III. Medizinische Klinik und Poliklinik
Nephrologie, Rheumatologie und Endokrinologie

TELEMEDIZIN: ERFAHRUNGEN AUS RHEUMATOLOGIE

DR. MARTIN KRUSCHE

Universitätsklinikum Hamburg-Eppendorf

DISCLOSURES

Vortrags-und Beratungshonorare:

FOMF, Abbvie, UCB, Pfizer, Sobi, Novartis, BMS, Amgen, Sanofi, BMS, Janssen, Medac, GSK,

Forschungsförderung:

Sobi, Novartis, Abbvie, Sanofi

Aktive wissenschaftliche Mitgliedschaften:

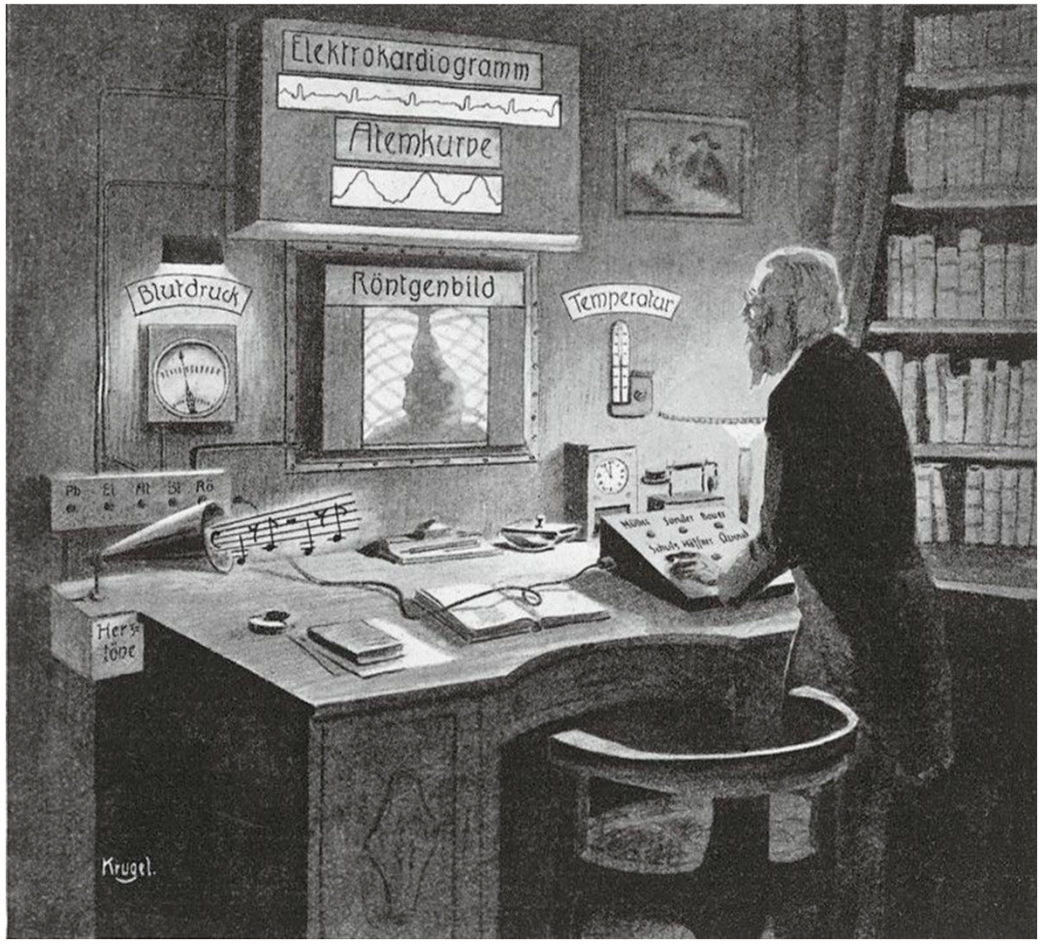
DGRh-Kommission: Digitale Rheumatologie, Aus-und Weiterbildung, studentische Lehre, Liason, Genetik;

DGRh-Leitlinie AOSD, kardiovaskuläre Komorbiditäten

DGIM-Kommission Digitale Medizin

EULAR: Task Force Remote Care, Task Force Recommandations for Behcet Syndrome, Educational Subcommitee

ÜBER 100 JAHRE TELEMEDIZIN



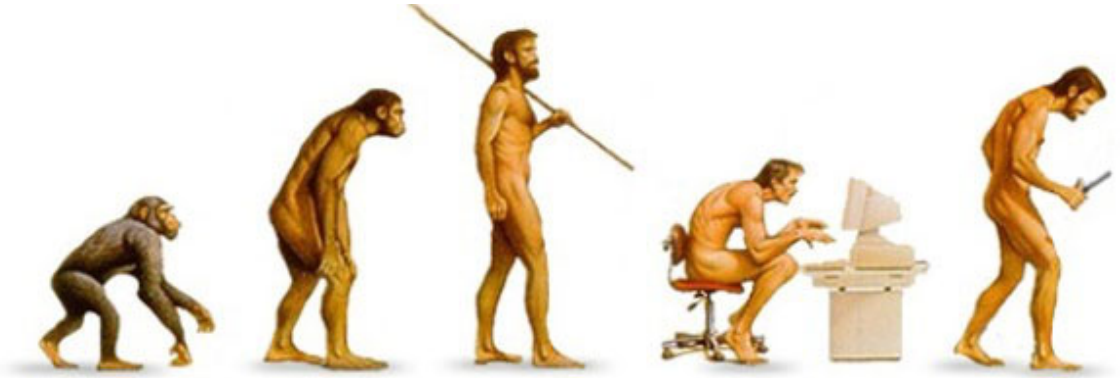
Arzt der Zukunft

Fritz Kahn (1924)

Telemedizin wird allgemein definiert als die **Erbringung medizinischer Leistungen über räumliche Distanzen hinweg,** unter Nutzung **digitaler Informations-und Kommunikationstechnologien**.

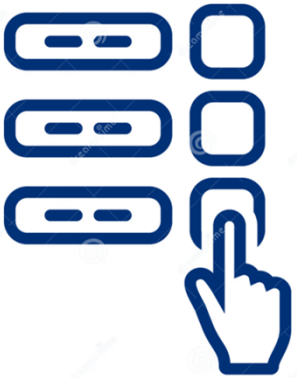
100 JAHRE SPÄTER- DIE TREIBER DER TELEMEDIZIN

https://as.tufts.edu/psychology/sites/g/files/lrezom206/files/styles/embedded_medium/public/2020-12/students-mask-small.jpg?itok=KXcgfByB



https://i.pinimg.com/originals/71/d1/69/71d1691f04d37eaa07e8de1facecd24f.jpg

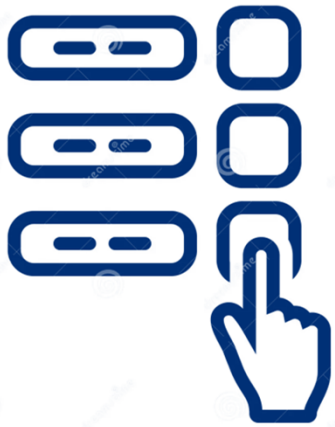
Haben Sie bereits selbst telemedizinisch gearbeitet?



- Ja, regelmäßig
- Nein
- Teilweise / in einzelnen Situationen

TELEMEDIZIN IN DER NEPHROLOGIE 2025

Für welchen Anteil Ihrer Patient:innen halten Sie telemedizinische Ansätze für sinnvoll?“



0–10 %
11–25 %
26–50 %
51–75 %
Mehr als 75 %

DIGITALE TRIAGIERUNG UND KRANKHEITSMONITORING

https://www.thestem.com/wp-content/uploads/2018/05/digital-health.png

DIGITALE TRIAGIERUNG

Berlin Alexanderplatz 2021

Rheumatology International (2022) 42:2167–2176
https://doi.org/10.1007/s00296-022-05202-4

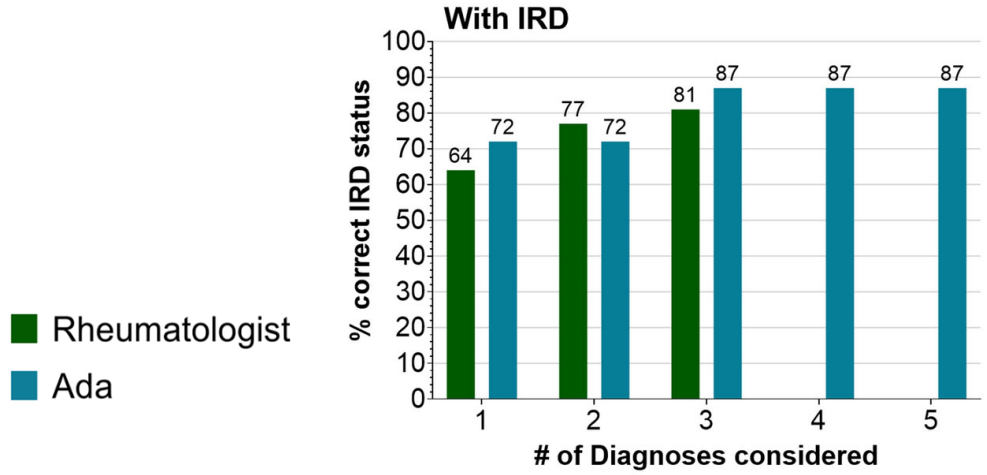
Rheumatology
INTERNATIONAL

OBSERVATIONAL RESEARCH

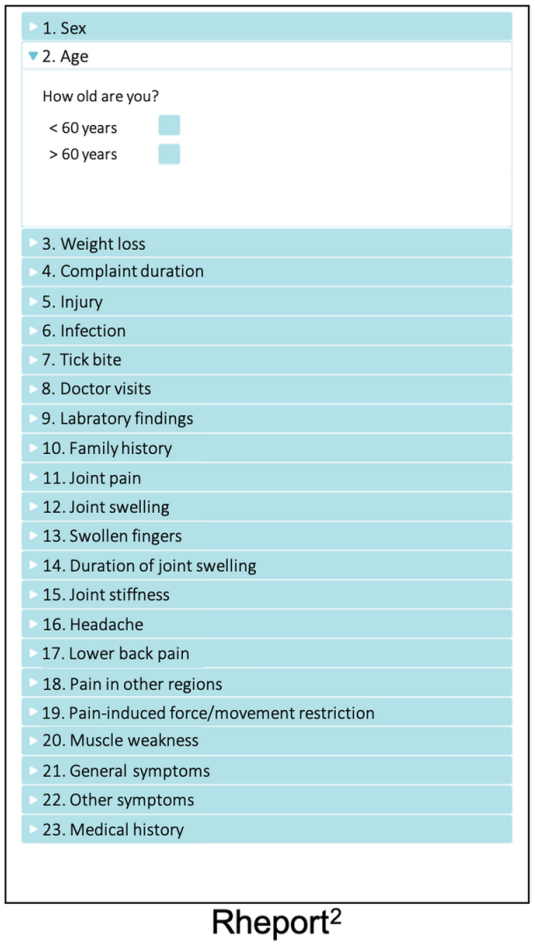
Check for updates

Comparison of physician and artificial intelligence-based symptom checker diagnostic accuracy

Markus Gräf[1,2] · Johannes Knitza[1,2,3] · Jan Leipe[4] · Martin Krusche[5] · Martin Welcker[6] · Sebastian Kuhn[7] · Johanna Mucke[8] · Axel J. Hueber[1,9] · Johannes Hornig[10] · Philipp Klemm[11] · Stefan Kleinert[12] · Peer Aries[13] · Nicolas Vuillerme[3,14,15] · David Simon[1,2] · Arnd Kleyer[1,2] · Georg Schett[1,2] · Johanna Callhoff[16,17]



DIGITALE TRIAGIERUNG



Rheport²

RhePort.de

Schnelle Hilfe bei Rheuma

von der Decken et al P. **RhePort 1.3 enhances early identification of inflammatory rheumatic diseases: a prospective study in German rheumatology settings.** Rheumatol Int. 2025 Apr 28;45(5):129.

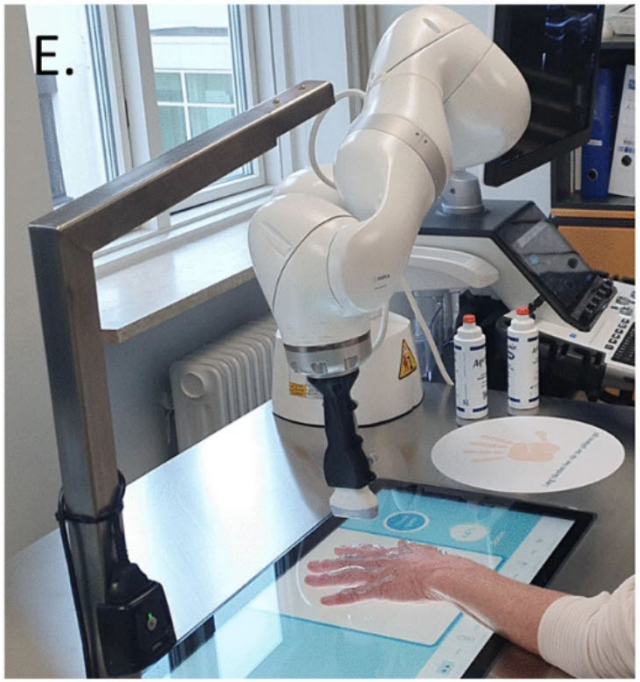
SMARTPHONE ZUR GELENKUNTERSUCHUNG

SMARTPHONE ZUR GELENKUNTERSUCHUNG

Sensitivität: 88%
Spezifität: 75%

Hügle T et al. *Digit Biomark*. 2022

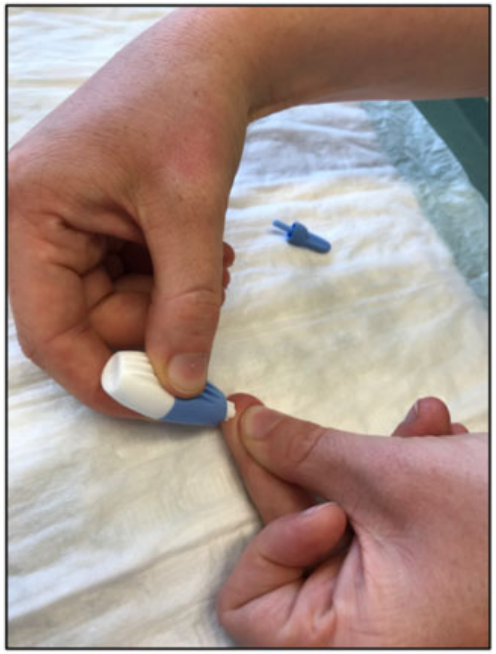
KI GESTEUERTER ULTRASCHALLROBOTER



Frederiksen B et al. *Advances in rheumatology*. 2022
Christensen A et al. *Ann Rheum Dis*. 2020

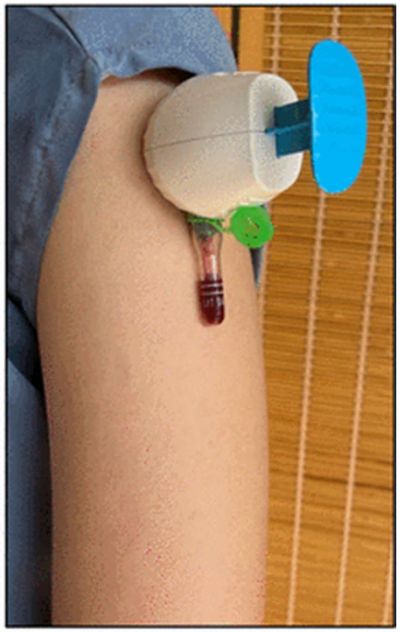
HOT TOPIC: PATIENT SELF-SAMPLING

Probengewinnung jederzeit & überall



Fingerbeere

Tasso

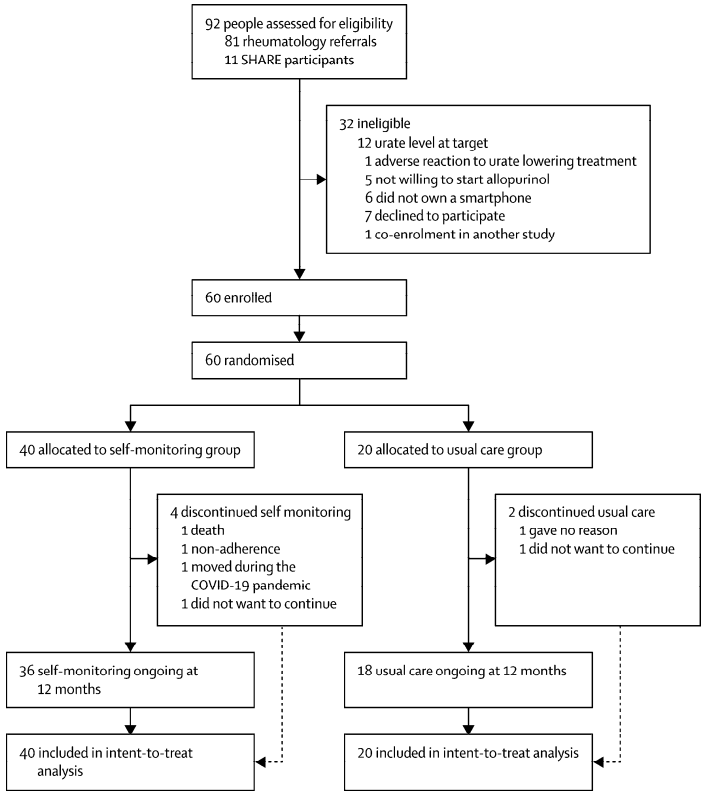


TAP II

Knitza J et al. *Art Res Ther*. 2022;
Zarbl J, Krusche et al *RMD Open*. 2022

SELBSTTESTUNG + INTERVENTION

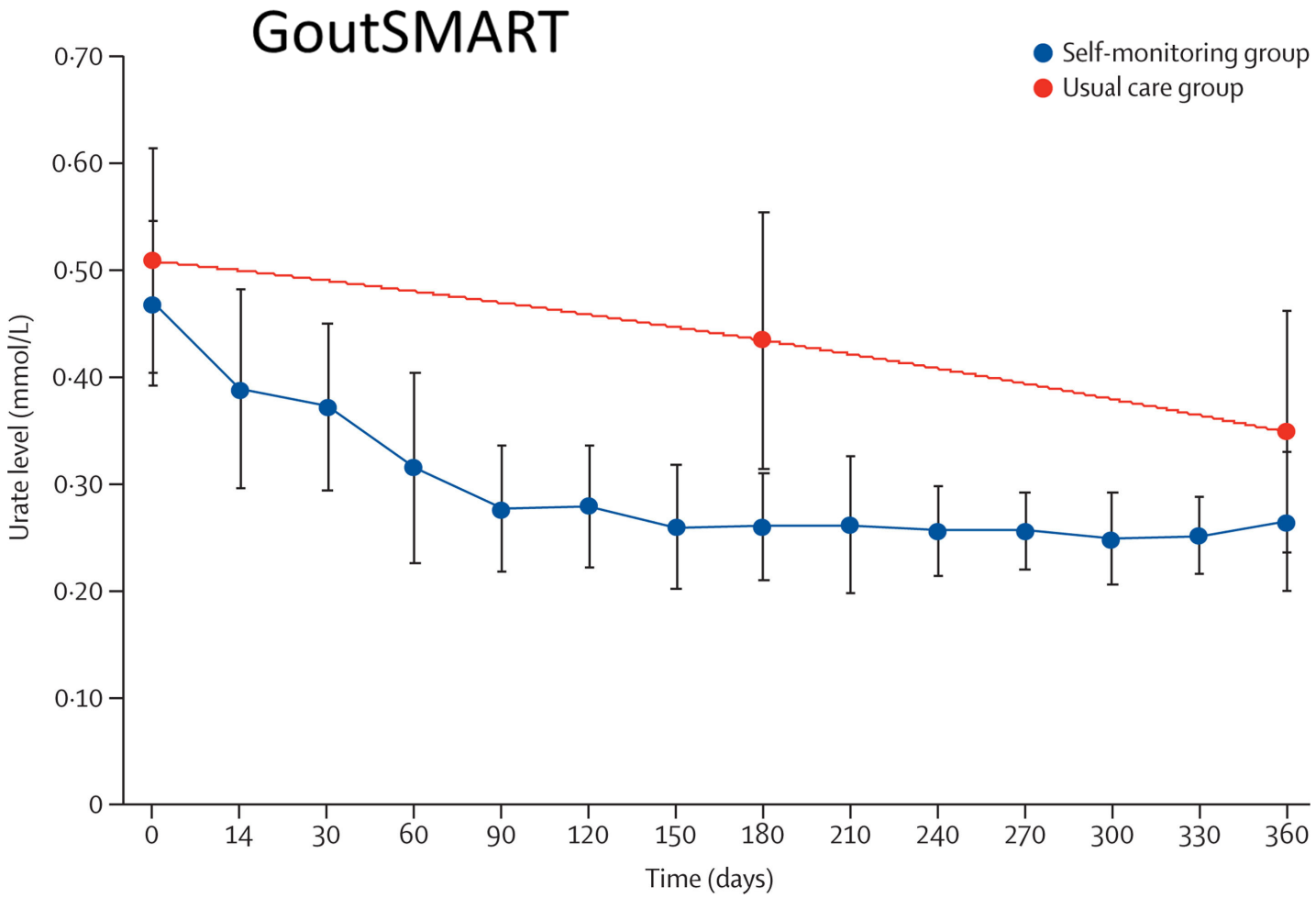
GoutSMART



https://de.aliexpress.com/item/1005004967354528.html?gatewayAdapt=glo2deu

Riches P. et al., Lancet Rheumatology (2022)

SELBSTTESTUNG + INTERVENTION



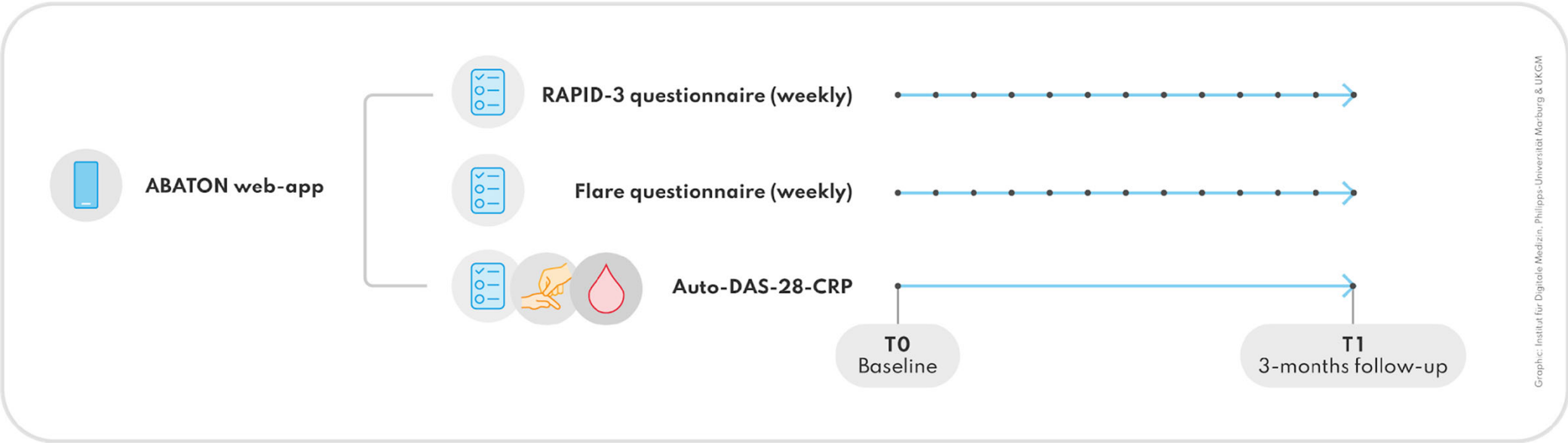
> 0,30 mmol/L
24 weeks

73% vs 15%

Riches P. et al., Lancet Rheumatology (2022)

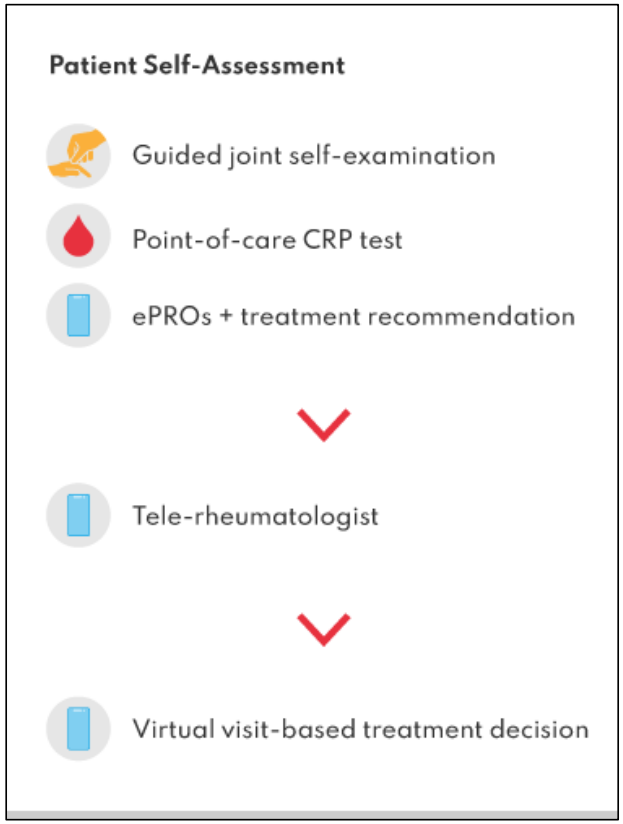
TELEMONITORING RA- *TELERA-TRIAL*

- prospektive-multizentrische Studie
- 120 RA-Patient:innen



Knitza J, Krusche M. *EULAR Rheumatology Open 2025*

TELEMONITORING RA



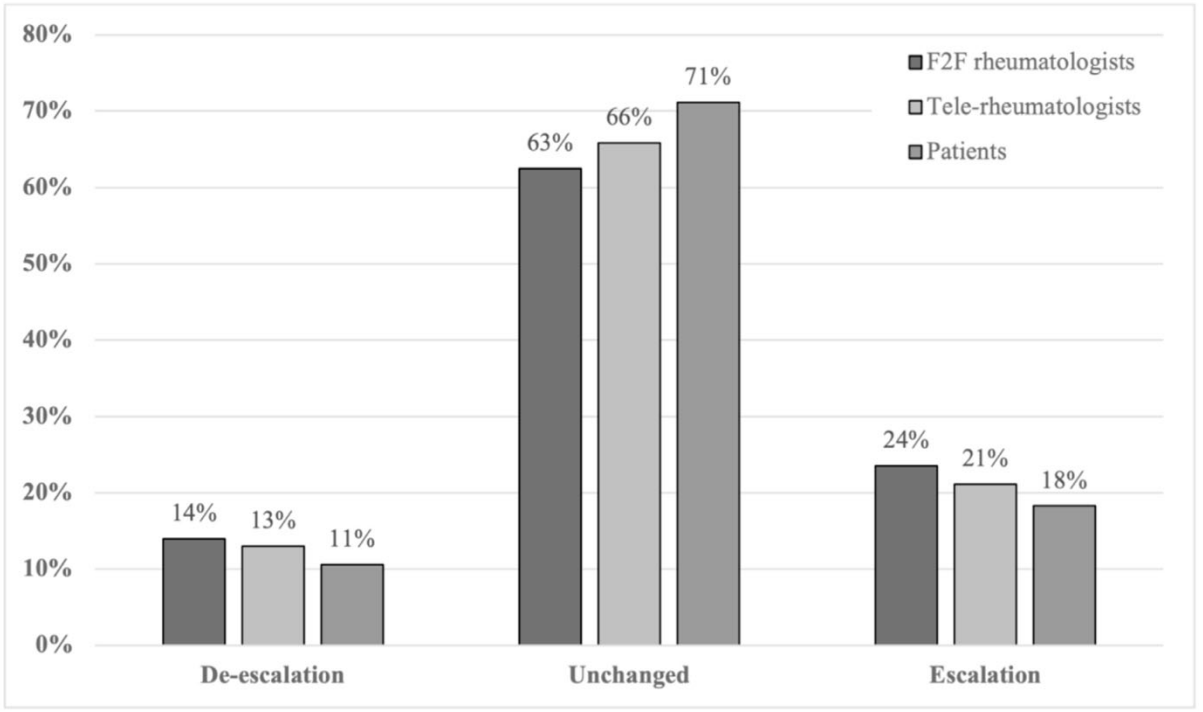
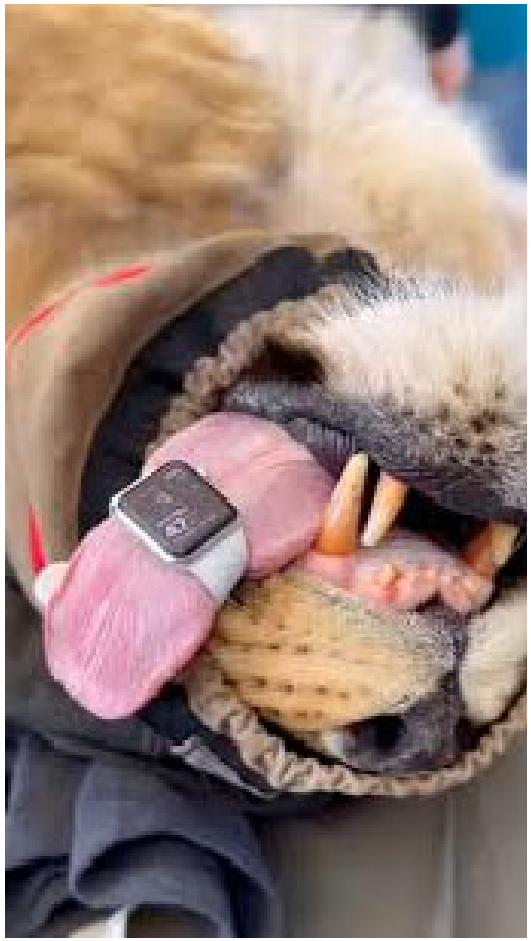
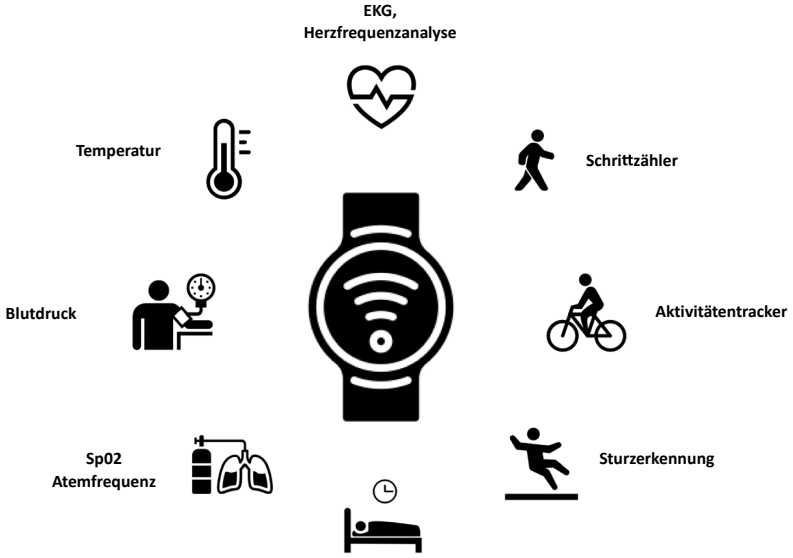


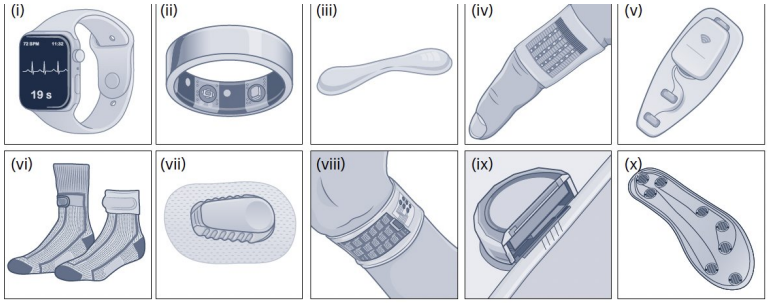
Figure 2. Proportion of treatment decisions made by face-to-face (F2F) rheumatologists, tele-rheumatologists, and patients.

Knitza J ,Krusche M. *EULAR Rheumatology Open 2025*

NEUE OPTIONEN FÜR DIGITALES KRANKHEITSMONITORING

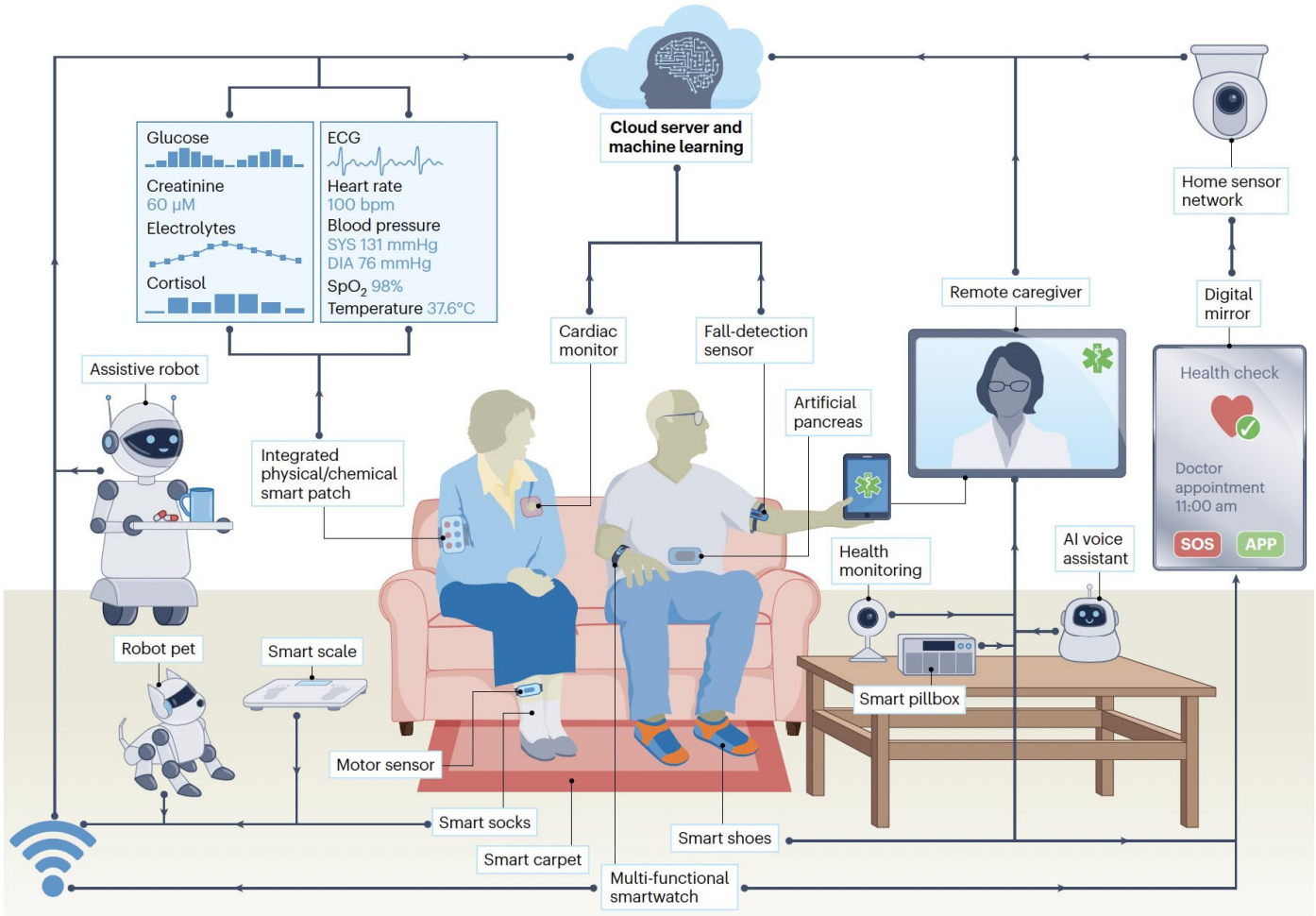






Xiong T,. ; Krusche M. ZfR (2023)
Chen, C., Ding, S. & Wang, J. *Nat Med* (2023).

DIGITALE KRANKHEITSMONITORING



Chen, C., Ding, S. & Wang, J. Digital health for aging populations. *Nat Med* (2023).

MONITORING IN DER RHEUMATOLOGIE

62-jährige Pat. ED GPA (schwere pulmonale und neuronale Mitbeteiligung)

Komorbiditäten: art. Hypertonus, DM II, Adipositias

Hallo Herr Krusche. Wenn es klappt bin ich [redacted] In Bad Bramstedt..
Mir geht es in Ruhe gut , lediglich das rechte Knie ist weiterhin etwas geschwollen.
Der Tipp mit der Swatchuhr war gut. Die Sauerstoffsättigung ist Nachts oft unter 90%. Die Belastungsgrenze ist sehr niedrig aber das solll ja besser werden jetzt in der AHB. Wann soll ich das Kortison weiter reduzieren.? Nehme jetzt 4 Tage nur 20mg. Ihnen ein schönes Wochenende
Halte die über die Werte der Diagnostik auf dem Laufenden.

DIGITALES RANKHEITSMONITORIERUNG

American College of Rheumatology
Empowering Rheumatology Professionals

Arthritis Care & Research
Vol. 71, No. 10, October 2019, pp 1336–1343
DOI 10.1002/acr.23768

Detection of Flares by Decrease in Physical Activity, Collected Using Wearable Activity Trackers in Rheumatoid Arthritis or Axial Spondyloarthritis: An Application of Machine Learning Analyses in Rheumatology

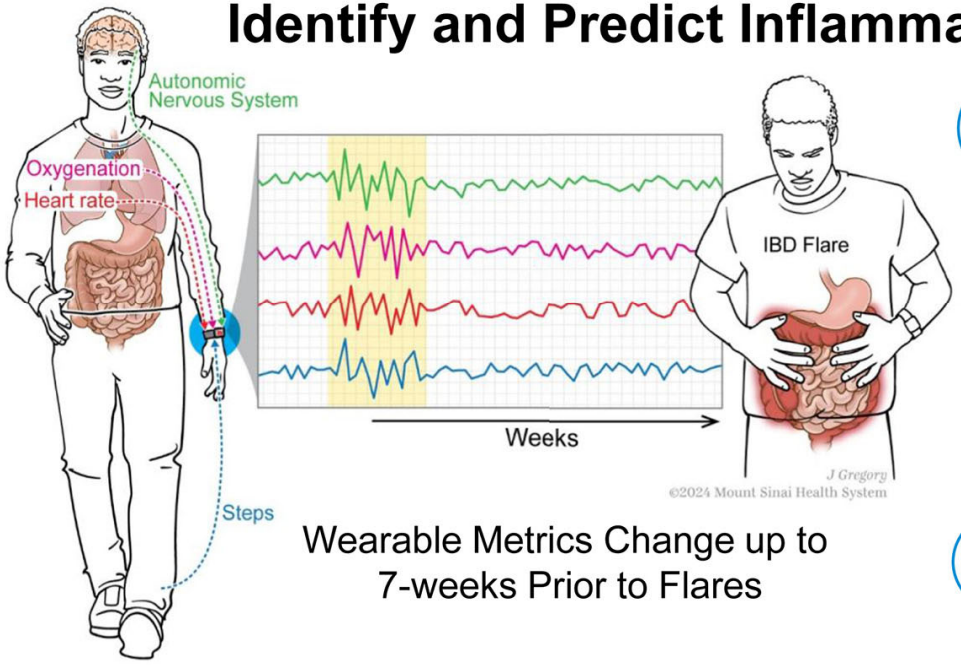
Laure Gossec,[1] Frédéric Guyard,[2] Didier Leroy,[2] Thomas Lafargue,[2] Michel Seiler,[3] Charlotte Jacquemin,[1] Anna Molto,[4] Jérémie Sellam,[5] Violaine Foltz,[1] Frédérique Gandjbakhch,[1] Christophe Hudry,[6] Stéphane Mitrovic,[1] Bruno Fautrel,[1] and Hervé Servy[7]

MACHINE LEARNING DETECTION OF FLARES

155 Patienten, 3 Monate
Schrittzahlung und Selbsteinschätzung
96% Sensitivität und 97% Spezifität Flare Prediction (mittels Machine Learning)

DIGITALES KRANKHEITSMONITORIERUNG

Physiological Data Collected From Wearable Devices Identify and Predict Inflammatory Bowel Disease Flares



Wearable Metrics Change up to 7-weeks Prior to Flares

- 309 participants across 36 states
- Circadian patterns of heart rate variability identify inflammatory and symptom flares
- Heart rate and resting heart rate are higher during inflammatory and symptom flares
- Lower daily steps during inflammatory flares
- Wearable metrics identify subclinical inflammation and whether inflammation is present during symptom flares

Gastroenterology

Hirten P et al Gastroenterology. 2025 May;168(5):939-951.e5. doi:

DIGITALE THERAPIE

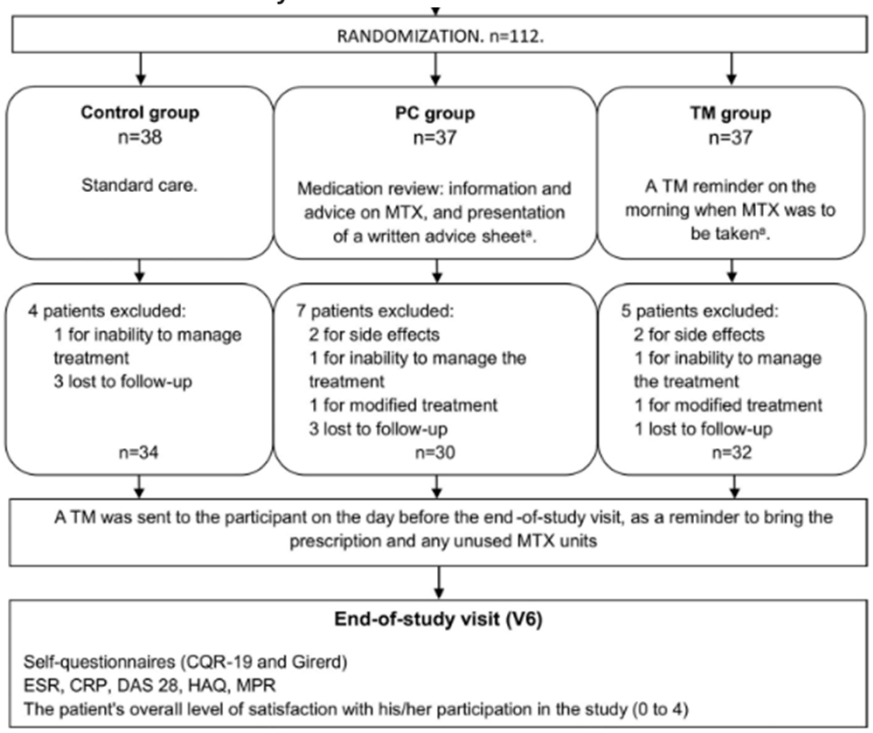
PROBLEM: ADHÄRENZ

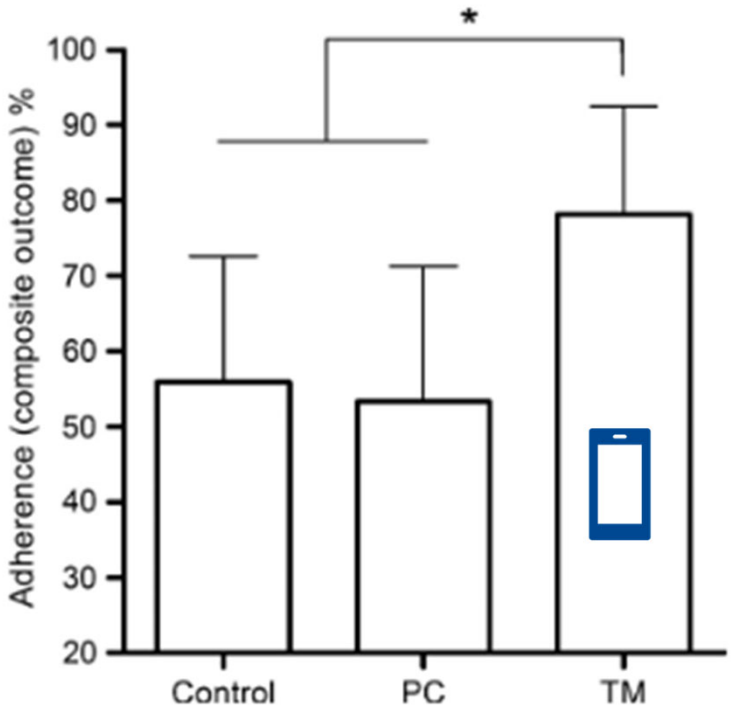
SMS REMINDER

Arthritis Care & Research
American College of Rheumatology

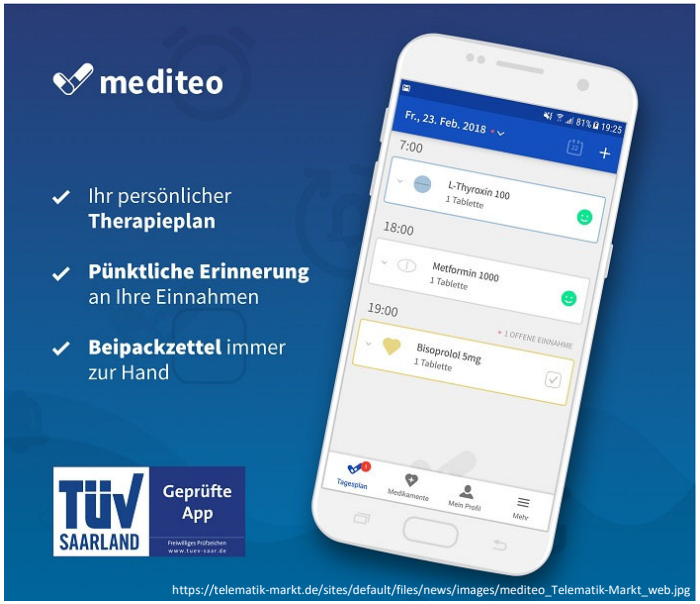
Original Article

Mobile Phone Text Messages and Effect on Treatment Adherence in Patients Taking Methotrexate for Rheumatoid Arthritis: A Randomized Pilot Study





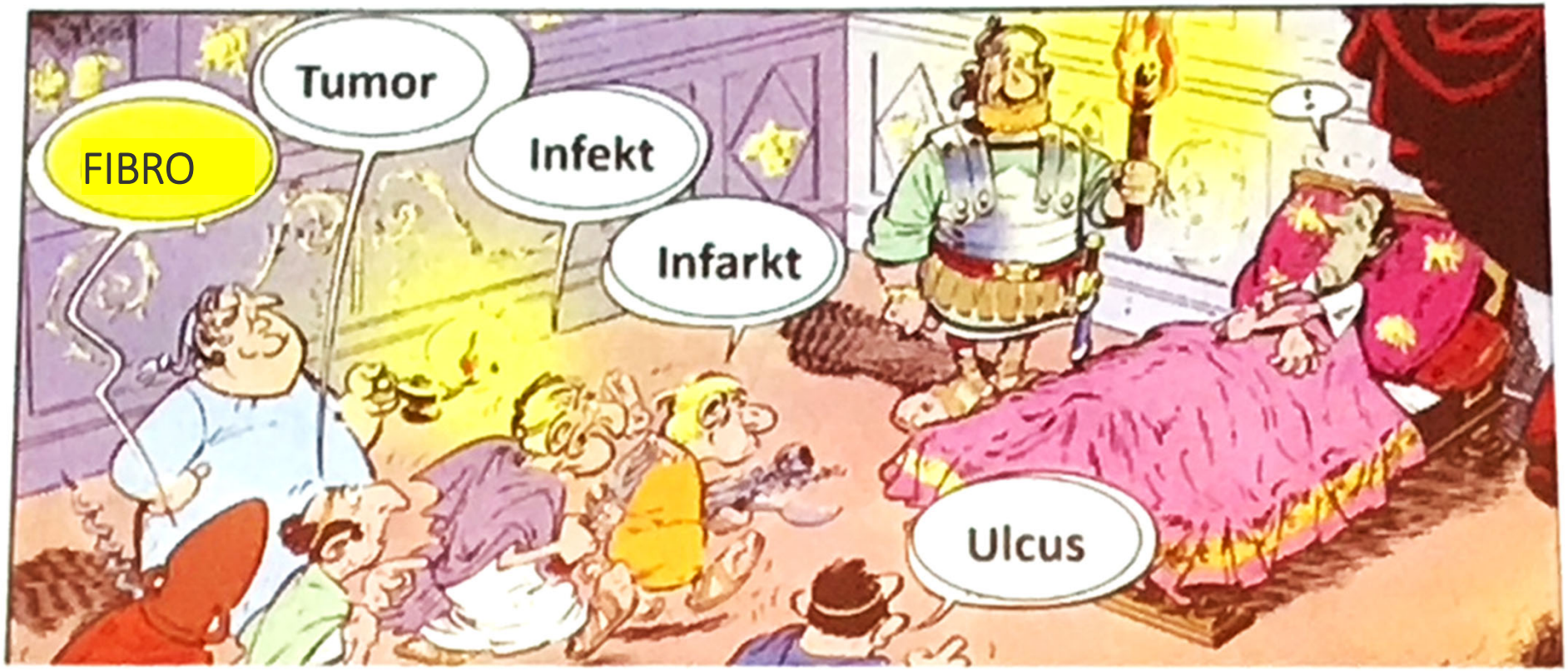
EINFACHE INTERVENTION: DIGITALE ERINNERUNG



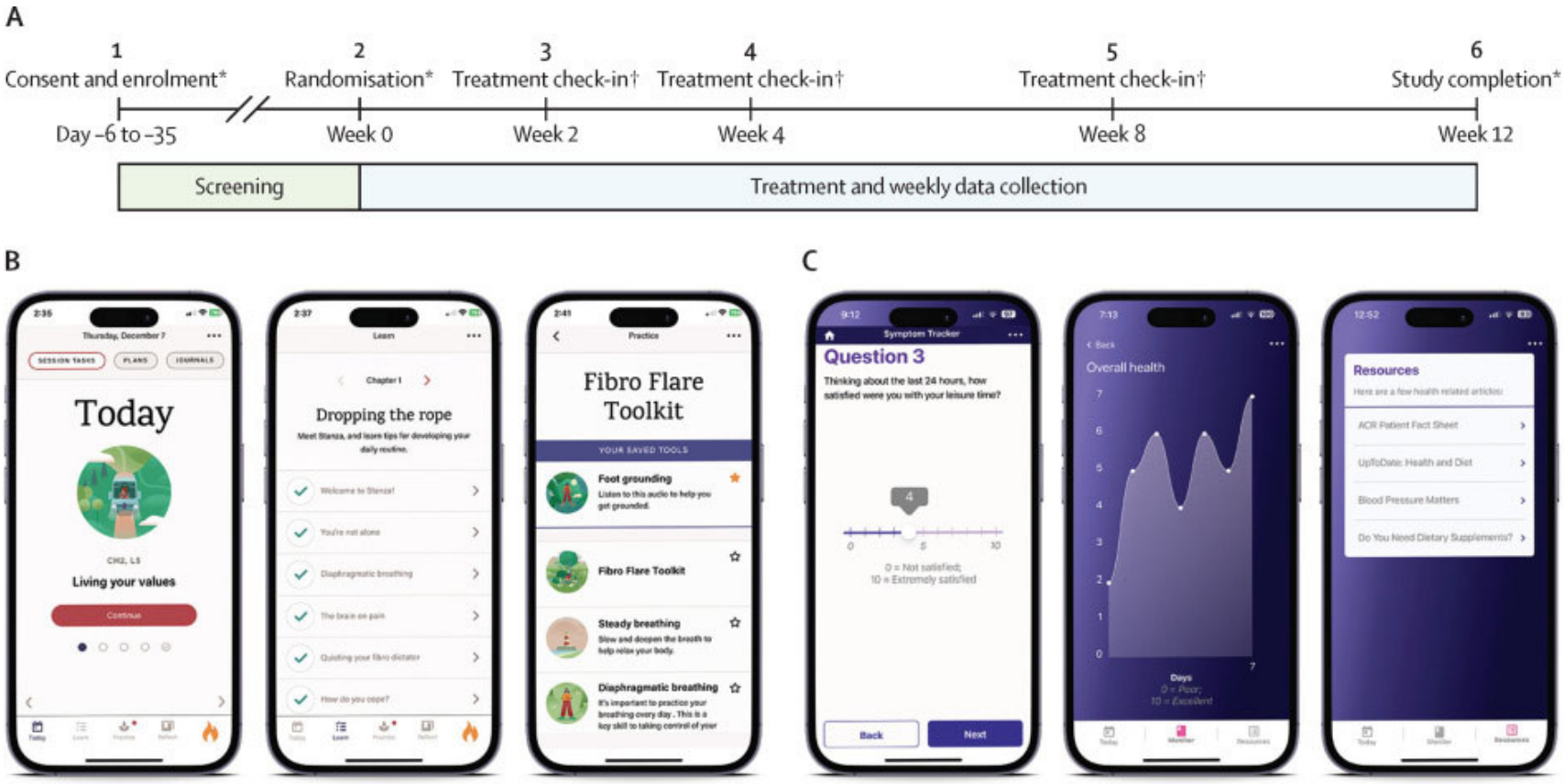
https://telematik-markt.de/sites/default/files/news/images/mediteo_Telematik-Markt_web.jpg

https://www.mytherapyapp.com/media/pages/de/home/58a1f4bfad-1651749928/medikamenten-und-tabletten-erinnerung-mytherapy-erinnerung-v2-de-600x-q65-optimized.png

EIN HÄUFIGES PROBLEM IN DER RHEUMATOLOGIE

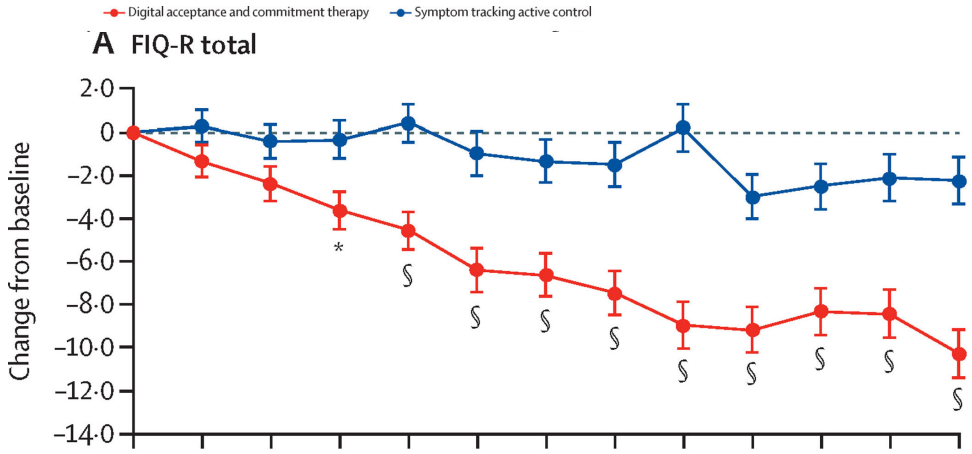


PROSPER-FM STUDIE



Gendreau RM, et al. Self-guided digital behavioural therapy versus active control for fibromyalgia (PROSPER-FM): a phase 3, multicentre, randomised controlled trial. Lancet. 2024

DIGITALE VERHALTENSTHERAPIE BEI FMS



stanza

Gendreau RM, et al. Self-guided digital behavioural therapy versus active control for fibromyalgia (PROSPER-FM): a phase 3, multicentre, randomised controlled trial. Lancet. 2024

WIRKSAME MENTALE UNTERSTÜTZUNG

VilaHealth

JAMA Network | Open

RCT: Digital Psychological Intervention for Inflammatory Rheumatic Diseases

POPULATION

10 Males, 92 Females

Adults with inflammatory rheumatic diseases, psychological distress, and a reduced quality of life

Mean age, 47.2 y

INTERVENTION

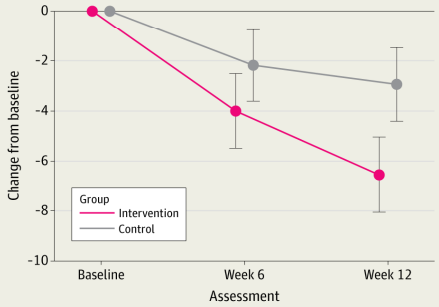
102 Patients randomized

52 Digital intervention
Self-guided digital psychological intervention in addition to treatment as usual

50 Treatment as usual
Control group with access to treatment as usual

FINDINGS

Patients in the digital intervention group showed significantly greater improvements in psychological distress compared with treatment as usual



Change in HADS-D score (95% CI) at 3 months:
Digital intervention: -6.6 (-8.1 to -5.0)
Treatment as usual: -2.9 (-4.4 to -1.5)
Difference: -3.6 (-5.7 to -1.5); *P* = .001

SETTINGS / LOCATIONS

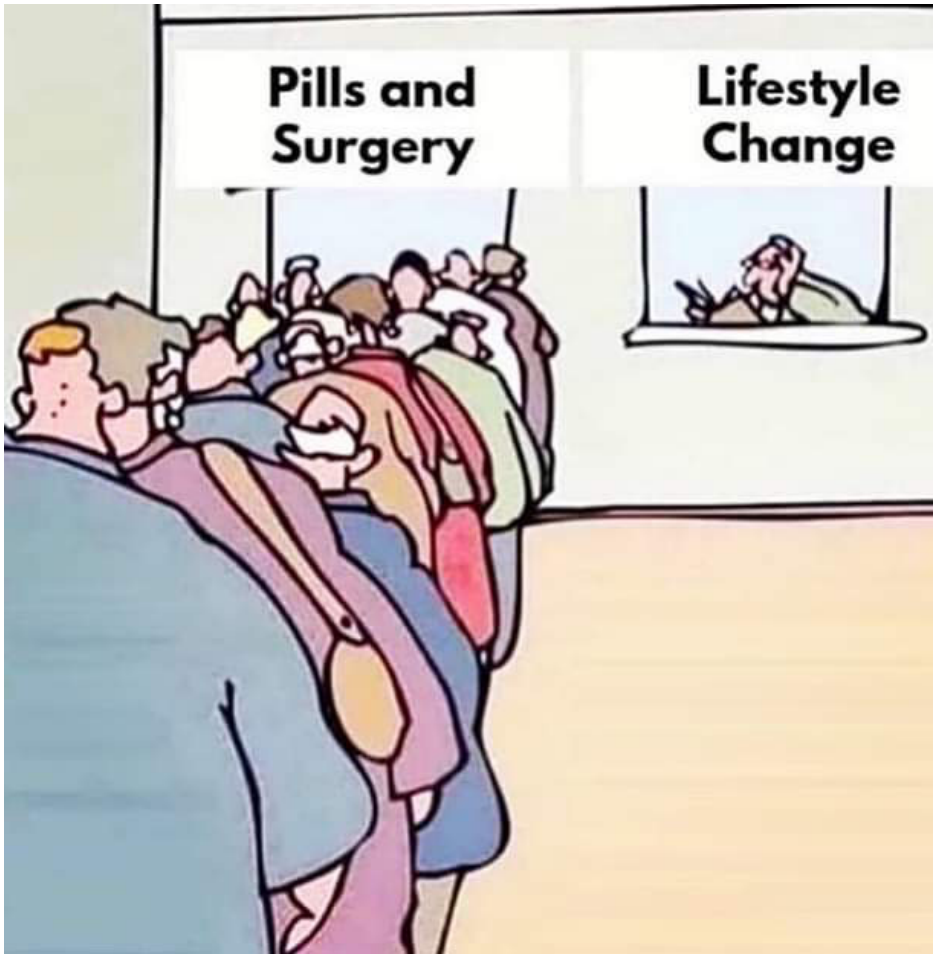
Online recruitment in Germany

PRIMARY OUTCOME

Change in psychological distress from baseline to 3 months, measured using the Hospital Anxiety and Depression Scale (HADS-D; range 0-42, higher scores indicate greater symptom severity)

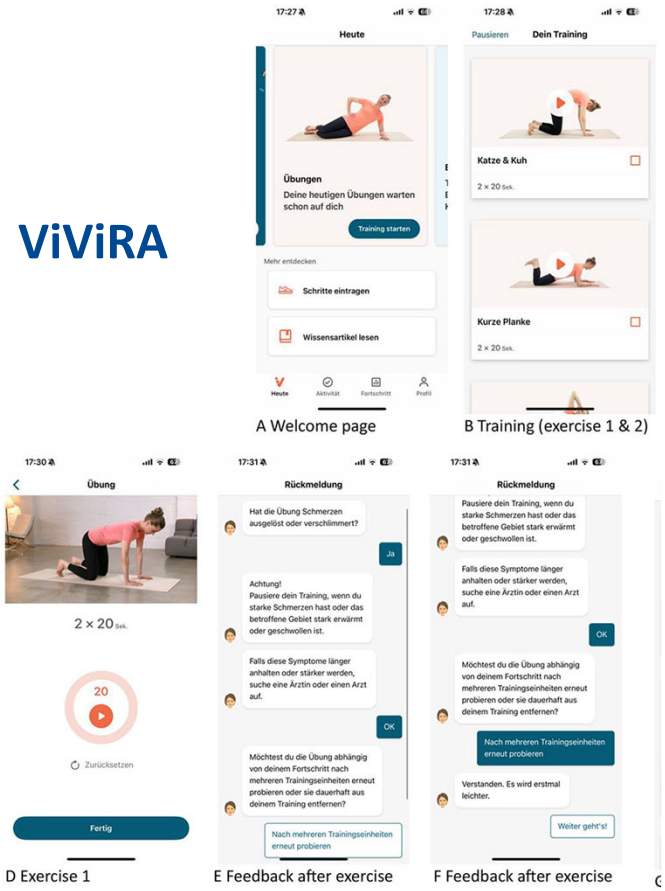
Knitza J, Kraus J, Krusche M, et al. Digital psychological intervention for inflammatory rheumatic diseases: a pilot randomized clinical trial. *JAMA Netw Open*. 2025;8(9):e2529892. doi:10.1001/jamanetworkopen.2025.29892

ALLGEMEINE HERAUSFORDERUNG



DIGITALE PHYSIOTHERAPIE

ViViRA

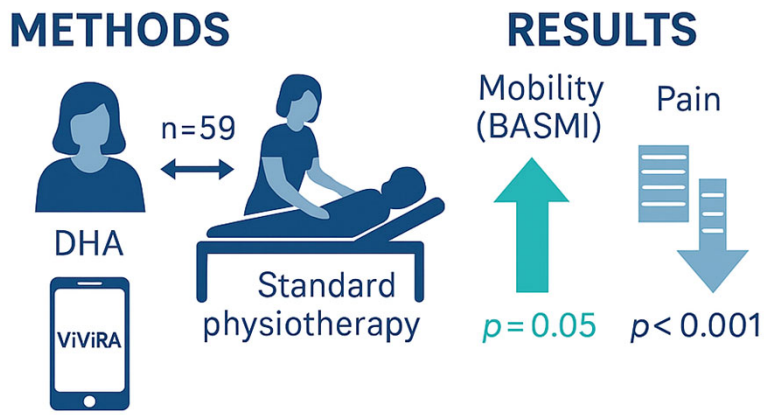


A Welcome page | B Training (exercise 1 & 2)

D Exercise 1 | E Feedback after exercise | F Feedback after exercise

Table 3 Training adherence of the intervention group ($n = 30$). Self-reported training adherence of the intervention group ($n = 30$) reported after 12 weeks of exercising with ViViRA

How many times have you exercised with the ViViRA app?			
1 times/week	2–3 times/week	4–6 times/week	7 times/week
7% ($n = 2$)	63% ($n = 19$)	20% ($n = 6$)	10% ($n = 3$)



Blaskowitz, et al. *Arthritis Res Ther* **26**, 208 (2024).

WEARABLES ALS „THERAPEUTIKUM“

Effectiveness of wearable activity trackers to increase physical activity and improve health: a systematic review of systematic reviews and meta-analyses

Ty Ferguson, Timothy Olds, Rachel Curtis, Henry Blake, Alyson J Crozier, Kylie Dankiw, Dorothea Dumuid, Daiki Kasai, Edward O'Connor, Rosa Virgara, Carol Maher

+ 1800 Schritte/d

+ 40 min mehr Bewegung

↓ 1kg Gewichtsverlust

“The benefit is clinically important and is sustained over time. Based on the studies evaluated, there is sufficient evidence to recommend the use of activity trackers.”

Domain	Metric	Explanation
Physical activity	Steps	19 meta-analyses and ten narrative analyses. 23 (79%) favoured intervention, none favoured control, and six (21%) were non-significant (although two of these were meta-analyses that approached significance, favouring intervention).
	Moderate-to-vigorous physical activity	Nine meta-analyses and six narrative analyses. 12 (80%) favoured intervention, 0 (0%) favoured control, and three (20%) were non-significant.
	Vigorous physical activity	No meta-analyses and three narrative analyses. Two (66%) favoured intervention, none favoured control, and one (33%) was non-significant. Only addressed by a small number of original studies.
	Moderate physical activity	No meta-analyses and five narrative analyses. Five (100%) favoured intervention. Only addressed by a small number of original studies.
	Light physical activity	No meta-analyses and two narrative analyses. Two (100%) favoured intervention. Only addressed by a small number of original studies.
	Physical activity	Eight meta-analyses and 11 narrative reviews. 17 (89%) favoured intervention, none favoured control, and two (11%) were non-significant.
	Walking	One meta-analysis and six narrative reviews. Four (57%) favoured intervention, one (14%) favoured control, and two (29%) were non-significant. Only addressed by a small number of original studies.
	Energy expenditure	Two meta-analyses and three narrative reviews. Four (80%) favoured intervention, none favoured control, and one (20%) was non-significant. Only addressed by a small number of original studies.
Physiological	Body composition	22 meta-analyses and nine narrative reviews. 20 (65%) favoured intervention, none favoured control, and 11 (35%) were non-significant.
	Blood pressure	Five meta-analyses and four narrative reviews. Seven (78%) favoured intervention, none favoured control, and two (22%) were non-significant.
	Fitness	Three meta-analyses and seven narrative reviews. Seven (70%) favoured intervention, none favoured control, and three (30%) were non-significant (although the meta-analysis approached significance, favouring intervention, and the two non-significant narrative analyses were each based on a single study).
	Cholesterol	Three meta-analyses and three narrative reviews. Four (66%) favoured intervention, none favoured control, and two (33%) were non-significant. Only addressed by a small number of original studies.
	Glycosylated haemoglobin	Four meta-analyses and two narrative reviews. Two (33%) favoured intervention, none favoured control, and four (66%) were non-significant. Only addressed by a small number of original studies.
	Blood glucose	Two meta-analyses and two narrative reviews. None favoured intervention, none favoured control, and four (100%) were non-significant. Only addressed by a small number of original studies.
	Triglycerides	Two meta-analyses and one narrative review. None favoured intervention, none favoured control, and three (100%) were non-significant. Only addressed by a small number of original studies.
	Resting heart rate	One meta-analysis and three narrative reviews. Two (50%) favoured intervention, none favoured control, and two (50%) were non-significant (although the meta-analysis approached significance, favouring intervention). Only addressed by a small number of original studies.
	Other, physiological	No meta-analyses and two narrative reviews. None favoured intervention, none favoured control, and two (100%) were non-significant.

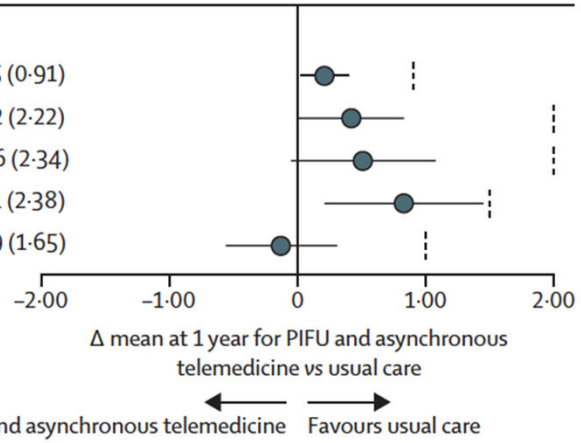
Lancet Digital Health 2022

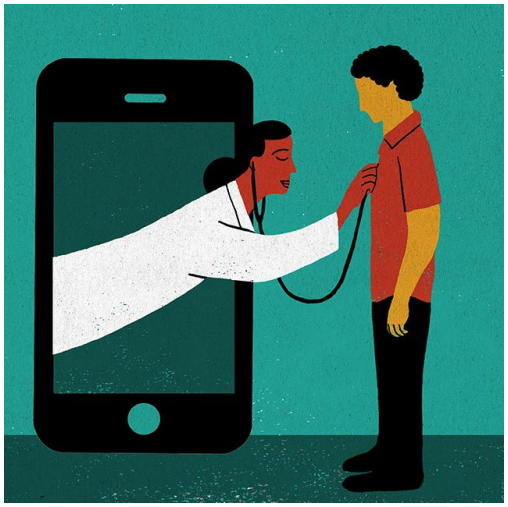
ZUKUNFT: „PATIENTENGESTEUERTE RHEUMATOLOGIE“

Patient-initiated follow-up supported by asynchronous telemedicine versus usual care in spondyloarthritis (TeleSpA-study): a randomised controlled trial of clinical and cost-effectiveness

Kasper Hermans, Casper Webers, Annelies Boonen, Harald E Vonkeman, Astrid van Tubergen

	Mean (SD) at 1 year	
	PIFU and asynchronous telemedicine (n=94)	Usual care (n=95)
Continuous outcomes		
ASDAS	1·92 (0·89)	1·75 (0·91)
BASDAI	3·65 (2·33)	3·22 (2·22)
Pain	3·17 (2·43)	2·66 (2·34)
Patient global assessment	3·61 (2·66)	2·71 (2·38)
Physician global assessment	1·58 (1·62)	1·79 (1·65)



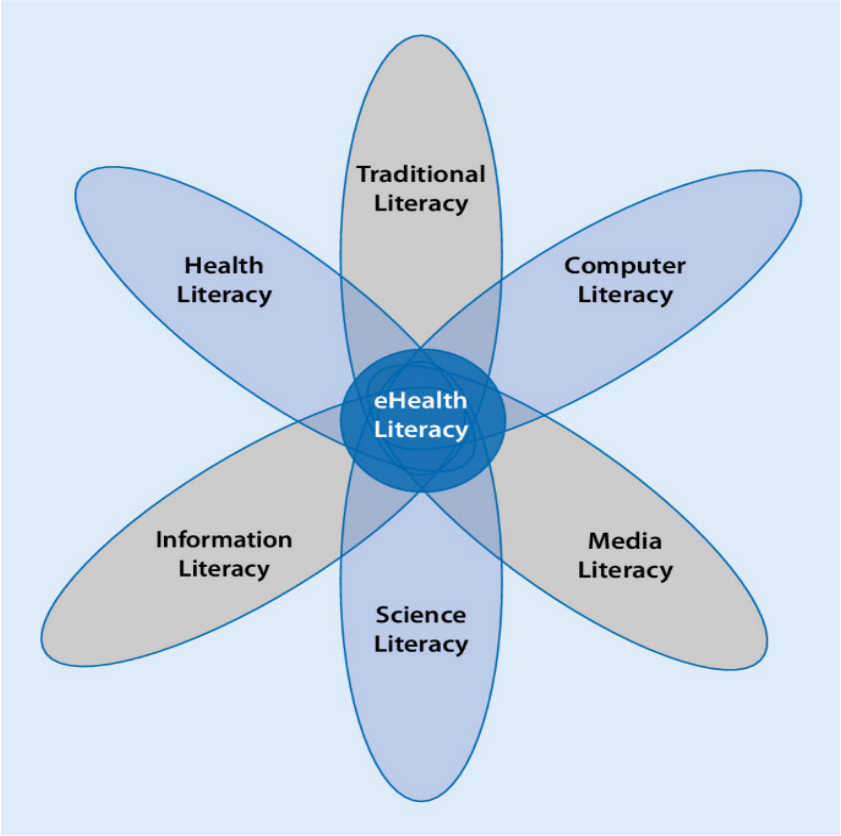


- 1.9 vs 2.6 Visits pro Jahr

-180 Euro ohne “Loss of quality-adjusted life-years“

Lancet Rheumatology 2024

HERAUSFORDERUNGEN DER (TELE)MEDIZIN



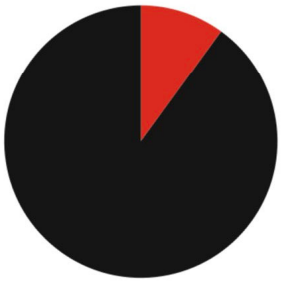
Bittlingmayer, U.H.,. *Bundesgesundheitsbl* **63,** 176–184 (2020)

HERAUSFORDERUNG DIGITALKOMPETENZ DER BEHANDLER:INNEN

Torten der Wahrheit

VON KATJA BERLIN

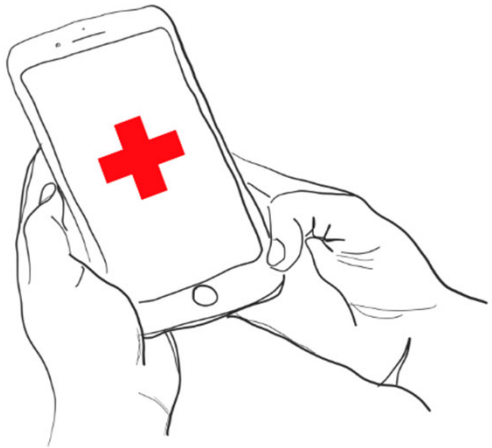
Datenschutzprobleme im Gesundheitssystem



Durch die elektronische Patientenakte
Durch den Anmeldebereich im Wartezimmer

DIE ZEIT 12/2023

- Investitionen in entsprechende (einfache) Software sowie Schulungen zu technischen Lösungen dringend notwendig (z.B. ePROs, DiGAS, Einsatz von Wearables)
- vermehrte Aus-und Weiterbildung im Bereich Bioinformatik, Verständnis von KI-Systemen (Plausibilitätskontrollen)



WANDEL DURCH TECHNIK

Danke!

Martin Krusche

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