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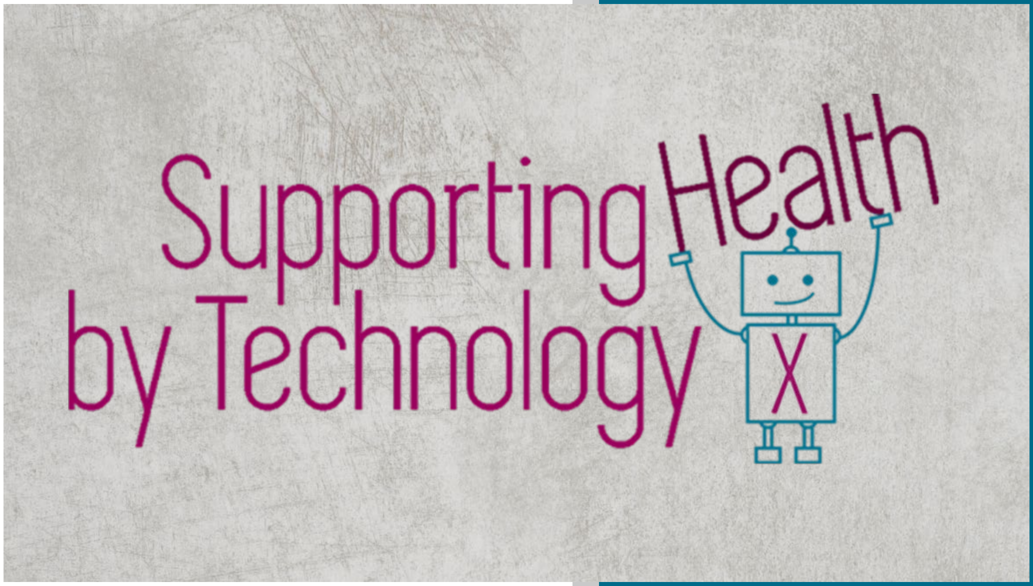
Abstract book



Supporting Health by Technology

International Conference

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Enschede, The Netherlands

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Preface

The Centre for eHealth & Wellbeing Research of the University of Twente, in collaboration with the University Medical Center Groningen, is very proud to present the abstract book of the **10th edition – 2021** of the successful 'Supporting Health by Technology' series.

The theme of our 2021 Supporting Health by Technology conference is:

Technology Transforming Health(care)

Therefore, we highly welcomed abstracts on subjects related to eHealth, ePublic Health, eMental Health, Big Data for Health, self-tracking, smart coaching and related fields, in a variety of inspirational and interactive formats, such as symposia, workshops, demonstrations, posters or oral presentations. We favored innovative contributions that highlight some of the newest applications of eHealth technologies and extended a warm welcome to pioneers who explore new fields or new ways to apply eHealth technologies.

We are pleased to have received scientific work related to these subjects from a broad variety of contributors, such as scientists, healthcare professionals, patient organizations, policy makers, eHealth companies, students and many others. By bundling the work of these contributors, we hope to broaden the eHealth community, and to promote the visibility of this community.

Given the current situation of the COVID-19 pandemic and regulations regarding travelling throughout the world, our second lustrum edition of the conference will be online: interactive; demonstrating and discussing progress in the development of eHealth interventions and introducing new methods and models for behavior change using monitoring technologies. Several parallel research presentations will be organized in the form of orals, workshops, symposia, demos and posters.

In total, we received 105 contributions to our conference from all over the world. This abstract book contains all accepted contributions to HealthByTech 2021. The included abstracts were reviewed by a board of experts in the field from University of Twente and University Medical Center Groningen in a double-blind review process. The program committee carefully assessed all reviews and comments made by the reviewers and based on this the final list of abstracts for the conference was comprised.

We would like to express our gratitude to all authors that submitted their valuable and inspiring work to our conference in 2021 and to the reviewers for their time and insights.

To keep in touch with the community, contributors are highly welcome to follow our Twitter and join our Linkedin group, a place to post own content, such as updates about current research, news, questions, or discussion points about digital and electronic health.

Oral presentations

Session 1: Supporting informal care by technology

Session 2: Supporting healthy lifestyles by technology

Session 3: Rehabilitation: development and acceptance of eHealth interventions

Session 4: eMental health interventions

Session 5: Innovative interventions for rehabilitation

Session 6: Development and implementation of eHealth interventions for lifestyle

Session 7: Supporting healthcare staff by technology

Session 8: Technology for loneliness and grief

Session 9: eHealth development for chronic diseases

Session 10: Methods for eHealth development, implementation and evaluation

Session 11: Technology and depression

Session 12: Putting the patient central in eHealth

Session 13: Technology and chronic disease

Session 14: eHealth and the elderly

Session 15: eHealth, infectious diseases and antimicrobial resistance

Session 16: Digital health coaches

Symposia

Workshops

Posters

Demos

Oral presentations

Session 1: Supporting informal care by technology

Challenges and Recommendations for the Deployment of Technology Solutions for Informal Caregivers.

Alhassan Hassan

Background

Information and communication technology (ICT)–based solutions have the potential to support informal caregivers in home care delivery. However, there are many challenges to the deployment of these solutions. The aim of this study was to review literature to explore the challenges of the deployment of ICT-based support solutions for informal caregivers and provide relevant recommendations on how to overcome these challenges.

Methods

A scoping review methodology was used following the Arksey and O'Malley methodological framework to map the relevant literature. A search was conducted using PubMed, IEEE library, and Scopus. Publication screening and scrutiny were conducted following inclusion criteria based on inductive thematic analysis to gain insight into patterns of challenges rising from deploying ICT-based support solutions for informal caregivers. The analysis took place through an iterative process of combining, categorizing, summarizing, and comparing information across studies. Through this iterative process, relevant information was identified and coded under emergent broader themes as they pertain to each of the research questions.

Findings

The analysis identified 18 common challenges using a coding scheme grouping them under four thematic categories: technology-related, organizational, socioeconomic, and ethical challenges. These range from specific challenges related to the technological component of the ICT-based service such as design and usability of technology, to organizational challenges such as fragmentation of support solutions to socioeconomic challenges such as funding of technology and sustainability of solutions to ethical challenges around autonomy and privacy of data. For each identified challenge, recommendations were created on how to overcome it. The recommendations from this study can provide guidance for the deployment of ICT-based support solutions for informal caregivers.

Discussion

Despite a growing interest in the potential offered by ICT solutions for informal caregiving, diverse and overlapping challenges to their deployment still remain. Designers for ICTs for informal caregivers should follow participatory design and involve older informal caregivers in the design process as much as possible. A collaboration between designers and academic researchers is also needed to ensure ICT solutions are designed with the current empirical evidence in mind. Taking actions to build the digital skills of informal caregivers early in the caregiving process is crucial for optimal use of available ICT solutions. Moreover, the lack of awareness of the potential added-value and trust toward ICT-based support solutions requires strategies to raise awareness among all stakeholders—including policy makers, health care professionals, informal caregivers, and care recipients—about support opportunities offered by ICT. On the macro-level, policies to fund ICT solutions that have been shown to be effective at supporting and improving informal caregiver health outcomes via subsidies or other incentives should be considered.

The road from interviews and focus groups to a digital eHealth tool.

Anne Looijmans, Marrit Tuinman and Mariet Hagedoorn

Background

Informal caregivers care for their incurably ill loved-ones with love, although it can be very burdensome. Caregivers experience struggles in balancing caregiving tasks and their social life, work or hobbies, and often fail to set boundaries. We aimed to develop a digital tool to support informal caregivers of patients in the palliative phase, to balance their personal wishes with caregiving demands, and to think about their boundaries. This presentation highlights the practical steps during the development process, and we provide examples of challenges and our solutions.

Methods

We developed the tool according to the CeHRes (Centre for eHealth & Wellbeing Research) roadmap of the University Twente, starting with qualitative interviews, focus groups and user testing with low fidelity and usability testing with high fidelity prototypes, with caregivers and experts.

Findings

<u>Challenges</u>: During interviews, how do you balance between being open to all information provided by caregivers, and taking into account that you will develop a digital tool? How to deal with focus group participants who envision different things in discussing 'a digital tool'? What does it take to collaborate with software developers? And, what to do with conflicting opinions of test-users?

<u>Solutions</u>: Decide in advance the boundaries that you set when interviewees drift away from the topic or are already too much focused on a digital solution. Prior to the focus group, we shared three examples of digital tools and evaluated these tools. First of all, chat with many software developers and pick the one who speaks the same (your) language. Keep in mind that test-users may have different opinions, explore what is commonly shared among them, and review their comments with your expertise from the interviews and focus groups in mind.

Discussion

This project started with a well-described project plan using the CeHRes roadmap to develop a digital solution for informal caregivers. Translating these steps into practice comes with several challenges. This presentation shows the practical issues that may arise during this journey, and we present our solutions along with the advice to keep breathing and keep talking.

CareCircle: Monitoring Older Adults‘ Health via Family, Friends and Neighbors.

Christina Jaschinski, Stephanie Jansen Kosterink, Marjolein den Ouden and Lex van Velsen

Background

With more people reaching old age, there is a growing number of people with chronic diseases and in need of care. At the same time, older adults are encouraged to age in their own home environment and monitor their own health and wellbeing. This can be problematic, especially for older adults without a strong social engagement, whose health issues might go unnoticed. In addition, older adults’ self-reported health status can be biased. A solution for these problems could be provided by CareCircle, a conceptual cooperative care system that enables family members, friends, and neighbors to actively engage in the care process and monitor an older adult’s health and well-being. The aim of this study was to investigate the early user acceptance of the CareCircle system among older adults, informal caregivers, and healthcare professionals.

Methods

To investigate early user acceptance, end-user walkthroughs with 6 older adults, 3 family members, and 4 healthcare professionals were conducted between November and December 2019. A low-fidelity prototype was used to illustrate the conceptual design of the CareCircle system. This prototype contained the following features: an overview of one’s CareCircle members, an overview of the data flow (who-can-see-what), a general report function, an incident report function, and a validated screening instrument for frailty. Participants’ responses were transcribed, and thematic analysis was applied to identify common concepts and themes.

Findings

Most older adults, family members, and healthcare professionals could imagine using the CareCircle system in the future. Perceived advantages included more insight into older adults’ health status and easy communication among stakeholders. However, older adults emphasized that acceptance would strongly depend on their level of control in the data sharing process. In addition, healthcare professionals were worried about the reliability of the reported data, potential information overload and a consequential increase in administrative burden.

Discussion

Overall, older adults are open to sharing basic health data with their social network (i.e., family members, friends, and neighbors) if they remain in control over the data-sharing process. Future research efforts will aim to further specify the user requirements, develop a high-fidelity prototype, and test the CareCircle system in daily (clinical) practice. Privacy and control will be the focal points for the further development of CareCircle.

Effectiveness and acceptability of the ICBT for informal caregivers: pilot findings.

Ieva Biliunaite, Austeja Dumarkaite, Evaldas Kazlauskas, Robbert Sanderman and Gerhard Andersson

Background

Informal caregivers are individuals who provide care for chronically ill or otherwise dependent people in their close environment. It is evident that caregiving can have a positive influence on caregiver's well-being. Despite that, informal caregivers often experience negative mental health outcomes, such as increase in stress or anxiety symptoms. This calls for investigation into psychological support options for improving informal caregiver well-being. Objectives: the main aim of this presentation is to present research data in relation to the effectiveness and acceptability of the internet-based cognitive behavioural treatment (ICBT) for reducing informal caregiver psychological burden and increasing their perceived quality of life. To meet this goal findings from two research studies will be presented.

Methods

The first study was a pilot randomized controlled (RCT) trial for evaluating ICBT program's effectiveness in reducing caregiver burden, depression, anxiety, stress and increasing the quality of life. The program was a transdiagnostic, eight-week-long, therapist supported intervention for informal caregivers in Lithuania. In total, 63 Lithuanian informal caregivers were randomized to either intervention or a wait-list control condition. The second study was based on the interview data collected from 23 participants from the pilot RCT trial. Interviews were transcribed and analyzed using thematic analysis.

Findings

Moderate to high between-group effects sizes were found for reduction in caregiver burden, depression, anxiety, and stress as well as increase in the quality of life. Majority of the informal caregivers have also positively evaluated program's format and materials. In turn, four main themes and a total of 10 sub-themes were generated from the interview data. These themes and sub-themes reflect aspects for the program, that participants appreciated the most (convenience, time for one-self and communication) as well as certain suggestions for program's improvement (including live support options, tailoring the format, and providing with more time and resources). Lastly, certain personal and situational factors affecting informal care-giver well-being were also outlined.

Discussion

Findings from the pilot RCT and qualitative interviews indicate ICBT to be an effective as well as acceptable option for improving informal caregiver psychological well-being. Further research is needed for evaluating the effectiveness of the intervention in a bigger sample. Alternatively, effectiveness of an improved version of the intervention that would incorporate participant suggestions outlined throughout the qualitative interviews.

Funding: This project has received funding from the European Union's Horizon 2020 research and innovation programme under the Marie Skłodowska-Curie grant agreement No 814072 and is part of The European Training Network on Informal Care (ENTWINE).

Session 2: Supporting healthy lifestyles by technology

“Screen work all the time”: Results from a mixed-methods study about consequences of forced home office working during COVID-19 regulations.

Christina Bode, Gerko Schaap, Evelina Tzaneti and Erik Taal

Background

Previous studies showed high sedentary behaviour in office workers and pointed to the detrimental health effects of occupational sitting (OS), including premature all-cause mortality, diabetes mellitus type 2, cardiovascular disease or chronic low back pain symptoms. OS seems to be influenced by multiple factors. Aim of this project was to explore the perceptions of employees of academic and non-academic staff at a Dutch university and to study predicting factors of sedentary occupational behaviour in the forced COVID-19 home office situation.

Methods

An online cross-sectional survey with open and standardized questions was filled out by 119 employees (14% PhD candidates, 53% academic staff and 33% support/management staff; 66% female; 55% full-time, 16% appointed < 32 hours/week), including experiences of employees with forced home office in general, questions about occupational sitting time, home office characteristics, facilitators and barriers to reduce OS time. Thematic analysis and multiple linear regression analyses were applied to analyse the data.

Findings

Mean OS time was 435 (SD = 113) minutes per day (=7,25 hours), equaling 81% of work time. The majority of the sample experienced more sitting (78%), less standing (68%) and also less moving (79%) during work time under the homeworking regulations compared to their usual work activities at the university. In total, employees sit more than 11 hours of their waking time. Employees described that work is 100% screen work since all teaching activities and all meetings are online. In addition, high work load, complicated work procedures and lacking social interaction with colleagues were given as reason for high OS time. Data revealed both negative and positive perceptions of forced working from home. Employees tried to find activities to change posture or to break the screen time in order to reduce the total OS time. In sum, the barriers to reduce OS time (mainly lack of adequate office equipment and perceived work pressure) clearly outperform the options employees see to reduce OS (e.g., reminders, outside activities). Prediction analyses showed that the lack of information on sedentary breaks, available interventions or other organizational support for healthy office work predicted the experienced increase in OS behaviour.

Discussion

Results showed that COVID-19 related home office work is mainly seated work in front of the computer screen. With appropriate furniture screen-work-time is not necessarily the same as sitting-work-time. However, in our study employees felt that for them computer work is equal to sitting all the time due to furniture that does not allow working in other postures and due to the perceived significantly higher work pressure since the COVID-19 pandemic. This unbeneficial pattern is further worsened by the finding that employees seem to sit a lot also during their not-working hours. It is warranted to compare the self-reports with objective activity measures in future studies, but for now we suggest the implementation of existing technological interventions to reduce occupational sitting time and furniture that supports posture changes, also or perhaps especially, in forced home working situations.

UltraViolet imaging to enhance awareness of UV damage to the skin and protection using sunscreen.

Rudolf Verdaasdonk and Bibi van Montfrans

Background

The significant increase of skin cancer occurring in the western world is attributed to longer sun expose during leisure time. For prevention, people should become aware of the risks of UV light exposure by showing skin damage and the protective effect of sunscreen with an newly developed UV camera.

Methods

An UV imaging system was developed given people the experience as if looking in the mirror seeing their face in UV light. The system was assembled from consumer components: A Sony NEX5t camera was adapted to full spectral range. In addition, UV transparent lenses and filters were selected based on spectral characteristics measured to obtain the highest contrast for e.g. melanin spots and wrinkles on the skin. Either UV 365 nm black light fluorescent tubes or UV LED strips were used for uniform illumination. Safety of the UV illumination was determined relative to the sun and with absolute irradiance measurements at the working distance according the international safety standards. The 'UV mirror' was demonstrated at public events (Dutch National Cancer Day and Marathon of Amsterdam) and images were taken before and after application of sunscreen giving a ' black paint' experience. The amount of coverage of sections of the face by sunscreen were scored and feedback from participants was obtained using questionnaires.

Findings

The UV imaging system shows superficial skin features like melanin spot and wrinkles with high contrast. The 'UV mirror' was successfully demonstrated during public events was well received by dermatologists and participating public. Especially, the 'black paint' effect putting sun screen on the face was dramatic and contributed to the awareness of regions on the face what are likely to be missed especially around the eyes and ears. Seventy eight percent of the participants responded that they intended to improve their sun protection behavior after being confronted with their UV face image.

Discussion

The UV imaging system induces a significant improvement of the awareness of sun damage and on skin protection behavior. UV imaging has high potential for diagnostics in dermatology and other areas.

DISCOV: Encouraging a Healthy Active Lifestyle through the Design of Interactive Environments.

Loes van Renswouw, Jasmijn Verhoef, Steven Vos and Carine Lallemand

Background

Promoting healthy and active lifestyles to prevent inactivity-related health concerns is a major social challenge in modern western societies, both for public policies as well as across multiple research fields. Design of 'activating' urban environments can be an effective trigger to subconsciously nudge people into moving (Krefis et al., 2018). Increasingly integrated in the environment, technology is becoming both more omnipresent and less noticeable. This embedded technology allows for new interactions and increased personalization of those 'smart' environments, expanding their potential to trigger, enable and motivate its users to change their routines.

Methods

To explore the potential of these interactive environments to support people to be more physically active, we designed Discov. Discov is a network of physical waypoints placed in a public park that triggers people to explore their surroundings in a fun and challenging way by creating an engaging walking experience. Discopoints attract passers-by through their shape and colorful design, amplified with lights when they come close enough. People can interact with Discov by touching or stepping onto it. When stepping off and away again, different lights indicate direction and relative distance to other Discovpoints, triggering curiosity and motivation for an extended walk. This encourages users to continue their playful and healthy discovery journey in the urban park. A two-stage pilot test was conducted (N=15), to test the interaction with a discovpoint and the implementation of the network of waypoints. The first part consisted of intuitive interaction with the discovpoint and open interview questions about expectations, experience and interpretation of the design. The second part consisted of 5 waypoint prototypes, only showing direction and relative distance to 3 or 4 other points, placed 100 to 250 meters apart in a park. Participants were invited to take a walk and interviewed about their experience and intentions.

Findings

First user tests showed that an initial interaction helps to let people know the device 'does something' but keeping it vague inspires curiosity followed by satisfaction. This both lengthens and enhances the interaction. Similarly, the direction indications were clear enough to demonstrate there are more waypoints to find, but the distance and multiple point signals were not always understood. Again, this caused some ambiguity that mostly added to the desire to explore and find out. A good balance between obvious interactions and hidden aspects can trigger interest and exploration, and helps to engage users over a longer time.

Discussion

While further research is needed to consolidate these findings, this design research shows promising use for interactive installations in the public space to encourage physical activity. Next to enabling and providing triggers and motivation to be more active, Discov is embedded in the physical public environment. It therefore has the potential to reach everyone that passes by, without prior commitment from the users. This makes such interactive environments more inclusive than other technologies to increase physical activity, even for the hard-to-reach group of people who are not consciously trying to change their inactive routines.

Outpatient smoking cessation: Preliminary findings of a non-inferiority RCT comparing blended with face-to-face delivery mode.

Lutz Siemer, M. E. Pieterse, Somaya Ben Allouch, M. G. Postel, Robbert Sanderman and M. G. Brusse-Keizer

Background

Blended face-to-face and web-based treatment is a promising mode to deliver smoking cessation treatment. In an outpatient clinic in a Dutch Hospital effectiveness of a blended treatment (BSCT) was compared to usual face-to-face treatment (F2F). The results from 6 months post-treatment follow-up are presented here.

Methods

In this open-label two-arm non-inferiority RCT patients (N=344) of a Dutch outpatient smoking cessation clinic were assigned either to the blended smoking cessation treatment (BSCT, N=167) or a face-to-face treatment with identical ingredients and duration (F2F, N=177). CO-validated point prevalence abstinence at 6 months follow-up, taken shortly after end of treatment was analyzed. Intention-to-treat analyses were performed, retaining missing participants as continuing smokers. Non-inferiority was assessed based on a one-sided margin of five percentage points difference between arms. Additionally, a Bayes Factor was estimated (with a BF>3 supporting non-inferiority, and a <.3 rejecting non-inferiority).

Findings

At 6 months follow up, 23 BSCT participants (13.8%) and 31 F2F participants (17.5%) were abstinent, with a difference of 3.7% (95%CI: 11.4;-4.0) in favor of F2F. Furthermore, a BF=1.28 was found.

Discussion

Based on observed biochemically validated abstinence rates, this RCT suggests that delivering outpatient smoking cessation treatment in a blended mode yields comparable quit rates as full face-to-face treatment mode. However, non-inferiority could not be supported conclusively. Ignoring patient preferences for either of the delivery modes may explain these inconclusive findings.

Session 3: Rehabilitation: development and acceptance of eHealth interventions

Development and evaluation of new technologies in insurance medicine using principles of Invention Mapping.

Elza Muller, Jolanda van Rijssen and Maaike Huijsmans

Background

Our daily life is changing fast due to the introduction of new technologies. The use of information and communication technology in order to enhance health and support health care (e.g. e-Health) is already essential nowadays in medical practice. Surprisingly enough, there is no record of new technologies being extensively used in the field of insurance medicine. This creates an interesting opportunity to investigate the benefits of introducing new technologies in the field of insurance medicine. The aim of the study is to develop one or more interventions, based on new technologies, such as e-Health, for insurance physicians and people with work disabilities and to evaluate their effectiveness and feasibility in daily practice. Research question(s): How can the use of new technologies enhance the reliability and practical implications of work disability claim assessments by insurance physicians and the effectiveness? of return to work interventions and RTW-counselling for people with work disabilities?

Methods

In order to design an effective and practical intervention for the field of insurance medicine, principles of the Intervention Mapping protocol will be used.

- Experts in the field of new technologies, such as e-Health were determined and subjected to semi-structured interviews in order to investigate the landscape of applications and tools that can be relevant and applicable in the field of insurance medicine.
- A needs assessment is conducted among insurance physicians to clarify the needs, expectations, facilitators and barriers with respect to the use of new technologies. Problems, solutions, and expectations of people with disability with respect to the use of new technologies will be investigated using interviews.
- A complementary literature study will be conducted in order to complete the insights on the selected topics presented by the stakeholders.
- Results and data gained in steps 1, 2 and 3 will be presented to relevant stakeholders in focus groups in order to discuss possible and applicable e-Health intervention(s) with added value in social insurance practice. Performance and change objectives of the interventions will be determined and specified.
- Developing interventions based on new technologies applicable for the field of insurance medicine.
- Small scale implementation and evaluation of effectiveness and feasibility of several intervention pilots in the daily practice of insurance medicine.

Findings

An online survey was conducted among insurance physicians to investigate needs, expectations, facilitators and barriers towards the use of new technologies. Results demonstrate that two-third of IPs believe that the use of new technologies could have added value for monitoring daily activities, health, and participatory behaviour in people with disability benefits. Diminished human aspect and privacy issues were indicated as main barriers.

Interviews with experts were completed. Preliminary results are expected in the summer of2021.

Discussion

We would like to discuss with different stakeholders, with knowledge and experience of both technology and/or an interest in insurance medicine, their ideas about the application of new technologies in the field of insurance medicine.

- What new technologies are in the nearby future suitable to apply in the field op insurance medicine?
- What are benefits and/or pitfalls of the use of these technologies?

Development of a Personalised m/eHealth Recovery Programme for Working-Age Knee Arthroplasty Patients: A Delphi Study.

Carlien Straat, Pieter Coenen, Denise J.M. Smit, Gerben Hulsegge, Rutger C. van Geenen, Gino M.M.J. Kerkhoffs, Rob P.A. Janssen, Tim A.E.J. Boymans, Judith A.F. Huirne, JonannesR. Anema and P. Paul F.M. Kuijer

Background

Recommendations concerning return to normal activities and work after total or unicompartmental knee replacement are often lacking and vary considerably between Dutch hospitals and clinics. Evidence is limited, and recommendations are therefore often based on expert opinions of health care professionals. Well-defined recommendations and multidisciplinary consensus regarding return to normal activities and work are important for recovery after surgery. Incorporating such recovery recommendations in a personalised m/eHealth programme could improve perioperative care. We aimed to obtain multidisciplinary consensus on return to normal activities and work after total and unicompartmental knee replacement for the development of an algorithm that will be used in the m/eHealth portal IkHerstel ("I Recover").

Methods

Using a Delphi procedure, a multidisciplinary panel of six orthopaedic surgeons, three physiotherapists and five occupational physicians – all with special interest and expertise in knee arthroplasty patients - participated to reach consensus on recommendations regarding the resumption of 27 activities like walking, cycling and return to work. The procedure involved three online questionnaire rounds and one consensus meeting. In each of the four rounds, all experts judged when activities could feasibly be resumed after total and unicompartmental knee replacement by three groups of patients, i.e. those with fast, average and slow recovery. Consensus was reached when at least two-thirds of the experts agreed with the recommendation. The recommendations were then converted into an algorithm that is currently being integrated in the m/eHealth portal IkHerstel that will provide patients with personalised recovery recommendations after surgery.

Findings

After four Delphi rounds, the expert panel reached consensus for all 27 activities including return to work and normal activities. For example, the expert panel agreed that total knee arthroplasty patients with a fast recovery could resume 'walking without walking aids' two weeks after surgery, those with an average recovery four weeks after surgery, and those with a slow recovery six weeks after surgery. Corresponding with the recommendations, we developed six algorithms: one for each patient group (fast, average, slow) and for both surgeries (total and unicompartmental knee replacement). Based on patient expectations and a recovery monitor, patients will receive the advice corresponding with one of these three algorithms. In addition, in the algorithm the advice can be adjusted every four weeks depending on the recovery speed of the patient.

Discussion

Consensus for multidisciplinary recovery recommendations were reached for 27 activities including return to work after total and unicompartmental knee replacement for patients with fast, average and slow recovery rates. Based on the developed recommendations, an algorithm has been developed that will provide patients with recovery recommendations after surgery using the m/eHealth portal IkHerstel. The effectiveness of the recommendations and the m/eHealth portal will be evaluated in a randomized controlled trial starting March 2020.

The acceptance of clinical decision support systems among clinicians in the treatment of neck and/or back pain.

Stephanie Jansen-Kosterink, Miriam Cabrita and Ina Flierman

Background

Clinical Decision Support Systems (CDSSs) are computerized systems using case-based reasoning to assist clinicians in making clinical decisions. Besides the classic or knowledge-based CDSS, the more complex CDSSs can generate feedback on quality indicators and treatment suggestions based on patient-specific information, guidelines, knowledge, stratifications tools, and machine learning algorithms. Despite the proven added value to reduce medical errors and to improve the quality of care the implementation of complex CDSS in daily clinical practice is scarce. Particularly, little is known about the acceptance of CDSS among clinicians. Therefore the aim of this study is to inform the audience about the factors involved in the acceptance of CDSSs among clinicians in the treatment of Neck and/or Low Back Pain (NLBP). This study is part of the Back-UP project (EU Horizon 2020 - No 777090).

Methods

To assess the acceptance of CDSSs among clinicians we conducted a mixed-method analysis of questionnaires and focus groups. An online questionnaire was sent to Dutch General Practitioners and physical therapists aimed to identify the factors influencing the acceptance of CDSSs. The online questionnaire started with demographic questions and continued with an animation of the CDSS followed by the set of measurement items (intention to use, perceived threat to professional autonomy, trusting believes, and perceived usefulness). The online questionnaire ended with two open questions enquiring the reasons to use, and not to use, a complex CDSS. Next to this, two focus groups were conducted with clinicians in secondary care addressing the general attitude towards CDSSs, the factors determining the level of acceptance, and the conditions to facilitate the use of CDSSs.

Findings

In total ninety-eight participants fully completed the questionnaire. The average age was 48 years (SD±12.2) and 52% of the respondents were male. Forty-six percent of the sample worked as general practitioners, 25% as primary care physical therapists, and the remaining 29% as clinicians at a rehabilitation centre. The three main reasons found for using a complex CDSS were (1) to improve the care for their patient, (2) out of curiosity toward the potential of a CDSS, and (3) because of an expected increase in efficiency of care provision. The three main factors found to hinder the intention to use a CDSS were (1) a too high interference with clinical practice, (2) high costs and time expected of using the

CDSS, and (3) potential malfunctioning of the system. Eight clinicians participated in two focus groups. After being introduced to various CDSSs, participants were positive about the value of CDSS in the care of NLBP. The clinicians agreed that the human touch in NLBP care must be preserved and that CDSSs must remain a supporting tool, and not a replacement of their role as professionals.

Discussion

This study was the first step in understanding the acceptance of clinicians toward a complex CDSS. By identifying the factors hindering the acceptance of CDSSs, we can draw implications for the development and implementation of CDSSs in the treatment of NLBP in both the primary and secondary care settings.

The need for objective physical activity measurements in routine bariatric care.

Ellen Kuipers, Josien Timmerman, Marc van Det and Miriam Vollenbroek

Background

Bariatric surgery has proven to be the most effective treatment for morbid obesity and its associated comorbidities. To achieve and maintain a healthy weight after surgery depends on adopting healthier eating and physical activity habits in the long term. Being more physically active may result in greater weight loss. Remote monitoring through wearable activity trackers can provide insight in physical activity of bariatric patients, which is essential in optimal guidance of patients and to optimize the results of surgery. This study aims (1) to quantify physical behavior through objective measures and (2) to examine the relationship between objective and subjective measures of physical activity in a bariatric population.

Methods

This cross-sectional observational cohort study recruited participants from the outpatient clinic at the obesity center of Hospital Group Twente from January 2021. Inclusion is ongoing at the time of submission. Participants wore a Fitbit accelerometer for 14 consecutive days and were instructed to maintain their usual activities. Minute-to-minute step count and heartrate data were collected using the Fitbit device. Self-reported physical activity was assessed with the International Physical Activity Questionnaire (IPAQ). To analyze the association between objective physical activity and self-reported physical activity, Spearman's correlation was used.

Findings

To describe physical behavior, we identified three main categories based on the literature: (1) overall levels of physical activity, (2) moderate-to-vigorous intensity physical activity and (3) sedentary behavior. The next step is to determine the clinically relevant parameters and to analyze the collected data to quantify physical behavior. We hypothesize self-reported physical activity by the IPAQ will overestimate actual physical activity based on accelerometer data in the bariatric population. The results of this study are expected at the time of the conference.

Discussion

In this study, accelerometer-based physical behavior was quantified for bariatric patients and compared with self-reported physical activity by the IPAQ. Our expectation is that the results emphasize the need for objective monitoring in routine bariatric care. Further studies incorporating long-term measurements are needed to improve the understanding of physical activity over time and to assess the relation with weight loss outcomes.

Session 4: eMental health interventions

Engagement as predictor of the effectiveness of mobile wellbeing interventions: a factorial experiment.

Saskia Kelders and Marcia da Silva

Background

Engagement is seen as an important concept within eHealth technology and often regarded as a predictor for the effectiveness of these interventions. However, whether this really is the case, has not been thoroughly studied. Therefore, in this study, it is investigated whether engagement measured after participants completed the first module of a 2-week mobile wellbeing intervention is predictive of the effectiveness of this intervention. Furthermore, it is studied whether different intervention and technological factors of a 2-week mobile wellbeing intervention influence engagement and effectiveness. Lastly, it is studied whether engagement mediates the relationship between the different versions of the intervention and their effectiveness.

Methods

A factorial experiment was carried out with 3 factors with 3 levels each (therapeutic approach: CBT, Meaning, Positive Psychology; feedback: text only, text with a picture of an avatar, pre-recorded video of a counselor; and design: non-gamified, story-line gamified, competitive gamified). Wellbeing, symptoms of depression and symptoms of anxiety were measured at baseline and after the intervention period, using the MHC-SF, PHQ-9 and GAD-7, respectively. Engagement was measured after completing the first module of the intervention with the TWente Engagement to Ehealth Technologies Scale (TWEETS). Regression and mediation analyses were used to answer the research questions.

Findings

Approximately 200 participants have completed both baseline and post-intervention questionnaires. Results of preliminary analyses will be presented at the conference.

Discussion

If the results confirm that engagement is a predictor for the effectiveness of digital health interventions and engagement can be influenced by different intervention and technological factors, this opens the way to create personalized, more effective, interventions.

Development of the LeaveApp: assisting forensic patients during leave is balancing between treatment and control.

Yvonne Bouman, Hanneke Kip and Dirk Dijkslag

Background

One of the most critical phases during secured clinical treatment of forensic psychiatric patients is the start of leave in general and more specific: unescorted leave. For both patients and staff, unescorted leave is strainful: Patient: Will I be able to withstand tempting possibilities? Will I be able to manage on my own? Staff: Will the patient abscond? And of course, will the patient refrain from delinquent behaviour whilst unsupervised? We developed a web-based app to assist patients and staff to support them during this phase: the LeaveApp [VerlofHulp] (Dijkslag et al., 2016).

Methods

During this presentation, we will guide you through the development process in which both the Risk Need Responsivity principles of effective forensic psychiatric treatment and self-management have been central. The first experiences with the use of the app (versions 1.0 and 2.0) in treatment will also be presented.

Findings

Implementation of this app proved to be a long road. Besides technical barriers, political, ethical and privacy issues had to be addressed during the process. Hence, we will present our lessons learned and the future path which we are currently taking in the implementation of de LeaveApp 2.1.

Discussion

Persuasion not only refers to the look and feel of technology, but also to contextual factors related to the target group and its environment. In forensic psychiatry, the complexity of the dual goal of protection of society coupled with treatment of severely ill patients warrants a thorough contextual analysis prior to the development and implementation of a specific technology.

Co-creation phases in integrating top-down and bottom-up requirements: development of a self-compassion app for cancer patients.

Judith Austin, Stans Drossaert, Jelle van Dijk, Jelena Mirkovic, Elin Børøsund Børøsund, Robbert Sanderman, Maya Schroevers and Ernst Bohlmeijer

A cancer diagnosis often involves profound psychological distress, while very few patients seek psychosocial care. Self-compassion is a resource that enables relating to experienced difficulties with kindness and wise, caring action. From previous research we know that compassion-based interventions can be effective in helping patients cope with long-term physical conditions. However, these interventions are minimally offered in self-help and/or mobile format. Since the uptake of existing psychosocial interventions is low, this project set out to develop a low-threshold self-compassion self-help intervention using mobile technology. The intervention needed to be based on theoretical evidence on compassion-based interventions to be able to offer their benefits. At the same time, the intervention needed to be aligned with the needs, wishes and experiences of patients to be of use to them, particularly during the chaotic time that follows after a cancer diagnosis. Therefore, design requirements include both theoretical evidence (top-down requirements) and user experiences, wishes and needs (bottom-up requirements).

To enable integration of these requirements, five co-creation phases based on workshops with patients and oncology nurses were conducted, each with concrete co-design exercises, as informed by the CeHRes Roadmap. The first phase, “exploration of challenges” focused on exploring bottom-up requirements. This phase searched input on the most important targets for the intervention according to participants and on topics to be addressed within intervention content. The second phase, “defining content and values” focused on user recognition, appreciation, and suggestions for alterations of top-down content, and how top-down content could be adapted to the needs and vocabulary of end-users. This phase yielded information on which topics and exercises were appealing to participants. The third phase, “concept design and features” focused on which bottom-up features are put forward by participants, and how they experience features derived from top-down requirements. This phase showed which design characteristics and features were most important for users (e.g. simple motivational elements but not too much gamification) and how top-down features would fit their needs (e.g. using push notifications, but letting the user choose the frequency). The fourth phase, “implementation”, explored how participants would receive, offer and tell others about the app. This input enabled us to determine the times and ways in which to introduce the app to patients and the role of oncology nurses. The fifth and last phase, “structure and integration” explicitly focused on the integration of bottom-up and top-down requirements by evaluating iterative cycles of prototypes (participants’ mock-ups, researchers’ mock-ups and designer prototypes). Valuable lessons from both the top-down input and bottom-up input were presented, after which similarities and differences between them were discussed. During the fourth and fifth phase, possibilities and constraints from the software developer were included as practical requirements.

During the presentation, concrete co-design exercises and methods of each phase will be illustrated, along with lessons learned. The five phases, methods and lessons from this co-creation process can be valuable for future intervention researchers/designers who aim to include end-users and stakeholders in the development, while also basing the intervention on existing theory and evidence.

Let’s Talk About It! Social Robots for Eliciting Disclosures for Emotional and Psychological Health.

Guy Laban, Jean-Noël George, Val Morrison and Emily S. Cross

Background

People tend to disclose thoughts and feelings with others, especially when experiencing unique life events. This is an evolutionary function of strengthening our interpersonal relationships, but also for producing a wide variety of health benefits. These include coping with stress and traumatic events, eliciting help and support (Frattaroli, 2006; Frisina, Borod, & Lepore, 2004; Kennedy-Moore & Watson, 2001), and playing a critical role in successful treatment outcome (Sloan, 2010). Given the importance of self-disclosure for psychological health, here we are interested in assessing the viability of using social robots for eliciting rich disclosures to identify needs and emotional states. We expect that people will ascribe mental capacities to these following social robots’ human-like design and gestures (Epely & Waytz, 2010), and thus disclosures to social robots will be genuine in nature.

Methods

Three (N1 = 26, N2 = 27, N3 = 61) within-subjects experiments with three treatments were conducted. In a random order, participants were asked one (in the first experiment) or two (in the second and third experiments) pre-defined questions about their life by each of the three different agents: (1) a social robot, (2) a human, or (3) a voice assistant, demonstrating different cues that corresponded appropriately to their embodiment. After the three interactions, participants answered a questionnaire reporting on their perceptions of self-disclosure (adapted from Jourard, 1971) for each of the agents. The interactions were recorded for content and voice analysis, extracting the length (in number of words) and duration (in seconds) of the disclosures, the sentiment (see Hutto & Gilbert, 2014) of the disclosures’ content, and the pitch, harmonicity, and intensity of the participants’ voice.

Findings

The first experiment entails that people perceived to disclose more to a human than to a robot and a voice assistant. This result was also observed in the third experiment, while that in the second experiment people perceived to disclose less to a voice assistant than to a human and a robot. In terms of objective measures of disclosure, no differences between the agents were found in the first experiment, mostly due to limited power. However, in the second and third experiments participants disclosed more information and were speaking for a longer duration to the human compared to the artificial agents (the robot and voice assistant). Also, participants' voice pitch was higher when speaking to a robot, compared to when speaking to a human or a voice assistant.

Discussion

Across three laboratory experiments, we provide relatively consistent evidence highlighting that subjective perceptions of self-disclosures differ from objective evidence of disclosure across three agents and suggesting that people are generally aware of their disclosures. As social robots are used in health interventions (see Robinson, Cottier, & Kavanagh, 2019) that rely upon high-quality verbal input from humans, developers should consider the stimulus cues to agent embodiment that will lead to optimal eliciting of information. Furthermore, the current results highlight that assessing quality of interactions in disclosures, especially in health settings, is not purely a matter of the quantity of information.

Session 5: Innovative interventions for rehabilitation

User profiles of myocardial infarction patients using The Box.

Laura Schrauwen, Veronica Janssen, Valentijn Visch, Thomas Reijnders, Andrea Evers and Douwe Atsma

Background

Rehabilitation after a myocardial infarction (MI) requires patients to change their behaviour of which one important aspect is maintaining a healthy lifestyle. Nowadays, this can be supported by selfmonitoring cardiovascular risk factors through eHealth. One such eHealth intervention is The Box, facilitating patients to use self-monitoring devices at home and continuously share these data with the hospital. Currently, this intervention is generic for all MI patients. However, tailoring The Box as to the needs of individual patients seems promising. Thereby, adherence can be enhanced, and healthy lifestyle maintenance can be supported. Accordingly, it is important to adopt a user-centred design approach and align to the user profiles. Therefore, the aim of this study is to develop rich user profiles (i.e., data-driven user segments) of MI patients using The Box.

Methods

This study will employ a mixed methods approach involving (1) database analysis of retrospective selfmonitoring data of The Box, and (2) generative interviews with patients currently using the box after MI. In (1), a cluster analysis will be done to identify and distinguish different usage patterns based on selfmonitoring data from around 260 subjects. In (2) these patterns will be enriched by generative interviews with 20 patients. Sampling will be based on each patient’s current usage pattern, as it is desired that all patterns found in (1) are represented. Each interview will be based on sensitizing material as part of the context mapping research method to immerse participants beforehand and be able to reveal latent needs. Finally, the results of (1) and (2) will be integrated create the user profiles.

Expected Findings

Preliminary cluster analyses in (1) have already revealed at least three consistent usage patterns that differ in terms of frequency and duration of using the self-monitoring devices. We expect that the generative interviews in (2) will provide insight in the different motivators underlying these usage patterns. Finally, the study will result in rich user profiles, each based on the typical usage pattern and explained by experiences, facilitators and barriers for (non)adherence and healthy lifestyle maintenance, and possible design opportunities. The generated user profiles will subsequently be used as a foundation for tailoring the design of The Box.

Discussion

During the conference, preliminary results of the creation of the user profiles will be shared which include the final results of the cluster analysis in (1). The generated user profiles through integrating (1) and (2) will directly be valuable for the further development of The Box: they will support the tailoring of this eHealth intervention to the needs of each individual patient through a user-centred design approach.

Kracht TeRUG – Development of Positive Psychology eHealth for spinal surgery patients.

Annemieke van der Horst, Karlein Schreurs, Ernst Bohlmeijer, Feike de Graaff and Saskia Kelders

Background

Spinal lumbar fusion surgery is an option to treat a specific type of (chronic) low back pain. About 65% to 75% of spinal surgeries are effective in achieving reduction of pain and improvement of physical functioning. Nonetheless, recovering from surgery is often accompanied by moderate to severe postoperative pain. Furthermore, around 20% of lumbar surgery patients experience persistent postoperative pain, also known as failed back surgery syndrome (FBSS).

To prepare spinal surgery patients for the procedure and help them cope with possible surgery-resistant pain and disabilities, an eHealth application ("Kracht TeRUG", Strength Back) is developed. The content of the application was created with the help of future users, i.e. patients and health care professionals.

Methods

For the development of the eHealth application, the CeHRes Roadmap was used. As a contextual inquiry, semi-structured interviews were held with 12 lumbar fusion surgery patients and nine health care professionals. For the value specification and design phase, three focus group sessions were held with health care professionals and new patients. During these sessions input was gathered, a prototype was demonstrated and feedback was collected.

Findings

Preoperatively, patients wanted to receive information about the surgery to prepare themselves and to manage expectations. Postoperatively, patients wanted to receive guidance during their recovery at home. They requested step-by-step physical guidelines and wished to remain in close contact with the health care professionals of the orthopedic center. Patients were open to the idea of positive psychology and thought this to be helpful in coping with the ups and downs of recovery. The health care professionals pointed out the app enables them to provide clear and uniform information.

We have developed an application with 8 modules and several exercises. The content is based on the input of the patients and professionals, combined with elements of positive psychology and mindfulness which have been proven effective for chronic pain patients in previous research.

The app, "Kracht TeRUG", contains several information modules: illness and surgery; preparation; pain education; pain medication; physical therapy; recovery; experiences of other patients; when to contact a doctor. Additionally, the app contains positive psychology modules with value based exercises and mindfulness exercises. To get a feel for the app: see screen shots in demo.

Discussion

During the interviews and focus group sessions, patients as well as professionals were very capable of voicing their needs and ideas for the eHealth application. Because future users were involved in the development of the application from the start, high adherence to the eHealth application is expected. Whereas care professionals may see surgery as a singular event, our research shows it takes place in a history full of health-related experiences, beliefs and expectations that require coping and emotion regulation to maintain emotional well-being. "Kracht TeRUG" aims to empower spinal surgery patients in the perioperative phase to cope with pain and their fluctuating recovery through the use of positive psychology, mindfulness and by providing information.

VReye! A virtual bicycle trainer for paediatric rehabilitation.

Jasmijn Franke, Juan Manterola, Hielke Penterman, Lieke Acherman, Ina Flierman and Monique Tabak

One of the problems experienced by children with developmental coordination disorder (DCD) is learning and performing motor skills, such as cycling. This is one of the skills learned in paediatric rehabilitation, however, the transition between the safe environment in which they train and the outside, real situation is too large. In the real situation, the number of cars and different kinds of distractions are not controllable and thereby cannot be gradually adapted to the individual capabilities. Furthermore, therapists are too occupied running after the children to prevent them from falling off the bicycle, making it impossible to pinpoint what exactly distracted the child or if the child was focussed on an object for too long. Without this information, the therapists cannot specifically target the therapy.

We expect that a virtual reality (VR) training environment can provide a tool that benefits the current treatment, by offering a safe and controlled environment for practicing bicycle riding without the risk of injury. Therefore, we have developed a VR bicycle training environment including eye tracking: the VReye!. The aim of the study is to investigate the user experience (i.e. enjoyment, presence, usability) of the VReye! prototype for children with DCD and to evaluate its clinical feasibility in paediatric rehabilitation.

A multidisciplinary, user-centered design approach was followed to develop the VReye!, including therapists treating children with DCD, parents of children with DCD, VR developers and scientists. Using the combined expertise and knowledge, specific design choices were made to ensure the VReye! is in line with the current therapy, their capabilities and their preferences. The VReye! consists of three components: 1) an immersive VR game training environment, 2) a real-life children's bicycle fixed on a bicycle trainer and 3) a therapist interface on a computer screen. Within the VR training environment the training goals and environmental stimuli can be adapted to the child's capabilities. Moreover, the virtual bicycle can be controlled (speed and direction) by pedalling and steering on the real-life children's bicycle. In total, 10 children will participate (7 – 13 years old) who can already cycle, of which two children with DCD. Each session consists of two phases: 1) a try-out of the VR training environment, followed by a structured interview with the child to assess enjoyment, presence and usability and 2) a simulated therapy session to use the VR training environment with a therapist. Afterwards, the therapist will fill out the System Usability Scale questionnaire. Clinical feasibility will be assessed by session notes of the therapist, analysis of the eye tracking data and a semi-structured interview with the therapists.

Results from the observational cohort study into the user experience and clinical feasibility of the VReye! will be presented at the conference. The outcomes of the study will benefit the further development of the VReye!, and will be used as a starting point for establishing the proof of concept and consequently, the clinical effects, to work towards a product that can benefit regular therapy of children with DCD.

Virtual Reality Mirror Therapy – Whenever and Wherever You Want.

Gido Hakvoort, Loes Bulle, Hilco Prins, Wouter Keuning, Martijn Klarenbeek, Sander Brink, Edwin Nibbering, Coen Kniknie and Marike Hettinga

Background

Mirror therapy is a common therapy to help patients recover after an accident in which an arm or hand is paralyzed. It activates mirror neurons and fools the brain into perceiving the paralyzed arm or hand is still moving. This stimulates the brain which is an important aspect to improve recovery. A similar setup can now be achieved using virtual reality technologies which not only allows for the addition of gamification elements but also gives patients the opportunity to practice whenever and wherever they want. Within the project 'Virtual Reality for Rehabilitation' we build these virtual reality environments and study how they can improve rehabilitation therapy and complement, or change, existing rehabilitation therapy. First, we studied to what extent the effects of mirror therapy are transferable to a virtual reality environment. We are now moving into the next phase of the project to study the use of virtual reality at home. In this research we focus on the question 'what kind of new issues and challenges are introduced when virtual reality mirror therapy is transferred to a home setting'.

Methods

We designed an in-the-wild study to evaluate the use of virtual reality for therapy at home as well as the experiences of the users. For this study we will invite participants with limited experience with virtual reality. We demonstrate participants how to use the virtual reality headset and show them how to exercise at home using a virtual mirror therapy room. Participants use the virtual reality headset (an Oculus Quest 2) for two weeks during which usage data is collected automatically by the system (e.g. duration of sessions, time spent in the lobby and virtual mirror room, time spent using the mirror, etc.). Furthermore, the participants will receive a cultural probe including instructions and a notebook, simple assignments, question cards, polaroid camera and (colour)pencils. After two weeks participants answer a questionnaire on usability (i.e. the System Usability Scale) and the virtual reality headset and cultural probe will be collected. Finally participants meet with the researcher to reflect on the use of virtual reality mirror therapy where the cultural probe will be used for leads.

Findings

At the time of writing, we are at the start of our study but will be able to present preliminary findings in the coming months. We expect to be able to identify some new issues and challenges when virtual reality mirror therapy is transferred to a home setting. Next to usability issues of both hardware and the virtual reality environment we also expect to find some environmental challenges which could help us to further develop virtual reality solutions for rehabilitation at home.

Discussion

During our study we invited participants with no to limited virtual reality experience, whether our findings can be generalized to patients is an important question that will have to be address. Finally, in order to integrate virtual reality mirror therapy, long term effects of the therapy on compliance, recovery, patient reported outcome measures (PROMs) and costs will have to be studied otherwise.

Session 6: Development and implementation of eHealth interventions for lifestyle

Exploring drivers and barriers to the implementation of lifestyle monitoring: a qualitative multiple stakeholder approach.

Karlijn Cranen, Inge Braspenning, Liselore Snaphaan and Eveline Wouters

Background

Lifestyle monitoring (LM), which allows for unobtrusive monitoring of activities of older adults in the home environment, is one approach in healthcare delivery to address problems associated with an aging population. It can detect health deterioration, facilitate early intervention and possibly avoid hospital admission. However, for LM to redeem its intended effects it is important that these innovative healthcare services are implemented effectively. Therefore, the aim of this study is to explore the perceptions of informal caregivers, healthcare professionals and healthcare managers of lifestyle monitoring and to gain an understanding of the factors that impede or facilitate successful implementation as seen important from their perspectives.

Methods

This study was based on a qualitative case design and included three regional care provider organizations in the Netherlands, which were involved in the implementation of lifestyle monitoring in the care for older (single household) adults living independently at home. The lifestyle monitoring system consisted of passive infrared - and contact sensors that were installed in the homes of older persons. Household activities were monitored with these sensors. With a mobile phone application, available for android and IOS devices, healthcare professionals and informal caregivers were able to monitor activities and receive alerts when unusual behavior was detected.

Semi-structured interviews were used to explore stakeholders' perspectives. A convenience sample was purposively selected and included five informal caregivers, four healthcare professionals and five healthcare managers. Interviews lasted between a half hour and one hour and a half hour approximately and took place at the homes of informal caregivers and the workplaces of healthcare professionals and managers. Written and verbal consent to participate was obtained from all participants. An open coding process was used to identify key themes of the implementation process. Data were then arranged according to a thematic framework using the four constructs of the Normalization Process Theory: coherence, cognitive participation, collective action and reflexive monitoring.

Findings

Coherence – all stakeholders agreed on the perceived benefits that lifestyle monitoring brings, e.g. fall detection, being able to monitor without intrusion of privacy and the provision of health data that support disease management decisions. Cognitive participation and collective action - management and healthcare professionals' engagement varied across providers, with low engagement impeding implementation. Engaging healthcare professionals was considered a challenge by all of the managers in this study sample and involvement strategies varied. Furthermore, informal caregivers raised the issue of being unaware of the existence of LM. In addition, stakeholders reported that an older adults' decision to use LM was often preceded by an adverse event such as fall injuries. Financial aid provided by the municipality was considered beneficial for the implementation of LM by all stakeholders. However, according to healthcare professionals, additional costs for Wi-Fi subscription remained an important barrier for low income households. Reflexive monitoring –all stakeholders made suggestions for improvements in LM design to facilitate uptake and implementation.

Discussion

This study highlights the complicated nature of implementing LM. The use of the NPT provided insight into which constructs could be targeted to facilitate successful implementation of LM. Future initiatives could possibly benefit from both the use of targeted communication strategies and the involvement of other stakeholders to reach involved users and increase engagement.

Screen Time Genie: Can Virtual Agents Help Humans Create Healthier Screen Time Habits? (Pilot Study 1).

Ari Qayumi, Steven Crane, Yuqi Yao, Roy Pea and Bj Fogg

Background

We used new behavior change methods and models to help people reduce unwanted screen time habits. Our goal for this pilot study was to test the impact of using a new scalable online tool developed by the Stanford Behavior Design Lab—Screen Time Genie (STG: accessible at screentime.stanford.edu). Our online tool uses a virtual agent chatbot for the behavior change intervention. STG aims to facilitate alignment between the user, designer, and algorithm, yet also empower the user to control their present and future screen time in ways that they want.

Methods

We received pre-screen survey responses from 344 participants about how they wanted to change their iPhone interactions. We subsequently ran a 21-day study with 187 qualified participants who wanted to reduce unwanted screen time on their iOS devices. We used a between-subjects design and randomized participants across three groups: passive control (PCG), active control (ACG), and experimental (EG). PCG received no intervention. ACG received no tool, but did receive researcher intervention for the selfdesign of two screen time reduction solutions. EG received the tool intervention (STG), choosing two solutions from STG's algorithmically-generated recommendations without researcher intervention. Participants re-intervention reported how they wanted to change their overall screen time and app specific usage. Post-intervention, the ACG and EG participants reported subjective feelings of confidence along three dimensions: implementing their solutions, reduction of unwanted screen time, and reduction of unwanted screen time as a result of implementing their solutions. After two weeks, 32 participants completed the study and reported whether they: would recommend the tool to a friend; intended to implement their solutions; implemented their solutions; had their smartphone in mind even when not using it; and how their screen time affected a series of health and human performance areas. iOS Screen Time reports measured participants' objective change in overall screen time and weekly averages for total screen time, most used apps, pickups, and notifications.

Findings

Pre-screen survey responses (n = 344) indicated people wanted to reduce their unwanted screen time use. Of this total, qualified participants (n = 206) reported how they felt about their screen time (43% sought less screen time, 24% desired more intentional and less mindless device use, 6% reported no issues in device use, 27% wanted context-specific screen time reduction). For these study participants, the intervention via our digital agent showed significant effects. In-session start surveys (n = 165) had a response rate of 17%, wherein the EG reported higher confidence in implementing their solutions (M = 6.33, SD = 1.03) than the ACG (M = 5.00, SD = 1.21), t(16) = -2.3, p < .05. In addition, iOS Screen Time reports from completed participants (n = 32) indicated a trend toward the EG reducing their unwanted screen time better than ACG or PCG. When compared to the ACG, the EG rated solution match quality more highly, engaged in fewer device pickups, and had lower screen time across applications, websites, and categories. EG participants reported less dependency, feeling more productive, focused, intentional, and mindful when using their devices as well as a 93% likelihood of recommending the product to a friend (compared to only 66% from ACG).

Discussion

With the onset of the COVID-19 pandemic mid-pilot, participants sought help with controlling and increasing, in addition to reducing, their screen time. Our pilot study results support further systematic investigation of STG's efficacy in promoting key digital health behaviors. To the authors' knowledge, our team created the first system that applied behavior design to optimize app-specific screen time behavior change. Further, we created, curated, and cultivated the largest global repository of solutions for reducing screen time. Participants' responses and device usage also showed a clear need and possible correlation: users want technology to empower them to feel more "intentional" and "mindful" in their interactions, and when they felt those ways, they tended to have less unplanned app-specific screen time, rather than less screen time overall. Given research on designing systems for healthy user–technology relationships is nascent, STG opens the door for pioneering consensual technology design principles distinguishing between app-specific wanted vs unwanted screen time behavior change. Future experimentation and longitudinal studies will examine facilitating better digital habits by design.

Adherence to Smoking Cessation Treatment and predictors of adherence: Comparing Blended Treatment with Face-To-Face Treatment.

Lutz Siemer, M. G. Brusse-Keizer, M. G. Postel, Somaya Ben Allouch, Robbert Sanderman and M. E. Pieterse

Background

Blended face-to-face and web-based treatment is a promising eHealth service. Since adherence has been shown to be an indicator for treatment acceptability and a determinant for effectiveness, we explored and compared adherence and predictors of adherence to a blended and a face-to-face smoking cessation treatment, both similar in content and intensity. The objectives of this study were (1) to compare adherence to a blended smoking cessation treatment (BSCT) with adherence to a face-to-face treatment (F2F); (2) to compare adherence within the blended treatment to its F2F-mode and Web-mode; and (3) to determine baseline predictors of adherence to both treatments as well as (4) the predictors to both modes of the blended treatment.

Methods

We calculated the total duration of treatment exposure for patients (N=292) of a Dutch outpatient smoking cessation clinic, who were randomly assigned either to the blended smoking cessation treatment (BSCT, N=162) or to a face-to-face treatment with identical ingredients (F2F, N=130). For both treatments (BSCT vs. F2F) and for the two modes of delivery within the blended treatment (BSCTs F2F mode vs. BSCTs Web mode), adherence levels (i.e. treatment time) were compared and the predictors of adherence were identified within 33 demographic, smoking-related, and health-related patient characteristics.

Findings

We found no significant difference in adherence between the blended and the face-to-face treatment. BSCT patients spent an average of 246 minutes in treatment (IQR 150-355; 106.7% of intended treatment time); F2F patients spent 238 minutes (IQR 150-330; 103.3%). Within BSCT, adherence to the face-to-face mode was twice as high as to the web-mode. BSCT-patients spent an average of 198 minutes in F2F-mode (SD 120; 152% of the intended treatment time) and 75 minutes in Web-mode (SD 53, 75%).

Higher age was the only characteristic consistently found to uniquely predict higher adherence in both BSCT and F2F. For F2F, more social support for smoking cessation was also predictive of higher adherence. The variability in adherence explained by these predictors was rather low (BSCT: R2=.049; F2F: R2=.076). Within BSCT, to be living without children predicted higher adherence to BSCTs F2F-mode (R2=.034), independent of age. Higher adherence to BSCTs Web-mode was predicted by a combination of an extrinsic motivation to quit, a less negative attitude toward quitting and less health complaints (R2=1.64).

Discussion

This study has been one of the first attempts to thoroughly compare adherence and predictors of adherence of a blended smoking cessation treatment to an equivalent face-to-face treatment. Interestingly, although the overall adherence to both treatments appeared to be high, adherence within the blended treatment was much higher to the face-to-face mode than the web mode. This supports the idea that in blended treatment one mode of delivery can compensate for the weaknesses of the other. The low variance in adherence predicted by the characteristics examined in this study, suggests that other variables, such as provider-related health system factors (e.g. communication style, clarity of diagnostic and treatment advice; or continuity of care) and time-varying patient characteristics should be explored in future research.

Monitoring menopause: Use of and need for self-tracking health technologies in menopause.

Teddy Eliëns, Marieke Hendriks, Marjolein de Boer, Nadine Bol, Jenny Slatman and Emiel Krahmer

Background

Over the last decade, self-tracking health technologies have become increasingly popular. A number of self-tracking apps offer options geared towards women and their health, and especially towards monitoring their bodily changes. As menopause involves a plethora of possible bodily changes – e.g., the cessation of menstruation, hot flashes, a dry(er) vagina, high blood pressure, or insomnia – , there is a broad spectrum of potential apps that menopausal women may use to track these changes. Despite the potential for technology in supporting menopausal women, we currently lack knowledge about these women's use of and needs for self-tracking apps.

Methods

To identify what kind of self-tracking apps women use, whether they use them for menopause, and what their self-tracking needs are, an online survey was developed. Through online posts and snowball sampling, we recruited menopausal women to fill out the online survey. Respondents (N = 203) were on average 53 years old (M = 52.82, SD = 4.15, range 42-66). The survey consisted of questions regarding women's current health app use, their need for apps regarding menopause, and perceived availability of apps for menopause. Current health app use was measured by asking the number of health apps women had installed on their smart device(s), the names of these apps (max. 10), and for which menopausal symptoms they used these apps. Furthermore, we assessed their need for and perceived availability of apps for menopause with two questions on a 7-point Likert scale.

Findings

Our preliminary findings indicate that out of the 203 respondents in the study, 125 women indicated to have mobile health apps (61.6%). On average, women reported to have about 3 health apps – such as pedometers, calorie counters, and period trackers – installed on their mobile device(s) (M = 2.81, SD = 2.62, range 1-20), of which 84.6% were actually used. Furthermore, 56.4% of the wide variety of health apps that women reported were used for menopausal symptoms, such as weight gain (11.6%), mood swings (6.1%), and fatigue (5.9%). Women who use health apps reported a higher need for apps specifically for menopause (M = 2.93, SD = 2.10) than those who do not use such apps (M = 2.01, SD = 1.65), t(188.49) = 3.44, p = .001); however, this need is still relatively low. Moreover, women who used health apps felt there was a lack of availability of health apps for menopause (M = 3.86, SD = 1.75) compared to those who do not use health apps (M = 4.58, SD = 1.59), t(194) = -2.87, p = .005.

Discussion

Our study shows initial support that many menopausal women are using mobile apps for their health, and also to some extent for monitoring menopausal symptoms. Interestingly, while women reported a relatively low need for menopause apps, they also generally felt that there was a lack of availability of such apps. Our poster will further outline women's formulated needs for menopause apps and the role technology could play in supporting those needs. Such insights are valuable in developing health interventions for menopause.

Session 7: Supporting healthcare staff by technology

Training of Ambulance Nurses with Virtual Reality: Finding the Business Case

Hilco Prins, Chris Dijksterhuis, Bram Oosting, Nick Degens and Marike Hettinga

Background

Virtual Reality (VR) can bridge the gap between theoretical educative materials and complex real-life situations that ambulance nurses face in practice. The ability to simulate scenarios from a compelling caregiver perspective offers a powerful learning method. We aim to contribute to the training of ambulance nurses by utilizing new opportunities that VR offers. In this study we investigate which factors contribute to the implementation and long-term use of VR training by ambulance services for their employees.

Methods

We held interviews with five heads of learning & development departments of ambulance care services. We developed a questionnaire with 20 open questions based on the STOF model in combination with phases of technology development. The interviews were recorded and then analyzed by placing relevant comments and statements in the CANVAS business model.

Findings

With regard to the value proposition, respondents think that use of VR can contribute to the organizations' vision on ambulance care training. They strive for practice-oriented, personified, teacher-independent, blended learning and learning together. Respondents would like to see that VR-training focuses on components that now receive less attention and situations that cannot easily be trained with other means, such as soft skills, rare situations and upscaling. They also find dealing with distracting and dangerous circumstances extremely suitable for VR. Respondents find it important that the VR training can be embedded in working processes and linked to IT systems. Both in terms of terminology and in terms of content, the VR training must fit with professional requirements and tasks, the CanMEDS roles and learning objectives. It must be provided with teaching materials and lesson plan. For accreditation, it should be possible to automatically register the credits and training hours of employees. Insights and procedures are changing rapidly in the world of ambulance care, which means that maintenance and organization of updates will have to be a major part of the service.

With regard to the business case, a distinction should be made between individual and team use. In the case of individual use, scarce ambulance personnel need to be scheduled less for training days, making them more employable. During the service, they can train independently at times when no effort is required, even during evening, night or weekend shifts. In the case of team use, savings can be made if it leads to substitution of more expensive training courses. With VR it should be possible to get more out of or save on expensive large-scale simulation exercises on location. It provides the opportunity for preparation, practice and repetition of all roles, thereby increasing learning outcomes.

Discussion

Simultaneously with the development of the VR application, we have started investigating the requirements from the implementation perspective so that this can serve as input for the development. This interactive method means that the implementation issue is still evolving. Important issue in the short term is ownership and in the long term multiplayer opportunities with other first responders such as police and firefighters.

Innovating care through technology and education. An ethnographic view on care education in transition.

Annemarie van Hout, Guus ten Asbroek and Marike Hettinga

Background

In the project "Fieldlabs, 21st Century community care", directed by ROC of Amsterdam, 17 partners in care, education, local authorities, technology providers and research institutes collaborate in the Amsterdam region. Fieldlabs aims to innovate education in care, in order to make it '21st century proof'. A major ingredient in this innovation process is care technology. In different subprojects, experiments are undertaken in which for example nursing students are testing different technologies to improve quality of life for residents of in a nursing home. One way to see if the project has the desired effect, is user research. We are therefore aiming to answer these questions: What experiences do the various users of the field labs have and how do these experiences relate to the objectives of the main project?

Methods

Ethnographic research helped us to map the subprojects and both observe and discuss what participants experience. We carried out participatory observations, interviews with various users and deliberated our findings in focus groups. During the project we discussed some of our data with the project leaders, deriving from responsive methods, in order to let them learn from our insights, and us learning from their expert reaction, but also to be able to follow the projects closely. Grounded theory helped us to analyze our material, which we present to the project group in regular interim reports.

Findings

Themes we have identified are: learning, encounters and organizational issues. The themes show different perspectives on starting problems of innovative processes, but also what works very well in the project. Some of the outcomes show how an innovation can be a success and an issue at the same time. Students for example were very enthusiastic about the opportunity to experiment with technology in order to solve a resident's problem, especially since they were on an internship and therefore exercising this learning in another care organization. For residents concerned and their regular care professionals it was mostly a nice intervention, but there are worries about scaling up: what if this experiment will repeat itself every semester? And who will take care of the follow-up: will the technology be here to stay, who is taking care of fall-outs, etcetera?

Discussion

In this presentation we will map different users for whom different norms and values are important and potentially can conflict. For caretakers an important value is being able to give care that fits the resident's needs. Often understaffed, projects out of the daily scope can be a challenge. Teachers, one of the other user groups, value innovating education, increasing supervision and using new technologies. We will discuss our observations of their interaction. We will furthermore explore the various values and norms in user research, focusing on innovating care through technology and education and try to answer questions on how to deal with them.

Using a digital interactive narrative as guided self-reflection to encourage self-care in novice nurses.

Ivo Bril, Nick Degens, Joke Fleer and Lisette van Gemert-Pijnen

Background

Burn-out and turnover rates among novice Dutch nurses are high. One of the main reasons for this is the difficulty in adjusting to the tumultuous working environment or making it work in their favor. This is particularly hard for novice nurses, as they do not have enough experience to reflect on their ordeals and take appropriate actions.

One way to prompt their self-reflection is to provide focused questions within controlled situations that are believable and relatable. The contextualized guidance provides clarity and helps novice nurses analyze tough situations in a safe and structured environment. Through this process, they are invited to reflect on what they could do differently, or whom they could reach out to for help.

Methods

Using a User-Centered design research approach, we have developed a digital interactive narrative that helps novice nurses identify aspects of their job that they find challenging (i.e. it provides contextualized guided self-reflection). In this prototype, the reader plays through an interactive story based on common work floor experiences that require assertive behavior (e.g. a shift throughout which a patient is too demanding). At certain points in the story, the user has to consciously decide how the protagonist acts by selecting from a set of possible (re)actions (Fig. 1). Each action leads to story-appropriate consequences (Fig. 2, 3), after which the story continues. After finishing the story, users are provided with more in-depth feedback on their (non-) assertive behaviors, using the related moments in the story as context.

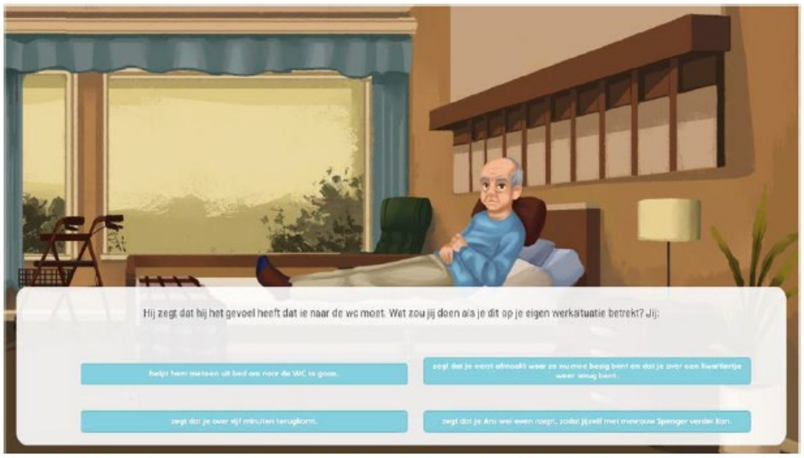
In line with our User-Centered approach, testing was aimed at informing future iterations of the prototype with input of the target audience. In its current form, the focus was put on the clarity and realism of the story, the level of control experienced by the user, and the acceptance and perceived usefulness of the feedback. Small-scale tests were conducted with a group of student nurses with internship experience (n=18). A version of the prototype was played and feedback was gathered through the use of interviews and surveys.

Results

Both groups deemed the story very realistic and recognizable; some nurses described that they had had similar experiences during their internships. The group had no issues with the interactive nature of the story and they liked the tough choices they had to make, stating that it made them think of similar situations they had experienced themselves. Although the feedback-aspect was only tested with a part of the participants, this aspect was unanimously seen as clear and useful. However, the prototype lacked a clear follow-up on what to do with the feedback and what to do next.

Discussion

As there is no true surrogate for experience, novice nurses need more support as they acclimate to the complex demands of the working field. Although the scale of testing was limited, the prototype shows promise as a vehicle for guided self-reflection. Further iterations should refine the feedback element at the end of the story to focus more on supporting the user in taking action to achieve meaningful change.



Hij zegt dat hij het gevoel heeft dat ie naar de wc moet. Wat zou jij doen als je dit op je eigen werksituatie betrekt? Jij:

Figure 1: A choice moment in the narrative. Do you help the patient straight away, come back after you're done with your other task, or ask for help?

Meneer Meijer pakt je hand vast en zegt: "bedankt lieverd, jij bent de beste".

Figure 2: An example reaction of a character. In this case he is pleased with the fact that you helped him straight away.

Meneer Meijer mokkend: "maar dit is toch gewoon jullie werk?"

Figure 3: An example reaction of a character. In this case he is upset because you didn't help him straight away.

Session 8: Technology for loneliness and grief

Qualitative explorations of robotic animal companions in dementia care.

Ans Tummers, Marleen Hillen, Yvonne De Kort and Wijnand Ijsselsteijn

Background

We explore the potential psychosocial health benefits offered by affective presence technology, specifically robotic animal companions, for people living with dementia. In research to date, robotic companions have shown promise to enhance quality of life, including the desire to feel needed, to hug, to ameliorate loneliness and stimulate reminiscence, and to provide emotional support, social bonding and feelings of security. .In our present research, we extend current work by including comparative and longitudinal perspectives. We report on insights obtained from two qualitative studies, deploying two different robotic animals in contrasting environments, timespans and circumstances.

Methods

Both qualitative studies use behavioral observations and interviews as the primary means of data collection. The first study (n=12), in a care home setting, compares psychological and behavioral engagement of people with dementia when interacting with a real dog, a robot animal companion (Pleo), or a human only. The second study (n=1), a longitudinal case study over 9 months, focuses on an elderly lady, Elsie, age 82 with middle stage Alzheimer's disease. It investigates the psychosocial effects of long-term bonding with a soft fur covered robotic cat. We use thematic analysis to explore the results.

Findings

The results from the first study suggest that the conversations and interactions with the life dog and the Pleo robot were more fluent than the interaction with the life person only. Participants were stimulated to enthusiastically tell about animals they used to own. In the second study, Elsie immediately started talking to the robotic cat, caressing it, and accepting it as a socially responsive and feeling creature. The robotic cat acted as a social lubricant and created opportunities for interaction between Elsie and other seniors. Even after 9 months of intense interaction with the robot cat, there's no lull in engagement and psychosocial rewards are still strongly experienced.

Discussion

Robotic companions appear to generate a form of affective presence which may result in rich and varied responses, ranging from surprise and engagement (Study 1 and 2) to intense feelings of love and attachment (Study 2). The 'illusion of non-mediation' appears to be rather high – robotic companions are immediately accepted as feeling, sentient creatures, and treated as such. Robotic companions provide excellent opportunities for interaction with others – they are shared objects of interest that can trigger conversations and social interaction between familiar strangers (i.e., triangulation) and may stimulate reminiscence.

The lifelikeness of the robotic companion seems to play a secondary role. The simple robot cat's repertoire of relatively basic responses combined with its tactile qualities appears sufficient to create a strong emotional attachment. The more complicated behavioral repertoire of the Pleo (Study 1) did not result in more rewarding interactions, and may be harder to use and more vulnerable to malfunctions. Overall, our results suggest that robotic animals, in quite different settings and over longer periods of time, can provide affective presence, create strong emotional attachment, and can play a significant role in the immediate and long term psychosocial health of individuals suffering from middle to late stage dementia.

A Delphi study for delivering blended care and personalising eHealth to support grieving older adults.

Lena Brandl, Miriam Cabrita, Jeannette Brodbeck, Dirk Heylen and Lex Van Velsen

Background

Complicated grief in adults is a condition where severe grief symptoms occur longer than six (ICD-11)/ twelve (DSM-5) months after bereavement and frequently results in a multitude of mental and physical problems. eHealth interventions have been shown to be effective in treating mental illnesses, including complicated grief. One such eHealth intervention is the evidence-based grief intervention LIVIA which supports grieving older adult in adjusting their lives after bereavement through text-based psychoeducation about the grief trajectory and cognitive-behavioural exercises. A core challenge for eHealth interventions is to keep clients engaged and thereby, to mitigate intervention dropout. To address these challenges, the LIVIA self-help intervention will be re-designed as part of the AAL project LEAVES so that a) it escalates from self-help to blended care when the mental state of the client deteriorates, and b) it dynamically tailors the intervention content to the client's characteristics.

Methods

We conducted a three-round Delphi study involving 16 international (clinical) grief and eHealth experts with two objectives. The first aim was to identify a set of indicators for monitoring the mental state of the client from within the grief intervention and to rank these indicators according to their importance for escalating from self-help to blended care. The second aim was to elicit adaptation strategies that can be used to tailor the intervention to the individual's characteristics and to rate these adaptations according to their potential for increasing clinical effectiveness through improved client adherence to the program.

Findings

Eighteen monitoring parameters were elicited and grouped into four categories: clinical, behavioural/emotional, interactive, and external. Clinical parameters emerged as the most important category for escalating from self-help to blended care. Overall, the expert panel perceived Suicidality, Self-destructive behaviour, Client-initiated escalation, Unresponsiveness and (Complicated) Grief symptoms as most urgent to attend to for escalation, despite considerable disagreement regarding parameters' importance when compared against parameters of the same category. Regarding the second objective, the resulting adaptation strategies encompass dynamic adjustments while the client interacts with the intervention, as well as static, one-time adjustments performed at the initialization of the service. Adaptations that dynamically affect when which content is presented to the client were rated as the most promising strategies for enhancing the clinical effectiveness of the intervention through client adherence.

Discussion

Monitoring parameters that capture perceived danger for the client and their ability to continue the intervention by themselves emerged to be most important to attend to for escalating from self-help to blended care in an eHealth intervention for grieving older adults who lost their spouses. Differences in the conceptualization of the monitoring feature appeared to underly panelist disagreement: some participants considered an initial assessment of the suitability of self-help for the client's individual grief situation, while others considered continuous monitoring of the client's mental state. The panel's preference for dynamic tailoring is discussed in light of earlier research that supports the enhanced effectiveness of tailored eHealth interventions that dynamically adjust their content to client characteristics.

LEAVES: A virtual agent for processing grief in later life.

Lex van Velsen and Lena Brandl

Background

Loss of a spouse is a frequent occurrence in later life. While most older adults successfully process this loss and will return to a normal life, approximately 25% of the individuals is unable to do this, and progress to prolonged grief. Prolonged grief, on its turn, can result in many mental and physical problems, like poor sleep, cardiovascular problems, depression, and suicidal tendencies.

Methods

LEAVES (optimizing the mentaL health and resiliencE of older Adults that haVe lost thEir spouSe via blended, online therapy) is an online grief program, offered by a virtual agent, that will support in the prevention and treatment of prolonged grief, so that older mourners can lead an active, meaningful and dignified life. The LEAVES service will consist of the online grief program Livia, the Before You Leave program, that allows for storing personal memories, Roessingh Research and Development's virtual agent platform, and accessible front-end design. LEAVES helps older adults to process the loss of a spouse in an empathic and caring online environment. It can detect persons at risk for complications, can uncover negative trends in their emotional life, and will act to counter this trend. LEAVES will cater to secondary end-users (family, informal caregivers) by reducing stress. The service relies on online treatment if possible, but is blended with telephone or face-to-face counselling when necessary.

Findings

LEAVES is a project that is funded within the Active and Assisted Living (AAL) Programme. The LEAVES consortium covers three countries (the Netherlands, Portugal and Switzerland), and includes lead users and exploitation partners from each country. The project takes place between February 2020 and January 2023. Through iterative, user- and stakeholder centered design, a service model, functional and visual design will be developed, tested, and redesigned to ensure high usability and a pleasant user experience. The project will include a real-life evaluation in which 315 end-users will use the service in three countries (the Netherlands, Portugal and Switzerland). The evaluation of LEAVES will focus on clinical effect, its business case, and technology acceptance. These results will pave the way for smooth integration in existing care paths and reimbursement schemes. Simultaneously, a value proposition and Pan-European business model will be developed. During the presentation, we will set out the project and present our initial findings on functional and user experience design.

Discussion

LEAVES service aims to soften the mourning process, prevents depression or social isolation, strengthens widow(er)s resilience and wellbeing, and quickens a return to societal participation. In this presentation, we will present the project in general and first results of the service model and technology development.

Companion Robots – Science Fact or Science Fiction?

Katie Riddoch and Emily Cross

Background

In an attempt to reduce loneliness and the myriad associated health problems, companies are in the process of developing 'companion robots' - machines designed to be engaging, comforting, and respond to the user in an intuitive manner. As well as having capabilities of functionally assistive robots (e.g. carrying food and fetching medication), a further aim of companion robots is to design these machines in such a way that they can connect with a user in a social way. To quantify the extent to which we perceive robots as social agents, opposed to objects, researchers have employed tasks in which they ask participants to inflict “harm” to a robot. The length of time between being given the instruction and complying (termed “hesitation”) is measured. Researchers propose that relatively long periods of hesitation reflect empathy for the robot, and the perception that it has agency, and is “sentient”.

Methods

In our laboratory-based experiment, 84 adults aged 18-83 interacted with the Pepper Robotic System (Softbank Robotics) for approximately 10 minutes. We then used an adapted version of the “hesitance to hit” paradigm in which participants were instructed to hit the humanoid robot on the head with a mallet. After agreeing to do so participants were halted, and a semi-structured interview was conducted to probe the thoughts and feelings they experienced during the period of hesitation. We were curious why people hesitated, and whether hesitation reflects bonding or attachment to the robot, as suggested in previous research.

Findings

Preliminary analysis of participant responses indicates that that hesitation not only reflects perceived socialness - but other factors including (but not limited to) concerns about cost, cognitive overload, and the influence of authority. Interestingly, the responses also offer insight into individual differences with regards to anthropomorphism, and feelings of connection towards the robot. Specifically, we find that some people heavily anthropomorphise the robot – expressing that they perceive the robot as aware, feeling, and with gender. In contrast, some people state that they feel little after being asked to hit the robot, and that it is simply an object or machine. In future we intend to compare the qualitative and demographic data – potentially shedding light on the source of such individual differences.

Discussion

The findings of this study allow us to better understand the “hesitance to hit” measurement technique – leading us to advocate for the use of semi-structured interviews in other lines of research. In addition to aiding method-validation, the words of participants are thought-provoking and insightful. In addition to generating new research questions, the responses speak to how some people form strong connections with the robot after a mere ten minutes. Currently, the end user of “companion robots” is regarded to be individuals with autism or dementia, however these findings suggest a potential place for social robots in the lives of the broader population.

Session 9: eHealth development for chronic diseases

User needs, requirements and usability issues of a platform for healthy Living: “BENEFIT for all”.

Jobke Wentzel, Britt Bente, Floor Sieverink, Thomas Reijnders, Linda Breeman, Roderik Kraaijenhagen, Veronica Janssen, Andrea Evers and Lisette van Gemert-Pijnen

Background

Make healthy living fun – this is the goal of the online ‘BENEFIT’ Personal Health Platform (PHP), which aims to support cardiac patients with adopting and maintaining a healthy lifestyle, by facilitating healthy behavior and rewarding it [1]. Grounding a healthy lifestyle in patients’ daily life, creating long-lasting behavior change and healthy habits is a challenge. This study aims to evaluate the user experience/usability with the Benefit PHP.

Methods

Two rounds of online usability tests with additional interviews were conducted with cardiac patients. Round 1) cardiac patients who were recently introduced to the BENEFIT PHP, just after finishing their revalidation process in the hospital. Round 3) cardiac patients who use the BENEFIT PHP for more than six months after they finished their revalidation process in the hospital. During both rounds, the BENEFIT PHP was evaluated by testing scenarios of use, and subsequently interview patients. In addition, participants were asked to fill in the Twente Engagement with Ehealth Technologies Scale (TWEETS) measuring their engagement with the technology [2].

Findings

Main usability findings in the first round (novice users) include the observation that most basic tasks (e.g., entering and viewing self-monitoring values such as blood pressure), are easy to perform. Some minor issues were identified such as use of difficult language, and difficulty in personalizing the overview dashboard. The usability tests and user comments show that the system guides users through the first tasks. Users encounter problems in goal-setting, and interpretation of entered values. The presence of a virtual coach (no mayor usability issues) contributes to motivation and a feeling of being ‘seen’. Outcomes of the TWEETS showed that users are neutral about the BENEFIT PHP as being part of their daily routine, making it easier to work on their goals, helping to get insight in their behavior, enjoying to use, and as fitting them as a person. Users agree that BENEFIT PHP is easy to use, can be used as often as needed, motivates them to reach their goal, and makes it enjoyable to see the progress they make. The second round of usability test will be conducted in February-April; the results will be compared to the first round’s results to learn about possible changes in use and user experience.

Discussion

The development process in this project has been iterative; many evaluations contributed to (proposed) changes in the design of the platform. No mayor usability issues were identified, previous user involvement may have contributed to this finding. Regarding user goals and expectations, some issues were encountered; users claimed a desire to also ‘do’ something with their data; receive support to learn and understand what is happening. Also, presence of a coach, even if there is little interaction with the coach is important for the patients and their use of the PHP. In fact, such findings shed light on the context and requirements for implementation of this project into various possible contexts.

Development of an online integrated care platform with and for health care providers and patients: lessons learned from the H2020 Connecare study in respiratory patients.

Esther Metting and Maarten Lahr

Background

The Connecare H2020-EU project aims to develop a smart adaptive integrated care platform for chronic disease management. The consortium consists of a health care providers, IT specialists and scientist from all over Europe. The developed prototype with a dashboard for health care providers and app for patients can support healthcare providers (HCP) to organize care around chronically ill patients. In this way, communication between HCP will be facilitated and patients self-management will be stimulated. In this study we describe the development of the app for respiratory patients.

Methods

Patients with asthma and COPD cyclically evaluated the prototype that was connected with a Fitbit and their opinions were shared with IT technicians during regular consortium meetings. Moreover we evaluated the log data of the prototype tested in 6 months follow-up. We also evaluated the usability of using motivating messages regarding physical activity using the System Usability Scale (SUS).

Findings

Patients provided feedback on the prototype of the application and the app was adapted accordingly. Especially the layout was improved. Patients who used the app for 6 months (n=46, mean age 60±13, range 31-82, 52% male, 30% asthma, 65% COPD, 4% ACO) needed support when installing the app but were able to use the app after installation. The app was considered to be user friendly (SUS: 82%±16). Sending motivational messages did not improve the average step count.

Discussion

The Connecare prototype improved substantially based on patients' feedback. However, patients need support when installing and linking the prototype with the Fitbit. The prototype is ready for further development and implementation.

Adherence to a pilot eHealth self-management intervention for patients with both COPD and heart failure.

Joanne Sloots

Background

eHealth might support self-management interventions by facilitating home-based care through monitoring and coaching. We hypothesize that our eHealth self-management intervention, tailored for patients with Chronic Obstructive Pulmonary Disease (COPD) and Chronic Heart failure (CHF), could improve patients' adherence to self-management action plans and inhaled medications.

Methods

The eHealth self-management intervention that was developed for this pilot study, included proven effective daily symptoms diaries that were linked to an automated decision support system and launched self-management advices if necessary (e.g. self-treatment), real-time monitoring of inhalation medication by an add-on sensorized inhaler, and feedback from an embodied conversational agent. Patients participated in three self-management training sessions and subsequently used the eHealth self-management intervention via a portal on a tablet for approximately four months. We assessed patients' adherence to: 1) symptom diary completion; 2) following up advices from the decision-support system; and 3) using inhalation medication. Also, inhalation technique was analyzed.

Findings

Eleven patients with COPD and CHF with a mean age of 66.8 ± 2.9 participated, 4 women and 7 men. In total, 1148 (91%) of the daily diaries were completed on the same day. Seven patients received 24 advised actions via the portal, of which 11 (46%) were performed. Thirteen (54%) actions were not performed, of which 6 were 'call the case-manager' and another 5 were not performed in agreement with a healthcare provider. Seven patients used a sensorized inhaler with a total inhalation adherence rate of 98.4%, while 51.9% of the inhalations were performed correctly. The most frequent error made was inhaling too short (79.6%).

Discussion

Patients' adherence to self-reporting symptoms via the eHealth self-management intervention and to inhalation medication was high. However, both following-up of the advice 'call the case-manager' and inhalation technique was poor. Qualitative analyses could help to identify reasons for non-adherence, so that the intervention could be further tailored and patient adherence could be improved. Also, it would be interesting to assess whether incorporating real-time personalized coaching could improve inhalation technique and adherence to following up actions.

Session 10: Methods for eHealth development, implementation and evaluation

The maturity of the technology as the starting point of your eHealth evaluation.

Stephanie Jansen-Kosterink

Background

The clinical evaluation of eHealth interventions is challenging. The time allocated to the evaluation in research projects is often insufficient to assess changes in clinical outcomes. Resulting in disappointing outcomes, hampering the future implementation of the eHealth intervention. In literature is suggested to tailor the type of evaluation to the development cycle of the technology. Therefore, the starting point of every eHealth evaluation should be the maturity of the technology. Therefore the aim of this presentation is to address the appropriateness to use the level of maturity of an eHealth technology as starting point for every evaluation to obtain valuable knowledge.

Methods

The maturity of an eHealth technology can be assessed by Technology Readiness Levels (TRLs). These levels offer the possibility to clearly communicate whether a technology is ready for use in daily practice. The TRL scale is an ordinal and qualitative scale and TRLs are time and context specific. In total three phases of maturity are described: the research phase (TRL1 toTRL3), the development phase (TRL4 – TRL6) and the deployment phase (TRL7 – TRL9). For this study we present the planned clinical evaluation of the Back-UP project (Project Number: H2020-SC1-2017-CNECT-2-777090) as a case. The aim of this European project is to develop a technological platform (Back-UP tool) with prognostic models to improve management of neck and low back pain. Within the duration of this project, 36 months, both the prognostic models and the technology needs to be developed and evaluated.

Findings

The original plan was to evaluate the clinical effectiveness of the Back-UP tool within a stepped wedge cluster randomized trial (SWT). An SWT is a pragmatic study design and the outcomes of a SWT are very close the daily clinical practice. At first, it was the idea that the maturity of the technology would be TRL7 or TRL8. However, during the project it seems that the overall maturity of the technology was more close to TRL3 or TRL4. The opinion of the consortium was that it will not be productive to introduce immature technology to clinical practice too quickly. This could lead to non-use and disappointment, and hamper further implementation of the Back-UP tool or other eHealth innovations. Therefore, it was decided to abandon this original plan and search for alternatives to support the development and further implementation of the Back-UP tool. Given the current maturity of the Back-UP tool the evaluation we will assess the level of acceptance of the future tool among clinicians based on a low-fidelity prototype, visualized by a computer animation.

Discussion

Within the Back-UP project, the adjusted evaluation will result in knowledge which speed up further evaluation and implementation of the Back-UP tool in a clinical setting. In conclusion, researchers should be resilience and adapt in all cases the clinical evaluation to the maturity of the technology to obtain valuable knowledge and speed up future implementation of the eHealth innovation.

Development methods for eHealth technologies: an initial overview.

Hanneke Kip, Julia Keizer, Nienke Beerlage-de Jong, Nadine Köhle and Saskia Kelders

Background

Thorough development of eHealth is necessary to ensure a good fit between the technology, its users and the context. Development processes of eHealth can be guided via models such as the CeHRes Roadmap: a framework for persuasive, holistic eHealth development. However, despite the importance of development, not much is known about specific methods for different development phases and settings. This highlights the importance creating an overview of methods that can be used to make informed, well-substantiated decisions about which methods to use in the development process, resulting in more efficient development. In order to create a first, initial overview of methods, we conducted a scoping review. The goal of this study was twofold: first, to create an overview of development methods used, and second, to provide insight into the lessons learned about these methods. The results of this study can serve as the foundation for a toolkit for eHealth development.

Methods

In order to create an up-to-date and complete overview of development methods used in the targeted studies, a scoping review on eHealth development studies which were based on the phases and principles of the CeHRes Roadmap was conducted. Data from 138 papers were systematically analyzed. Via elaborate data extraction forms we extracted information about the type of method, the rationale for using the method, accompanying research questions, and reported information about lessons learned about using the method in eHealth development. The lessons learned were analyzed by means of an inductive coding approach.

Findings

A distinction was made between development methods and products. Methods are used to gather new data, while products can be used to synthesize previously collected data and to support the collection of new data. The following methods were identified and described: focus groups, interviews, questionnaires, usability testing, literature studies, desk research, card sorting, log data analysis, Delphi studies, theory-based methods, and experience sampling. The following products were identified: prototypes, stakeholder maps, requirements, values, and business models. For each of these methods products, information about lessons learned was synthesized and described to provide more insight into what to account for when choosing and using these methods and products.

Discussion

This study shows that there is a plethora of methods that can be used at different points in the development process and in different settings. To do justice to the complexity of eHealth development, multiple methods should be combined. Additionally, there is no step-by-step approach to develop eHealth: researchers need to select the most suitable research methods for the research objectives, the context in which the data collection takes place, and the characteristics and skills of the participants. The current study serves as a first step for a more elaborate toolkit to support researchers in shaping the most suitable and efficient development process.

Care-for-Data platform for privacy-friendly healthcare effectiveness measurement across organizations.

Martine van de Gaar, Maarten Everts and Pieter Verhagen

Background

Care-for-Data is a decentralized platform that provides automated privacy-preserving statistical analysis results over multiple organizations' datasets with full data governance and AVG (GDPR) compliancy. With this platform we bridge the desire to be able to do evidence-based decision making in healthcare with privacy regulation compliancy (e.g., AVG and WGBO), without leaning on trusted third parties and central registries.

Methods

We achieve this by combining two technologies. The first is advanced cryptography in the form of secure multi-party computation (MPC) to allow statistical analysis over fully encrypted data sources distributed over multiple parties. In addition, we use blockchain technology for distributed governance to give the parties involved control over the MPC analyses performed and the data sources used. More specifically, the parties use smart contracts running on a consortium blockchain to describe the business rules that define under what circumstances the data sources may be queried. The smart contract in this approach acts as a gatekeeper: all actions in this distributed system are checked by the smart contract before the MPC analyses are executed, providing technologically enforced control. Furthering the sense of control, any change to the rules in the smart contract must be decided upon unanimously. And because of the nature blockchain technology, this setup provides an immutable audit log, with which malicious behavior can be detected after the fact. We evaluated this platform in the healthcare domain in a realworld pilot with actual patient data to determine the cost-effectiveness of an eHealth solution. Because real patient data was used in this pilot, we were able to also tackle organizational and legal challenges involved in the application of such new technology.

Findings

The Care-for-Data platform facilitates organizations to unlock the potential of each other’s sensitive data without sharing it, yet with proper governance. This results in being able to perform analyses that were not achievable before or only with the help of a trusted third party. The analysis performed on the platform can be automated for real-time insights to evaluate changes over time. An external legal evaluation confirmed that our platform is compliant with the relevant privacy legislations in healthcare (AVG & WGBO).

Discussion

MPC technology has a long academic track-record, but only recently has started to become feasible to put in practice. We feel that MPC has great potential, particularly in the healthcare domain, as data is typically very distributed and the same time very sensitive. We are actively developing new MPC algorithms for analysis methods. Until now, our platform illustrates that even with simple statistical operations (e.g., mean, standard deviation) it is possible to achieve relevant results that are traditionally only possible through trusted third parties that collect all the data. We would like to explore collaboratively how insights from the whole healthcare chain can improve healthcare in general.

Attitudes towards health, healthcare and eHealth in a disadvantaged neighborhood: A community-based participatory research approach.

Jasper Faber, Isra Al-Dhahir, Thomas Reijnders, Jos Kraal, Andrea Evers, Niels Chavannes, Rita van den Berg-Emons and Valentijn Visch

Background

Health disparities between high and low socioeconomic classes of people are growing. eHealth is on the one hand considered a solution, as it can be personalized to fit the needs of a specific target group. On the other hand it is regarded as a cause, as it requires digital skills and a specific pro-active attitude towards health and healthcare that is not shared among all socioeconomic classes. To turn eHealth into a solution for people in low socioeconomic environments, it is necessary to design it to align with their attitudes. Therefore, we aimed to explore the attitudes of people in a low socioeconomic environment towards their health, healthcare, and eHealth. This information will be used to form an eHealth design guideline that enhances the alignment of eHealth to people in these areas.

Methods

We adopted a community-based participatory research approach with 23 members of a community center in a low SES neighborhood in the Netherlands. We conducted semi-structured interviews and analyzed these using grounded theory analysis resulting in a set of themes (N = 29). The themes were validated and generalized using a visual questionnaire (N = 43) involving participants from multiple community centers in the same neighborhood. A subsequent cluster analysis resulted in distinct profiles of attitudes towards health, healthcare, and eHealth. We validated and contextualized the profiles in focus groups (N = 3) with a subset of the questionnaire participants. Finally, using a factor analysis, we discovered overarching attitudes as a combination of different profiles.

Findings

Our cluster analysis resulted in nine profiles of attitudes towards health (N = 3), healthcare (N = 3), and eHealth (N = 3). Within the relations between these profiles, we discovered two overarching attitudes. The first attitude, optimistically engaged, embodied approximately half of our sample and was related to being conscious about health, motivated to perform healthy behavior, feeling in control about future health, being satisfied with and loyal towards healthcare, and open and enthusiastic about the use of eHealth. The second attitude, doubtfully disadvantaged, embodied approximately a quarter of our sample and represented a low self-efficacy, difficulties understanding health messages, wanting more autonomy in the healthcare process, distrusting connected technologies, a lack of exposure regarding eHealth and therefore hesitance towards using it.

Discussion

The resulting attitudes strengthen the knowledge of the motivation and behavior of people with a low SES regarding their health, healthcare, and eHealth. We discovered that negative health attitudes are not as apparent as often claimed. Nevertheless, eHealth designers should still be mindful of attitudes that differ from those with high SES. We recommend eHealth interventions should fit into the person's daily life, ensure personal communication, be perceived usable and useful, improve self-efficacy and allow for meaningful self-monitoring.

Session 11: Technology and depression

Individuals with depression express more distorted thinking on social media.

Krishna Bathina, Marijn ten Thij, Lorenzo Lorenzo-Luaces, Lauren Rutter and Johan Bollen

Background

Depression is a leading cause of disability worldwide, but is often under-diagnosed and under-treated. Cognitive-behavioral therapy (CBT) holds that individuals who are depressed exhibit distorted modes of thinking, so-called cognitive distortions, which can negatively affect their emotions and motivation. However, the critical assumption at the foundation of CBT, namely that depression is associated with changes in language that are indicative of distorted thinking, has not been directly confirmed from studies of the language of depressed individuals in ``real-world'' settings.

Methods

Our analysis compares two cohorts of individuals: individuals with depression (D cohort) and a cohort of randomly selected individuals (R cohort). For our D cohort, we identified a cohort of social media users that (1) received a clinical diagnosis of depression and (2) posted an explicit report of this diagnosis on Twitter, i.e., by stating a variant of ``I was diagnosed with depression by my doctor''. We measure the difference in presence of cognitive distortions by comparing the prevalence of a set of 241 Cognitive Distortion Schemata (CDS), patterns of thought represented by sequences of words (n-grams), in the language of a large cohort of depressed individuals vs. a random sample on social media (Twitter), excluding organizational accounts.

Findings

We show that the language of individuals with a self-reported diagnosis of depression on social media is characterized by higher levels of distorted thinking than a random sample (mean prevalence comparison: t(1619) = 21.20, $p < .001$, Cohen's d = 0.56). Particularly distortions of the “Personalizing” (i.e., it’s all my fault) and “Emotional Reasoning” (e.g., if it wasn’t my fault I wouldn’t feel so worthless) types were 2.3 times more prevalent in the online language of the D cohort. This effect is specific to the distorted nature of the expression and cannot be explained by the presence of specific topics, sentiment, or firstperson pronouns.

Discussion

This study identifies online language patterns that are indicative of depression-related distorted thinking. Our results suggest a path for mitigation and intervention, including applications that engage individuals suffering from mood disorders such as major depressive disorder via social media platforms and that challenge particular expressions and types of depression-related language. We caution that any future applications of this work should carefully consider ethical and data privacy issues.

Can Virtual Reality optimize Cognitive Therapy for depression? Two experimental studies.

Annet Kleiboer, Felix Bolinski and Heleen Riper

Background

Cognitive restructuring is a widely-used therapeutic technique that helps people with depression to critically challenge negative interpretations and adapt them to more helpful interpretations. Identifying and challenging negative interpretations within a face-to-face therapy session is often a difficult task for patients, however. A reason may be that Cognitive Restructuring is not limited to a cognitive verbal level, but inextricably linked to emotions, behavior and physiological responses. Practicing Cognitive Restructuring in a virtual environment could potentially help people with depression. A virtual environment is an immersive, ecologically valid, computer-generated world where situations can be simulated and manipulated. This allows people to experience situations when they happen, and makes it easier to access associated emotions, physical experiences and cognitions, and may evoke a stronger response, which creates an excellent environment for learning. The current project examined first whether Cognitive Restructuring practiced in a virtual environment can evoke an increased emotional response compared to face-to-face imaginary Cognitive Restructuring, and secondly whether Cognitive Restructuring in VR leads to better cognitive skills.

Methods

We conducted two experiments. The first experiment was a crossover study in 41 students who were exposed to 3 situations that can trigger negative automatic thoughts either in VR or face-to-face (imaginary) with the aim to compare emotional arousal (heart rate, skin conductance, subjective arousal). The second experiment used a randomized design in 72 students to examine whether Cognitive Restructuring in VR leads to better Cognitive Skills after the session and one week later compared to face-to-face.

Findings

Results of the first experiment showed that students had significantly higher objective arousal in VR (heart rate, skin conductance) compared to face-to-face but there was no difference in subjective arousal. Results of the second experiment are currently being analysed.

Discussion

The experiments give a first indication that VR might be able to optimize Cognitive Therapy for depression. More research is needed.

Digital Interventions for People with Co-occurring Depression and Problematic Alcohol Use: a Systematic Review and Meta-analysis.

Maria Schouten

Background

This systematic review and meta-analysis assessed the effectiveness of digital interventions addressing depressive symptoms and alcohol use simultaneously among people with co-occurring depression and problematic alcohol use.

Methods

Seven databases were searched for trials evaluating digital interventions aimed at depression and alcohol use. Random-effects meta-analyses were conducted to pool effects on depressive symptoms and alcohol use up to 3-month and 6-month follow-up. Overall quality for every outcome was assessed with GRADE (Grading of Recommendations Assessment, Development, and Evaluation).

Findings

The pooled effect of digital interventions compared to their comparators was in favour of digital interventions. Small but significant effects on depressive symptoms at 3-month follow-up were found (g = 0.34, 95% CI: 0.06 – 0.62, p = 0.02, k=6) and non-significant effects at 6-month follow-up (g = 0.29, 95% CI: -0.16 – 0.73, p = 0.15, k=5). For alcohol use, the pooled effect of digital interventions was small and non-significant at 3-month follow-up (g = 0.14, 95% CI:-0.02 – 0.30, p = 0.07, k=6) and significant at 6-month follow-up (g = 0.14, 95% CI: 0.07- 0.20, p = 0.005, k=5). Sensitivity analysis indicated the latter finding to be sensitive to statistical estimator choice. Quality of evidence was moderate, except for depressive symptoms at 6-month follow-up for which it was low.

Discussion

Based on the literature, digital interventions are effective in reducing depressive symptoms at 3-month follow-up and alcohol use at 6-month follow-up among people with comorbid depression and problematic alcohol use. More high quality trials are needed to confirm the current findings.

‘Move your Mind’: A user-centered mix of methods to develop a tool for blended care.

Miriam van Ittersum, Gido Hakvoort, Paul van Wilgen, Robert van der Noord, Davy Paap, Els Blijd-Hogewys, Patrick Landsman, Nick Lammers and Hilbrand Oldenhuis

Background

In Western societies about 20% of adults suffer from chronic pain and 25% to 50% of them have depressive complaints. Cognitive-behavioral approaches and promoting a healthy lifestyle are widely advised treatments for both these disorders. However, for this group of patients a healthy lifestyle can be difficult to achieve as both depression and pain hinder activities, and motivation is often absent. Moreover, patients often experience difficulties to accurately inform their healthcare provider, which makes it harder for professionals to provide patient-tailored treatment. As a result, professionals revert to "one-size-fits-all" programs which are not in line with current requirements for personalized interventions and the emphasis on self-management of patients. The use of activity-trackers could provide objective insights into patients’ daily patterns and variables such as sleep quality, heart rate, and exercise levels, which can be used to create body awareness and support rich, personalized feedback. However, by themselves activity-trackers are not sufficient. For example, they cannot collect subjective variables such as mood, which also need to be considered for the treatment of these patients. Furthermore, in a treatment setting this data should be ‘handed over’ efficiently to professionals to provide meaningful insights. Finally, to add personal value, additional features such as reminders, motivational messages, and personal goals are needed. In our project ‘Move your Mind’ we tried to bring all these requirements together to improve the treatment of patients with chronic pain and/or depression.

Methods

Throughout the project we applied a design thinking process using user-centered approaches and a mix of research instruments. We started with a small group of therapists and clients to gain insights into the issues we were facing. We used in-depth interviews with both therapists and clients and provided them with activity-trackers. Next, we created design prototypes for a mobile app which were reviewed during focus group meetings. Here we used think-aloud protocols to examine how users navigated the app while performing simple tasks. The final design prototype was implemented together with a dashboard for the therapist that underwent a similar process. Finally, we performed a feasibility pilot in a real client-therapist treatment setting. They used the mobile app and dashboard for five weeks after which in-depth interviews were performed to assess the outcomes on experienced ease of use, added value, and ideas about content and lay-out.

Findings

By applying a design thinking process we were able to develop a system which supports both professionals and patients while validating every step of the process. Our Move your Mind app monitors and presents daily activity, sleep, and general state of well-being of patients in an easy to understand and appealing way. Data from the app can be disclosed to a professional who can monitor and act on this data.

Discussion

We are currently finetuning the system based on results of the feasibility pilot and are preparing a larger study to assess feasibility and effect on meaningful treatment outcomes, PROMs, and patient adherence. During the conference we can hopefully share some first results from this study.

Session 12: Putting the patient central in eHealth

Simultaneous practices in developing eHealth: the patient journey as outcome and innovative instrument.

Loes Bulle-Smid, Annemarie van Hout, Marloes Bults and Marike Hettinga

Background

Telemonitoring is gaining attention as a way to improve care for patients with chronic heart diseases. A successful project on monitoring heart patients at home has turned into a regular service. In our research project, the objective was to gain insight in patients' and professionals' experiences and knowledge when using telemonitoring. Heart Care at a Distance, including technology, ways of working, protocols, support and logistics, was developed by Hartcentrum Isala and the company HC@home. During development the involved professionals (care, IT, logistics) developed along, but the acquired knowledge and experience has remained implicit. For successful professionalization and upscaling of the service these must be made explicit. Our research aimed at both adding to the quality of the service as to education of professionals.

Methods

The project had an iterative approach in which different qualitative methods were used. First we observed regular care by joining the professionals and patients during the meetings in the hospital. We interviewed patients at home and asked them to use the cultural probe. By inviting them to take pictures, keep a diary, make drawings or 'send' postcards, we gathered rich data on how heartcare at home influenced their lives. Then we discussed the contents of the cultural probe in a second interview. We also interviewed the professionals we further deepened the analysis of the observations and cultural probes. The care professionals were involved in dialogues that were used as a part of our analysis.

Findings

First, we drew a patient journey of the 'Heartcare at Home'- service. Meanwhile we noticed how their journey was influenced by the new knowledge care professionals gain while monitoring patients at a distance. The dialogues we had with the professionals on the data we gathered, showed us how professionals' knowledge and experience helped them to deal with all the individual differences in patient care. This knowledge became clear while discussing the hindrances and choices they encounter. We called this 'issues' and embedded them in the patient journey. The second result of the project consisted of three profiles for the professionals working with Heart Care at a Distance: nurse specialist, physician and IT support. These profiles represent the tasks and skills required for these (care) professionals which can serve the purpose of validation of portfolios of potential co-workers to assess their required education.

Discussion

The patient journey map is an instrument for the professionals to discuss the facilitating and impeding factors of the monitoring service on their daily work processes and other factors that have consequences for the patient. The map is provided with issues that can be used in the discussion and in the development of the service. These arguments are linked to items on the patient journey. Competence profiles were conducted for professionals working with heartcare at a distance. These profiles include specific competences such as motivational interviewing to promote the patients' lifestyle at a distance. With the use of these profiles 'Heart Care at a Distance' can deploy targeted employees who are ready to scale up this care.

Introducing Edna: the trainee genomic chatbot designed with patients in mind.

David Ireland, Dana Bradford and Clara Gaff

Background

Clinical genomic testing is increasingly being used to help find the cause of a patient's medical condition. Unlike earlier genetic tests, genomic tests can also be analyzed to identify information about future health risks, or 'additional findings (AF)'. AF are genetic changes known to cause a condition. This raises challenges around how to support patient decision making and provide equitable access, with the current burden on genetic counsellors. In a pilot service, patients were offered genomic testing for 58 conditions for which early detection or risk reducing interventions are publicly funded by Victorian State Government (Australia). Genetic counselling is provided to ensure they understand the possible results of the test and to explore psychosocial issues (e.g. impact of results, family communication). Given the expected demand for this service for AF it was hypothesized that a chatbot could be developed to support genomic health decisions. The use of chatbots in health care is a rapidly emerging field to which CSIRO has contributed by developing chatbot technology for people with Parkinson's Disease and other neurological conditions. A chatbot can be accessed at any time by a patient from their own devices, and so has the potential to overcome barriers to accessing traditional genetic counselling.

Methods

Adults who had whole exome sequencing conducted for a genetic condition and had received the results were offered a genetic counselling session to discuss interest in provision of AF information. For those attending (N=83), a subset of de-identified transcripts (n=19) were analyzed to develop the chatbot 'brain'.

Findings

Themes common to the AF genetic counselling sessions included introductory conversations, definitions, probing for information and summarizing factors to consider in decision making. These themes were relatively straightforward to code, we simply entered the information we wanted the chatbot to provide. More challenging, the transcripts showed that sentiment analysis would be required – could Edna detect someone crying? We also made Edna's brain clever enough to understand synonyms, which meant we could collect information on family history. As a 'trainee', we decided it was not appropriate for Edna to give medical advice or information on support groups.

Discussion

On the basis of the transcribed counselling sessions, an engaging chatbot was successfully developed that is able to both provide and collect information. Edna is now being trialed to determine barriers to uptake, enablers for decision making and language processing issues for patients; and to explore genetic counsellor perspectives.

AYAs' Online Information and eHealth Needs: A Comparison With Healthcare Professionals' Perceptions.

Daniëlle L. van de Graaf, Carla Vlooswijk, Nadine Bol, Emiel J. Krahmer, Rhodé M. Bijlsma, Suzanne E.J. Kaal, Eveliene Manten-Horst, Sophia H.E. Sleeman, Winette T.A. van der Graaf, Olga Husson and Mies C.H.J. van Eenbergen

Background

Adolescents and young adults (AYAs) diagnosed with cancer greatly rely on the Internet to fulfil their cancer-related information needs. The Internet is often coined the most important source of health related information and plays a considerable role in fulfilling needs and coping with cancer. However, often overlooked in the field of eHealth is the role of healthcare professionals (HCPs). Adequate perceptions of AYAs' online information and eHealth needs are crucial, as HCPs may adapt their related guidance and advice accordingly. In other words, having inadequate perceptions of AYAs' online information and eHealth needs may lead to inappropriate information provision by HCPs. We therefore aim to examine the extent to which AYAs' indications and HCPs' perceptions regarding AYAs' online information and eHealth needs correspond.

Methods

Two surveys were disseminated; one among AYAs (N = 299) via PROFILES Registry and one among HCPs (N = 80). AYAs were recruited via Kanker.nl (central online platform in the Netherlands with information about cancer), patient organizations, NFK (Dutch Federation of Cancer Patient Organisations) and hospitals. Healthcare professionals were recruited via AYA-specialized hospitals. Assessments were made using 40 items for online information needs and 18 items for eHealth needs.

Findings

AYAs reported significantly more online information needs compared to HCPs' perceptions regarding survival rates, p<.001; AYA=69%, HCP=35%, treatment guidelines, p<.001; AYA=65%, HCP=41%, return of cancer, p=.004; AYA=76%, HCP=59%, 'what can I do myself', p=.029; AYA=68%, HCP=54%, and metastases, p=.040, AYA=64%, HCP=50%. Several other topics were significantly overestimated by HCPs compared to AYAs' indications, with major differences in topics regarding consequences for young family, p<.001; AYA=62%, HCP=98%, insurance and/or mortgage, p<.001; AYA=60%, HCP=95%, sexuality and intimacy p<.001; AYA=52%, HCP=89%, return to work and/or study, p<.001; AYA=47%, HCP=89%, fertility and child wish, p<.001; AYA=47%, HCP=100%, and peer meeting possibilities, p<.001; AYA=51%, HCP=81%. Furthermore, significantly more unmet eHealth needs were reported by AYAs compared to HCPs relating to access to own test results, p<.001; AYA=25, HCP=0%, request tests p<.001; AYA=30%, HCP=7%, access to medical information, p=.001; AYA=22%, HCP=0%, e-consult with nurses, p<.001; AYA=30%, HCP=10%, e-consult with physicians, p=.001; AYA=38%, HCP=13%, and request prescriptions, p=.009; AYA=33%, HCP=21%. In contrast, HCPs reported significantly more unmet eHealth needs compared to AYAs regarding face-to-face peers contact, p=.002; AYA=34%, HCP=47%, and online peers contact, p=.004; AYA=42%, HCP=64%.

Discussion

It was found that HCPs both overestimate and underestimate AYAs' online information and eHealth needs, which could indicate that AYAs may be provided insufficient, or sometimes irrelevant, information. As adequate information is vital for coping with cancer, it is important to understand how HCPs can support AYAs in meeting their online information needs. To address the most common needs AYAs have, checklists including topics could be used in consultations, which may serve as a starting point for personalized information provision to tailor consultations to individual needs. This way, HCPs will be more able to provide guidance and advice which contributes to AYAs' access to, understanding of, and satisfaction with online information and eHealth.

Session 13: Technology and chronic disease

Tailoring eHealth to Support the Self-Care of Patients with Cardiovascular Diseases: A Vignette Survey Experiment.

Roberto Rafael Cruz-Martínez, Jobke Wentzel, Robbert Sanderman and Lisette van Gemert-Pijnen

Background

Cardiovascular diseases constitute an alarming crisis for health care worldwide. Remote, technology-based self-care support is proposed as a potential solution. However, little research has been done to understand how technologies should be designed so that they can effectively support the different self-care needs of patients. This study investigates how experts from multiple fields of science assess the potential success of different eHealth design strategies when matched to key self-care needs.

Methods

An online vignette survey experiment was conducted. Nine vignettes representing different combinations of self-care needs (maintenance, monitoring, management) and eHealth persuasive design strategies (primary task support, dialogue support, social support) were evaluated. The factors and levels used were based on the Middle Range Theory of Self-Care of Chronic Illness and the Persuasive Systems Design model. In each vignette, the self-care need was represented with a short video that described the situation and self-care needs of an individual with a CVD. To complement that, the persuasive design strategy was represented by a visual mock-up of an eHealth intervention. Experts with experience on the topics self-care, cardiovascular diseases, and eHealth were invited to participate. Snowball sampling was also used, prompting those first invited to refer other experts. The survey collected both quantitative and qualitative data in parallel. Descriptive statistics and generalized linear mixed modeling were used to analyze the quantitative data. Qualitative data were analyzed with the thematic analysis method.

Findings

Out of 752 invited experts, 118 completed the survey (15.7% response rate). Respondents were from 18 countries in total. The Netherlands (38.3%), the United Kingdom (10.3%) and the United States (8.4%) were the most common countries of origin. The results show that some combinations of cases and designs did noticeably and significantly differ with each other (F=3.22; p=.013). In general, primary task support was perceived by experts to be consistently successful across all key self-care needs. Primary task support was used as the reference point to compare with other design strategies. Compared to primary task support, dialogue support was perceived to be less effective in supporting a management need (OR=.147; 95% CI .028-.769; p=.023). Likewise, social support was perceived to be less likely to succeed when supporting both monitoring (OR=.167; 95% CI .035-.801; p=.025) and management (OR=.114; 95% CI .024-.540; p=.006) needs.

Discussion

The multidisciplinary experts included in this study generally perceived primary task support to be consistently successful across all self-care needs. This type of support was even seen as a prerequisite, as it could best ensure the safety of patients under the context of remote care. Six major themes were identified in the qualitative data: (i) unraveling complexity to achieve patient-centeredness; (ii) addressing complexity by adjusting the pacing and simplicity of eHealth interventions; (iii) supporting persons and their circumstances, not just as patients; (iv) supporting collaboration between the patient and the health care team; (v) targeting key objectives with eHealth support; and (vi) fitting eHealth into self-care routines. In practice, the findings suggest that designers and implementers should take a “lean” approach towards eHealth tailoring and implementation.

Facilitating wearable sensor measurements to augment general movements assessment at home: What do parents need?

Dana Bradford, Christian Redd, Mohanraj Karunanithi and Roslyn Boyd

Background

General Movements (GMs) assessment in early infancy is highly predictive of a later diagnosis of cerebral palsy. Current investigations are underway to broaden the availability of the GMs assessment by facilitating video collection in the home using a smartphone app for later remote assessment. Despite this promising new modality, challenges remain, including dependency on infant behavioral state, and overall assessment load on the parents. Augmentation of in-home GMs assessment could be achieved using non-invasive wearable movement sensors attached to the trunk and limbs of the infant for a period of time. The degree to which parents are comfortable using this sensor technology at home has not been investigated. This study looked at potential enablers for parent facilitated GMs sensor assessment.

Methods

Qualitative analysis of parent interviews of a typically developing infant cohort. Recruitment is ongoing with four parents (all female) contacted to date. Parents were recruited through a preliminary cohort study testing the sensors in a clinic environment. Parents were invited to participate in a short semi-structured interview to discuss the barriers and enablers they foresaw for parents of ‘high-risk’ babies undertaking sensor assessment in the home. Content analysis of interview notes was undertaken to determine themes of barriers and enablers.

Findings

Participants suggested or supported several resources to facilitate home implementation of sensor technology including demonstrations prior to leaving hospital; provision on discharge of a package including written instructions, link to an app demonstrating placement with a ‘gingerbread man’ showing correct sensor placement that utilized the phone camera to determine if sensors were correctly positioned, supplemented by online videos, a frequently asked questions page and helplines for both technical and psychological support; and a follow-up call offered post-discharge. Parents felt it was important to manage expectations around when findings from the sensors would be provided. It was suggested that immediate feedback should be given on completion of data capture that the sensor had captured data (feedback that the technology worked) but that the interpretation of those data should be provided by a specialist. To manage anxiety, all parents could have a specialist appointment scheduled for approximately 4 months corrected age (CA) with the understanding that interpretation of sensor findings and video analysis taken at 12-14 weeks CA by a trained GMs assessor would be disseminated at that time.

Discussion

On the basis of interview data, multi-modal instructional resources, including a mobile phone app and online videos, are being developed as part of a broader implementation plan for using sensors to augment GMs assessment in the home environment.

‘Not to the clinic early in the morning’: Chronically ill patients’ perceptions on self-sampling blood.

Femke Hilverda and Vincent Molenaar

Background

Innovations to enhance self-management of patients are being developed in the Netherlands. One example of this is a device patients can use to self-sample their blood. This way of collecting blood possibly has advantages over venepuncture. Especially for chronically ill patients, self-sampling of blood might offer benefits as they regularly have their blood drawn. Self-sampling blood at home may enable patients to have more control over their disease and increase their self-management skills. However, no research has been conducted into the perspectives of patients. In this study we focus on the perceptions of chronically ill patients to fill this gap. The following research question was examined: How do chronically ill patients in the Netherlands perceive self-sampling of blood at home, and what is their behavioral intention to do this?

Methods

To answer our research question two studies were conducted. In study 1, an online survey was constructed based on the Technology Acceptance Model (Davis, 1989) and Innovation Diffusion Model (Rogers, 1995) to investigate the general perceptions and (dis)advantages of self-sampling blood among chronically ill patients (n= 2133). After this, a second study was conducted using the (dis)advantages collected in study 1 to create more in-depth knowledge about the perceptions of self- sampling blood. In this second study, a total of 782 chronically ill patients filled out an online questionnaire in which they selected and ranked these (dis)advantages.

Findings

Our studies show that chronically ill patients have a high intention to self-sample blood at home, which was positively predicted by their general perceptions. These patients overall felt that the advantages outweigh the disadvantages of self-sampling. Most important advantage was the convenience of self-sampling. That is, patients believed that self-sampling was advantageous because it was location and time independent. The most important disadvantage was the perceived lack of reliability. Patients questioned the validity of the results and the safety of the procedure to obtain their own results.

Discussion

While most chronically ill patients had positive perceptions of the technology and were inclined to use this device, it remains unclear how to implement this technology on a large scale. Respondents questioned the validity of the results and perceived the procedure as prone to flaws. More research is needed to provide insight into what makes the implementation process successful. Once successfully implemented, self-sampling blood has the potential to increase self-management among patients.

Cognitive bias modification training targeting fatigue in kidney patients: patients' and health care professionals' perspectives.

Jody Geerts, Marcel Pieterse, Goos Laverman, Femke Waanders, Nicole Oosterom, Jacqueline Slegten, Elske Salemink and Christina Bode

Background

The aim of the current study was to evaluate a cognitive bias modification (CBM) application among kidney patients and health care professionals. Specifically, using an iterative design process, evaluating expectations and experiences with the training, acceptability and applicability in the clinical setting were assessed. A longitudinal, qualitative and multiple stakeholder-perspective usability study interviewing end-users and health care professionals, during the prototyping phase and after end of treatment.

Methods

Semi-structured interviews were conducted with in total 29 patients and 16 health care professionals. The interviews were transcribed and analyzed thematically.

Findings

Generally, participants were positive about the training and its applicability. The biggest negatives were doubts about effectiveness and annoyance about the repetitive character of CBM. Barriers for applicability were patients' varying computer skills, the subjectivity of fatigue, the integration with regular treatment, and health care professionals' involvement. Possible solutions were assigning representatives among nurses, offering the training on an app, and providing assistance via a helpdesk. The iterative design process, including the repeated waves of testing user expectations and experiences, yielded complementary data.

Discussion

The current study provided one of the first user evaluations of a CBM training, both among patients and care providers. Acceptability and applicability appear positive although barriers were identified. Possible solutions were offered, but need further testing, preferably following the same frameworks as the iteration in the current study contributed positively to the quality of the training.

Session 14: eHealth and the elderly

Healthcare professionals’; Attitudes as a potential facilitator of using digital technology by older adults.

Ittay Mannheim, Eveline J.M. Wouters, Leonieke Van Boekel and Yvonne van Zaalen

Background

Digital technology (DT) has the potential to improve quality of life and healthcare for older adults. Albeit, adoption of healthcare related DT is low and early abandonment is prevalent. Age-based stereotypes and attitudes of healthcare professionals, towards the abilities of older adults to use DT have not been considered as possible barriers in how DTs are used and designed.

Methods

Two studies assessed healthcare professionals’ attitudes towards older adults’ abilities to use DT. In study I, physiotherapists (N=97) rated the abilities of young and old people to use different types of DT described in three vignettes. A new measurement of Attitudes Towards Older Adults Using Technology (ATOAUT-10) was developed and used to examine healthcare professionals’ attitudes towards use of healthcare DT and ageism towards older adults. In order to assess attitudes towards older adults indirectly and not in comparison with younger adults, In study II stereotype activation was manipulated among healthcare professionals (N=93). A moderation modal of stereotype activation on the correlation between ageism and ATOAUT was thereafter tested.

Findings

In study I, participants rated older adults as less able to use healthcare DT compared to younger adults. Higher levels of ageism were found to predict more negative attitudes towards technology use of older adults, even when considering other variables in a multiple regression analysis ($\beta = 0.36$, $t = 3.73$, $p < 0.001$). In Study II participants were randomly assigned to rate the abilities of a young or old person to use healthcare DT. A moderation modal of stereotype activation on the correlation between ageism and ATOAUT-10 was found ($R2 = 0.19$, $F(6,85) = 3.35$, $p = 0.005$), such that higher levels of ageism correlated with more negative attitudes towards technology use of older adults, in the old age condition, but not the young condition. Stereotype activation accounted for healthcare professionals’ attitudes, more than experience of working with older patients or the professional’s age.

Discussion

While using DT in healthcare holds a promise to improve care that older adults receive, it seems that healthcare professionals generally hold negative attitudes towards older adults’ abilities to use DT. More so, it seems that comparison of older adults to younger adults or stereotype activation might amplify age-based stereotypes and lead to higher levels of ageism, and more negative attitudes towards technology use of older adults. This in turn might influence how professionals actually use or introduce DT with older adults. Therefore, in order to realize the potential of using DT in the care of older adults, the role of stereotypes and ageism must be considered. Further research and development of interventions to reduce ageism, and increase of older adults’ participation in development of DT is also called upon.

Alzheimer Care Trainer: the design of a personalized simulation to practice daily care situations with people with Alzheimer's disease.

Henk Herman Nap, Nienke Vos, Mariet Theune, Frédéric Ehrler, Nicolas Szilas, Pia Vandebergh, Razvan Craciunescu and Martijn Vastenburg

Background

In the POSTHCARD project, we developed the Alzheimer Care Trainer, a narrative simulation game in a 3D home environment where caregivers of people with dementia can practice how to deal with difficult daily living situations, by interacting with a 3D character that represents the person they care for. Daily situations that can be practiced include eating (learning how to react positively to the person's loss of appetite and changing abilities to eat) and toileting (learning to deal with the person's negative attitudes towards activities such as taking a shower or simply washing hands).

Methods

Informal and formal caregivers of people with dementia participated in iterative design and testing of early mockups of the game. Through questionnaires and productive interactions they provided feedback on the design, as well as input for the desired functionalities. Based on this input, a first digital prototype was developed. The prototype was evaluated with eight informal caregivers from the Netherlands and Belgium (NL - n = 5; BE - n = 3). In an online one-on-one session, the caregivers played the game performing several tasks whilst using the 'thinking aloud' method. After playing, the caregivers reported on the usability and credibility of the game through verbally answering and elucidating on a predefined usability and credibility questionnaire.

Figure 1. Eating scenario in Alzheimer Care Trainer game

Findings

Participants were efficient in performing low-complex single tasks, such as turning on the light and finding objects they could interact with. Complex multi-step tasks such as the caregiver having to motivate the person with dementia to eat dinner were too complex. The participants reported that they wanted to play using their own caring tactics, but could often not find suitable options in the game to execute these. Mostly because the game divides a task into a set of fixed smaller chronological steps (e.g. in order to eat, you have to sit first, then pick up the cutlery). Participants reported that their personal approach consist of a continuous flow of adjustments to the reactions of the person they care for. Overall, the participants did enjoy playing the game, recognized the behaviour of the 3D character and reported about the potential of the game for (in)formal carers.

Discussion

The first digital prototype has potential for practicing how to deal with difficult daily living situations with people with dementia. In future designs, a balance should be found between the logics of the game with multiple steps and levels and the personal approach and adjustability of real-life situations. The player of the game should rather be able to practice customisable situations, learning different tactics through different interactions in the game. One way of achieving this, is providing the possibility to include personalized caregiving experiences which are planned to be designed and included in a future version of the game.

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Why is eHealth not being used to its full potential?

Marian Hurmuz and Stephanie Jansen-Kosterink

Background

With the increase in average human life expectancy, the burden on the healthcare system increases as well. eHealth applications can reduce this burden preventively, by improving users lifestyle, and also in the healthcare service, by taking some processes. These day, a lot of eHealth applications are available, ranging from small sensors to large robots. Unfortunately, a lot of eHealth applications are not being used in the real-world setting. This presentation focuses on the use of different web-based eHealth applications and an mHealth application, and reasons for not using eHealth.

Methods

During this presentation, three case studies within three European projects (Frail (Eurostars-2 Programme, grant no. 10824), Council of Coaches (European Horizon 2020, grant no. 769553) and Back-UP (European Horizon 2020, grant no. 777090)) will be presented in which different eHealth applications were being used by older adults (55+), and adults (18+) suffering from low back and/or neck pain. These three eHealth applications were implemented in a real-world setting for 4-8 weeks, and evaluated within observational cohort studies. The use of the different applications was assessed by log data. To examine reasons for not using eHealth, semi-structured interviews were conducted face-to-face or by phone.

Findings

Ninety older adults participated in the study within the Frail project. This population consisted of 34.4% (N=59) men and a total mean age of 65.6 (SD=7.2) years old. Within this study, the eHealth application was used on average 4.5 (SD=2.7, N=90) times in the first week, and 5.7 (SD=3.4, N=41) times in the last week (week 4). In the study within the Council of Coaches project, 51 older adults participated, with a mean age of 65.3 (SD=7.4) years old and a minority of men (N=36, 70.6%). On average, the eHealth application was used 3.3 (SD=2.2, N=44) times in the first week, and 1.7 (SD=1.1, N=7) time in the last week (week 8). Regarding the use of eHealth, a decline in active users over time was present within these two studies. During the interviews, users gave reasons for not using the eHealth application. These were mainly technology-oriented, e.g. difficulties with using technology, or too simplistic. Other reasons given were for example no time to use it, not fun to it, or already feeling fit and healthy. Besides those two studies, the evaluation study as part of the Back-UP project is still ongoing at the time of writing this abstract. The findings of this study will also be presented during the presentation.

Discussion

When eHealth is implemented, people are enthusiastic to start using it in the beginning. After a while, the use of eHealth decreases. How can we solve this problem and why is it important to solve this problem? From our experience, people are willing to use it if it fits their needs and expectations. When knowing the barriers and facilitators for using eHealth, the eHealth application can be adapted to the users' needs and the implementation of the application will be more effective.

Session 15: eHealth, infectious diseases and antimicrobial resistance

How Frisian residents perceive the promises of e-health technologies before and during the Covid 19-epidemic.

Job Van T Veer and Dirk Postma

Background

In the upcoming decades the Dutch healthcare system faces an increase in healthcare consumption because of an ageing population. Further, in the peripheral regions of The Netherlands the population is shrinking, which threatens the availability and quality of the healthcare system. Much is expected of ehealth technology to help us face these challenges. However, there is no detailed understanding of the willingness and perceived ability of citizens residing in these regions to use e-health technologies in their personal contexts. These insights are needed to effectively stimulate their use of e-health technologies. We employed a questionnaire before and during the Covid 19-pandemic in the northern part of The Netherlands (Friesland). This allows us to gain insight in the impact of the pandemic on the willingness and perceived ability of citizens use e-health technologies.

Methods

Two consecutive questionnaires were send to the 5.942 members of Panel Fryslân (recruited from probability samples of all Frisian municipalities), resulting in 2.845 participants in November 2019 (48% response) and 3200 in November 2020 (54% response). We translated the generic term of ‘e-health technology’ into six specific user-scenarios (r.g. an older lady using assisted living technology, a middleaged man using online therapy for anxiety). About each scenario, respondents estimated for themselves the expected benefits, efforts, risks, intent of use (based on UTAUT-model). We concluded with general questions about respondent’s current e-health use.

Findings

In general, respondents showed moderately positive attitudes towards health technology in November 2019, and significantly positive attitudes during the Covid 19-pandemic. A majority believes e-health technology helps maintaining a healthy lifestyle (58%), supports self-management (60%), and improves communication with health professionals (61%). People are less convinced about ‘policy-maker’ arguments: Technology as a solution to the decreasing availability of healthcare or the increase of healthcare-costs, is recognized by 32% and 41% respectively. A majority sees a responsibility for careorganizations and governments to support health-consumers in adequately using e-health technology. 28% did not use any form of e-health in November 2019. One year later, during the pandemic, this percentage decreased to 19 %. Attitudes (expected benefits, expected easy of use) towards all six technologies are also moderately positive. Scenario’s describing technology that provide practical and physical support (assisted living technology, chip in shoulder to monitor vital signs) generate more positive attitudes. Scenario’s in which human contact is facilitated or substituted with technology (online self-help for mental health issues or consulting an artificial intelligent care-professional) generate more critical attitudes. Despite their moderate personal attitudes, most people do expect increased future needs for all six technologies.

Discussion

Attitudes of people in the Northern part of The Netherlands towards e-health are moderately positive, though ambivalent. Its use seems motivated by maintaining personal health and independence, yet people expect support from care and government institutions to (learn to) use it. Although the coronapandemic had a catalyzing effect, more detailed insight is needed to develop effective strategies to stimulate the uptake of e-health in these regions.

The plot thickens: data visualization in antimicrobial resistance research.

Julia Keizer, Christian Luz, Nienke Beerlage-De Jong, Bhanu Sinha, Corinna Glasner and Lisette van Gemert-Pijnen

Background

Communicating data and research to relevant stakeholders is essential to ensure impact in practice. This is especially true for global ‘wicked’ healthcare challenges, such as antimicrobial resistance (AMR). Data visualizations can transform the increasingly growing data into more comprehensible information for exploration and communication purposes. In general, there is little guidance on selecting and designing data visualizations. This study aims to lay the ground for improving visual communication of data and research on AMR and other wicked healthcare challenge by creating an overview of the visual dictionary (incl. vocabulary and design space) for AMR research.

Methods

Data visualizations in published research articles on antimicrobial stewardship, infection control and institutional surveillance (identified by a prior science mapping study) were studied. One visualization per article was randomly extracted of a random sample of 180 articles. The extracted data visualizations were assessed on content (i.e. vocabulary) and design space (based on Munzner's nomenclature and categorization). Additionally, visualization errors, chart junk, and quality were assessed. Two researchers (CL, JK) independently assessed half of the visualizations. To calculate the interrater reliability 10% was analysed in duplicate, and answers for the remaining 150 visualizations were double-checked. By combining the vocabulary and design space, an AMR research visualization dictionary was created including dos and don’ts in the use and design of data visualization.

Findings

The three most used attribute combinations (representing the vocabulary) were time and antimicrobial consumption (n=21), time and incidence (n=18), and antimicrobial consumption and antimicrobials (n=12). Regarding the visual design space, colour and shape channels were frequently used, and time was always visualised with lines. Bar charts (n=54, 36.0%) and line charts (n=42, 28.1% n=42, 28.1%) were the most commonly used of the fourteen visualization types identified. 55.3% of visualizations were interpretable without additional text and visualization quality was rated 3.6 on average (scale 1=poor to 5=good , SD: 1.2).

Dos:

- Clarify what is shown. E.g. use titles, legends, axes names, labels, annotations or captions, and explain abbreviations.
- Prefer colours over shape for grouping/stratifying (keeping in mind colour-blindness and black-white printing) and ensure that groups are distinguishable.
- Prefer length over area/volume to compare sizes.

Show even and equal axes for readability and comparison (for a single visualization and across combined or faceted visualizations).

Don’ts:

- Colour scheme mismatches. E.g. using categorical colours for ordered attributes and vice versa, and using non-intuitive colour schemes.
- Use double y-axis.
- Hide data points through overlaps.
- Use chart junk (e.g. unnecessary 3D, shadows, or colours).
- Overcrowd (e.g. channel or attribute overflow).

Discussion

This study provides an overview of the use and design of data visualization in the field of antimicrobial stewardship, infection control and institutional surveillance, including visualization dos and don'ts. The field of AMR is under constant change and heavily influenced by new data-driven technologies increasing the need for translating these data into comprehensible information supported by high-quality visualizations. Results of this study can serve as the basis to optimize future communication in AMR research and practice matching visualizations with the visual dictionary of the target group.

Needs and barriers of urologists for e-Health decision support to limit antimicrobial resistance (AMR).

Elske M. Engel-Dettmers, Julia Keizer, Nashwan Al Naiemi, Hero E. Dijkema, Nienke Beerlage-De Jong, Louise M.A. Braakman-Jansen and Lisette J.E.W.C. van Gemert-Pijnen

Background

Antimicrobial resistance (AMR) threatens modern healthcare and leads to deteriorated patient outcomes and increased hospital costs. Limiting AMR requires adequate diagnostics and treatment, also known as Antimicrobial Stewardship (AMS). In many hospitals Antimicrobial teams (A-teams) are struggling, suffering from lack of time, budget and IT support. In this setting urology departments are extra vulnerable because of the high number of (high risk) gram-negative bacteria species encountered. In most electronic patient files it is currently not possible to simultaneously gain an overview of required clinical, microbiological and pharmaceutical information per patient. Reviewing this information still requires a lot of time. To increase efficiency and effectivity hospitals are looking for computer-assisted surveillance systems to support AMS activities. The aim of this study is to explore the needs and barriers of urologists for e-Health decision support in daily clinical practice.

Methods

A qualitative participatory approach was applied and the CeHRes roadmap was used. Two consecutive focus groups were conducted among urologists and urology fellows from a general hospital.

For the first focus group the SWAB guideline for AMS was used to identify the most important decision support indicators using a 5-point rating scale. Subsequently the motivation, current situation and information needs for these most relevant indicators were explored. The results were translated in examples for possible e-Health solutions, which were discussed in the second focus group to determine important values. These values and prospective users' needs will be translated into user requirements together with key-stakeholders. Both focus groups were audiotaped and transcribed verbatim. The output of the focus groups was deductively coded using the interview questions.

Findings

During the first focus group (n=5) the following decision support indicators were considered most relevant for improving diagnostics and antimicrobial treatment: taking cultures before starting antimicrobial therapy, switching intravenous therapy to oral, changing to pathogen-directed therapy as soon as culture results are available, protocolled A-team consultations and adapting antimicrobial dose to renal function. The motivation for choosing these indicators were: a) treating pathogen-directed, b) saving time and c) avoiding AMR. In the current situation there is a) a lack of data and b) data are only available after a time consuming effort. For better decision support there was a need for a) automated prescribing support; b) clearly presented infection related data, c) swifter insight in culture results and d) extension of the A-team support.

During the second focus group (n=5) three e-Health examples were explored using screenshots: an infection dashboard, a pop-up notification and a multidisciplinary consultation interface. At the time of writing the abstract the second focus group has taken place. The output is however yet to be transcribed and coded.

Discussion

The focus groups show a clear need for decision support with diagnosis and treatment of infections among urologists. The user centered approach of the CeHRes roadmap gives insight in end-user requirements to design an usable e-Health solution that fits the environment in which it will be used. This solution could improve efficiency and effectivity and subsequently AMS within the hospital.

Close Encounters of the Infectious Kind: the Epidemio Simulator for Exposure Notification Apps.

Judith Kaptein, Henri Ter Hofte, Wouter Keuning and Marike Hettinga

Background

As illustrated by the Dutch CoronaMelder app and other exposure notification apps, smartphones can be a valuable tool to help fight infectious diseases. After a person indicates he or she is a confirmed case, other potentially infected persons can be identified and warned by the system, by tracing back recent encounters. In this way, more newly infected persons may be identified, probably even before they start to develop symptoms.

Several years before the COVID-19 outbreak hit, we started research based on the idea that smartphones might be a valuable tool for studying and fighting outbreaks of infectious diseases, by automatically tracking encounters: periods in which two humans are in proximity close enough for long enough for an infection to occur. The idea to study such outbreaks has already been applied by others, for example in the LowlandZ zombie app that spread a virtual epidemic at the Lowlands festival in 2017 and in the BBC Pandemic app in 2018. Our idea to ultimately fight such outbreaks seemed highly hypothetical until the COVID-19 pandemic abruptly changed the context of our research. Data minimization and application of privacy-by-design make it very hard to use data from an exposure notification app like CoronaMelder to assess potential improvements of the effectiveness of such apps in a fine-grained fashion. We developed a simulation engine, which not only detects recent encounters, but is able to detect and map encounter networks to able to simulate the course of a virus. Such an engine can help evaluate and improve the effectiveness of exposure notification apps in more detail.

Methods

We design and evaluate the capability to simulate and fight epidemics with smartphones in three stages, with three components:

Component / stage	Infector *infectious disease*	Behavior *human behavior*	Detector *detects encounters to identify possible newly infected persons early*
1.	Simulated	Simulated	Simulated
2.	Virtual disease (app)	Real subjects	Smartphone app + network + service
3.	Real disease	Real subjects	Smartphone app + network + service

Findings

In this oral presentation, we provide an overview of these stages and report the findings of our simulations in stage 1 and the results of our technical feasibility studies for stage 2 of the Epidemio Engine, an individual-based engine that can simulate:

o infectious diseases, based on various disease parameters;

o human behavior, based on patterns of encounters, how individuals respond to the disease, and how individuals provide input to and respond to notifications of the detector;

o detector: an IT-system that detects and processes encounters and human input, and that identifies suspected newly infected individuals via backward and forward tracing of possible infections via the encounter network, and that provides notifications to these individuals or the individuals they likely encounter.

Discussion

Using smartphones to fight epidemics is epidemiologically relevant and technically feasible. In future research we intend to develop a virtual disease app and detector and test the reaction of hundreds of users using the app for several weeks to months, while carefully taking privacy and ethical considerations into account.

Session 16: Digital health coaches

Designing Liz, an embodied digital coach for healthy eating.

Martijn Vastenburg, Janna Alberts, Judith de Koning, Natasja Ryova, Femke Spikmans, Karen Lips and Marian de van der Schueren

Background

Malnutrition is a major societal problem, affecting in particular frail seniors. A healthier nutritional lifestyle would result in improved quality of life, fewer health issues, and decreased need for care. Various digital solutions have been developed to measure food intake, inform patients of healthy eating choices, and remind people when it's time to eat. Current solutions are however limited in terms of facilitating behavior change towards prolonged healthy living. Reporting apps tend to be detailed and complex, and require substantial effort from the users. App adoption by frail seniors tends to be low. In our project, we aimed to design an embodied digital coach, Liz, that pro-actively supports frail seniors in maintaining a healthy nutritional lifestyle. Liz was designed to blends into the current practice of dietary coaching.

Methods

An iterative, participatory design process was followed. First, interviews were conducted with 9 dietitians, in collaboration with the Nutrition and Health group at HAN university of Applied Sciences. In parallel, 18 seniors participated in an online questionnaire, and 15 seniors participated in interviews. Various concepts were designed, resulting in a prototype that was tested in the field with 3 seniors and their dietitians. Through pre- and post-interviews, together with diaries, the user experiences with the prototype were collected. The key themes of the field study were acceptance, impact, usability, desirability, functionalities and design. The data from the interviews, diaries and log files were transcribed, and thematic analysis was applied to identify common concepts and themes, and design improvements were formulated.

Findings

The key finding from the interviews with dietitians was related to food reporting. The dietitians indicated that even though detailed insight in exactly what the seniors eat is valuable, the dietitians would already be helped to know if the seniors eat. Due to decreased appetite, seniors tend to forget to eat, and the key challenge is to make sure the seniors eat regularly. The dietitians indicated they have only few face-2-face contacts with their patients, and in between consults the dietitians have very limited view on the nutritional behavior of their patients.

The key finding from the interviews with the senior users were related to acceptability of the digital coach. Whereas the participants preferred a human-like design of the digital coach (as opposed to an abstract form), the participants did not want the coach to be patronizing. Participants liked the idea of the coach giving reminders and feedback, and they did want to see information regarding recipes, nutrients and nutritional values.

Discussion

An embodied digital coach seems to be a valuable addition to existing nutritional coaching mechanisms. Rather than building a high-tech sensor-based coaching system, the core value seems to be in selfreports and collaboration. A "collaborative coaching" approach, in which the digital coach collaborates with the patient and the healthcare professional, might as well be applied in other domains in which healthcare professionals support behavior change. As a next step, we will conduct a prolonged field study to validate the value of Liz in terms of quality of treatment and acceptance.

Raya: A Tangible Sports Buddy Reminding Oneself of the Commitment to Exercise.

Daphne Menheere, Alynne de Haan, Steven Vos and Carine Lallemand

Background

Many people try to be physically active and to incorporate some form of exercise into their daily life. Yet despite these positive intentions, a key challenge for many is to transform intentions into exercise behavior, eventually creating a long-term exercise habit. Social support as a motivational strategy can increase adherence to exercise and can be provided by relational agents as a substitute for human coaches.

Methods

To investigate how to design for exercise motivation, we designed a tangible sports buddy using voice interactions. Raya is a tangible relational agent entailing human characteristics, aim to support overcoming barriers experienced before exercising. Raya helps users to plan a workout and enquire about their motivation to exercise that day. When the user experiences doubt about going or not, Raya sparks a dialogue and triggers emotions, remembering why one initially wanted to go exercising and stimulating the actual intended behavior. Raya does so by adopting a supportive communication style, which refers to a coach perceived as one's ally and support rather than a persuader [4]: "Guess what? It is almost time to exercise! You said you were motivated because you want to [reason]. It is [date] [time] already, so go and get dressed!".

We conducted two user studies, a two-week longitudinal study (N = 6) focused on communication styles, and a user test (N = 6) to explore how emotional design and tangible interaction influence the experience and motivation to exercise. The aim of the latter was to understand how participants physically interact with the buddy and experience this tangible interaction, as well as how empathic and emotional factors play a role in their perception and the anticipated motivation triggered.

Figure 1 Raya, a tangible sports buddy that supports women to exercise

Findings

Our findings show the benefits of a supportive communication style. While the results seem promising, an in-depth exploration of needs fulfillment would require a longer in-situ user study with the product. In our design case, lifelike attributes (animal shape, heartbeat, body warmth) contributed to trigger an emotional effect and create a sense of attachment to the buddy. According to the participants, characteristics of Raya that relate to its tangible nature were key to create that bond. Emotional aspects triggered by the tangibility of the buddy were valued as compared to virtual support for physical activity. Psychology can provide additional supporting theories and frameworks to increase the "friendliness" of a tangible buddy [3] or to determine which type of social support helps users maintaining their goals.

Discussion

Our sports buddy Raya acts here as a propositional object, entailing human and tangible characteristics, aiming to help overcome barriers experienced prior to exercise. By positioning this work

opposed to the current paradigm of quantification [1] and 'in-the-moment' interventions [2], we question the current approaches of motivational design to address the needs of different target groups.
We thus invite designers to bridge the gap within the design space of sport-related technologies by designing tangible artifacts embedding supportive and qualitative aesthetics of interaction rather than focusing on performance.

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Human cues and conversational agents: A field study with an app-based lifestyle intervention.

Talia Cohen Rodrigues, Thomas Reijnders, David de Buisonjé, Prabhakaran Santhanam, Tobias Kowatsch, Veronica Janssen, Roderik Kraaijenhagen, Douwe Atsma and Andrea Evers

Background

eHealth shows to be an effective solution in the treatment and prevention of lifestyle-related diseases. As healthcare professionals experience barriers in providing lifestyle support (e.g. lack of time) self-help eHealth interventions would seem the best alternative. However, these often suffer from a low level of adherence. This study aims to investigate what factors of human-supported eHealth interventions could be applied to self-help ones to make these more attractive to adhere to.

Some level of "humanness" shows to be key in people's use of an intervention. A conversational agent could be used to add this to self-help interventions. We predict that increasing humanness by integrating visual human cues (human resemblance of the coach and its messages) and relational human cues (human-like behavior in the message content) into a conversational agent will increase adherence to the eHealth intervention.

Working alliance with healthcare professionals has shown to predict effectiveness and adherence in both face-to-face and digital settings. And as studies show that people are able to form relationships with technology too, we expect that working alliance is the underlying mechanism for the effect of human cues on adherence.

This study will therefore test how (1) the use of human cues (visual and relational) influence intervention adherence, and whether (2) the working alliance between user and agent mediates this effect.

Methods

Participants (N=121) followed a 3-week physical activity app-based intervention in which a text-based conversational agent sent daily exercises. People could interact with the agent within a chat. Working alliance was measured with the Working Alliance Inventory Short Revised form. Adherence was measured as number of days people finished the session of conversational turns with the agent. Participants were randomized over 4 conditions differing in the type of human cues the conversational agent used, i.e. visual cues (e.g., human avatar, human tone-of-voice), relational cues (e.g., showing empathy, using humor), both, or no cues.

Findings

A one-way ANOVA revealed a significant difference for adherence between conditions. Contrary to what we expected, visual cues and both visual and relational cues led to lower adherence compared to relational or no cues (p=.001). No significant difference was found between relational and no cues. Working alliance was not affected by cue-type, but showed a significant positive association with adherence (r=.378, p=.001).

Discussion

Our results show that adding visual human cues to self-help interventions leads to lower adherence. We hypothesize that this could be due to a lack of transparency about the conversational agent. Participants were not told whether they interacted with a human or computer, and thus the human representation of the conversational agent could have caused a mismatch between participants' expectations and the agent's performance. We also discuss the difference in embodied and text-based conversational agents, as using non-verbal communication by conversational agents might be necessary to make relational cues effective. Future research could therefore focus on the effect of transparency about the true nature of the conversational agent, and of its use of non-verbal communication on both adherence and working alliance within self-help eHealth interventions.

What to discuss? Automatic topic selection for embodied conversational health coaches.

Tessa Beinema, Harm Op den Akker, Lex van Velsen and Hermie Hermens

Background

Health coaching using embodied conversational agents is an active topic of research. However, coaching interactions with agents either tend to rely heavily on the user indicating what they want to discuss, or letting the user follow a predefined route. Development of an artificially intelligent algorithm that is able to select the most relevant topic to discuss would be a way to make the interactions agent-initiated, but still tailored to the user.

During the Council of Coaches project, we investigated the development of such automatic topic selection. Two main steps in this process were: a) to specify topics that are part of coaching conversation (e.g. goal-setting, social conversation or giving feedback on performance) and to create a practical model for designing and implementing coaching conversations; and b) to develop an algorithm that automatically selects which coaching topic to discuss next, based on, for example, available knowledge about the user, their context and the coaching domain.

Methods

A topic model was developed and evaluated through card-sorting methods with experts. Coaching techniques and topics from the behaviour change literature (such as the Behaviour Change Technique Taxonomy v1, Michie et al. 2013) were put on cards and as the initial set of cards to sort. Topics that are relevant for virtual coaches, but not included in literature on human-human coaching were also added (e.g. explaining the interaction paradigm, or introduction between the coach and user).

We evaluated an implemented version of the topic model and topic selection algorithm through a micro-randomized trial (MRT) that compared the topic selection version (the coach suggests a topic) with a fully scripted version (the user selects a topic). This MRT was incorporated in the final two evaluation rounds of Council of Coaches.

Findings and discussion

The final topic model contained 115 actions that contributed to 30 topics. Overall, the 11 experts that participated in the card-sort validated the contribution of these actions to those topics.

In the two rounds of the MRT (N=40 and N=42), the mix between the coach suggesting a topic and the user selecting a topic was perceived as a natural interaction, with no difference in interaction length, and with good acceptance rates for coach suggestions.
In the presentation we will shortly present the developed topic model, and further elaborate on the practical implementation of topic selection and the results of the micro-randomized trial.

Symposia

Newest scientific developments and implementation efforts on self-monitoring and wearables in psychiatric care

Fionneke Bos, Barbara Montagne, Yoram Kunkels and Harriette Riese

People with mental health disorders are often looking for ways to successfully live and cope with the impact of the disorder. One way to do so is to frequently monitor mood, symptoms, experiences, and physiological markers in daily life. Indeed, research has shown that self-monitoring as well as wearable devices (e.g., heartrate monitoring or actigraphy) might help people regain a sense of control and obtain insight into ways to influence their well-being. Similarly, the obtained data can help patients and clinicians to discuss treatment goals. Therefore, self-monitoring and wearables are generally seen as highly promising for psychiatric care.

In this symposium, we will present the latest scientific developments concerning self-monitoring and wearables in psychiatric care, and elaborate on current implementation efforts. We will start by shortly outlining the rationale behind self-monitoring for psychiatry and introducing an innovative flexible interface that can be used for the implementation of personalized self-monitoring. Next, we will examine the potentials and the pitfalls using activity monitors to measure activity in patients suffering from mood disorders. Finally, we will discuss a clinical case where self-monitoring and innovative personalized feedback was used in psychiatric care.

Walking away from this symposium, you will know more about what currently is possible regarding self-monitoring and wearables in psychiatry.

PErsonalized Treatment Real-time Assessment (PETRA): a flexible interface for personalized diaries in psychiatry

Fionneke Bos, Marieke Wichers, Ando Emerencia, Wim Veling, Benno Haarman, Date van der Veen, Robert Schoevers, Erwin Veerman, Evelien Snippe, Judith Rosmalen and Hariëtte Riese

Background

Research shows that the frequent recording of mood and experiences throughout the day (termed the experience sampling method, ESM) may be highly relevant for mental health care. Clinicians and patients expect ESM may increase awareness, insight and self-management, and it may personalize interventions or alert patients to rising symptoms. The present project aims to develop a flexible interface to enable use of ESM in clinical practice.

Methods

Interviews and focus groups (with 42 patients and 34 clinicians) were held to identify needs and barriers for implementation. The roadmap of the Center for E-health Research (CeHRes; Van Gemert-Pijnen et al. 2011) was used to develop a flexible interface that supports the use of ESM for patients and clinicians. The interface is termed PETRA: PErsonalized Treatment Real-time Assessment.

Findings

PETRA consists of two modules: a decision aid to guide patients and clinicians from their clinical question to a scientifically valid and personalized ESM diary, and a feedback module that attractively visualizes the data. First prototypes of both the decision aid and the feedback module have been developed and tested with end users. During the presentation, we will demonstrate the decision aid and feedback modules, and elaborate on the development process.

Discussion

PETRA is the first tool that facilitates the use of ESM in clinical practice. Ultimately, we aim to create a tool that helps to improve the patient-clinician relationship and increases efficiency of care.

Using wearable technology to facilitate long-term ambulatory assessment of activity in patients with mood disorders

Yoram Kunkels, Hariëtte Riese, Stefan Knapen, Rixt Riemersma-van der Lek, Sandip George, Arie van Roon, Robert Schoevers and Marieke Wichers

Background

Rapid technological advancements in the field of wearable monitors of physiological functioning have dramatically changed the way we measure participants. These developments offer novel opportunities, such as collecting long-term continuous datasets, while at the same time introducing new hurdles, such as how to process and analyze such Big Data sets. In this presentation we will share our experiences with these new wearable technologies during data collection and analysis.

Methods

Long-term, continuous activity data was collected using actigraphy in multiple samples. In the first study, patients with a history of Unipolar depression tapered their antidepressant dosage while wearing light-weight, wrist-worn accelerometers continuously for 120 days. In the second study a sample of patients suffering from Bipolar disorder continuously measured their activity using actigraphy for 180 days.

Findings

In general, actigraphy performs well as a wearable technology for ambulatory assessment in psychopathological samples. We found that patients did not experience substantial burden due to wearing the device. Moreover, actigraphy offers high-resolution data which can be used for both common circadian rhythm and sleep analyses, as well as more advanced analysis methods. However, generalizability of the results is hampered by variation in measurement units between devices.

Discussion

Wearable activity monitors can be a useful addition to the toolkit of various health-related professionals, such as clinicians, researchers, and coaches. Its strength lies with its ability to obtain large, long-term datasets with only a small burden to participants. Actigraphy is well supported with dedicated software to perform multiple processing tasks and analyses. Nonetheless, in order to reach its full potential, various issues due to lack of standardization still have to be resolved.

JCP DNA: Prevention is better than cure in the event of crisis!

Barbara Montagne, Massi Aoudjan, Elisa van Delft, Corine ter Burg, Date van der Veen, Laura Bringmann and Gert Stulp

Background

Individuals with a personality disorder experience rigid and long lasting social, emotional and cognitive problems. Problems with the regulation of their arousal frequently results in crisis. In a Joint Crisis Plan (JCP) the client identifies, together with the clinician, predictive signs for crises and possible solutions to stop a crisis from happening or to resolve a crisis. Even though the results of JCPs are generally promising, there are pitfalls: 70% of the participants do not complete the JCP and 87-96% do not implement a JCP once completed. This can be due to a number of problems when creating a JCP. Firstly, drafting the JCP requires reflection on one's own emotions and secondly, it requires recognition of the relation between the various variables of the JCP. Both are difficult. One can argue that the information on which the JCP is based, is not as reliable as we want it to be. In this usability and feasibility study, we investigated whether we can bring the information on which the JCP is based closer to daily life by using a personalized questionnaire that is filled in several times a day (Experience Sampling Method).

Methods

Four patients, treated at GGZ Centraal at the personality disorders outpatient clinic, participated. Each individual patient transformed, together with a clinician, their old JCP into a personalized questionnaire including the most relevant variables (context, thoughts, feelings, behavior). The patient completed this personalized questionnaire three times a day for four weeks, using an online app, until there were at least 60 measurements. After all the data was collected, it was visualized in a poster (ESM-viz). During face-to-face contact this visualization was presented and discussed between patient and clinician with the aim to really understand what is shown.

Findings

Patients were very positive about the information it provided, even when patients had been in treatment for a long time (years), it brought new insights into the relationship between the different variables included and the threat of a crisis. It also appeared on several occasions that specific context variables were much more important than previously thought.

Discussion

This study shows that not only patients are willing and able to fill out an online questionnaire during an unstable period in their lives but also that the data collected is valuable for the patient as well as the clinician. This methodology provides information about the relationship between specific variables and the imminent crisis that was not previously recognized as such. This is an important step in narrowing the gap between daily reality and the information on which the JCP is based. A follow-up study is planned to further investigate this ESM-viz methodology.

When we are able to retrieve previously unavailable information on the relationship between variables as well as make this visible in an informative and meaningful way for patients, this also gives specific direction to interventions aimed at crisis prevention. In short, we can prevent rather than cure in the event of a crisis!

mHealth and eHealth interventions in the treatment of patients suffering from cancer-related fatigue.

Mariët Hagedoorn, Rosalie van Woezik, Melanie Schellekens and Marije van der Lee

One of the most prevalent side effects of cancer and its treatment is fatigue, characterized by feelings of weakness, exhaustion, and lack of energy. After completion of treatment, one-third of cancer patients suffer from severe fatigue that can persist for months and even years. This cancer-related fatigue (CRF) is a complex, multifactorial condition that is often accompanied by significant distress and reduced quality of life. As the number of cancer survivors is expected to increase considerably in the coming years, a better understanding and development of effective treatments for CCRF are critical.

We present three studies that contribute to a better understanding and improvement of CRF and its treatment:

1. The results of a randomized controlled trial, showing the effectiveness of a self-management app to improve fatigue and quality of life in cancer patients.
2. The design of a preference trial, discussing the development and pilot testing of an online couple Mindfulness-Based Cognitive Therapy and online couple Activity Coaching intervention to improve patients' fatigue and both couple members' emotional wellbeing.
3. The results of a proof-of-principle study, discussing how an experience sampling app and the resulting symptom networks can help personalize psychological care for chronic CRF.

Beating Cancer-Related Fatigue with the Mobile App 'Untire': Results from a Waiting-List Randomized Controlled Trial

Simon Spahrkäs, Anne Looijmans, Robbert Sanderman and Mariët Hagedoorn

Background

The purpose of this waiting list randomized controlled trial (RCT) was to examine the effectiveness of the 'Untire' mHealth self-management app in improving fatigue and quality of life (QoL) in (former) patients with cancer.

Methods

Patients with CRF were recruited via social-media, and randomized into intervention and waiting list control group. Outcomes were assessed at baseline, 4, 8, 12, and 24 weeks. GLMM were calculated to assess the effects of having access to the Untire app versus no access over time. Additionally, we tested potential moderators (i.e., patient characteristics) and the clinical relevance (i.e., reliable change) of the hypothesized intervention effects.

Findings

Results revealed steady improvement for the intervention vs. waiting list control group in fatigue severity, fatigue interference, and overall QoL on average after 12 weeks (all P's < .01), whereas no differences were found in levels of overall QoL in the past week (P = .71). Overall effect sizes were largest for fatigue severity (d = 0.40), followed by fatigue interference (d = 0.35), and overall QoL on average (d = .32). Moderation analyses indicated that the intervention effects did not depend on age, gender, country of residence, and cancer status (patients vs. former patients). Exploratory sensitivity analysis indicated that patients with high or medium use benefited most, compared to low, non-active intervention and control participants.

Discussion

Access to the Untire app significantly improved levels of fatigue severity, interference, and overall QoL on average, among patients with CRF after 12 weeks of app access, with generally small to moderate overall effect sizes.

COMPANION – Co-creating a Couple Online Mindfulness intervention and Physical Activity interveNtION targeting cancer-related fatigue

Sophie van Dongen, Melanie Schellekens, Fabiola Müller, Marrit Tuinman, Marije van der Lee and Mariët Hagedoorn

Background

There is a growing group of patients in need for treatment of chronic cancer-related fatigue (CCRF). While online mindfulness-based cognitive therapy (eMBCT) and online physical activity coaching (AC) are effective in reducing CCRF, their effectiveness is not optimal: Some patients do not or do not sufficiently improve. Importantly, these interventions are directed at the patient alone despite growing evidence for the importance of a dyadic approach.

Current eMBCT interventions solely intervene upon individual factors (e.g. patient cognitions), while evidence strongly suggests that also dyadic factors (partner responses, couple communication) perpetuate patient fatigue. Moreover, current physical activity interventions solely intervene upon patient activity and do not take advantage of the dyadic mechanisms (being active together, partner support) that can facilitate a more balanced physical activity.

A more profound approach to relieve the fatigue burden is not directed at the patient alone, but also the patient’s partner as this allows intervening upon the dyadic context that evidently shapes patient fatigue.

Methods

In the COMPANION project, we will extend two evidence-based patient interventions, eMBCT and AC, to the couple. Both couple interventions will make use of the processes targeted in the patient interventions and, additionally, intervene upon the dyadic context. That is, targeting the dyadic perpetuating factors of fatigue (couple eMBCT) and dyadic mechanisms to facilitate activity change (couple AC) has the potential to provide an additional treatment effect.

We will start with a needs assessment to explore how and to what extent patients want their partners to be involved in their CCRF care, and partners want to be involved in the patient’s care for CCRF. To assure the couple interventions’ feasibility in terms of usability and engagement for both couple members, we will co-create these interventions with couples, MBCT- and systemic therapists, physiotherapists, and service providers.

In a preference trial we will assess the feasibility, potential effectiveness and potential working mechanisms of the couple eMBCT and couple AC. Couples with a preference are assigned accordingly, otherwise they are randomized to eMBCT or AC.

Findings

We expect to develop a needs-based, usable and engaging couple eMBCT and couple AC targeting CCRF. Furthermore, the pilot preference trial will provide insight into the couple interventions’ (1) feasibility in terms of recruitment rate, intervention preferences, adherence to the protocol and acceptability to patients, partners and (physio-)therapists, (2) potential effectiveness (including patients fatigue, patient and partner wellbeing and relationship satisfaction) and (3) potential working mechanisms (e.g. sleep quality, catastrophizing) for reducing patient fatigue.

Discussion

Given that a healthy relationship is an important coping resource for cancer patients and their partners, by developing a couple eMBCT and couple AC we can help the couple cope with fatigue in a manner that is adaptive for patients' fatigue and both couple members' emotional wellbeing, in addition to optimizing effectiveness.

First results of an ESM-app to personalize treatment for chronic cancer-related fatigue using network analysis.

Rosalie van Woezik, Tom Bootsma, Melanie Schellekens and Marije van der Lee

Background

Chronic Cancer-Related Fatigue (CCRF) can have a negative effect on quality of life and can lead to impairments in patients' daily functioning. Previous research has shown that patients differ in their experience of CCRF (Bootsma, Schellekens, van Woezik, van der Lee, & Slatman, 2019). For example, one patient was disturbed by unexpected waves of fatigue during the day, whilst another person experienced severe fatigue constantly throughout the whole day. Moreover, CCRF influences different aspects of patients' lives, from the way they see themselves to their social life.

Both physical activity interventions and psychosocial interventions have shown to be effective in reducing fatigue. However, it is unclear which therapy works best for which patient. Since patients experience CCRF differently, it is important to take a personalized approach. One method to personalize treatment for CCRF is by applying the network analysis (Borsboom & Cramer, 2013). The network approach views a disorder as a network of symptoms that can influence, strengthen, and sustain one another instead of being loose components. For example, one patient can experience waves of fatigue, withholding him/her from planning social activities, resulting in a depressed mood, increasing the fatigue even further. By mapping the individual's specific symptoms and relationships between these symptoms, we can study what factors contribute to CCRF and what factors are helpful in coping with CCRF. By using an experience sampling app, which measures thoughts, feelings and behaviors throughout the day, we can model these individual networks. This information can help patients and therapists to discuss what treatment is most suitable for the patient. We will test whether the app is considered helpful by patients and therapists and whether it contributes to a more personalized treatment of CCRF.

Methods

Based on extensive network analysis and qualitative research we developed an Experienced Sampling Method (ESM) app in which patients' experiences with CCRF were comprehensively measured. Patients registered their fatigue, thoughts, feelings, and behaviors 5 times a day for 21 days (n=5) using Ethica software (www.ethicadata.com). This allowed us to model individual contemporaneous and dynamic networks of CCRF. Patients received descriptive feedback of the app's results. Moreover, a therapist presented the personal network to the patient during the intake meeting. Patients were interviewed about their experiences with the app and the feedback reports. Therapists were also interviewed on whether the app helped them to personalize the patient's treatment.

Findings

The first results of using networks during the intake are promising. Therapists and patients are positive about the new insights these networks bring.

Discussion

The aim of this study was to gain more insight into whether feedback regarding individual networks of CCRF can contribute to more personalized and effective psychological care for CCRF. We will discuss potential benefit and disadvantages of the ESM-app.

Workshops

Exploring the Possibility of AI Paternalism in Health Apps.

Katja Stoppenbrink, Michael Kühler, Lena Maren Busch, Yashar Saghai, Nils-Frederic Wagner and Lucie White

Background

Health apps are supposed to promote their users' health by tracking health related data and assist in possible diagnosis and/or by influencing their users to act in a healthier way, for instance by way of nudging or gamification. Concerning this latter potential, such health apps may thus be considered persuasive technologies, which raises concerns about how they may affect their users' autonomy. On the one hand, it is argued that such health apps in fact promote their users' autonomy because they enable them to pursue their (authentic and autonomously chosen) goals in a better way. On the other hand, it is argued that such apps rather diminish autonomy in that the users are infantilized and unduly manipulated. However, both positions at least agree on the fact that such apps do have an influence on their users' decision-making and behavior and thus affect users' autonomy. Moreover, it can safely be assumed that the apps are not actors themselves, since they do not act autonomously—however weakly defined.

In contrast, consider health apps which include AI technology and are capable of

1) analyzing their users' behavior in light of the individual user's health related data as well as data gathered from other users and more general health related data,
2) drawing conclusions as to which behavior would benefit the individual user in terms of health, and
3) influence the individual user's behavior accordingly, for example again by way of making "nudging" suggestions on what to do or by means of gamification.

Arguably, such AI based health apps may now be considered a sufficiently autonomous actor when it comes to influencing the users' behavior for their own good. If so, it seems that AI based health apps gain a paternalistic potential, which needs to be analyzed and critically addressed in more detail.

Goals

The workshop is intended to do just that and aims at an interdisciplinary discussion about the possibility and potential of AI paternalism in health apps. Leading questions are:

1. How plausible is the idea and concept of AI paternalism in health apps to begin with?
2. How feasible would such an AI paternalism be from an engineering point of view?
3. Assuming it being sufficiently plausible and technically feasible, how would the actual influence of such AI based health apps on users' autonomy look like in more detail in order to be considered paternalistic?
4. Finally, following the above, what kind of ethical conclusions should be drawn concerning the legitimacy of AI based health apps' paternalistic potential?

Content and (interactive) activities

In order to facilitate a maximum amount of interdisciplinary interaction, the workshop will feature only very brief pitches on the above listed questions (no more than 15 minutes total), before engaging in a plenary discussion with the audience. Depending on the number of people present, this may be conducted as a plenary discussion right after the pitches or feature a number of discussions in smaller groups (about 15 minutes), each joined by one of the principal participants, before finally engaging in a plenary discussion on each group's results.

Expertise of workshop leader(s)

Katja Stoppenbrink and Michael Kühler have collaborated on topics in ethics for years, in particular on the topic of paternalism. Most recently, they organized a panel on paternalism at the Tagung für Praktische Philosophie in Salzburg 2019, Katja Stoppenbrink presented a paper at the workshop "For One's Own Good? The Concept and Ethics of Paternalism" in Belgrade 2019, co-organized by Michael Kühler. Currently, they are working on an international and interdisciplinary project proposal on the topic of "AI paternalism." The proposed workshop is part of this ongoing work.

Serious games for professional skills: an escape room for exploring the possibilities of eMental Health

Joyce Bierbooms, Milou Feijt, Wijnand Ijsselsteijn, Meddy Weijmans, Wouter Sluis-Thiescheffer and Inge Bongers

Background

Despite a growing body of evidence in support of the benefits of eMental Health (EMH), its actual use among mental healthcare professionals remains relatively low. Reviews on this topic found that the adoption by professionals is negatively influenced by limitations in their skills, abilities, and experiences with EMH. To overcome these limitations, a possible approach is to apply gaming techniques in training skills and abilities. Gaming techniques are a powerful means to provide hands-on experiences in a safe and social environment, and increase engagement in skill enhancement. This supports professionals in exploring EMH in a meaningful setting which would be difficult and potentially problematic in genuine therapeutic settings.

In our project we aim to design a game-based environment for mental health care professionals, anticipating required EMH skills in modern therapeutic settings. Extensive research into the context and needs of mental healthcare professionals informed the design of an escape room scenario. An escape room is a game in which participants find themselves in a story line and have to solve puzzles within a limited amount of time. An escape room scenario offers the possibility to design story lines that reflect the real therapeutic settings of mental healthcare professionals.

Goals

In the workshop we aim to present the developed escape room scenario by providing the attendants a hands-on opportunity to experience and evaluate elements of the escape room scenario. Having this possibility to really 'play' parts of the escape room makes this workshop very interactive and increases participants' awareness of the possibilities of EMH. In addition, it introduces them to using an escape room as a new concept for skill enhancement.

Content and (interactive) activities

In the workshop we will first introduce our escape room scenario and underlying rationale for the design choices. Following this, we will have an interactive part where the attendants have the opportunity to work in small groups to work on a number of escape room puzzles. We will end the workshop with a short reflection on the experiences and a discussion on the applicability of an escape room for the purpose of exploring and experiencing EMH.

Due to the content of the escape room puzzles, this will be a Dutch only session.

Expertise of workshop leader(s)

The workshop will be led by Joyce Bierbooms and Milou Feijt. Joyce Bierbooms is a senior researcher at Tilburg University, currently leading a postdoc research into the possibilities of serious games to enhance mental healthcare professionals' skills in using EMH. Milou Feijt is a PhD student at TU/e and has done extensive research into the adoption of EMH among mental healthcare professionals. She is currently focusing on the development of a measurement instrument to assess professionals' adoption of EMH, and the exploration of novel technologies to support empathic interactions in EMH.

Co-designing technology with health care professionals: yet another task on their plate?

Anita Cremers and Rosa de Vries

Background

Health care professionals have extremely busy work schedules. Unfortunately, they need to spend a lot of their time on administrative tasks, whereas they would like to devote it to helping patients, which is what they were trained for in the first place. Properly designed technology could help to lessen the burden of administration and provide more quality time with patients. In the project COUNT (Communication and Operation on the Unit Between Nurses and Technology), we are working on developing this type of technology for hospital nurses. To make sure we are developing technology that is really helpful to and usable by nurses, we involve them in co-design activities. This is a challenge in itself, similar to the reason why the project was started: nurses have very little time, and it is hard to plan activities since chances of something unexpected coming up are high. Because nurses are so engrossed in their daily activities, it is difficult for them to take some distance to think about innovations, and moreover, technology is generally not of particular interest to them.

In COUNT, we have developed and applied a number of techniques to involve nurses in co-design and to stimulate them to think of possible technological innovations in their daily work. Although the techniques were primarily targeted at hospital nurses, lessons learned apply to a much wider target group of health care professionals.

Goals

In the workshop, we intend to share our experiences and insights on involving health care professionals in co-design processes. We invite the audience to discuss these findings and to share their own experiences with co-designing in a health care context, and apply these in a small exercise in which we develop a new technique targeted at a specific type of health care professional.

Content and (interactive) activities

We first present some of the techniques we have developed for co-designing with nurses in a hospital context. We then share our experiences, insights, do's and don'ts with respect to applying these methods. We invite the audience to discuss our findings and to share their own experiences with co-designing in health care. On the basis of the combined experiences we carry out an exercise in small groups to develop a new technique for involving specific types of health care professionals (described in personas) in a specific case of developing technology. We end the workshop by sharing the techniques and considerations made with the other groups.

Expertise of workshop leader(s)

Anita Cremers is professor (lector) Multimodal Use Interface Design at the Research group Co-Design of Utrecht University of Applied Sciences and senior researcher at TNO, The Netherlands. Rosa de Vries is researcher and designer at the Research group Co-Design of Utrecht University of Applied Sciences. They are both working in the (Dutch SIA RAAK Publiek project COUNT (Communication and Operation on the Unit Between Nurses and Technology)), in which they are co-designing technology that supports nurses in their daily work to reduce time spent on administration and enhance time spent with patients.

Lessons Learned from implementing an ICT innovation in the care and support sector.

Geja Langerveld, Jan Jukema and Annemarie Johannes

Background

Over the past few years more and more eHealth/ICT innovations for the care sector are being developed. Innovation in health and care is also stimulated by governments. The Active & Assisted Living programme is an example of how development of ICT innovations is stimulated by public means. Since the Covid19 pandemic has occurred the awareness for digital innovations in health and care has increased. These developments raise the expectation that ICT solutions are more and more taken up by health and care providers. In practice it still seems not that easy to implement ICT innovations, specially on the long-term.

Goals

In this workshop we want to share some lessons and insights from ICT solutions (mainly from the AAL programme) who try to make their way into the daily practice of support and care. We will highlight what barriers you can encounter and which possible solutions to overcome those. In the interactive discussion we hope to come up with suggestions/input on how research can be better utilized to overcome certain barriers in implementing technology for health.

Content and (interactive) activities

In the workshop Geja will introduce what the AAL programme does and some of the main lessons learned over the years. By a concrete case of Anne4care Annemarie will present the journey of how a technology is developed into a ICT solution that is now used on a daily basis by for instance older adults. Jan Jukema will present what role research has in the implementation of the Anne4care solution today.

Up front people can answer some polls and questions via the Mentimeter tool. After the presentation there is room for discussion on the questions that will be raised with concern to the barriers of implementation. The audience will be asked to contribute how they see that research can play a beneficial role in promoting the uptake of technological innovation in health and care. Around 20 minutes of the session will be devoted to discussion and interaction via polls and questions.

Expertise of workshop leader(s)

Geja Langerveld has a wide experience in chairing workshops at a kinds of care conferences nationally as well as internationally. As programme manager of AAL at ZonMw she had multiple years of knowhow on the development and the obstacles around that in the domain of care and support. Jan Jukema has a long experience in research and education. As a professor in the domain of gerontology/nursing he has a wide expertise. Specialties: co-creation; older adults; nursing education; applied gerontology; nursing ethics; care; qualitative research; practice development; co-design Current research: healthy ageing in older migrants; care dependency in later life; personalised prevention, care and welfare in communities; technology as enabler of prevention, care and welfare; collaboration citizens and professionals; citizen science. Annemarie Johannes Experienced Owner with a demonstrated history of working in innovation in Health Care and ICT and of working in the events services industry. Skilled in Innovation Management, Operations Management, and Event Management. Strong business development professional with a Bachelor of Science.

Posters

The use of outcome data for shared decision making in breast cancer follow-up - the SHOUT-BC study protocol.

Jet Ankersmid, Constance Drossaert, Luc Strobbe, Cornelia van Uden - Kraan and Sabine Siesling

Background

In the Netherlands, about 15.000 new cases of breast cancer are diagnosed yearly. Treatment for breast cancer is highly personalized. In contrast, follow-up is equal for each curatively treated breast cancer patient based on a standard guideline: an annual mammogram and physical examination for five years following treatment. This one-size fits all approach is under debate as about half of the patients detect recurrence themselves and the risks for locoregional recurrence (LRR) and second primary (SP) breast cancers are not equal for everybody. Moreover, patient preferences are not taken into account. Personal risks for LRR and SP can be used to guide informed decision making regarding personalized follow-up (e.g. by using them in a patient decision aid (PtDA)). In our SHOUT-BC study, we aim to assess the effects of Shared Decision Making (SDM) supported by outcome date on perceived and observed SDM, satisfaction about care and utilisation and outcomes of care; alongside its implementation in daily clinical practice.

Methods

A PtDA was developed in several co-creative sessions with key stakeholders (patients and healthcare providers (HCPs) and SDM experts) with input of qualitative needs assessment studies among patients (n=21) and HCPs (n=21). Moreover, the PtDA incorporates the outcomes (LRR and SP risk) based on the INFLUENCE-nomogram: a tool to calculate personal risks for LRR and SP, developed based on a large set of outcome data from the Netherlands Cancer Registry (https://www.evidencio.com/models/show/721). The PtDA consists of three parts: a handout sheet, an online PtDA (to go through at home), and a summary sheet (an overview of the patient's preferences and considerations as a base for final decision-making). To support implementation, HCPs in the participating hospitals will receive a training concerning outcome-based SDM regarding breast cancer follow-up, specifically using the developed PtDA.

The effects of outcome-based SDM are assessed using a Multiple Interrupted Time Series (mITS) design, in which 630 breast cancer patients will be included into two conditions (before or after implementation of the PtDA) in seven top clinical hospitals over a period of 20 months. Data is collected at three timepoints using questionnaires: after the consultation in which the decision for the organisation of follow-up care is made and after 6 and 12 months. In addition, 230 consultations between HCPs and patients facing the decision about the organization of follow-up care are audio-recorded and analysed. Additional data (e.g., data on health care utilization), is collected from patients’ medical records. Primary outcomes of the study are reported and observed SDM. Secondary outcomes include decisional conflict and regret, fear of recurrence, risk perception, disease perception, and quality of life. Separate Interrupted Time Series (ITS) analysis using segmented regression will be performed to analyse the mITS data per hospital.

Results

In this presentation, the developed outcome-based PtDA will be demonstrated and the study protocol will be presented.

Discussion

This project will increase insights into the feasibility and value of transparency of outcomes relevant to patients and identify best practices on disclosing and using these outcomes for SDM, specifically concerning breast cancer follow-up.

Access to music for people with dementia.

Rik Wesselink, Geke Ludden, Berry Eggen and Marike Hettinga

Background

Difficulties and inabilities in using everyday products decrease quality of life and hamper independent living for people with dementia (PwD). Impairment in executive functioning, apraxia and apathy are common amongst PwD and they progress as the dementia progresses. Next to problems in understanding how to interact with a product, this results in the fading of initiative.

Music can have a great positive impact on quality of life of PwD. A growing number of studies show the positive effect of listening to music on quality of life. Listening to music can have positive effects on mood and quality of sleep, decrease symptoms of depression and decrease fear.

With a focus on the interaction with music, we study how smart technology can enable human-product-interaction while adapting to loss of initiative. The resulting knowledge will support (interaction) designers to create better products for PwD.

Methods

In a first study, we used contextmapping to study the needs and barriers of people with mild-moderate dementia in relation to music in daily life. Results from this study have informed our second study: a case study on the design of a music player for PwD. This music player addresses problems in human-product-interaction and loss of initiative.

Results

The first study resulted in rich data and a deep insight into the needs and barriers in relation to music. One participant explained that at a certain point she had enough of all the thoughts in her head and put on music that made her feel happy again. Another participant recently bought an all-in-one music system to play his cd's and records and listen to the radio. Unfortunately, the product was almost impossible to use for the participant. This shows that the needs of PwD in relation to music might be richer than what people generally expect. Moreover, it shows a gap between these needs and the availability of solutions. In our second study, the design case study, we found ways to address loss of initiative in the design of a music player for PwD. These findings are based on insights from literature on agency in product design and design for behaviour change.

Discussion

PwD participated in our first study, but due to the COVID-19 restrictions we were unable to involve them in our second study. It is, of course, of utmost importance to test the design solution with PwD. We therefore decided to aim, in the second study, for a functional research prototype that we can evaluate with PwD in a safe way. In a future study, we will evaluate how PwD experience the music player and the inviting behavior we embedded to counter the loss of initiative.

Co-creating with patients and other stakeholders: design of an eHealth intervention to support long-term behavior change and weight loss maintenance.

Rikke Aune Asbjørnsen, Jobke Wentzel, Mirjam Lien Smedsrød, Marianne Ollivier, Jøran Hjelmesæth, Lisette van Gemert-Pijnen and Lise Solberg Nes

Background

Long term behavior change and maintaining weight after weight loss is hard. Research examining motivational and persuasive design elements to meet end-user needs, has the potential to identify which ingredients to incorporate in the design of innovative eHealth solutions supporting sustainable behavior change. The aim of this study was to identify design elements that motivate and support patients in maintaining weight after weight loss.

Methods

Service design tools and - methods were applied to elicit user needs and engage end-users and stakeholders in the early design process. Two focus groups with patients (n=10) and one focus-group with health care providers specialized in obesity (n=6) (i.e., medical doctor, health psychologist, physical therapist, clinical nutritionist) were conducted. Focus groups participants were asked to identify elements that can meet end-user needs to maintain weight, through an open card sorting task, by means of specially developed cards with motivational and persuasive design features (e.g. rewards, goal-setting, feedback) based on earlier research findings (1).

Results

The study revealed 10 design elements identified by both prospective end-users and other stakeholders as essential in supporting weight maintenance after weight loss, in order to stimulate motivation and engagement(2). Tailoring and personalization of the eHealth technology were key design features highlighted by the participants. Stakeholders' perspectives indicated how these design principles should be combined with other identified design elements and be concretized to meet user needs (e.g. tailored feedback and suggestions based on personalized goals, action and coping planning, and rewards).

Discussion

This study shows how creative service design methods and co-creation with users and other stakeholders, can provide valuable input in the design of products and services, including digital technologies, to meet end-user needs. The findings can contribute to the development of novel solutions that may support long-term behavior change and weight loss maintenance, and provide knowledge on how digital design choices were made and translated into low and high fidelity prototypes.

Evaluating an online patient portal for communicating laboratory test results: A real-world study into patients’ attitude using the eHealth Impact Questionnaire (eHIQ).

Rosian Tossaint, Esther Talboom-Kamp, Annelijn Goedhart, Anke Versluis and Marise Kasteleyn

Background

Communicating laboratory test results online has several advantages for patients, such as improving clinical efficiency and improving accessibility, thereby helping patients to take an active role in managing their health.

This study aims to investigate the experiences and self-efficacy of patients using an online patient portal that communicates laboratory test results.

Methods

The online-administered eHealth Impact Questionnaire was used to explore patients’ attitudes towards the portal. Patients visiting the portal were asked to complete the questionnaire. The subscale ‘information and presentation’ assessed the usability of the patient portal and the subscale ‘motivation and confidence to act’ assessed self-efficacy to determine whether patients were motivated to act on the presented information. A cut-off score of ≥ 65 was used to determine whether the portal was rated positively.

Results

The questionnaire was completed by 354 patients, with a response rate of 2.6 %. ‘Information and presentation’ scored 67.70 (SD = 13.12) and ‘motivation and confidence to act’ scored 63.59 (SD = 16.22). A positive, significant correlation was found between the two subscales, $r(345) = .77$, $p < .001$.

Discussion

This study showed that the usability of the portal was rated positively by patients that participated in this study. However, the portal only slightly helps patients to take an active role in managing their own health. The low response rate precludes generalization of the results. Future research should examine avenues to further increase patients’ self-efficacy and study whether portal acceptability differs in subgroups. All in all, patient portals conveying laboratory test results in understandable language seem usable and provide potentially a viable way to help patients take a more active role in managing their own health.

The impact of patient characteristics on the attitudes toward an online patient portal for communicating laboratory test results: real world-study.

Rosian Tossaint, Marise Kasteleyn, Annelijn Goedhart, Anke Versluis and Esther Talboom-Kamp

Background

Patient portals are promising tools to increase patient involvement and allow them to manage their health. To optimally facilitate patients, laboratory test results should be explained in easy language. Patient characteristics affect the usage of portals and the user satisfaction. However, limited research is available, specified for online communicating laboratory test results, on whether portal use and acceptance differ between groups.

This study aims to assess the effect of patient characteristics (gender, age, education and chronic disease) on the self-efficacy and perceived usability of an online patient portal that communicates diagnostic test results.

Methods

We used the online-administered eHealth Impact Questionnaire (eHIQ) to explore patients' attitudes towards the portal. Patients visiting the portal were asked to complete the questionnaire and to answer questions regarding gender, age, education and chronic disease. The subscale 'information and presentation' of the eHIQ assessed the usability of the patient portal and the subscale 'motivation and confidence to act' assessed self-efficacy to determine whether patients were motivated to act on the presented information. Age, gender, education and chronic disease were the determinants to analyze the effect on usability and self-efficacy. Descriptive analyses were performed to explore patient characteristics, usability and self-efficacy. Univariable and multivariable regression analyses were performed with age, gender, education and chronic disease as determinants, and usability and self-efficacy as outcomes.

Results

The questionnaire was completed by 748 respondents, of 428 (57.2 %) were female, 423 (56.6%) highly educated and 509 (68%) had no chronic disease. The mean age was 58.5 years (SD 16.4). Higher age, high education and asthma/COPD were significant determinants for decreased usability; respectively, B=-.094, (95% CI (-1,147 to 0.042), P<0.001, B=-2.512 (95% CI -4.791 to -0.232), P=.031 and B =-3.630 (95% CI -6.545 to -0.715), P=.015. High education was also a significant determinant for a lower self-efficacy B=-3.521 (95% CI -6.469 to -0.572, P=.019). Other determinants were not significant.

Discussion

This study showed that the usability of the portal decreased with age, if a user was highly educated or had asthma/COPD. Patients' motivation and confidence to act on the presented information decreased with age. The results portal is not tailored for different groups. Further research should investigate which factors from a patient perspective are essential to tailor the portal for different groups, and how a result portal can be optimally integrated within the daily practice of a doctor.

Effect of motivational interviewing combined with digital shoe-fitting on adherence to orthopedic shoes: study protocol.

Manon Jongebloed-Westra, Christina Bode, Erik Koffijberg, Jaap van Netten, Peter ten Klooster, Stein Exterkate and Lisette van Gemert-Pijnen

Background

Diabetic foot ulcers are a leading cause of hospitalization, amputation and high treatment costs. Personalized orthopedic shoes are considered essential to prevent (re)ulcerations, and adherence to this footwear is crucial. However, adherence to orthopedic footwear is often low and there is a lack of insight in methods to improve this adherence. We propose a novel care approach, motivational interviewing (MI) and a digital shoe-fitting procedure to improve adherence to custom-made footwear and to be (cost-)effective. The aim of this trial is to assess the (cost-)effectiveness of a novel care procedure (MI combined with digital fitting) compared to the usual care (no MI and traditional fitting) in ulcer prevention and footwear adherence.

Methods

In a randomized controlled trial, 140 participants with diabetes mellitus, with or without previous ulcers, whom are prescribed custom-made orthopedic shoes will be included. Participants will be randomized over the intervention or control condition. The intervention group will receive the novel care procedure, the control group will receive usual care. A temperature sensor will be built in participants' custom-made shoes to measure wearing time continuously throughout 12 months. Daily activity will be measured using logdata with a stepwatch, combined with the wearing time to calculate adherence. Clinical outcomes and complications will be registered. Patient satisfaction, medical consumption and quality of life will be measured through questionnaires and using the logdata. Differences in costs and quality of life will be determined in a formal cost-effectiveness analysis. The primary outcome is the proportion of participants who adhere to the use of their orthopedic shoes, that is, take at least 80% of their total steps with custom footwear.

Results

Results will consist of sensor-based, objective and subjective assessment of adherence to the orthopedic shoes, clinical outcomes and complications, measures of patient satisfaction and podiatrist satisfaction, incremental costs, incremental quality-adjusted life years, and (cost-)effectiveness, over a 1 year time horizon in both the intervention and control groups. As such this trial will generate insights into the socio-economic and wellbeing impact of the novel care procedure on adherence to orthopedic shoes.

A Pilot Study on the Diameter app: Lifestyle Support for Type 2 Diabetes Mellitus Patients.

Niala den Braber, Eclaire A.G. Hietbrink, Anouk Middelweerd, Annemieke A.J. Konijnendijk, Miriam M.R. Vollenbroek-Hutten and Gozewijn D. Laverman

Background

Diabetes mellitus is one of the most common non-communicable diseases worldwide. In patients with Diabetes Mellitus type 2 (T2DM), a healthy lifestyle is essential as it has positive effects on glucose regulation and therefore reduces the risk of complications. ZiekenhuisGroep Twente (ZGT), University of Twente (UT) and Roessingh Research & Development (RRD) developed 'the Diameter' in close corporation with T2DM patients and professionals from the outset. The Diameter is a mobile application that supports patients with T2DM to develop a healthy lifestyle in order to support optimal glucose regulation. The Diameter enables continuous monitoring of nutrition (via a food diary), physical activity (via activity tracker Fitbit) and glucose values (via Freestyle libre sensor). Furthermore, the Diameter offers guided goal setting, personal lifestyle coaching via daily informative and motivating coaching messages and weekly exercises aimed at learning to cope with barriers that arise in daily life to maintain a healthy lifestyle.

Methods

A mixed-method approach was used to explore intervention usage and acceptability with regard to the Diameter. Ten patients with T2DM who were treated at the diabetes outpatient clinic of ZGT hospital used the Diameter for 10 weeks. Study participants monitored physical activity, nutrition, blood glucose values and the achievement of lifestyle goals. In addition, participants received digital coaching offered by two short coaching messages per day and one exercise per week. Log-data was analyzed to assess the number of times and duration the Diameter and each component was used. To assess acceptability, questionnaires and open-ended interviews were used to gain insight into perceptions of participants regarding the determinants of the Unified Theory of Acceptance and Use of Technology 2 (UTAUT2) model and perceived barriers and facilitating conditions concerning Diameter usage.

Results

The first results revealed that participants appreciated the self-monitoring functionalities the most as it provided new insights into lifestyle and how glucose levels respond accordingly. This resulted in the monitoring functions being used frequently over the entire period of use. About 80% of the coaching message was liked. Feedback included that messages often contained already known knowledge, but also provided useful advice to improve lifestyle. The purpose of the weekly exercises was unclear for some participants and this functionality was hardly used by them. About 85% of the exercises were completed by participants who understood the purpose of the exercise. Points for improvement can mainly be found in expanding the food diary with additional nourishments and offering more tailored coaching based on real-time data. According to the participants, the Diameter can lead to more personalized care by providing healthcare professionals with insight into lifestyle data and might have the potential to improve diabetes management if used in blended-care setting.

Discussion

The first perceptions regarding the Diameter were predominantly positive, although mainly the coaching components contain points for improvement. Clear information about the purpose of functionalities seems important to stimulate their use. Moreover, good integration of the Diameter in current diabetes care is considered an important condition for contributing to diabetes management.

Improving health literacy in Rural Communities in Africa through mobile technologies for a more inclusive healthcare.

Ismaila Ouedraogo, Borlli Michel Jonas Some, Roland Benedikter and Gayo Diallo

Background

Advancement of mobile technologies in Africa over the last decade has noticeably impacted healthcare systems. Various mHealth apps are currently available on marketplaces. These apps are designed to facilitate fighting various health issues and problems, and are intended to be used outside clinic settings. However, enhancing people involvement in their pwn healthcare process is still a challenge due to low literacy in Africa. Numerous descriptive and explanatory studies on the use of mhealth to improve health literacy have been reported recently, but few of them have addressed specifically the use of mobile phones to improving health literacy in rural Africa. The current study aims at reviewing iand identifying existing mobile health initiatives in rural areas which target the improvement of health literacy.

Methods

A systematic literature search was performed in SCOPUS, Google scholar and PubMed databases from 2011 to 2020. The review was performed following PRISMA (A Liberati, 2009) items to identify relevant publications. In addition, manual searching methods were used to find keywords related to m-health initiatives in Africa.

Results

Over 1222 publications, we only identified 17 (1.39 %) articles that were related to mobile technology and health literacy in African rural areas. Our manual look-up yielded 33 m-health initiatives related to improving health literacy in Africa. In total, 38 studies were included in the literature review. The other reviewed articles 1205 (98.60 %) were not intended to improve health literacy in rural areas of Africa. With further screening, we found that only 17 of the articles were related to health literacy and mobile technology in rural areas. Further analysis of these 17 studies indicated that they were not specifically intended to improve health literacy of rural communities. This finding highlights the need of conducting on studies related to improving health literacy in rural communities of Africa.

Discussion

We found only 17 studies related to health literacy and mobile technologies in Africa. But very few of them were focused on health literacy and mobile technologies in rural areas of Africa. We also found that m-health initiatives were so far not inclusive. It appears that few m-health solutions integrate local languages in the development of m-health solution. The mhealth initiatives need to be implemented based on the local realities, so experimental studies are desired to test the adaptability of mhealth projects and to explore any adjustments required.

Remote Patient Monitoring App for Traumatic Brain Injuries.

Yashwee Kothari

Background

Every year 69 million people around the world suffer a Traumatic Brain Injury (TBI). A study funded by the National Institute of Health demonstrated that 41% of TBI patients with moderate-severe TBI lacked a follow-up visit with their medical provider within three months. Neurologists' busy schedules do not allow them to spend sufficient time communicating with their patients. As a result, their TBI patients do not receive the proper care needed for recovery. A remote-monitoring app that collects data in between doctor visits via an AI-based chatbot and neuropsychological batteries can help bridge the lack of communication between doctors and patients.

Methods

To identify if TBI patients were willing to use a monitoring app and found meaningful insights, we developed a weekly survey to emulate the function of an app. We recruited participants through Facebook and Reddit TBI Support Groups. Participants were to complete a weekly survey for 4 weeks sent via text or email. Respondents (N=15) who had experienced TBI symptoms at the time of the survey varied in the duration of their TBIs. The respondents had TBIs between the years 2006-2019. 6 participants chose to share their gender and age. 3 identified as male, 2 as female, and 1 as non-binary. The ages of 6 participants ranged from 17 to 56. 4 out of the 6 were in their mid-late 20s and 30s. The weekly check-ins survey consisted of collecting data on the patient's symptoms in 3 different categories: physiological, cognitive, and behavioral. The check-in questionnaire asked patients to rank their symptoms on a scale of 1 to 10, 10 being a severe presence of symptoms and a brief explanation of what symptoms in each category they were experiencing.

Results

The preliminary findings showed that only 11 out of the 15 respondents consistently completed the weekly check-ins over 4 weeks. To ensure the participants were completing the weekly surveys on time 3 to 4 reminders were sent throughout each week. The participants showed a positive response to the frequent reminders. At the end of the 4 weeks, all 11 patients received a personalized TBI progress report which displayed 2 charts. The report showed the collected data from the respondents with graphs as a visual aid and a summary. The 1st chart showed a breakdown of each category of symptoms for each week. The 2nd chart showed an overall severity score for each week plotted on a line graph to show changes in symptoms. In a feedback survey, 5 patients stated that the report helped them better see the trends in their symptoms and progress with their TBIs.

Discussion

The next steps include researching and implementing objective methods of collecting data such as neuropsychological batteries for the patient app. Additionally, developing a conversational chatbot to capture behavioral symptoms and emotional sentiment. The data collected on the patient app can be analyzed and provided to doctors through a web portal. With a better analysis of the different symptoms affecting each patient, doctors can create effective treatment plans tailored to each patient's needs.

eHealth as a tool to support dental hygiene of frail elderly: an explorative study.

Ybranda Koster, Laurence Alpay, Linda Wauben and Carla de Graaf

Background

Good dental hygiene is important to prevent or reduce frailty in the elderly. Research shows that 66% of elderly patients admitted to a nursing home have bad dental hygiene. During their stay, dental hygiene remains moderate to bad. To start addressing this issue, a group of students (nursing, occupational therapy, computer science and health care technology), part of an exchange collaboration facilitated through our Vitale Delta Research Program, have been researching 1) why caregivers struggle to give good dental hygiene, 2) which eHealth applications could support the (professional) caretakers and the elderly in performing appropriate dental hygiene, and 3) to develop an app to support dental hygiene.

Methods

Mixed methods were used including literature review and quantitative research. A first literature review focused on caregivers' support for good dental hygiene and helped designing the questionnaire. This questionnaire was held amongst third-year nursing students who have had an internship of at least 20 weeks in elderly care. A second literature review helped to determine design requirements for a dental hygiene app that can be used by elderly patient as well as their (professional) caregivers.

Results

The questionnaire was completed by 36 third year nursing students. Results indicate that main reasons for insufficient dental hygiene performed by nurses include insufficient knowledge of protocols, lack of skills and time, opposition of the patient and low priority. In addition, respondents indicated that an eHealth application with explanation, pictures, videos, examples and a reminder function and a possibility for report could help nurses to optimize dental hygiene care in their elderly patients.

Results from literature review on the design of an eHealth application used by both elderly caretakers and (professional) caregivers indicated that the application should ideally have the colors green or blue, font Arial size 13,5 and have large buttons. It was found that music stimulated brushing teeth.

The developed app includes a step-by-step narrated dental care instruction video, a 2-minute timer with a choice of jazz or classical music. Questions in the app assess the condition of mouth and dental hygiene, allowing patients and/or their (professional) caregivers to report the condition and identify problems at an early stage.

Discussion

To make sure that the contents of the app were correct, a dentist reviewed the step-by-step description and the video and concluded in was conform guidelines.

The app was tested among different family members of the students but not with the elderly or with people in the care of elderly. It is not yet known whether the app matches with the caregivers and caretakers and meets their needs. Further research among nurses and elderly of the app is therefore needed to be able to determine the usability and effectiveness of the app for nurses and the elderly. The research was done amongst nursing students, with little experience in the field. Experienced nurses might have a different view or have different needs. Further research amongst experienced nurses throughout the country is recommended to be able to generalize the results.

The role of national culture in the adoption of public e-health systems in Sweden.

Shweta Premanandan and Pär Ågerfalk

Background

Studies show that public digital systems (for example, formal care services) fail due to underutilization by citizens, despite heavy investment, good design, usability and support. Investigating this underutilization from the perspective of national culture is essential. Hence, the aim of this study is to explore the effect of national culture on the way e-health systems are perceived and used by individuals. It is helpful for policy makers to explain the currently relatively low penetration rate of such public digital systems and formulate strategies to encourage adoption. The outcome will form the basis for further study to understand adoption of digital systems in the context of informal care. The results from this study of public e-health systems (formal care services) will be used as theoretical propositions to design a study protocol in order to understand adoption of digital systems in the context of informal care.

Methods

Semi-structured in-depth interviews were conducted with eight users of public e-health systems in Sweden. Snowball sampling was used to identify respondents. The study protocol was developed using the extended Unified Theory of Acceptance and Use of Technology (UTAUT) and Global Leadership and Organizational Behavior Effectiveness (GLOBE) cultural dimensions. Interviews were recorded, transcribed verbatim and analyzed using thematic analysis using NVivo 12.

Results

The themes that were analyzed were Perceived Risk, Performance Expectancy, Effort Expectancy, Social Influence, Facilitating Conditions, Performance Orientation, Power Distance, Collectivism, Uncertainty Avoidance and Assertiveness. Most of the respondents found the interface inconsistent but still used it because it was easy. Though the system was considered easy to use, the users perceived the process to accomplish a simple task as complicated.

Discussion

The study indicates that cultural dimensions largely determine use behavior. Swedish society is characterized as being high on uncertainty avoidance and low on power distance, collectivism, performance orientation and assertiveness. Despite being high on Uncertainty Avoidance, the perception of risk associated with use was low due to an inherent trust in their government and the systems they provide like the e-health. Users, however, expected an unambiguous system equipped with help files to navigate without having to seek external help. Unlike other cultures, word of mouth was not found to be a determinant to adoption owing to the individualistic nature of the Swedish culture. These cultural dimensions provide a schema for system designers and developers to comprehend the needs of users and design accordingly. On a theoretical note, the extended UTAUT seemed to not be the best theoretical framework for this context and further work will investigate the use Social Cognitive Theory.

Technologies for the detection and prevention of pressure ulcers-the need for capability sensitive design.

Lily Frank

Background

"A Pressure Ulcers (PU) is a localized injury to the skin and/or underlying tissue, usually over a bony prominence, resulting from sustained pressure."1 There is a significant and urgent need to engineer new solutions for the problem of PUs (sometimes known as bed-sores) in bed-bound and wheel-chair bound individuals for both economic reasons and from the perspective of human flourishing. This often-overlooked medical condition is painful, contributes to patient isolation, and complicates existing health and mobility problems. Yet most PUs are preventable. Promising innovation in the area of the prevention and detection of pressure ulcers involves the development of smart-mats or smart-pads or wearables embedded with sensors that can communicate information via mobile applications to users or caregivers. These technologies either alert those at risk for PUs that they should change their positioning or posture or serve as an early warning system for caregivers that a particular area of a person's body is at risk. The connected mobile devices also have to potential to collect valuable data on patient physiology which may be useful for personalizing the PU prevention strategy. While these technologies face technical challenges, in terms of sensors, mechanics, costs, and materials, they also face some overlooked ethical issues.

Methods

In this poster I explain the need for technological innovation in this area and some of the digital solutions currently on the horizon. I then map a wide range of potential ethical concerns that arise with these emerging technologies for pressure ulcer detection and prevention. I focus then on what I identify as three central concerns: privacy, bodily autonomy, and trust.

Results & discussion

I conclude that the method of capability sensitive design (CSD)2 (a form of value sensitive design) interests is a fruitful method for taking these and other ethical issues into account from the beginning of the research and design process. CSD is a combination of value sensitive design3 and the capability approach4 developed to guide designers and engineers in accounting for human values throughout a design process. Thus CSD is committed to focusing on innovations that restore or broaden what human beings are able to do and be, expanding human freedom and flourishing. This method must also be supplemented by future empirical research on the values and interests of stakeholders, including patients/users (people with spinal cord injuries, people otherwise bound to wheel chairs, bedridden people, people wearing prostheses, neonates), nurses, rehabilitation specialists, and occupational therapists.

Inclusive eHealth Development and Implementation for People with Intellectual Disabilities.

Julia van Calis, Kirsten Bevelander and Jenneken Naaldenberg

Background

The use of eHealth by people with intellectual disabilities (ID) is increasing but in comparison to the general population more challenging since the technologies are not developed to fit the needs of people with ID. eHealth has the potential to provide support for the higher demand for personalised care and to increase the level of independence for people with ID. Review shows multiple advantages for eHealth for people with ID, such as increasing access to care, empowerment of its users and the improvement of quality of care. Despite the promising eHealth applications that are being introduced, implementation is challenging and often cannot be maintained over time. This could be explained by the fact that eHealth for people with ID often is developed and implemented without the involvement of key stakeholders, such as the target group, their caretakers and the organisations that have to work with the eHealth applications.

Methods

In the current presentation, the outline of a 4-year PhD project investigating the role of inclusive research in developing and implementing eHealth for people with ID is presented. The NASSS framework and the CeHRes roadmap indicate that involving the target group is important, but these concepts have not yet been adapted for eHealth for people with ID. Therefore, elements from both concepts are integrated to create a guide to support the development and implementation of eHealth for people with ID. The NASSS framework will provide the preconditions for implementation and the CeHRes roadmap will be used to describe clear development steps and activities. By means of inclusive research with people with ID and the involvement of key stakeholders in drawing up the desired guidelines, it is ensured that the practical point of view is also considered. Throughout the full project activities will be performed together with people with ID such as co-designing the research questions and methods, testing prototypes, and collecting, analysing and communicating data.

Results

This presentation will show how practical experiences and theoretical frameworks can be integrated to create guidelines for inclusive eHealth development and implementation for people with ID. The findings regarding these guidelines will be applied to (re-)design and implement eHealth for people with ID. Moreover, the impact of inclusive research for eHealth development and implementation for people with ID will be identified.

Discussion

People with ID have very heterogeneous needs for health and support and are strongly dependent on their social and physical context for the access to and use of eHealth. Therefore, eHealth must be developed adjusted to these contexts to ensure that the benefits of eHealth are obtained. A better fit between the users, the eHealth technology and context can be created by organizing development and implementation together. By providing guidelines for inclusive development and implementation eHealth can be made more accessible for people with ID.

An interactive self-test for guiding people with suicidal ideation in overcoming barriers towards seeking help.

Margot van der Burgt, Saskia Mérelle and Willem-Paul Brinkman

Background

113 Suicide Prevention is the national Dutch suicide prevention centre, financed mainly by the Dutch Ministry of Health, Welfare and Sport. Mental health professionals and a large group of fully trained volunteers provide round-the-clock anonymous support. The mental health services include a 24/7 chat- and telephone helpline, chat therapy and coaching, a self-help course, self-tests and a consultation telephone line for professionals or next of kin about someone in need. The philosophy of the organisation is that online help extends the reach of care, addresses the needs of people struggling with suicidality that are not met in regular care and lowers the threshold towards mental health care.

Every month, around 7,000 people fill in the online self-test about suicidal thoughts on 113’s website. The self-test includes the Suicidal Ideation Attributes Scale (SIDAS) and informs people about the severity of their suicidal thoughts and offers advice for help. Although the majority of participants score high on suicidal ideation, they tend not to get in contact with the helpline. Therefore, in collaborating with TU Delft, 113 is currently exploring the possibility of having a self-test guide people in an interactive way to solve their barriers towards help-seeking.

Methods

Together with TU Delft, 113 will develop a prototype for a barrier-reduction intervention in the self-test for suicidal ideation. We will test this prototype in a Dutch-speaking panel and study the effectiveness in a RCT with the interactive self-test in real life on the website of 113. Main outcomes are helpline utilization rates and perceived usefulness.

Results

In this presentation, the development of the prototype and the research design will be presented. High-risk individuals in the experimental condition will receive a barrier questionnaire in which they can indicate what is holding them back to contact the helpline (e.g. wanting to solve the problem themselves, shame, fear of hospitalization) and receive personalised information based on their concerns. The control condition will follow the same procedure and includes the traditional self-test.

Discussion

Our RCT will provide insight into whether an interactive self-test including a barrier-reduction intervention increases the use of a suicide prevention helpline.

Perceived acceptability of persuasive features in mHealth interventions: Does stage of change matter?

Kimberly Bakker, Christian Wrede and Pelin Gül

Background

Through the past years research has increasingly focused on promoting health behaviour through persuasive eHealth interventions delivered through mobile applications. A large part of applications apply a one-size-fits-all approach, which does not include tailoring the application to users’ individual differences. As tailoring can have a positive impact on sustaining user interest and adherence to the intervention, tailoring is of great importance for long-term behaviour change. The aim of this research was to explore the relationship between stages of change, according to the transtheoretical model, and the perceived acceptability of commonly employed persuasive mHealth intervention features aimed at promoting healthy eating. In this study five stages were taken into account (precontemplation [PC], contemplation [C], preparation [P], action [A], maintenance [M]), which according to the model individuals need to go through in order to reach a sustainable behaviour change.

Methods

Data were collected through a cross-sectional online survey among 178 participants using storyboards depicting eight different persuasive features, the URICA-E2 measuring stage of change, and questions with respect to how acceptable participants perceived the depicted persuasive features.

Results

The results of Pearson Correlation analyses showed that the stages PC and P were significantly positively correlated with at least one persuasive feature. C was significantly positively correlated with all eight persuasive features. The last stage M showed several significant negative correlations with the persuasive features.

Discussion

The results suggest that people who are actively thinking about eating healthy and intend to eat healthy in the next six months (C) perceive the different persuasive features as acceptable. People who have already been eating healthy for at least six months (M) do not perceive most of the persuasive strategies as acceptable.The findings from this study indicate that persuasive mHealth interventions promoting healthy eating may better accomodate the needs of diverse users by considering their individual stage of change, thereby highlighting the importance of creating individualized intervention sequences.

Implementation of e-mental health interventions for informal caregivers: a systematic review.

Chelsea Coumoundouros, Erika Mårtensson, Giulia Ferraris, Louise von Essen, Robbert Sanderman and Joanne Woodford

Background

Informal caregivers of people with chronic health conditions can experience anxiety, distress, depression, and other mental health difficulties as a result of their caregiving role. E-mental health interventions present a way to provide effective and accessible mental health support to informal caregivers, however implementation of e-mental health interventions can be challenging. A systematic review was conducted aiming to (1) examine implementation barriers and facilitators, and (2) identify implementation and intervention features associated with intervention effectiveness, to inform the design and implementation of e-mental health interventions for informal caregivers of adults with chronic diseases.

Methods

Studies published since 2007 were searched for in six electronic databases, clinical trial registries and OpenGrey. Eligible studies reported on the implementation and/or effectiveness of e-mental health interventions for informal caregivers of adults with chronic diseases. Studies reporting on implementation were included in a thematic synthesis using the Consolidated Framework for Implementation Research (CFIR) to identify implementation barriers and facilitators. Randomized controlled trials reporting on intervention effectiveness were included in a qualitative comparative analysis to determine conditions related to implementation (e.g. interventionist training) and intervention characteristics (e.g. presence of support) sufficient for an intervention to be effective.

Results

A total of 34 studies have been included, representing 18 unique interventions for informal cancer (n=8), dementia (n=9) or stroke (n=1) caregivers. The majority of interventions were self-administered, and were either based on cognitive behavioral therapy or stress and coping frameworks.

Aim 1: Implementation data were identified in 27 studies, representing 15 interventions. Intervention and individual (primarily informal caregiver) characteristics were the domains of the CFIR most commonly addressed. A barrier to implementation was lack of diversity among the informal care situations presented in interventions (e.g. not showing informal caregivers of different ages, ethnicities and care dyad types). Lack of support provided to informal caregivers was an additional barrier to implementation, however not all types of support are equally desirable (e.g. peer discussion forums). Implementation facilitators included intervention’s user-friendly designs and use of materials that informal caregivers could apply to their daily lives and routines. Perspectives from stakeholders at implementing organizations were not often explored, however, resource constraints (e.g. time) was one barrier to implementing e-mental health programs for informal caregivers.

Aim 2: The qualitative comparative analysis included 8 randomized controlled trials and explored conditions such as the presence of peer support, professional support and the type of intervention theory. However, the analysis could not be conducted as the consistency level across the included studies was too low.

Discussion

A variety of implementation barriers and facilitators were identified that can be used to inform future intervention development and implementation planning. Few studies were included in the qualitative comparative analysis, however there was low consistency in conditions sufficient for intervention effectiveness. Future research about e-mental health interventions for informal caregivers should seek out perspectives from a broader group of stakeholders, such as clinicians and care organizations, to gain further insight into implementation barriers and facilitators at different organizational levels.

Exploring the design requirements and design recommendations for an eHealth tool to support young adult caregivers: A usability study.

Srishti Dang, Anne Looijmans, Giovanni Lamura and Mariët Hagedoorn

Background

Informal caregivers (ICGs) provide care to their family or friends in case of an illness, disability, or frailty. They often do so out of love, but it is also burdensome. eHealth interventions to support ICGs are being developed. However, different ICGs may have different needs as a caregiver, which may result in different design requirements for eHealth tools. For example, young ICGs may prefer other content or how it is presented in eHealth interventions than older ICGs. In our study, we aim to explore the design requirements for an eHealth tool expressed by young adult caregivers (YACs) aged 18-25 years. We will specifically examine two design requirements: (a) the usability, which is the pragmatic quality of the tool such as effectiveness and ease of use, and (b) the user experience, which is the hedonic quality of the tool such as aesthetic impression and novelty.

Methods

We will make use of an already existing eHealth tool, 'MantelzorgBalans', as an example to study YAC's design requirements of an eHealth tool. 'MantelzorgBalans' aims to support ICGs who take care of a palliative ill loved-one, in making decisions in informal care activities. A usability testing method will be used with the following approach: (i) a think-aloud approach in which participants will verbalize their thoughts while using the tool. This approach will help us understand the usability requirements such as ease of use and clarity of the navigation, (ii) a task-based performance test in which task completion and accuracy will be captured to measures how effectively users are able to complete a given set of tasks, and (iii) for the user experience requirement, participants will complete the User Experience Questionnaire (UEQ) to understand the user experience of the tool regarding, for example, its attractiveness and novelty. We plan to conduct one-on-one interview sessions with 12 YACs.

Results

We expect to identify design requirements for eHealth interventions expressed by YACs, and provide design recommendations for refining and further designing the 'MantelzorgBalans tool' and other eHealth tools to support YACs.

Discussion

The results from the usability study will help us in tailoring the eHealth tools based on YACs requirements for design.

Identification of Factors Contributing Towards Development of an Engaging Type 2 Diabetes Mellitus Application for Self-management.

Kuthethur Sneha Jagannath Das, Nic Moens and Felix Janszen

Background

Type 2 Diabetes Mellitus (T2DM) is a chronic condition affecting the geriatric population globally. Studies show that T2DM will affect approximately 642 million people worldwide by 2040. Self-management by adopting healthy lifestyle behavior choices from the patient's side is integral for optimal T2DM care. Advancements in medical technology have enabled the implementation of mobile health (mHealth) for remote self-management of chronic conditions. In the market, mHealth solutions exist in plenty. However, the literature reveals that the solutions are not largely evidence-based, lack the necessary health certifications, and are primarily focused on personal use rather than clinical use. Hence, through our project, we aim to develop a science-based, evidence-based, and AI-based tailored mHealth smartphone application (app) to support the patient in remote self-management of T2DM.

To adopt and sustain healthy behaviors, engagement of the user with the digital intervention is crucial and studies have shown user engagement is a precondition for achieving health effectiveness. Engagement is defined as the quality of the user's experience with technology and understands of how the user interacts with the technology. As the first step in this project, we aimed to understand the factors influencing user engagement with a T2DM management app.

For this purpose, wireframes were designed after eliciting the user requirements (generated through the CeHReS Roadmap). These wireframes were shown to expert stakeholders of the app. The expert panel consisted of 5 members with expertise in the areas of mHealth, behavior change, Artificial Intelligence, app development, and T2DM. This qualitative evaluation aided in understanding the views of the expert panel and the feedback was gathered through a questionnaire and an elaborate panel discussion. Based on the insights gained from the evaluation, a decision to conduct a literature study was taken. For this purpose, 10 papers focusing on T2DM were identified from JMIR (open source). T2DM, mHealth, eHealth, self-management, user engagement, and sociodemographic were the keywords used in identifying these papers.

In the expert session, the feedback received was to address the aspect of the sociodemographic factors of the individual. The analysis from the literature study identified 9 sociodemographic factors affecting patient engagement with a T2DM mHealth intervention. Health illiteracy, digital illiteracy, education level, income level, age, ethnicity, residence, cultural awareness, and clinician presence are the factors. These factors match with the factors proposed by the expert panel. It was also evident from the results that the factors are interrelated to each other. As the next step in this project, the results obtained from this small study have been taken as input to further optimize the interface designs and are currently in the app development phase. With this developed functional prototype, we aim to conduct a longitudinal study with T2DM patients belonging to different age groups, education levels, income levels, and ethnicities. This user evaluation will focus on usability, user experience, and effectiveness of the app.

Social media use, loneliness, and well-being among older adults: the moderating role of social cohesion.

Rosa Krause, Inge Knippenberg, Catherine Bolman, Lilian Lechner, Denise Peels and Montserrat Prats López

Background

Loneliness and social isolation are well-known issues among older adults, often caused by age-related issues, and likely to result in reduced well-being (Cotterell, Buffel, & Phillipson, 2018; Finlay & Kobayashi, 2018; von Soest, Luhmann, Hansen, & Gerstorf, 2018). In the digital age, one solution to this problem could be social media. Social media is opted as a potential contribution in strengthening well-being and social connectedness, and decreasing loneliness among older adults (Chopik, 2016; Hashi, 2016; Khosravi, Rezvani, & Wiewiora, 2016; Leist, 2013; Lüders and Brandtzæg, 2016; Nef, Ganea, Muri, & Mosimann, 2013). However, studies into the associations between social media use, and loneliness and well-being among elderly revealed inconsistent results (Aarts, Peek, & Wouters, 2015; Bell et al., 2013; van Ingen, Rains, & Wright, 2017; Chopik, 2016). This is why more insight is needed to gain better understanding and to possibly find options for prevention and treatment strategies. In fact, social cohesion is known to be an important determinant of well-being (Chopik, 2016) and is therefore assumed to influence the relationship between social media and loneliness and well-being.

Methods

313 randomly selected adults aged 65 years and older living in four communities from one city in the Netherlands participated in this study. No exclusion criteria were defined. Participants could either fill out the survey on paper or online. The survey contained demographic measurements, as well as social media use, loneliness, psychological well-being, and social cohesion. Hierarchical multiple regression analysis were performed using IBM SPSS version 24.0 (IBM Corp, 2016) to test the effect of the predictors on loneliness and psychological well-being. Social media use was entered at stage one,

demographic factors and social cohesion were entered at stage two, and the interaction term (social media use * social cohesion) was entered at stage three.

Results

63.1% of the participants used social media; primarily those a) with a lower age, b) married or cohabitant, and c) with an average or high level of education. Results revealed that at stage one, social media use predicts significantly overall and emotional loneliness, and psychological well-being. A marginal effect of social media use was found for social loneliness. At stage two, where demographic factors and social cohesion were added, only social media use as predictor for emotional loneliness remained significant, marginal effects of social media use were found for overall loneliness and wellbeing. Finally, the interaction term (stage 3) predicts significantly overall and social loneliness, and psychological well-being.

Discussion

The results indicate that the associations between social media use on the one hand and overall and social loneliness, and psychological well-being on the other hand, are moderated by social cohesion. However, causality cannot be established with the current design. Further, only social cohesion was measured in the neighborhood and not social connectedness with friends, relatives, and acquaintances. Also, the current study is limited to only one city in the Netherlands. Therefore, it is important to be cautious to generalize these results. Possible future implications would be to execute this study in other Dutch cities for validation purposes.

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A framework for personas creation to monitor risk of Covid-19 burnout in nurses.

Emanuele Tauro, Chiara Caglio, Alessandra Gorini and Enrico G Caiani

Background

Covid-19 pandemic has generated a huge amount of stress upon all healthcare workers, with an increased risk of developing burnout syndrome and Post Traumatic Stress Disorder (PTSD). Mobile health could provide tools for preventive interventions, whose efficacy could be improved by applying User-Centered Design (UCD) techniques to create personas in order to stratify the associated risk and tailor those interventions. Accordingly, we propose a framework for the definition of such personas applied to a nurse population, to highlight different levels of risk relevant to burnout, anxiety, depression, and PTSD induced by Covid-19.

Methods

Data was gathered by web-questionnaire delivered to nurses in Lombardy, Italy, between April and May 2020. Qualitative and quantitative information about respondents' lifestyle, professional experience, impact of Covid-19 pandemic on both work conditions and personal life were collected, together with psychological indexes including Maslach Burnout Inventory (MBI), Impact of Event Scale (IES) and Patient Health Questionnaire (PHQ), used to quantitatively define the risk level of burnout, PTSD, and anxiety and depression, respectively. Collected variables (55) were first reduced using Principal Component Analysis, considering those features cumulatively explaining at least 75% of total variability. Then, k-medoids clustering with Partitioning Around Medoids algorithm was applied, where the best value of k was determined by silhouette and total within sum of square differences heuristics, together with evaluation from domain experts. Statistical analysis was then applied to define which variables were able to differentiate among the k clusters, thus constituting the basis for the definition of a Persona card (i.e., a template with textual and graphical information) for each of the obtained clusters.

Results

From the 175 respondents nurses, a total of three clusters (personas) were identified. They presented very strong dissimilarities both in lifestyle and in how nurses reacted to the pandemic, showing distinct profiles associated to three different levels of risk of developing burnout ant PSTD: the highest (representing 38.3% of all respondents), associated to a married nurse with children and living with family, also using Personal Protective Equipment (PPE) at home to prevent spreading the infection, with workload highly impacted by COVID-19; the middle one, associated to an engaged nurse living alone with workload highly impacted by COVID-19; the lowest, associated to a married nurse living only with the husband and wearing PPE at home, with workload moderately impacted by the pandemic. All the obtained personas showed a good amount of knowledge about burnout.

Discussion

The proposed framework, considering several psycho-social variables collected using a web-based questionnaire, was designed as a tool to define personas among healthcare workers to assess impact of COVID-19 on burnout and PSTD risk. Its application to nurses showed three clusters that evidenced three risk profiles associated to different personas, each requiring distinctive treatment. This approach constitutes the first step for the development of tailored m-health interventions aimed at monitoring and preventing burnout and PTSD among healthcare workers in critical situations, such as the one provoked by COVID-19 pandemic.

Digital alcohol moderation intervention for cancer survivors: health economic evaluation alongside a randomised controlled trial.

Ajla Mujcic, Matthijs Blankers, Brigitte Boon, Anne H. Berman, Heleen Riper, Margriet van Laar and Rutger Engels

Background

Alcohol moderation (AM) interventions may contribute to better treatment outcomes and the general wellbeing of cancer survivors.

Methods

A health economic evaluation alongside a pragmatic two-arm parallel-group randomised controlled trial (RCT) was conducted with baseline assessment and follow-ups at 3, 6 and 12 months post-randomisation comparing the AM intervention with the information brochure. The study was conducted online in The Netherlands, from 2016 to 2019. Participants were adult 10-year cancer survivors drinking over the Dutch recommended drinking guidelines (maximum 7 standard units [10g alcohol] per week) with the intention to moderate or quit drinking. In total, 103 participants were randomised and analysed; 53 in the experimental group and 50 in the control group. In the experimental group, participants had access to a newly developed, digital, minimally guided AM intervention “MyCourse – Moderate Drinking”.

The primary outcome was self-reported number of standard drinks (10 gr of ethanol) in the past 7 days at 6-month follow-up. Secondary outcome measures were alcohol-related problems as measured by the AUDIT and treatment satisfaction at all follow-ups. For the health economic evaluation, healthcare costs, productivity losses and quality of life (QALYs) were assessed.

Results

Alcohol use at 6-month follow-up declined by 38% in the experimental group and by 33% in the control group. No difference in 7-day alcohol use was found between conditions (B = 2.1, 95%CI (−7.6 to 3.1, P = .22) at any of the follow-ups. AUDIT scores for alcohol-related problems decreased over time in both conditions, showing no significant difference between groups (Cohen’s d = 0.3, 95%CI −0.1 to 0.6, P = .21). Intervention costs were estimated at € 218 (US$ 279) per participant for the experimental group and at €58 (US$ 74) for the control group, mean societal costs were US$ 18,092 (experimental) and US$ 23,496 (control). The experimental condition led to fewer gained QALYs, at lower societal costs in the cost-utility analysis. In the cost-effectiveness analysis, the experimental condition led to a larger reduction in drinking units over time at lower societal costs (incremental cost-effectiveness ratio per reduced drink US$ −1,158, 95% CI US$ −1,609 to US$ −781).

Discussion

At 6 months, alcohol use was reduced by about a third in both conditions, with no significant differences between the digital interactive intervention MyCourse and a non-interactive online brochure. At 12 months, cost-effectiveness analyses showed that MyCourse led to a larger reduction in drinking units over time, at lower societal costs. The MyCourse condition led to marginally fewer gained QALYs, also at lower societal costs.

Defining the Pre-Examination Experience of MRI patients through Affective Interaction.

Katja van Weert, Tianyi Chen, Pepijn Verburg and Carine Lallemand

Background

For many patients, Magnetic Resonance Imaging (MRI) experiences are uncomfortable and associated with high levels of anxiety and stress. Such negative experiences may interfere with image quality and increase examination time. It is therefore necessary to understand the mental states of the patients prior to the examination in order to provide stress-relieving measures.

Studies exploring MRI-related anxiety and interventions to alleviate it have typically relied on selfreported data (e.g. STAI-6 questionnaire) or psychophysiological measures [1], usually in the waiting room. One could however benefit from an alternative measurement approach to overcome the limitations of current methods. The purpose of our study is to develop a tool for measuring mental states in the context of MRI experiences and explore the suitability of various sensors to detect anxiety.

Methods

Through an iterative design process, we designed (UN_DEFINED), an artifact that aims to interpret the relation between mental states and interaction through data gathered by various sensors. While patients interact with the device to customize their MRI ambiance preferences (ambient colors and sounds), (UN_DEFINED) senses hand movements and gathers physiological data for pattern recognition analysis. In a controlled lab environment, participants (N =9) performed a series of tasks with the artifact. Natural interaction data was gathered by sensors including an accelerometer-gyroscope and stretch sensors. Information about hand movements and behavior was extracted through signal processing. Qualitative insights included observations and a debriefing interview about participants' experience.

Results

We mainly observed individual differences in interaction patterns, indicating the necessity of creating a baseline for each individual rather than looking for a universal interaction pattern. Qualitative assessment (interviews and inspection of the processed sensor data) nevertheless hinted at the fact that stressed participants displayed quicker and more erratic hand movements. We validated the artifact's interaction design through the interviews and observations, leading to relevant insights regarding the mapping of output to various features.

Discussion

This research provides a new view on measuring MRI patient anxiety through sensing technology. Our contributions to the research field of health technologies are the following: (a) a sensing artifact that collects interaction data, (b) a dataset containing sensor data, gathered in an experimental research setup, (c) insights into the measurement of patients experiences through sensor data, particularly the need for an individual baseline necessary for recognizing mental states through interaction. Some limitations, related to the sample size and some biases in data analysis, require future examination.

Identifying Subgroups of Cannabis Users Based on Help-Seeking Preferences: a Latent Class Analysis.

Marleen Olthof, Matthijs Blankers, Margriet van Laar and Anneke Goudriaan

Background

The majority of people with cannabis use disorder does not seek treatment. More insight in subgroups of cannabis users based on their help-seeking preferences would help to offer treatment options of their preference, to ultimately narrow the treatment gap.

Methods

An online survey was conducted among 1510 frequent cannabis users (18-72 years) to assess their cannabis use, help-seeking preferences, psychopathology and psychological distress. Latent class analysis was used to identify classes of cannabis users based on their help-seeking preferences. Differences between the identified classes in terms of socio-demographics, cannabis use and psychopathology were examined.

Results

We identified four classes with distinct preferences for support. Class 1, (‘no support/only social’, n=548) had a low probability of finding any form of support appealing other than social support. Class 2, (‘online help’, n=173) had relatively high probabilities for online help. Class 3, (‘GP/outpatient’, n=209) had a relatively high probability of finding support from the general practitioner and outpatient substance use disorder treatment appealing. Class 4 (‘all sources’, n=85) had moderate to high probabilities for all sources of support. DSM-5 symptoms and previous quit attempts were strongly associated with class membership. Socio-demographic characteristics were only weakly associated with class membership.

Discussion

The strong variation in help-seeking preferences is reflected in the four distinct subgroups of cannabis users. Our findings emphasize the importance of promoting a variety of treatment modalities for cannabis users, including real life and digital options, and indicate what might appeal to whom.

Quality assessment of infection treatment by urologists at ZGT: a mixed methods study.

Florinde Pas, Elske M. Engel-Dettmers, Nashwan Al Naiemi, Hero E. Dijkema, Annemarie L.M.A. Braakman-Jansen and Katja Taxis

Background

Infections with resistant bacteria cause extended hospital stays, additional follow-up doctor visits and require sometimes costly alternatives. Therefore, it is important to optimize infection treatment for both individual patient care as well as to limit antimicrobial resistance (AMR).

As the urology department has a high number of infections with (resistant) gram-negative bacteria and consequently has a large amount of antimicrobials prescribed, this department is interesting from an antimicrobial perspective. Therefore, qualitative research was conducted with the urologists of ZGT into needs and barriers to treating infections. That study showed room for optimization of the current care process, with a clear wish for automated support. To optimize this process with a technological intervention, insight in the quality of outpatient antimicrobial prescriptions and the decision-making process around prescribing antimicrobials is necessary.

Methods

A mixed methods study was used by combining electronic medical record research with outpatient visit observations.

The researcher assessed 98 outpatient antimicrobial prescriptions from urologists at ZGT, based on the following six quality criteria mentioned in literature:

1. guideline,
    a. antimicrobial choice,
    b. duration/dose,
    c. indication,
2. culture results,
3. previous treatments,
4. allergies,
5. contraindications,
    a. renal function,
    b. other,
6. interactions.

Information from the hospital's medical records, laboratory results from the medical microbiology department and medication overviews from the community pharmacy were used for the assessment. A hospital pharmacist confirmed the assessments and a microbiologist was consulted in case of doubt. This provided insight into the percentage of deviating prescriptions.

The information gained from the quality assessment determined the criteria for selecting outpatient urology visits for observation. The goal of the non-participant, structured observations by the researcher was to gain insight into the decision-making process of urologists when treating patients with infections. Observations were carried out for 5 weeks.

Results

The evaluation of n = 98 outpatient antimicrobial prescriptions showed that n = 67 (68%) cases deviated from the quality criteria. In total, 86 deviations were found in the 67 prescriptions, which means that some prescriptions deviated on several criteria. Causes for deviation per criterion were:

1a) antimicrobial choice (n=27),
1b) duration/dose (n=26),
1c) indication (n=7)
2) culture results (n=5),
3) previous treatment (n=11),
4) allergies (n=3),
5a) renal function (n=2),
5b) other contraindications (n=5),
6) interactions (n=0).

The observations were not analysed yet, but these will be available during the congress.

Discussion

A high percentage of prescriptions deviated from the quality criteria, which is in contrast with literature. The main limitation of our electronic medical record research could partly explain this; not everything is

described in detail in medical records and considerations are not always clear. This could lead to a different interpretation of infection severity and so to a different treatment.
The observations will give insight in the urologists’ actions. This will help us understand what information is used by the urologists for the decision making process and what technological support is needed to facilitate these actions. The results of this study will provide insight for developing technology to optimize decision-making and limit antimicrobial resistance.

Demos

InTake Care: a framework to enhance medication adherence based on passive gesture-tracking and tailored engagement.

Silvia Maddalena Rossi, Claudio Pighini, Emanuele Tauro, Grzegorz Bilo, Gianfranco Parati, Alessandra Gorini, Mahshad Khornegah, Sarah Solbiati, Sara Moccia and Enrico G Caiani

Background

Long-term therapy for chronic illness has an average medication adherence (MA) of 50% in developed countries and even lower rates in developing ones, with consequences that may result in serious worsening of patients' conditions. One of the possible approaches to this problem is using m-Health applications, aimed at leveraging persuasive technology to engage, motivate and empower patients to increase MA. Current m-Health solutions include smartphone applications, which propose various combinations of the four main principles of persuasive technology: primary task support, dialog support, credibility support and social support. The aim of this demo is to present the concept of our solution: an integrated framework based on reminders set by the physician, automatically set alarms on the patients' smartphones and passive tracking of MA through a sensorized wrist device and Machine Learning (ML) gesture-recognition.

Description of the application/technology/concept

Our concept includes four main components: a dashboard for physicians, a wrist device, a mobile application for patients and a backend database which embeds ML algorithms for data analysis. Physicians specialized in treatment of the targeted chronic disease are included in the initial planning phases, and presented with a dashboard mock-up, to be used both to set the therapy, relevant reminders, and to control MA; the result of their feedback is adopted to generate a prototype. The patients have been presented with a video-tutorial of the application and a questionnaire related to its perceived usability and usefulness, giving promising feedback regarding the presented solution.

Once a therapy is set on the dashboard, data are available on the application on the patient's mobile phone to support them in therapy-related activities via automatic setting of notifications, reminders, and data acquisition using the wrist monitor. At the scheduled time, the patient receives a notification together with vibration on the wrist device, after which data-acquisition via inertial sensors is activated for a set period of time. These signals are used to automatically recognize gestures related to drug intake, thus providing feedback to both the patient and the physician about current and past adherence, for specific medications and for the overall therapy.

Practical description of demo

The demo will include a presentation of the concept, and a run-through of the developed parts, starting with the creation of the patient's account and therapy setting in the physician dashboard. Then, a presentation of the mobile application and of the sensorized wrist device will be given, including log-in data acquisition, following the notification event. Examples of the reports for both patient and physician will be presented, where the patient will have access to graphs portraying daily adherence and periodic progress.

No more inconvenient blood collection in the clinic, do it yourself!

Vincent Molenaar and Annelijn Goedhart

Background

Trends in a digitalizing healthcare industry such as patient-centered approaches and self-management of health are increasingly developing. One innovation in this field focused on blood collection. Change in blood collection by independently using blood sampling devices at home, could influence (primary) healthcare provision deeply. Self-sampling blood has the potential to give people greater control over their own health, and could facilitate a patient-centered approach next to increasing patients' self-management of health. Self-sampling blood might be especially beneficial to chronically ill people, as self-sampling at home could enable monitoring diseases more regularly.

Description of the application/technology/concept

Imagine going to the clinic for blood withdrawal. You will have to get ready, travel to the clinic, enter a waiting room, and experience a possibly painful puncture of your vein for blood to be taken. What if this experience could be changed? Single-button activated blood collection for laypersons allows everyone to collect their blood at home for diagnostic purposes. One performs the blood collection independently at any time and place and returns the device including their whole blood sample to the laboratory for analysis. Returning the blood to the laboratory will be done via postal services that are widely available.

Practical description of demo

In this demo, we would like to showcase the novel technology of painlessly sampling one's blood and explain its future potential. Annelijn Goedhart and Vincent Molenaar will present the device used for sampling one's blood and will perform a live demo of collecting blood. During this demo, we will explain the details of this technology and answer questions people may have about its application.

"Kracht TeRUG" – Positive Psychology eHealth for spinal surgery patients, developed through co-creation.

Annemieke van der Horst, Karlein Schreurs, Ernst Bohlmeijer, Feike de Graaff and Saskia Kelders

Background

Spinal lumbar fusion surgery is an option to treat a specific type of (chronic) low back pain. About 65% to 75% of spinal surgeries are effective in achieving reduction of pain and improvement of physical functioning. Nonetheless, recovering from surgery is often accompanied by moderate to severe postoperative pain. Furthermore, around 20% of lumbar surgery patients experience persistent postoperative pain, also known as failed back surgery syndrome (FBSS).

To prepare spinal surgery patients for the procedure and help them cope with possible surgery-resistant pain and disabilities, an eHealth application ("Kracht TeRUG", Strength Back) is developed. The content of the application was created with the help of future users, i.e. patients and health care professionals.

Description of the application/technology/concept

"Kracht TeRUG" is developed by following the steps of the CeHRes Roadmap. Through contextual inquiry (interviews), value specification (focus group sessions) and design, a prototype of the app is developed. The application consists of 8 modules and several exercises. The content is based on the input of patients and professionals, combined with elements of positive psychology and mindfulness which have been proven effective for chronic pain patients in previous research.

“Kracht TeRUG” contains several information modules: illness and surgery; preparation; pain education; pain medication; physical therapy; recovery; experiences of other patients; when to contact a doctor. Additionally, the app contains positive psychology modules with value based exercises and mindfulness exercises.

Practical description of demo

During the demo visitors of the conference can “walk through” the steps of the different perioperative phases, read the patient information, fill in the positive psychology exercises and listen to the mindfulness audio exercises.

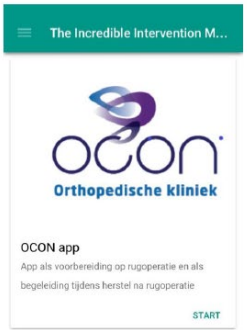
To get a feel for the app: see screen shots below

Screen shots “Kracht TeRUG” app for spinal surgery patients

Inlog

The Incredible Intervention Machine

POWERED BY THE UNIVERSITY OF TWENTE



The Incredible Intervention M...

OCON Orthopedische kliniek

OCON app

App als voorbereiding op rugoperatie en als begeleiding tijdens herstel na rugoperatie

START

Quotes of previous patients that have undergone the same surgery:

Kracht TeRUG - OCON

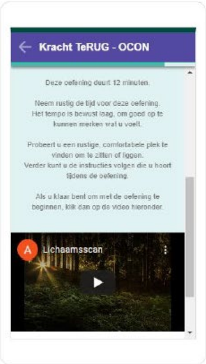
Quotes over periode vóór de operatie

“Voor de operatie was de pijn weleens zo erg, dat ik dacht: als dit zo door gaat, dan kom ik in een rolstoel terecht. Ik kon zo weinig lopen of dingen doen. Dan schoot dat weleens door m'n hoofd, zo erg werd het. Kijk, en dat heb je nu niet meer, dat je die gedachten hebt. Maar voor die tijd, dacht ik dat wel.”

“Die pijn voor de operatie? Ondragelijk, het was erg, heel ondragelijk. Ik zei tegen m'n dochter, bel de dokter maar op, want het kan niet langer. Ik weet niet wat ik moet. Ik kon in bed niet wezen, ik kon ook niet staan of zitten.”

“Ik had al zoveel dingen geprobeerd voor de pijn in m'n rug. Fysiotherapie, mensendieck, osteopaat, van alles en nog wat. Maar niets leek echt te helpen, niet voor lang in ieder geval. De operatie leek voor mij de laatste hoop. Ik had hoge verwachtingen van de operatie.”

Mindfulness exercise:



Kracht TeRUG - OCON

Deze oefening duurt 12 minuten.

Neem rustig de tijd voor deze oefening. Het tempo is bewust laag, om goed op te kunnen merken wat u voelt.

Probeert u een rustige, comfortabele plek te vinden om te zitten of liggen. Verder kunt u de instructies volgen die u hoort tijdens de oefening.

Als u klaar bent om met de oefening te beginnen, klik dan op de video hieronder.

Lichaamsscan

Information modules of pain education:

Kracht TeRUG - OCON

Hoe werkt pijn?
Animatie

In deze animatie wordt uitgelegd hoe pijn werkt en hoe u tijdens uw herstel met pijn om kan gaan.

Door op de video te klikken, begint hij met afspelen.

Er is ook ondertiteling beschikbaar.

De ingesproken tekst (iets uitgebreider) is hierna terug te lezen op de volgende pagina's.

Hoe werkt pijn?

Kracht TeRUG - OCON

Uitleg over pijn

In deze module wordt uitleg gegeven over pijn.

Dit gebeurt eerst door een animatie (video).

De tekst van de animatie is ook terug te lezen in de pagina's erna.

Als laatste is in deze module een metafoor te vinden over touwtrekken en informatie voor als er pijn aanwezig blijft.

Exercise (valuable image) based on ACT:

Kracht TeRUG - OCON

Een waardevolle afbeelding

Eerder hebben we u gevraagd om in te vullen wat u waardevol vindt in het leven. Wat vindt u fijn en belangrijk om te doen.

Het kan soms best moeilijk zijn om daar antwoord op te geven.

Met deze oefening willen we u helpen om erachter te komen wat waardevol is voor u. Oftewel: concentreren op wat u de moeite waard vindt in het leven.

De oefening werkt aan deze twee punten:

1. Achterhalen wat belangrijk is voor mij
2. Hoe zit het nu in mijn leven en waar wil ik naartoe werken?

De reden dat we u vragen om over uw waarden na te denken, is omdat dit u kan helpen om pijn te verdragen.
Wat maakt het allemaal de moeite waard?
Waar wilt u naartoe met deze operatie en dit herstel?

Information on pain medication:

Kracht TeRUG - OCON

Oxycodon Immediate release (Oxynorm®)

- Werking: Sterk pijnstillend (kortwerkend)
- Werkzaam: 2 tot 4 uur
- Werkt binnen: 20 minuten
- Hoe vaak: Wanneer u pijnpieken heeft, mag u dit medicijn tot 6 maal per dag innemen. Bij te verwachten extra pijn kunt u dit ook al van tevoren innemen (± 30 minuten)
- Meest voorkomende bijwerkingen: zie bijwerkingen oxycontin.

Virtual reality for physiotherapy – Functional reach training for automating walking patterns.

Gido Hakvoort, Loes Bulle, Hilco Prins, Josien Kosse, Edwin Nibbering, Coen Kniknie and Marike Hettinga

Background

Walking is something that most of us do every day. From the moment we set our first steps we perfect this skill until it eventually becomes an automatic walking pattern. However, due to injury, illness, or disease, someone might lose control over this automated task. When this happens, physical therapy is often used to help restore a patient's use of muscles and train a new automatic walking pattern. An important element is to reduce postural sway and increase functional reach. In some cases, this includes using a Body Weight Support system which allows patients to experience walking at an early stage of their rehabilitation. However, this also confines them to a predefined area, away from everyday situations. As continuing their rehabilitation throughout everyday life can be challenging, being able to bring these everyday situations into the rehabilitation therapy might therefore aid their transition. By transferring all of this into a virtual reality environment, it allows a therapist to do exactly that. Moreover, it allows for usage data to be collected, analyzed, and presented to provide meaningful insights. In the project 'Virtual Reality for Rehabilitation' we focus on the question how new technologies can facilitate natural interaction in a virtual reality environment and support, optimize and maybe even replace existing rehabilitation processes. For this we are developing a system that support both patients and therapist.

Description of the application/technology/concept

Our system consists of an application aimed at functional reach exercises in two virtual reality environments. Within the first environment patients can see how far they can reach. We use an Oculus Quest 2 to detect hand movement and translate these movements into movements in the virtual reality environment. This allows patients to interact with objects in the virtual reality environment and allows for accurate measurements of a patient's functional reach to be record as a baseline. In the second environment patients can walk around a virtual supermarket where they will have to collect items from a shopping list. The items on the list are determined based on the patient's baseline which allows them to practice within their limit and in an interactive way. In the meantime, additional data is collected and send to a backend application. This application analyzes the data, translates it into a patient progress overview and makes it available for a therapist to gain insights into the status of the therapy. During appointments, these insights could help the therapist to adjust the therapy and set new goals for the patient. Future work includes adding additional sensors to our system to quantify balance and gait, and having a system analyze patients' progress to come up with suggestions for new goals or moving into next stages.

Practical description of demo

Our demo shows the current state of our virtual reality environment for patients who need to practice and train a new walking pattern. The demo contains several mini games to practice functional reach in an interactive way and shows how new technologies can turn everyday activities into safe exercise simulations.

Health Text Processing with Orange.

Erik Tjong Kim Sang, Peter Kok, Wouter Smink, Bernard Veldkamp, Gerben Westerhof and Anneke Sools

Background

Currently digital data is available abundantly for health research. The amount of data calls for automatic analysis but this requires experience in data mining and computer programming usually not present in health research groups. Analysis software with a user-friendly interface is required to enable research using large digital data sets. Such software is now available in the form of Orange, a free data mining toolkit developed by the Bioinformatics Laboratory of the University of Ljubljana in Slovenia. The software offers a large collection of modules that can be combined in a user-friendly graphical interface to form customized data analysis pipelines. Orange consists of open source Python code and can be extended with custom-built modules.

Description of the application/technology/concept

We use Orange for text analysis of online correspondence between counselors and patients with substance dependence related health problems. We have extended the Orange software with project specific modules that take care of data loading, data organization, data selection, data filtering, data analysis and data visualization.

Practical description of demo

We will demonstrate how Orange can be used for building data processing pipelines by selecting and linking modules with mouse clicks. Next we will show how text data can be loaded in Orange, be processed and be visualized.

Self-compassion by Tech: A Demonstration of a Supportive Self-compassion App for People with Newly Diagnosed Cancer.

Judith Austin, Stans Drossaert, Jelle van Dijk, Robbert Sanderman, Maya Schroevers and Ernst Bohlmeijer

Background

A diagnosis of cancer often has an immense impact on the life of cancer patients, and they are at an increased risk for distress, depression and anxiety. Given the low number of distressed patients who ask for or receive psychosocial care, the already high load of medical appointments for patients and their needs for autonomy, an intervention that can be executed in their own time may be particularly helpful. Mobile technology offers possibilities to partake in an intervention in a familiar context, to reach a large amount of people at low-threshold, and to help with integration of intervention content into daily life. Self-compassion, a way of responding to difficulties with kindness and wise, caring action, can help patients to increase their well-being and reduce distress. Since people with cancer are in the midst of an extremely challenging situation that entails difficult emotions and often self-blame, self-compassion is particularly relevant as a tool to help cope with the diagnosis. In compassion-based interventions such as Compassionate Mind Training, participants learn about the origins and nature of their emotions and safety strategies, and to cultivate mindful and compassionate acceptance towards them. Participants learn to recognize three evolutionary based emotion systems (threat-protection, drive and soothing system) within themselves, as a way to reduce self-blaming and shame and increase the sense that it is human and universal to experience functional but difficult emotions that are not our fault. In addition to such psychoeducation, Compassionate Mind Training consists of reflective, meditative and visualization exercises, in which participants learn to soothe and support themselves during difficult times. A recent review found that compassion-based interventions show promise in reducing anxiety and depression in people with cancer and are well-received by intervention participants.

Combining the relevancy of self-compassion with the benefits of mobile technology, we have developed a supportive self-compassion app for people with newly diagnosed cancer in a cocreative design process. The development process consisted of a series of co-creative workshops with patients and nurses, and focused on integrating requirements of cancer patients and stakeholders (bottom-up input) and theoretical evidence about compassion-based interventions (top-down input) into an intervention.

Description of the application/technology/concept

The self-compassion smartphone app consists of six sequential modules that include psychoeducation and exercises aimed at cultivating self-compassion in the time after a cancer diagnosis. Next to the sequential modules, features that are directly accessible from the app homepage include a mood tracker and an exercise in which the user recalls a pleasant moment of the day. Push messages are used to stimulate integration of the content into daily life.

Practical description of demo

The researcher will guide the visitors through the app. The visitors can learn how we have translated the theoretical and user requirements into technical solutions.

IJ-lab: less assumptions, more research.

Matthijs Spruijt

Background

IJ-lab is the research hub of Therapieland and Gezondeboel, e-mental health platforms which offer a broad range of preventive and curative e-mental health modules, which are used in blended treatments or as self-help.

At IJ-lab a diverse group of internal and external researchers, team members and students share knowledge and jointly conduct research into the effectiveness and applicability of e-health.

Use, effectiveness and satisfaction are our most important pillars. We start projects in different research areas, including effectiveness, tracking & monitoring, virtual reality, persuasive design / UX design, implementation, screening, and analytics.

Description of the application/technology/concept

IJ-lab actively searches for collaborations with universities, colleges and knowledge institutions, to conduct research and put the generated knowledge directly into practice. These collaborations can take different forms:

- Facilitate research

By providing insight into our data, by providing access to our platform and by providing tools such as a VR application. This is possible in the context of short-term or long-term research.

- Research consortium

IJ-lab can be a partner of a research consortium when submitting a research application. We can make an in-kind contribution to the research.

- Development of e-health applications

IJ-lab has a lot of knowledge and expertise in the field of e-health development through Therapieland and Gezondeboel. This means that we can be a good partner for the development of an e-health application in the context of research. Think of adapting one of our existing e-health programs or developing a new program, if this is not yet part of our products. When the development of an e-health application is part of a research consortium, this may be part of the in-kind contribution on behalf of IJ-lab.

- Possibility for student graduation projects

IJ-lab gives students the opportunity to conduct graduation research. Preferably it concerns a subject from our research directions, which includes effectiveness, tracking & monitoring, virtual reality, persuasive design / UXdesign, implementation, screening, and analytics.

Practical description of demo

We would like to demo the platforms Therapieland and Gezondeboel and concept of IJ-lab hoping to inspire others to conduct research together. By displaying the different possibilities for collaboration, we aim to create opportunities for future research projects on eHealth.

Using virtual nature to promote social connectedness in older adults through storytelling.

Kars Otten, Thomas van Rompay, Debby Gerritsen, Jan-Willem van T Klooster and Gerben Westerhof

Background

Half of all older adults experience feelings of loneliness, i.e. experience a lack in social connectedness (1). Considering our aging population, interventions to promote social connectedness in older adults are called for. People tend to connect to and socially interact with each other by means of communicating stories: i.e. storytelling (2,3). Hence, a promising strategy to enhance social connectedness could be to stimulate storytelling.

Over the years, researchers have accumulated a range of beneficial effects of nature (4,5): positive communication (6), enhanced feelings of social support and, particularly relevant to the present context, reduced feelings of loneliness (7), and increased feelings of being connected to others and the world at large (8). However, for older adults access to nature can be limited, e.g. due to by mobility constraints. Interestingly, when nature is presented digitally or virtually, positive effects have been found as well (6,8,9,10), underscoring the benefits of virtual nature for those with limited access to nature. Consequently, virtual nature could be used to promote social connectedness in older adults through storytelling. This project aims to investigate which specific features of virtual nature can act as a conversation starter to encourage storytelling in older adults.

Description of the application/technology/concept

With the virtual nature system one can easily create immersive, computer-animated projections of nature scenes, which can be tailored to specific needs and made available to those who have limited access to real nature. Moreover, with this technology the effects of specific features of nature (e.g. tree density) can be tested experimentally. Several features are animated to enhance immersion in the virtual environment, e.g. clouds rolling by, and audio can be incorporated as well. The nature scenes can be exported as videos.

Practical description of demo

We will demonstrate the software for designing nature scenes with a online tutorial. Moreover, previous designed virtual nature scenes will be shown to provide examples of current design possibilities and additionally the results of a study showing the practical and scientific uses of this software package.

Drughelp.care: Quickly connect people struggling with substance misuse to treatment that matches their needs.

Patricia Stoddard Dare, Miyuki Tedor and Michelle Unanagst

Background

Alcohol and other drug use disorders, when left untreated, contribute to significant morbidity and mortality. Treatment is generally vastly underutilized, and individuals who are struggling with active addiction may only have a short window of time when they are amenable to treatment. It is; therefore, essential to quickly connect individual in need to quality services during this period of willingness. As a complicating factor, in the U.S., it can be challenging to find an open treatment slot that matches a person's age (minor/adult), gender, pregnancy status, insurance status, and other treatment needs such as co-occurring physical and mental health disorder. Even seasoned professionals can have difficulty finding available treatment, or the next stage of treatment that meets basic client needs. Delays in securing treatment can lead to increases in fatal overdose. Technology can be leveraged to help bridge this gap and improve the efficiency of the service delivery system by quickly connecting those in need with services matched to their unique characteristics.

Description of the application/technology/concept

Drughelp.care is a new, free, and easy to use web application funded by the US Centers for Disease Control and Prevention through a Data to Action grant. It allows substance use treatment provider agencies to register the services they provide and quickly update their available treatment slots and wait time on a daily basis. The app is fully searchable and allows both laypersons and professionals to enter client characteristics and instantaneously receive local treatment facilities that have availability at any given moment in time. The value of this web application was particularly apparent during the initial phase of the COVID 19 pandemic when government mandated shut downs made access to in person treatment even more difficult. Since drughelp.care is nimble and adaptable, managers of this web application were able to easily add a "telehealth" search feature without having to write new code. Within a few days of adding this new search term, more than 170 agencies were able to broadcast their availability of telehealth services.

Practical description of demo

During the demonstration we will describe how drughelp.care can be used to find an available substance use disorder treatment slot that matches a client's characteristics and needs. Search features include level of care, gender, pregnancy accommodations, age, and co-occurring mental health concerns. We also offer a filter for difficult to place clients with a sexual offense or arson history. This tool also allows a search for treatment that provides different types of medication assisted therapy, various psychosocial treatment modalities, and access to harm reduction services. A short 3 minute preview of our demonstration can be found here: https://drughelp.care/static/media/Drughelp_care_How_To_Video-_v1_small.ca5229a9.mp4. We hope to inspire others to solve health related challenges by leveraging technology.

Supporting bariatric surgery patients in their aftercare journey: a playful technological intervention “Truth-or-Dare?"

Emma Driesse, Pepijn Verburg, Jos-Marien Jansen and Carine Lallemand

Background

The amount of people coping with obesity keeps on increasing. While the physical comorbidities are clearly visible, mental issues such as a low self-image are just as damaging. Bariatric surgery is currently the most effective treatment with long-term results [2, 3]. Its effectiveness is however often expressed in postoperative weight loss, leaving the impact on psychological health aside [3].

Methods

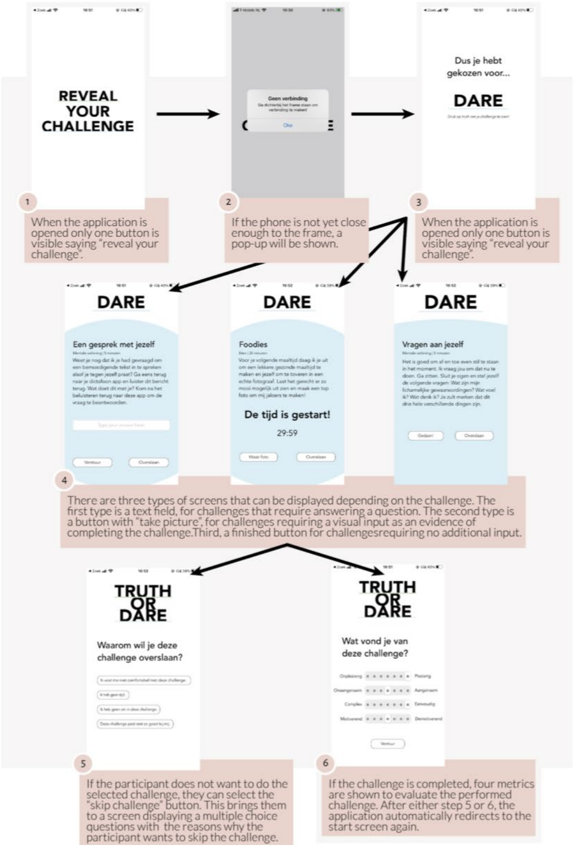
To support bariatric patients in the aftercare pathway, we designed Truth-or-Dare. Combining a physical artefact and a mobile app, Truth-or-Dare is a playful way to track patients' mental state, using challenges to help them to establish a better self-image and a physical exercise routine. The frame attracts attention by dropping magnetic wooden blocks, indicating it is time to play! The app displays a personalized exercise or reflection challenge. By placing the block back on one side of the frame the choice is made: truth or dare? The Truth-or-Dare frame and app have been used by a former bariatric patient for two weeks. Every 6-12 hours a block fell out of the frame. We conducted two semistructured interviews, the first focused on the experience and initial thoughts about the product, the second informed by the data gathered. During the deployment, we also implemented a feedback loop to collect participants’ experiences with the challenges, allowing to understand which strategy was the most effective for a patient and to iterate on them.

Findings

The challenges were positively perceived by the participant and helped her to become more aware of her behavior and mindset. While she enjoyed taking her time to perform each challenge, she felt pressed and rushed by the too short interval between challenges. She often rated the challenges as unpleasant, complicated or annoying, yet motivating. If a challenge is annoying, it does not mean it is not motivating. “If I would not want challenges like that, I would ignore my problems.” We observed a pattern of switching between truth and dare challenges, mainly triggered by the physical properties of the board.

Discussion

Playful Truth-or-Dare challenges implemented in a physical artefact and a related app are a new intervention approach for mental wellbeing after bariatric surgery. It shows potential in raising awareness amongst patients around their behaviors and motivating them throughout their journey. As the product is placed in a shared environment, family members are encouraged to join, which has a positive influence on both the patient and partner [1]. The design of the physical product uses friction as a motivational mechanism: (a) a block on the ground calls for action. Will the patient remove it without performing a challenge or engage with the game? (b) placing the block back, one can choose Truth or Dare. Yet, the board is designed to prevent one type of challenge to be chosen too often. These moments of friction act as triggers to step outside the comfort zone. Further research is necessary to refine the challenges, or even personalize them, and to investigate the longterm effect of Truth-or-Dare on patients’ mental wellbeing and self-image.



Weet je nog dat ik je had gevraagd om een bemoedigende tekst in te spreken alsof je tegen jezelf praat? Ga eens terug naar je dictafoon app en luister dit bericht terug. Wat doet dit met je? Kom na het beluisteren terug naar deze app om de vraag te beantwoorden.

Voor je volgende maaltijd daag ik je uit om een lekkere gezonde maaltijd te maken en jezelf om te toveren in een echte fotograaf. Laat het gerecht er zo mooi mogelijk uit zien en maak een top foto om mij jaloers te maken!

Het is goed om af en toe even stil te staan in het moment. Ik vraag jou om dat nu te doen. Ga zitten. Sluit je ogen en stel jezelf de volgende vragen: Wat zijn mijn lichamelijke gewaarwordingen? Wat voel ik? Wat denk ik? Je zult merken dat dit drie hele verschillende dingen zijn.

1 When the application is opened only one button is visible saying "reveal your challenge".

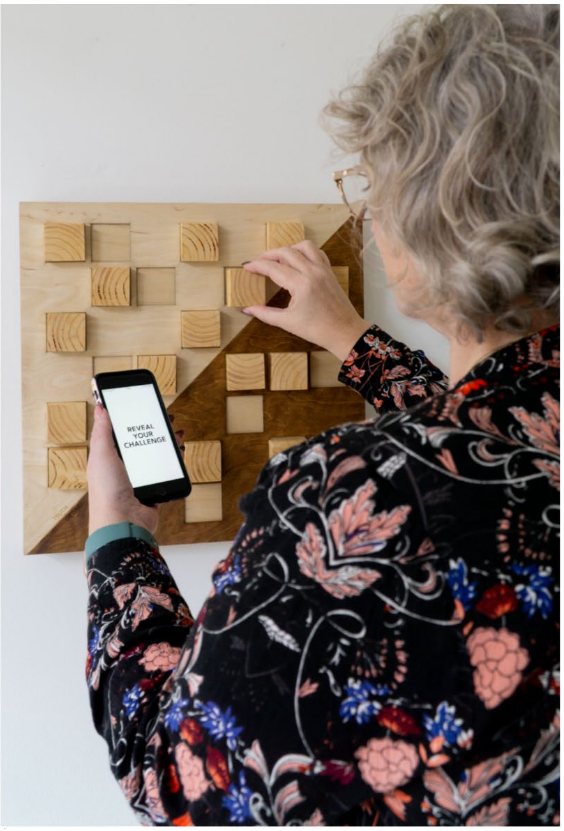
2 If the phone is not yet close enough to the frame, a pop-up will be shown.

3 When the application is opened only one button is visible saying "reveal your challenge".

4 There are three types of screens that can be displayed depending on the challenge. The first type is a text field, for challenges that require answering a question. The second type is a button with "take picture", for challenges requiring a visual input as an evidence of completing the challenge.Third, a finished button for challengesrequiring no additional input.

5 If the participant does not want to do the selected challenge, they can select the "skip challenge" button. This brings them to a screen displaying a multiple choice questions with the reasons why the participant wants to skip the challenge.

6 If the challenge is completed, four metrics are shown to evaluate the performed challenge. After either step 5 or 6, the application automatically redirects to the start screen again.



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Using a mobile laboratory for field research: experiences on the road and in the field.

Jan-Willem van 't Klooster

Background

The BMS Lab is the faculty lab of the faculty of behaviour, management and social sciences (BMS) of the University of Twente. It consists of over 500 m2 lab facilities and various ambulant and digital resources. The majority of its projects takes place at fixed lab spaces at the university. Although having clear advantages (e.g. high control, fixed set-up), university locations also come with substantial restrictions, including the often Western student samples from relatively high socio-economic status available for experiments. These samples are arguably limited representative. Moreover, inclusion of elderly, patients and healthcare professionals is challenging.

Methods

To tackle the abovementioned restrictions, BMS commissioned a mobile laboratory in 2018. We give a retrospective update on its design and usage in the field so far.

Findings

A plethora of studies and demos have been carried out with the mobile laboratory since 2018. This included eye tracking experiments using participants from the street, on-site evaluations with healthcare professionals, demos and VR experiments with students, and testing of various covid related materials.

Discussion

The mobile laboratory allows field research that requires a fixed setup, but brings it into the field. Usage so far shows that it is a fitting facility to conduct field research in naturalistic settings, and different field experiments were facilitated successfully, leading to international interest from other social sciences faculties.