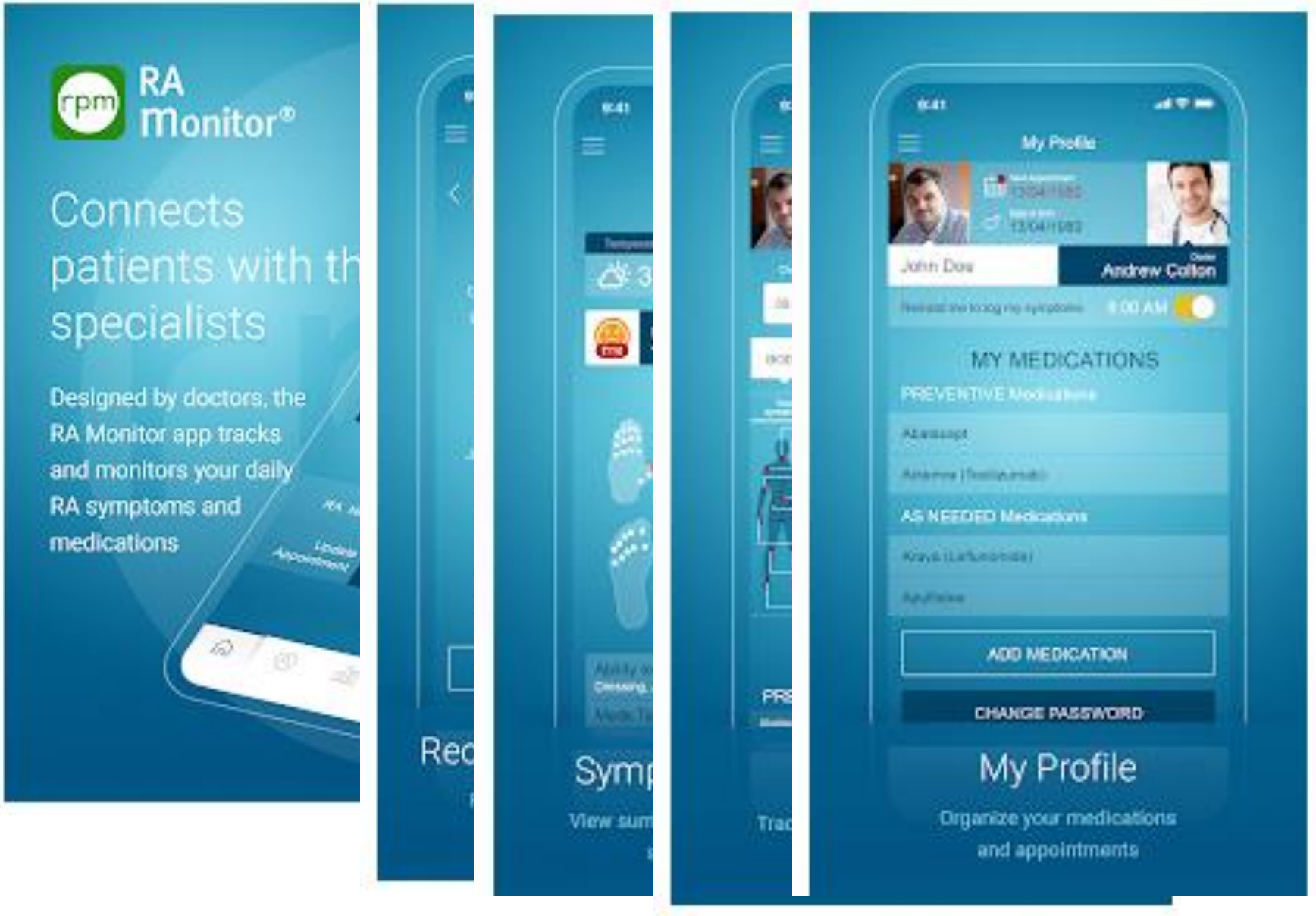
Rheum Dis Clin N Am ■ (2019) ■–■
https://doi.org/10.1016/j.rdc.2019.01.011

Table 1 Types of mobile apps for rheumatoid arthritis self-management

Type of application	Example app name	Description	Author
Apps designed for rheumatoid arthritis population			
RA disease education	Rheumatoid Arthritis Treatment	Education on RA symptoms, causes, and treatments	Creative Live Apps
RA lifestyle education	Rheumatoid Arthritis	Nutritional recommendations to reduce RA Sx	Personal Remedies LLC
RA community connection	My RA Team	Social network and support for RA. Tips to manage life, and insight into treatments.	My Health Teams
Rheumatologist connection	RA Monitor	RA tracker, medication tracker, connect to your specialist or RA navigator between in-person visits	RPM Healthcare LLC
RA self-monitoring and management	Rheumatoid Arthritis Diary	Track symptoms, warning signs, triggers, treatments, appointments, and other details.	HomeInSync LLC
Non-RA self-management apps that can be used by RA population			
Medication management	Medisafe Medication Management	Track medicines, doses, times, set reminders	Medisafe, Inc.
Pain management	Manage My Pain	Record, reflect, track symptoms and medications, highlight trends	Managing, Inc.
Lifestyle management	MyFitnessPal	Nutrition and activity tracking, lifestyle education	Under Armour
Other chronic disease apps	Emilyn-My MS Companion	Track symptoms, identify triggers, set medication and appointment reminders	Breakthrough X Health GmbH

Curr Rheumatol Rep (2021) 23: 2

RA monitor


RA Monitor®
Connects patients with th specialists
Designed by doctors, the RA Monitor app tracks and monitors your daily RA symptoms and medications
My Profile
John Doe
Andrew Colton
MY MEDICATIONS
AS NEEDED Medications
ADD MEDICATION
CHANGE PASSWORD
My Profile
Organize your medications and appointments

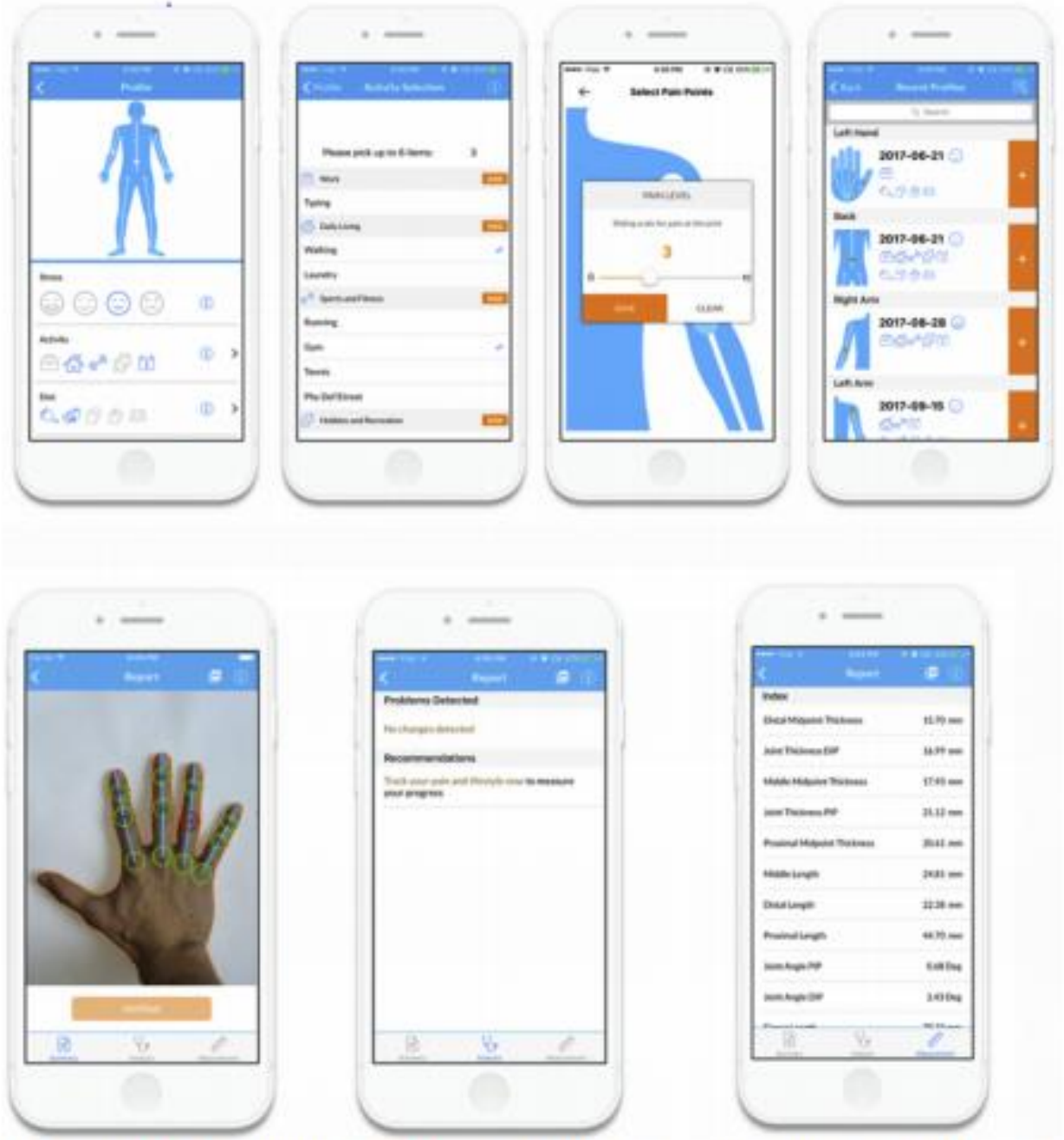


Fig. 2. The Live With Arthritis app allows patients to track information about their RA and changes to their hand using a novel optical imaging feature.

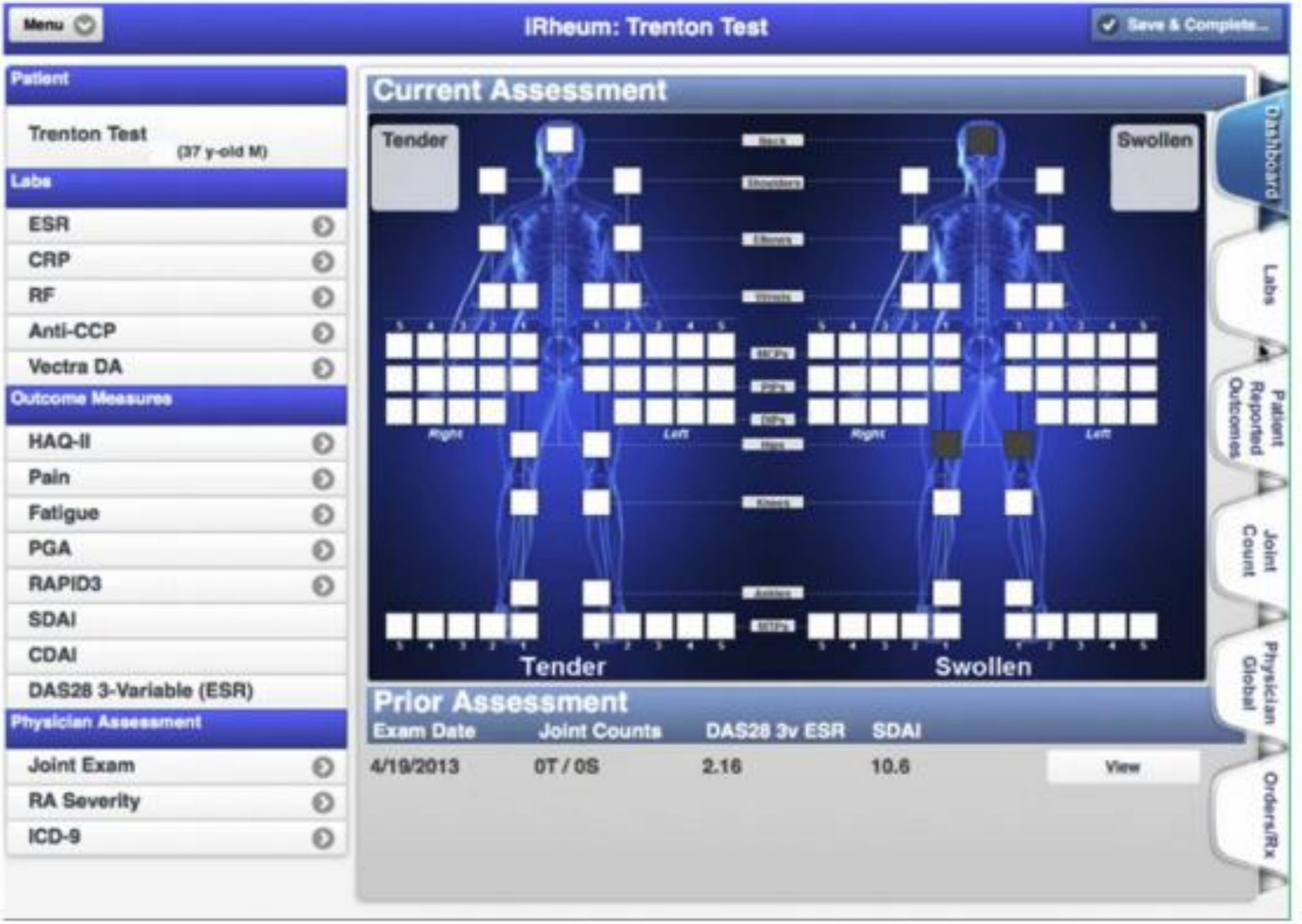
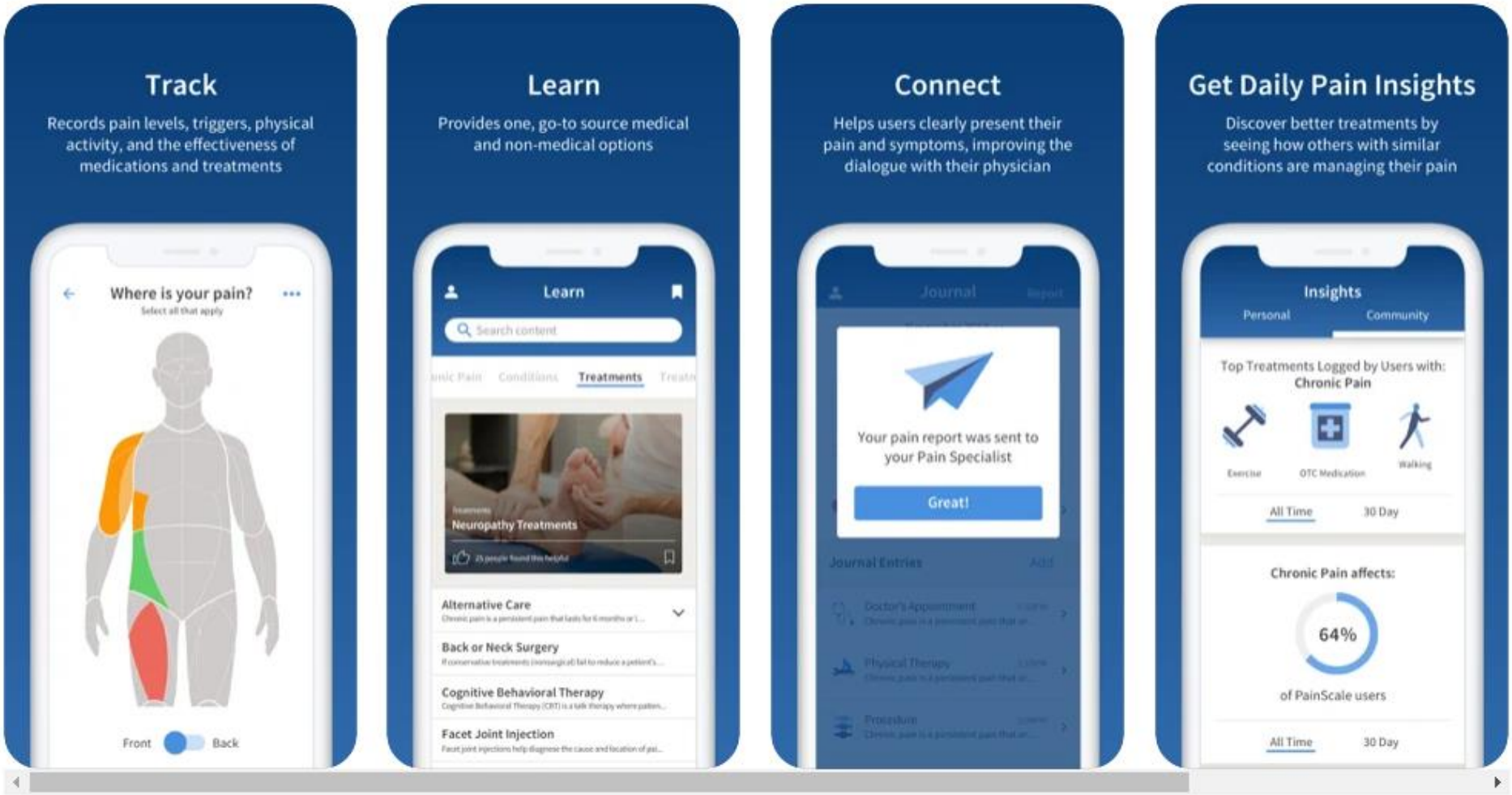


Fig. 1. iRheum tablet-based app to improve recording of clinical measures.

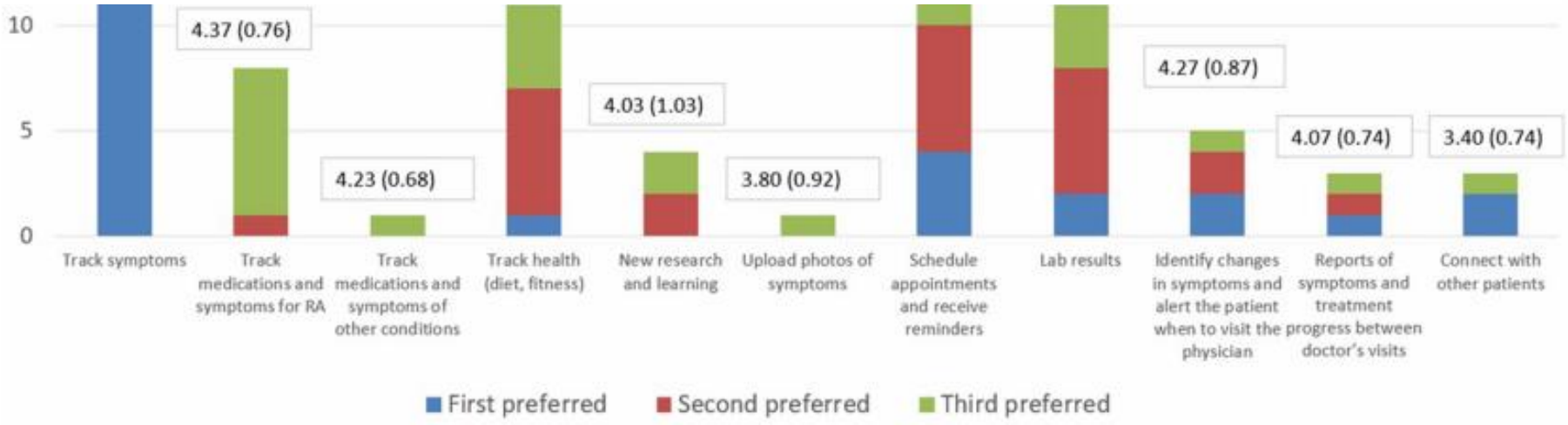
Pain scale-Pain tracker diary

iPhone Screenshots



Προσδοκίες ασθενών

Conclusion: RA patients appear to prefer task support features in an RA app, notably symptom tracking, appointment scheduling, and reminders, over other features such as those related to dialogue support and social support. The choice of whether an RA app will be free or based on a subscription, pay-per-service, or one-time purchase model may also play a role in eventual adoption. Similarly, physician recommendation appears to influence patients' decision to use an RA app as well as their willingness to pay a subscription for an app.



Patient Perspectives on a Digital Mobile Health Application for RA. *Open Access Rheumatology: Research and Reviews* 2021:13 63–71

JMIR mHealth and uHealth
mhealth.jmir.org

Needs, Experiences, and Views of People With Rheumatic and Musculoskeletal Diseases on Self-Management Mobile Health Apps: Mixed Methods Study

JMIR Mhealth Uhealth. 2020 Apr; 8(4): e14351.

Aurelie Najm, MD, Heidi Lempp, PhD, [...], and Elena Nikiphorou, MBBS/BSC,

Methods

The study used a mixed methods approach: (1) an initial qualitative phase via a patient focus group in the UK and (2) a survey disseminated through national organizations for patients with RMDs across European countries, the United States, Canada, and Australia.

Results

The focus group included six patients with life-long musculoskeletal conditions. Half had used a self-management app at least once. The use of existing apps was reported as time-consuming due to a lack of functionality. The need for bespoke apps was voiced by all participants. Among 424 patients across European countries, the United States, Canada, and Australia, the main age group was 45 to 54 years (122/424, 28.7%), and 86.8% (368/424) were women. Half of the respondents were aware of the existence of apps to support self-management of their RMDs (188/355, 53%), with 42% (79/188) of them currently using such devices. Patients were mostly interested in an app to self-monitor their health parameters (259/346, 74.9%) and disease activity (221/346, 63.9%) or communicate directly with their health care provider (200/346, 57.8%).

Conclusions

Patients considered that using an app could help them to self-manage their RMD condition if it was tailored to their needs and co-developed with health professionals. The development of such apps will require standardization and regular quality control.

Keywords: mHealth, mixed methods, mobile health apps, rheumatic and musculoskeletal disease, smartphone, apps, rheumatoid arthritis, digital health, mobile health

Introduction

JMIR mHealth and uHealth
mhealth.jmir.org

German Mobile Apps in Rheumatology: Review and Analysis Using the Mobile Application Rating Scale (MARS)

JMIR Mhealth Uhealth. 2020 Apr; 8(4): e14351.

Johannes Kni

Results

In total, 128 a
Store, respect
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criteria, which
targeting patie
or rheumatic d
apps and (2) c
and 7 apps ad
and safety of a
developers of
a patient organization. This app had the highest overall MARS score (4.19/5). Three out of 9 patient apps featured validated questionnaires. The median overall MARS score was 3.85/5, ranging from 2.81/5 to 4.19/5. One patient-targeted and one physician-targeted app had MARS scores >4/5. No significant rater gender or platform (iOS/Android) differences could be observed. The overall correlation between app store ratings and MARS scores was low and inconsistent between platforms.

Conclusions

To our knowledge, this is the first study that systematically identified and evaluated mobile apps in rheumatology for patients and physicians available in German app stores. We found a lack of supporting clinical studies, use of validated questionnaires, and involvement of academic developers. Overall app quality was heterogeneous. To create high-quality apps, closer cooperation led by patients and physicians is vital.

JMIR Mhealth Uhealth. 2019 Nov; 7(11): e14730. PMCI
Published online 2019 Nov 26. doi: 10.2196/14730 I

Mobile Health Apps for Self-Management of Rheumatic and Musculoskeletal Diseases: Systematic Literature Review

Results

Of 562 abstracts, 32 were included in the analysis. Of these 32 abstracts, 11 (34%) referred to an app linked to a connected device. Most of the apps targeted rheumatoid arthritis (11/32, 34%). The top three aspects addressed by the apps were pain (23/32, 71%), fatigue (15/32, 47%), and physical activity (15/32, 47%). The development process of the apps was described in 84% (27/32) of the articles and was of low to moderate quality in most of the cases. Despite most of the articles having been published within the past two years, only 5 apps were still commercially available at the time of our search. Moreover, only very few studies showed improvement of RMD outcome measures.

Conclusions

The development process of most apps was of low or moderate quality in many studies. Owing to the increasing RMD patients' willingness to use mHealth apps for self-management, optimal standards and quality assurance of new apps are mandatory.

Table 1

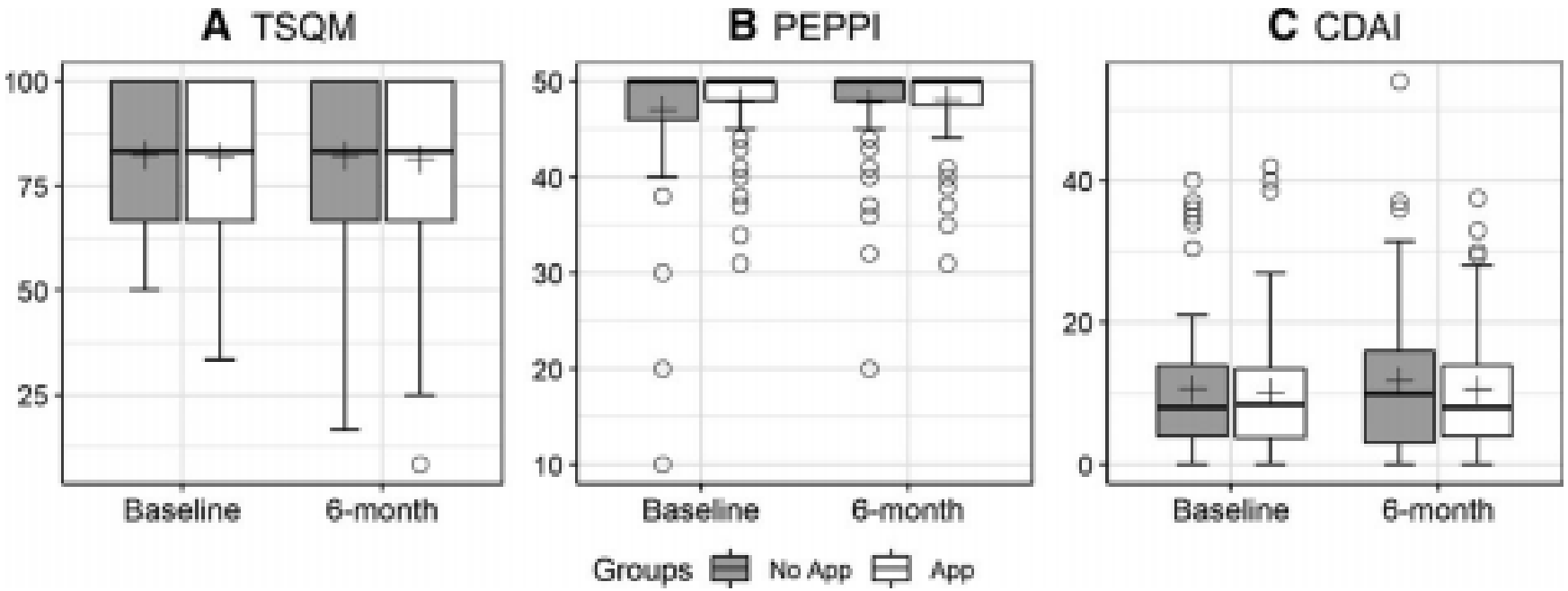
Featu			
Featu			
Pain			disease
Fatigu			
Physi			
Sleep			
Disea			
Healt			
Mood			
Globa			
Morni			
Depre			
Medication/adherence	1 (3)	3 (9)	JIA, OA, and fibromylagia
Tender joint count	1 (3)	3 (9)	JIA
Gait	4 (13)	0 (0)	—[d]
Social support	0 (0)	2 (6)	JIA
Work	0 (0)	2 (6)	JIA
Grip	1 (3)	0 (0)	—

JMIR Mhealth Uhealth. 2020 Apr; 8(4): e14351.

Recommendations for developers of mobile rheumatology apps
1. Inclusion of patients, rheumatologists and researchers in the app development process
2. Randomised controlled trials to evaluate cost-effectiveness, safety and usability
3. Inclusion of app features that minimize patients' focus on their disease and limitations
4. Transparency concerning involvement of pharmaceutical companies and other industries
5. Safe and easy export function to share data with health care providers and researchers
6. Inclusion of correct and uptodate therapeutic and diagnostic guidelines
7. App availability in Google Play and Apple app store
8. Inclusion of videos, audio files and images
9. Development of apps for rare diseases
10. Exclusion of advertisements

Outcomes of a Mobile App to Monitor Patient-Reported Outcomes in Rheumatoid Arthritis: A Randomized Controlled Trial

Arthritis & Rheumatology
Vol. 73, No. 8, August 2021, pp 1421–1429



rated their likelihood of recommending the app as ≥7 of 10. Of the 11 physicians who completed the exit survey, 73% agreed/strongly agreed that they wanted to continue offering the app to patients.

Conclusion. A mobile app designed to collect ePRO data on RA symptoms did not significantly improve patient satisfaction or disease activity compared to care coordination alone. However, both patients and physicians reported positive experiences with the app.

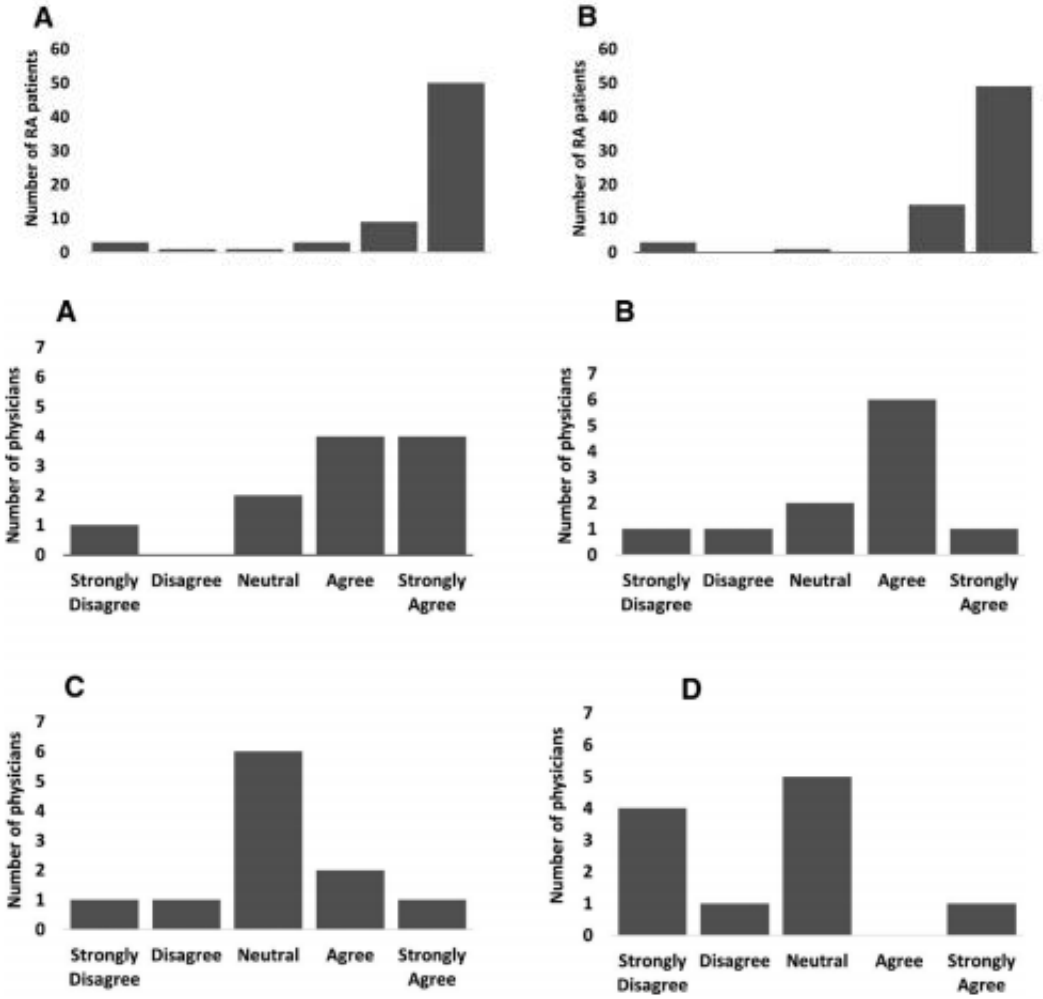


Figure 5. Physician responses to a survey regarding physician satisfaction with the mobile application (app). Of the 22 physicians who had patients in the intervention group, 11 (50%) completed the survey. Physicians were asked whether they would like to continue offering the app (**A**), whether the app improved management of disease activity (**B**), whether the app led to earlier changes in disease-modifying antirheumatic drugs (DMARDs) (**C**), and whether the app led to an increase in workload (**D**).

Impact of assessing p outcomes with mobil provider interaction

Table 5 Unadjusted rates of outcomes

Patient–provider interaction analyses (n=2106)	
SDM†	
Physician disease tracking†	
Disease management analyses (n=1695	
Low disease activity at last visit	
Improved disease activity	
Treatment intensification	

*χ^2 test of difference compared with no app use
†Maximum rating of physician effort in SDM or
and figure 1 for more details on the survey ques
SDM, shared decision making.

What does this study add?

- This is one of the first studies to evaluate the effect of apps measuring PROs on quality of care in rheumatic diseases in an observational setting.
- Only 55% of app users reported discussing their app results with their rheumatologist.
- Patients who used an app and discussed the results with their rheumatologist during clinic visits reported increased physician engagement in shared decision making and following the course of their disease over time, compared with non-app users. However, patients who used an app without discussing the results did not report improvements in these aspects of care relative to non-app users.

EULAR points to consider for the development, evaluation and implementation of mobile health applications aiding self-management in people living with rheumatic and musculoskeletal diseases

RMD Open 2019;5:e001014

Overarching principles	Agreement (%)
Apps* for self-management support the health, well-being and empowerment of people living with RMDs.	100
Apps* require an overarching conceptual framework, which defines the target population and purpose of the app.	100
User privacy and safety are fundamental considerations for all apps* aimed at people living with RMDs.	100

PtC	Oxford level of evidence	Strength of statement	Level of agreement Mean (SD)
1. The information content in self-management apps should be up to date, scientifically justifiable, user acceptable and evidence based where applicable.	Level 5	D	9.8 (0.4)
2. Apps should be relevant and tailored to the individual needs of people with RMDs.	Level 5	D	9.7 (0.5)
3. The design, development and validation of self-management apps should involve people with RMDs and relevant healthcare providers.	Level 5	D	9.8 (0.6)
4. There should be transparency on an app's developer, funding source, content validation process, version updates and data ownership.	Level 5	D	9.9 (0.3)
5. Data collection as part of apps must adhere to all applicable regulatory frameworks, particularly data protection.	Level 5	D	9.9 (0.3)
6. Apps must not result in physical or emotional harm to people with RMDs.	Level 5	D	9.3 (1)
7. Apps could facilitate patient–healthcare provider communication and contribute to electronic health records or research.	Level 5	D	9.4 (0.9)
8. App design should consider accessibility of people with RMDs across ages and abilities.	Level 5	D	9.4 (0.9)
9. If a social network is an important component of an app, structures should be in place to ensure appropriate content moderation.	Level 5	D	9.5 (0.6)
10. The rheumatology community should consider the cost-benefit balance of apps before endorsement and/or promotion.	Level 5	D	8.9 (1.3)

RMD Open 2019;5:e001014

Συμπερασματικά…

- Η ψηφιακή τεχνολογία και ειδικότερα τα apps των smartphones μπορούν να έχουν σημαντικό ρόλο στην αυτοδιαχείριση των ασθενών
- Φροντίδα ασθενών – εκπαίδευση – έρευνα
- Χρειάζεται να πληρούν προϋποθέσεις λειτουργικότητας και ευχρησίας
- Έλλειμμα στην ελληνική πραγματικότητα:
  πεδίον δόξης λαμπρόν…

Σας ευχαριστώ πολύ