**Readme 2**

**Table 1. Initial codes of evaluation timing considerations of the digital patient experience.**

| **Categories and initial codes** | | **Description** |
| --- | --- | --- |
| **Intervention maturity stages** (Coulter et al., 2009; Former Capacity4dev Member, 2022; World Health Organization, 2016b) | | |
|  | Efficacy | Assess whether the DHIa achieves the intended results in research or controlled setting |
|  | Effectiveness | Assess whether the DHI achieves the intended results in nonresearch or uncontrolled setting |
|  | Implementation | Assess the uptake, institutionalization, and sustainability of evidence-based DHIs in a given context, including policies and practices |
| **Timing of the evaluation** (Former Capacity4dev Member, 2022) | | |
|  | Before intervention | A baseline test is performed before individuals adopt or implement the intervention. It assesses individuals’ initial status and their anticipated perception of the intervention |
|  | During intervention | An evaluation performed during intervention’s use aims to monitor individuals’ real-time feedback and reactions |
|  | After intervention | An evaluation that is performed right after or a long time after the completion of the interventions by individuals. It assesses individuals’ changes regarding using the intervention |
| **Timing of data collection** (Coulter et al., 2009; LaVela & Gallan, 2014) | | |
|  | Immediate evaluation | Aims to collect real-time data on patients’ experiences during or immediately after their treatment |
|  | Delayed evaluation | Aims to obtain more substantial responses after the intervention’s completion over a long period |
|  | Momentary evaluation | Aims to collect transient information from individuals at a specific moment |
|  | Continuous evaluation | Aims to gather feedback from individuals at different points along the care pathway |

aDHI: digital health intervention.

**Table 2. Initial codes of evaluation indicators of the digital patient experience.**

| **Categories and initial codes** | | **Description** |
| --- | --- | --- |
| **Intervention outputs** (Bolton et al., 2018; Norman & Nielsen, 2016; Richardson et al., 2021; World Health Organization, 2016b, 2022b) | | |
|  | Functionality | Assess whether the DHIa works as intended. It refers to the ability of the DHb system to support the desired intervention. |
|  | Usability | Assess whether the DHI is used as intended. It refers to the degree to which the intervention is understandable and easy to use. |
|  | Quality of care | Assess whether the DHI delivers effective, safe, people-centered, timely, accessible, equitable, integrated, and efficient care services. It refers to the degree to which health services for individuals and populations increase the likelihood of desired health outcomes. |
| **Patient outcomes** (America, 2001; Hollander et al., 2017; NHS National Quality Board, 2011; Reeves et al., 2002; Shandley et al., 2020; Staniszewska et al., 2014) | | |
|  | Emotional outcomes | Assess whether patients’ feelings and well-being change positively or negatively because of the use or anticipated use of DHIs. It refers to what the patients feels. |
|  | Perceptual outcomes | Assess whether the informed state of mind that patients achieve as intended before, during, or after using the DHIs. It refers to what the patient thinks and believes. |
|  | Capability outcomes | Assess whether patients’ health literacy, communication skills, or computer confidence in managing diseases, communicating with health care providers, or operating digital devices increased as expected. It refers what the patient knows and acquires. |
|  | Behavior outcomes | Assess whether patients engage in activities to cope with the disease and treatments through DHIs. It refers to what the patient acts and does. |
|  | Clinical outcomes | Assess whether patients’ health improvements meet the intentions of the DHIs. It refers to what medical condition the patient is in and aims to maintain. |
| **Health care system impact** (World Health Organization, 2016b) | | |
|  | Economic outcomes | Assess whether the DHIs are cost-effective, whether the organization and DH users can afford the DHI system, and whether there is a probable return on investment. It refers to the use of health care resources. |

aDHI: digital health intervention.

**Table 3. Initial codes of evaluation approaches of the digital patient experience.**

| **Categories and initial codes** | | **Description** |
| --- | --- | --- |
| **Study designs** (World Health Organization, 2016b) | | |
|  | Descriptive study | Aims to define the “who, what, when, and where” of the observed phenomena and include qualitative research concerning both individuals and populations. |
|  | Analytical study | Aims to quantify the relationship between the intervention and the outcomes of interest, usually with the specific aim of demonstrating a causative link between the 2, including experimental and observational studies. |
| **Data collection methods and instruments** (Streefkerk) | | |
|  | Qualitative methods | Qualitative research is expressed in words. It is used to understand concepts, thoughts, or experiences. Common qualitative methods include interviews with open-ended questions, observations described in words, and literature reviews that explore concepts and theories. |
|  | Quantitative methods | Quantitative research is expressed in numbers and graphs. It is used to test or confirm theories and assumptions. Common quantitative methods include experiments, observations recorded as numbers, and surveys with closed-ended questions. |
|  | Qualitative analysis | Qualitative data consist of text, images, or videos instead of numbers. Content analysis, thematic analysis, and discourse analysis are the common approaches used to analyze these types of data. |
|  | Quantitative analysis | Quantitative data are based on numbers. Simple math or more advanced statistical analysis is used to discover commonalities or patterns in the data. |

**Table 4. Themes, subthemes, and evaluation indicators of the intervention outputs of the digital patient experience.**

| **Themes and subthemes** | | **Studies (n=45), n (%)** | **Evaluation indicators** | **References** |
| --- | --- | --- | --- | --- |
| **Functionality (n=36, 80%)** | | | | |
|  | Intended values | 21 (47) | * Ability to either change or maintain the user’s health state in a beneficial way: support self-management, shared decision-making, trigger actions, and track and respond to changes * Ability to collect clinical metrics: the number of monitored variables and the frequency, accuracy, concordance, timeliness, and visibility of monitoring | (Baumel et al., 2017; Harman Chaudhry et al., 2021; Kei Long Cheung et al., 2019; M. F. De La Cruz Monroy & A. Mosahebi, 2019; Jacqueline Susan Feather et al., 2016; Joseph Firth & John Torous, 2015; Greenhalgh & Shaw, 2017; Ingemann et al., 2020; Sakib Jalil et al., 2015; Emily G Lattie et al., 2019; Christopher Lemon et al., 2020; A.-C. L. Leonardsen et al., 2020; Clare Liddy et al., 2016; Guillermo Molina-Recio et al., 2020; O’Keefe et al., 2021; Kristin L Rising et al., 2018; Helen Slater et al., 2017; Søgaard Neilsen & Wilson, 2019; Rachael C Walker et al., 2019; Yanxia Wei et al., 2020; Linda MP Wesselman et al., 2019) |
|  | Content and information | 20 (44) | * Quality of the content: evidence based, tailored, relevance, practicality, consistency, and clarity * Amount of the information: comprehensible, completeness, glanceability (understandability), and conciseness * Language of the information: simple nontechnical language; actionable message; and a nonauthoritarian, friendly, and nonjudgmental tone of voice | (Ames et al., 2019; Baumel et al., 2017; Amberly Brigden et al., 2020; Kei Long Cheung et al., 2019; M. F. De La Cruz Monroy & A. Mosahebi, 2019; Lauren Jones & Carol Grech, 2016; Kuijpers et al., 2013; Christopher Lemon et al., 2020; Siew Lim et al., 2019; Guillermo Molina-Recio et al., 2020; Deborah Morrison et al., 2014; Ramya Sita Palacholla et al., 2019; Esther Rincon et al., 2017; Dawn K Sakaguchi-Tang et al., 2017; Helen Slater et al., 2017; Søgaard Neilsen & Wilson, 2019; Simen A Steindal et al., 2020; Randi Stokke, 2016; Yanxia Wei et al., 2020; Linda MP Wesselman et al., 2019) |
|  | Intervention features | 20 (44) | * Appropriate features that meet the intended values: activity planning, activity scheduling, activity tracking, diary, alerts, journal, feedback, and reminders * Degree of setup, maintenance, and training: ready to use, initial training, and ongoing education * Channel or mode of delivery: phone calls, social media, mobile apps, web, video, devices, and wearable kit | (Ames et al., 2019; Baumel et al., 2017; Wonchan Choi et al., 2020; M. F. De La Cruz Monroy & A. Mosahebi, 2019; Jacqueline Susan Feather et al., 2016; Sakib Jalil et al., 2015; Lauren Jones & Carol Grech, 2016; Christopher Lemon et al., 2020; A.-C. L. Leonardsen et al., 2020; Siew Lim et al., 2019; Guillermo Molina-Recio et al., 2020; O’Keefe et al., 2021; Ramya Sita Palacholla et al., 2019; Esther Rincon et al., 2017; Dawn K Sakaguchi-Tang et al., 2017; Helen Slater et al., 2017; Søgaard Neilsen & Wilson, 2019; Yanxia Wei et al., 2020; Werder, 2015; Linda MP Wesselman et al., 2019) |
|  | Theory-based interventions | 11 (24) | * Presence or absence of an underlying theoretical basis: behavior change theory, social presence, and a quality certification | (Tina Lien Barken et al., 2019; Baumel et al., 2017; Amberly Brigden et al., 2020; Greenhalgh & Shaw, 2017; Siew Lim et al., 2019; Deborah Morrison et al., 2014; Katherine Morton et al., 2017; Esther Rincon et al., 2017; Søgaard Neilsen & Wilson, 2019; Simen A Steindal et al., 2020; Yanxia Wei et al., 2020) |
| **Usability (n=26, 58%)** | | | | |
|  | Technology quality attributes | 24 (53) | * Technology operability: the ease of use, learnability, memorability, readability, efficiency, system errors, product, or service * Technology standards and specifications: interoperability, integration, scalability, ergonomics, connectivity, adaptability, flexibility, accuracy, and reliability | (Barello et al., 2016; Baumel et al., 2017; Amberly Brigden et al., 2020; Harman Chaudhry et al., 2021; Kei Long Cheung et al., 2019; Wonchan Choi et al., 2020; Jacqueline Susan Feather et al., 2016; Greenhalgh & Shaw, 2017; Lauren Jones & Carol Grech, 2016; Emily G Lattie et al., 2019; Christopher Lemon et al., 2020; A.-C. L. Leonardsen et al., 2020; Clare Liddy et al., 2016; Siew Lim et al., 2019; Mukhtiar Memon et al., 2014; Guillermo Molina-Recio et al., 2020; Ramya Sita Palacholla et al., 2019; Dawn K Sakaguchi-Tang et al., 2017; Helen Slater et al., 2017; Simen A Steindal et al., 2020; Randi Stokke, 2016; Yanxia Wei et al., 2020; Linda MP Wesselman et al., 2019; Gaby Anne Wildenbos et al., 2018) |
|  | Interaction design | 17 (38) | * Use of human-centered design methodologies during the development process: co-design, user-centered design, and inclusive design * Design quality of system architecture, layout, and interface: intuitive, interactive, personalized, and esthetic | (Baumel et al., 2017; Amberly Brigden et al., 2020; Wonchan Choi et al., 2020; Jacqueline Susan Feather et al., 2016; Greenhalgh & Shaw, 2017; Christopher Lemon et al., 2020; A.-C. L. Leonardsen et al., 2020; Siew Lim et al., 2019; Mukhtiar Memon et al., 2014; Guillermo Molina-Recio et al., 2020; Dawn K Sakaguchi-Tang et al., 2017; Helen Slater et al., 2017; Søgaard Neilsen & Wilson, 2019; Simen A Steindal et al., 2020; Yanxia Wei et al., 2020; Werder, 2015; Gaby Anne Wildenbos et al., 2018) |
| **Care quality (n=30, 67%)** | | | | |
|  | Accessible care | 27 (60) | * Accessibility of care services: data, information, and HCPsa * Involvement of related stakeholders: family, friends, and peer-to-peer communication * Accessibility to high-quality care: timely, integrated, continuous, improved (more predictable daily life), convenient (fits into daily routines), and personalized care | (Ames et al., 2019; Barello et al., 2016; Tina Lien Barken et al., 2019; Baumel et al., 2017; Amberly Brigden et al., 2020; Anna Cox et al., 2017; M. F. De La Cruz Monroy & A. Mosahebi, 2019; Jacqueline Susan Feather et al., 2016; Greenhalgh & Shaw, 2017; Ingemann et al., 2020; Sakib Jalil et al., 2015; Lauren Jones & Carol Grech, 2016; Kuijpers et al., 2013; A.-C. L. Leonardsen et al., 2020; Clare Liddy et al., 2016; Siew Lim et al., 2019; Guillermo Molina-Recio et al., 2020; Katherine Morton et al., 2017; O’Keefe et al., 2021; Ramya Sita Palacholla et al., 2019; Kristin L Rising et al., 2018; Dawn K Sakaguchi-Tang et al., 2017; Helen Slater et al., 2017; Simen A Steindal et al., 2020; Randi Stokke, 2016; Rachael C Walker et al., 2019; Yanxia Wei et al., 2020) |
|  | Safe and credible care | 14 (31) | * Credibility and accountability of care: the owners’ credibility and third-party verification * Security of care: the number of medical errors * Privacy of care: the presence of general privacy notifications, the documentation of individual access to user private data, and regulation compliance | (Ames et al., 2019; Tina Lien Barken et al., 2019; Baumel et al., 2017; Kei Long Cheung et al., 2019; Jacqueline Susan Feather et al., 2016; Mukhtiar Memon et al., 2014; Guillermo Molina-Recio et al., 2020; Kristin L Rising et al., 2018; Dawn K Sakaguchi-Tang et al., 2017; Helen Slater et al., 2017; Simen A Steindal et al., 2020; Swanepoel & Hall III, 2010; Yanxia Wei et al., 2020; Werder, 2015) |

aHCP: health care provider.

**Table 5. Themes, subthemes, and evaluation indicators of patient outcomes of the digital patient experience.**

| **Themes and subthemes** | | **Studies (n=45), n (%)** | **Evaluation indicators** | **References** |
| --- | --- | --- | --- | --- |
| **Emotional outcomes (n=32, 71%)** | | | | |
|  | Positive emotions | 31 (69) | * Patient satisfaction * A sense of reassurance * Well-being * A sense of security * Peace of mind * A sense of belonging | (Barello et al., 2016; Tina Lien Barken et al., 2019; Brunton et al., 2015; Harman Chaudhry et al., 2021; Anna Cox et al., 2017; M. F. De La Cruz Monroy & A. Mosahebi, 2019; Jacqueline Susan Feather et al., 2016; Joseph Firth & John Torous, 2015; Greenhalgh & Shaw, 2017; Ingemann et al., 2020; Sakib Jalil et al., 2015; Lauren Jones & Carol Grech, 2016; Kuijpers et al., 2013; Emily G Lattie et al., 2019; Christopher Lemon et al., 2020; A.-C. L. Leonardsen et al., 2020; Clare Liddy et al., 2016; Guillermo Molina-Recio et al., 2020; Deborah Morrison et al., 2014; Katherine Morton et al., 2017; O’Keefe et al., 2021; Ramya Sita Palacholla et al., 2019; Esther Rincon et al., 2017; Dawn K Sakaguchi-Tang et al., 2017; Simen A Steindal et al., 2020; Randi Stokke, 2016; Swanepoel & Hall III, 2010; Rachael C Walker et al., 2019; Werder, 2015; Linda MP Wesselman et al., 2019; Gaby Anne Wildenbos et al., 2018) |
|  | Negative emotions | 16 (36) | * Concerns * Fears * A sense of uncertainties * Dissatisfaction * A sense of frustration * A sense of insecurity * Worries | (Tina Lien Barken et al., 2019; Brunton et al., 2015; Greenhalgh & Shaw, 2017; Ingemann et al., 2020; Lauren Jones & Carol Grech, 2016; Christopher Lemon et al., 2020; A.-C. L. Leonardsen et al., 2020; Clare Liddy et al., 2016; Siew Lim et al., 2019; Guillermo Molina-Recio et al., 2020; Katherine Morton et al., 2017; Ramya Sita Palacholla et al., 2019; Dawn K Sakaguchi-Tang et al., 2017; Simen A Steindal et al., 2020; Randi Stokke, 2016; Rachael C Walker et al., 2019) |
| **Perceptual outcomes (n=32, 71%)** | | | | |
|  | Empowerment | 23 (51) | * Perceived values * Quality of life * Confidence * Self-efficacy * Comfort | (Barello et al., 2016; Tina Lien Barken et al., 2019; Brunton et al., 2015; Anna Cox et al., 2017; Jacqueline Susan Feather et al., 2016; Joseph Firth & John Torous, 2015; Greenhalgh & Shaw, 2017; Ingemann et al., 2020; Sakib Jalil et al., 2015; Lauren Jones & Carol Grech, 2016; Kuijpers et al., 2013; Christopher Lemon et al., 2020; A.-C. L. Leonardsen et al., 2020; Clare Liddy et al., 2016; Guillermo Molina-Recio et al., 2020; Deborah Morrison et al., 2014; Katherine Morton et al., 2017; Esther Rincon et al., 2017; Dawn K Sakaguchi-Tang et al., 2017; Helen Slater et al., 2017; Simen A Steindal et al., 2020; Randi Stokke, 2016; Linda MP Wesselman et al., 2019) |
|  | Acceptability | 19 (42) | * Degree to which technology, treatment, and care services are accepted: willingness to use, intention to use, intention to continue using, and likelihood to recommend | (Ames et al., 2019; Barello et al., 2016; Amberly Brigden et al., 2020; Wonchan Choi et al., 2020; Jacqueline Susan Feather et al., 2016; Joseph Firth & John Torous, 2015; Sakib Jalil et al., 2015; Lauren Jones & Carol Grech, 2016; Emily G Lattie et al., 2019; Christopher Lemon et al., 2020; A.-C. L. Leonardsen et al., 2020; Clare Liddy et al., 2016; Siew Lim et al., 2019; Guillermo Molina-Recio et al., 2020; Katherine Morton et al., 2017; Helen Slater et al., 2017; Randi Stokke, 2016; Swanepoel & Hall III, 2010; Linda MP Wesselman et al., 2019) |
|  | Connectedness | 16 (36) | * Relationships between patient and provider: closeness, detachment, trust, or doubts | (Barello et al., 2016; Tina Lien Barken et al., 2019; Anna Cox et al., 2017; Jacqueline Susan Feather et al., 2016; Greenhalgh & Shaw, 2017; Ingemann et al., 2020; Sakib Jalil et al., 2015; Lauren Jones & Carol Grech, 2016; Christopher Lemon et al., 2020; Guillermo Molina-Recio et al., 2020; Katherine Morton et al., 2017; Ramya Sita Palacholla et al., 2019; Simen A Steindal et al., 2020; Swanepoel & Hall III, 2010; Rachael C Walker et al., 2019; Yanxia Wei et al., 2020) |
|  | Attitudes | 14 (31) | * Initial beliefs, preferences, and expectations * Impression of the excellence of the DHIsa * Interpretation of the DHIs * Motivation to change behavior | (Ames et al., 2019; Barello et al., 2016; Anna Cox et al., 2017; Jacqueline Susan Feather et al., 2016; Joseph Firth & John Torous, 2015; Greenhalgh & Shaw, 2017; Sakib Jalil et al., 2015; Lauren Jones & Carol Grech, 2016; Guillermo Molina-Recio et al., 2020; Katherine Morton et al., 2017; Ramya Sita Palacholla et al., 2019; Dawn K Sakaguchi-Tang et al., 2017; Swanepoel & Hall III, 2010; Linda MP Wesselman et al., 2019) |
|  | Burden | 12 (27) | * Perceived burden and restriction * Discomfort * Unconfident | (Tina Lien Barken et al., 2019; Brunton et al., 2015; Anna Cox et al., 2017; Ingemann et al., 2020; Lauren Jones & Carol Grech, 2016; Guillermo Molina-Recio et al., 2020; Katherine Morton et al., 2017; Esther Rincon et al., 2017; Dawn K Sakaguchi-Tang et al., 2017; Randi Stokke, 2016; Swanepoel & Hall III, 2010; Rachael C Walker et al., 2019) |
| **Capability outcomes (n=19, 42%)** | | | | |
|  | Autonomy and knowledge-gaining | 19 (42) | * Participants’ level of informed state of mind after using the DHIs: clinical awareness * Patients’ level of health knowledge: health literacy, skills, and understanding * Patients’ ability to make clinical decisions: problem-solving and shared decision-making | (Barello et al., 2016; Tina Lien Barken et al., 2019; Anna Cox et al., 2017; Jacqueline Susan Feather et al., 2016; Greenhalgh & Shaw, 2017; Sakib Jalil et al., 2015; Lauren Jones & Carol Grech, 2016; Kuijpers et al., 2013; A.-C. L. Leonardsen et al., 2020; Deborah Morrison et al., 2014; Katherine Morton et al., 2017; Ramya Sita Palacholla et al., 2019; Kristin L Rising et al., 2018; Helen Slater et al., 2017; Simen A Steindal et al., 2020; Randi Stokke, 2016; Swanepoel & Hall III, 2010; Rachael C Walker et al., 2019; Linda MP Wesselman et al., 2019) |
| **Behavioral outcomes (n=26, 58%)** | | | | |
|  | Adherence | 19 (42) | * Initial, sustained use of certain features * Download and deletion rates * Completion rates * Dropout rates * Speed of task completion | (Barello et al., 2016; Joseph Firth & John Torous, 2015; Greenhalgh & Shaw, 2017; Sakib Jalil et al., 2015; Lauren Jones & Carol Grech, 2016; Kuijpers et al., 2013; Emily G Lattie et al., 2019; Christopher Lemon et al., 2020; A.-C. L. Leonardsen et al., 2020; Clare Liddy et al., 2016; Guillermo Molina-Recio et al., 2020; Deborah Morrison et al., 2014; Katherine Morton et al., 2017; O’Keefe et al., 2021; Esther Rincon et al., 2017; Kristin L Rising et al., 2018; Dawn K Sakaguchi-Tang et al., 2017; Randi Stokke, 2016; Linda MP Wesselman et al., 2019) |
|  | Self-management behaviors | 17 (38) | * Number of individuals exercising regularly or using dietary behaviors compared with the total number of participants * Engagement of treatment, self-care, and help-seeking behavior | (Barello et al., 2016; Tina Lien Barken et al., 2019; Amberly Brigden et al., 2020; Brunton et al., 2015; M. F. De La Cruz Monroy & A. Mosahebi, 2019; Jacqueline Susan Feather et al., 2016; Joseph Firth & John Torous, 2015; Greenhalgh & Shaw, 2017; Sakib Jalil et al., 2015; Kuijpers et al., 2013; Christopher Lemon et al., 2020; A.-C. L. Leonardsen et al., 2020; Guillermo Molina-Recio et al., 2020; Deborah Morrison et al., 2014; Katherine Morton et al., 2017; Esther Rincon et al., 2017; Linda MP Wesselman et al., 2019) |
|  | Patient-provider communication | * 11 (24) | * Number and frequency of patient-provider contacts * Engagement of patient-provider communication * Quality of patient-provider communication (eg, percentage of patients reporting that HCPsb communicated well) | * (Barello et al., 2016; Tina Lien Barken et al., 2019; Amberly Brigden et al., 2020; Anna Cox et al., 2017; M. F. De La Cruz Monroy & A. Mosahebi, 2019; Greenhalgh & Shaw, 2017; Sakib Jalil et al., 2015; O’Keefe et al., 2021; Ramya Sita Palacholla et al., 2019; Kristin L Rising et al., 2018; Simen A Steindal et al., 2020) |
| * **Clinical outcomes (n=23, 51%)** | | | | |
|  | * Health conditions | * 23 (51) | * Level of pain and symptoms control * Status of physical health * Level of health or treatment-related anxiety, depression, and stress * Mortality rates * Morbidity rates * Adverse effects | * (Barello et al., 2016; Amberly Brigden et al., 2020; Harman Chaudhry et al., 2021; Wonchan Choi et al., 2020; M. F. De La Cruz Monroy & A. Mosahebi, 2019; Joseph Firth & John Torous, 2015; Greenhalgh & Shaw, 2017; Sakib Jalil et al., 2015; Lauren Jones & Carol Grech, 2016; Emily G Lattie et al., 2019; Christopher Lemon et al., 2020; A.-C. L. Leonardsen et al., 2020; Clare Liddy et al., 2016; Guillermo Molina-Recio et al., 2020; Deborah Morrison et al., 2014; Katherine Morton et al., 2017; O’Keefe et al., 2021; Ramya Sita Palacholla et al., 2019; Esther Rincon et al., 2017; Kristin L Rising et al., 2018; Simen A Steindal et al., 2020; Randi Stokke, 2016; Linda MP Wesselman et al., 2019) |

aDHI: digital health intervention.

bHCP: health care provider.

**Table 6. Themes, subthemes, and evaluation indicators of health care system impact of the digital patient experience.**

| Themes and subthemes | | Studies (n=45), n (%) | Evaluation indicators | References |
| --- | --- | --- | --- | --- |
| Economic outcomes (n=16, 36%) | | | | |
|  | Cost-effectiveness | 14 (31) | * Out-of-pocket expenses for patients: care costs and travel costs * Time efficiency of using the DHIsa: waiting time, travel time, and consultation time * Reduction in overuse of services: printed materials | (Harman Chaudhry et al., 2021; Anna Cox et al., 2017; M. F. De La Cruz Monroy & A. Mosahebi, 2019; Greenhalgh & Shaw, 2017; Ingemann et al., 2020; Lauren Jones & Carol Grech, 2016; Clare Liddy et al., 2016; Deborah Morrison et al., 2014; O’Keefe et al., 2021; Ramya Sita Palacholla et al., 2019; Kristin L Rising et al., 2018; Helen Slater et al., 2017; Swanepoel & Hall III, 2010; Rachael C Walker et al., 2019) |
|  | Health care service use | 8 (18) | * Duration of consultations * Number of hospitals, primary care, and emergency department visits * Hospital admissions * Hospitalization * Proportion of referrals | (Tina Lien Barken et al., 2019; M. F. De La Cruz Monroy & A. Mosahebi, 2019; Greenhalgh & Shaw, 2017; Lauren Jones & Carol Grech, 2016; A.-C. L. Leonardsen et al., 2020; Clare Liddy et al., 2016; Deborah Morrison et al., 2014; Ramya Sita Palacholla et al., 2019) |

aDHI: digital health intervention.

**Table 7. Study designs for evaluating the digital patient experience.**

| **Study designs** | | **Studies, n (%)** | **References** |
| --- | --- | --- | --- |
| **Mode of inquiry (n=36, 80%)** | | | |
|  | Qualitative research   * Phenomenology * Ethnography | 35 (78) | (Ames et al., 2019; Barello et al., 2016; Tina Lien Barken et al., 2019; Nazli Bashi et al., 2020; Amberly Brigden et al., 2020; Brunton et al., 2015; Harman Chaudhry et al., 2021; Anna Cox et al., 2017; M. F. De La Cruz Monroy & A. Mosahebi, 2019; Eze et al., 2020; Jacqueline Susan Feather et al., 2016; Joseph Firth & John Torous, 2015; Greenhalgh & Shaw, 2017; Ingemann et al., 2020; Sakib Jalil et al., 2015; Lauren Jones & Carol Grech, 2016; Emily G Lattie et al., 2019; Christopher Lemon et al., 2020; A.-C. L. Leonardsen et al., 2020; Clare Liddy et al., 2016; Siew Lim et al., 2019; Guillermo Molina-Recio et al., 2020; Deborah Morrison et al., 2014; Katherine Morton et al., 2017; Ramya Sita Palacholla et al., 2019; Kristin L Rising et al., 2018; Dawn K Sakaguchi-Tang et al., 2017; Helen Slater et al., 2017; Søgaard Neilsen & Wilson, 2019; Simen A Steindal et al., 2020; Randi Stokke, 2016; Swanepoel & Hall III, 2010; Rachael C Walker et al., 2019; Yanxia Wei et al., 2020; Linda MP Wesselman et al., 2019) |
|  | Quantitative research | 21 (47) | (Nazli Bashi et al., 2020; Brunton et al., 2015; Harman Chaudhry et al., 2021; Eze et al., 2020; Jacqueline Susan Feather et al., 2016; Joseph Firth & John Torous, 2015; Greenhalgh & Shaw, 2017; Ingemann et al., 2020; Lauren Jones & Carol Grech, 2016; Christopher Lemon et al., 2020; A.-C. L. Leonardsen et al., 2020; Clare Liddy et al., 2016; Siew Lim et al., 2019; Guillermo Molina-Recio et al., 2020; Deborah Morrison et al., 2014; Ramya Sita Palacholla et al., 2019; Dawn K Sakaguchi-Tang et al., 2017; Søgaard Neilsen & Wilson, 2019; Simen A Steindal et al., 2020; Randi Stokke, 2016; Yanxia Wei et al., 2020) |
|  | Mixed methods research (and multiple methods research) | 17 (38) | (Ames et al., 2019; Brunton et al., 2015; Jacqueline Susan Feather et al., 2016; Greenhalgh & Shaw, 2017; Ingemann et al., 2020; Lauren Jones & Carol Grech, 2016; Christopher Lemon et al., 2020; A.-C. L. Leonardsen et al., 2020; Clare Liddy et al., 2016; Siew Lim et al., 2019; Katherine Morton et al., 2017; O’Keefe et al., 2021; Dawn K Sakaguchi-Tang et al., 2017; Helen Slater et al., 2017; Simen A Steindal et al., 2020; Randi Stokke, 2016; Yanxia Wei et al., 2020) |
| **Nature of the investigation (n=33, 73%)** | | | |
|  | Experimental research   * Randomized controlled trials * Nonrandomized trials | 25 (56) | (Ames et al., 2019; Barello et al., 2016; Nazli Bashi et al., 2020; Amberly Brigden et al., 2020; Brunton et al., 2015; Harman Chaudhry et al., 2021; Wonchan Choi et al., 2020; M. F. De La Cruz Monroy & A. Mosahebi, 2019; Eze et al., 2020; Jacqueline Susan Feather et al., 2016; Greenhalgh & Shaw, 2017; Lauren Jones & Carol Grech, 2016; Kuijpers et al., 2013; Emily G Lattie et al., 2019; A.-C. L. Leonardsen et al., 2020; Clare Liddy et al., 2016; Deborah Morrison et al., 2014; Katherine Morton et al., 2017; O’Keefe et al., 2021; Ramya Sita Palacholla et al., 2019; Esther Rincon et al., 2017; Kristin L Rising et al., 2018; Søgaard Neilsen & Wilson, 2019; Simen A Steindal et al., 2020; Randi Stokke, 2016; Swanepoel & Hall III, 2010) |
|  | Observational research | 9 (20) | (Ames et al., 2019; Brunton et al., 2015; Wonchan Choi et al., 2020; Greenhalgh & Shaw, 2017; Lauren Jones & Carol Grech, 2016; Kuijpers et al., 2013; Clare Liddy et al., 2016; Siew Lim et al., 2019; Swanepoel & Hall III, 2010) |
|  | Descriptive research   * Case reports * Case series * Cross-sectional | 7 (16) | (Joseph Firth & John Torous, 2015; Clare Liddy et al., 2016; Dawn K Sakaguchi-Tang et al., 2017; Helen Slater et al., 2017; Simen A Steindal et al., 2020; Swanepoel & Hall III, 2010; Yanxia Wei et al., 2020) |
|  | Analytical research   * Case control * Cohort | 6 (13) | (Wonchan Choi et al., 2020; Greenhalgh & Shaw, 2017; Clare Liddy et al., 2016; Dawn K Sakaguchi-Tang et al., 2017; Simen A Steindal et al., 2020; Werder, 2015) |
| **Number of contacts (n=21, 47%)** | | | |
|  | Cross-sectional | 8 (18) | (Joseph Firth & John Torous, 2015; Clare Liddy et al., 2016; Dawn K Sakaguchi-Tang et al., 2017; Helen Slater et al., 2017; Swanepoel & Hall III, 2010; Yanxia Wei et al., 2020) |
|  | Longitudinal | 6 (13) | (Kei Long Cheung et al., 2019; A.-C. L. Leonardsen et al., 2020; Dawn K Sakaguchi-Tang et al., 2017; Simen A Steindal et al., 2020; Randi Stokke, 2016; Rachael C Walker et al., 2019) |
|  | Before and after | 4 (9) | (Amberly Brigden et al., 2020; Wonchan Choi et al., 2020; M. F. De La Cruz Monroy & A. Mosahebi, 2019; Jacqueline Susan Feather et al., 2016; Fouquet & Miranda, 2020; Emily G Lattie et al., 2019; A.-C. L. Leonardsen et al., 2020; Deborah Morrison et al., 2014; O’Keefe et al., 2021; Ramya Sita Palacholla et al., 2019; Simen A Steindal et al., 2020; Swanepoel & Hall III, 2010; Linda MP Wesselman et al., 2019) |
| **Reference period (n=10, 22%)** | | | |
|  | Prospective | 8 (18) | (Wonchan Choi et al., 2020; M. F. De La Cruz Monroy & A. Mosahebi, 2019; A.-C. L. Leonardsen et al., 2020; Clare Liddy et al., 2016; Esther Rincon et al., 2017; Simen A Steindal et al., 2020; Swanepoel & Hall III, 2010; Werder, 2015) |
|  | Retrospective | 4 (9) | (Wonchan Choi et al., 2020; Clare Liddy et al., 2016; Helen Slater et al., 2017; Randi Stokke, 2016) |
| **Research through design (n=4, 9%)** | | | |
|  | User research | 3 (7) | (Wonchan Choi et al., 2020; Fouquet & Miranda, 2020; Dawn K Sakaguchi-Tang et al., 2017) |
|  | Participatory design or contextual design | 1 (2) | (Sakib Jalil et al., 2015) |
|  | Design sessions | 1 (2) | (Dawn K Sakaguchi-Tang et al., 2017) |

**Table 8. Data collection methods of evaluating the digital patient experience.**

| Data collection methods | Studies, n (%) | References |
| --- | --- | --- |
| Questionnaires | 33 (73) | (Ames et al., 2019; Barello et al., 2016; Tina Lien Barken et al., 2019; Nazli Bashi et al., 2020; Amberly Brigden et al., 2020; Brunton et al., 2015; Kei Long Cheung et al., 2019; M. F. De La Cruz Monroy & A. Mosahebi, 2019; Jacqueline Susan Feather et al., 2016; Fouquet & Miranda, 2020; Ingemann et al., 2020; Sakib Jalil et al., 2015; Lauren Jones & Carol Grech, 2016; Kuijpers et al., 2013; Emily G Lattie et al., 2019; Christopher Lemon et al., 2020; A.-C. L. Leonardsen et al., 2020; Clare Liddy et al., 2016; Siew Lim et al., 2019; Guillermo Molina-Recio et al., 2020; Deborah Morrison et al., 2014; Ramya Sita Palacholla et al., 2019; Esther Rincon et al., 2017; Kristin L Rising et al., 2018; Dawn K Sakaguchi-Tang et al., 2017; Helen Slater et al., 2017; Søgaard Neilsen & Wilson, 2019; Simen A Steindal et al., 2020; Randi Stokke, 2016; Swanepoel & Hall III, 2010; Yanxia Wei et al., 2020; Linda MP Wesselman et al., 2019) |
| Surveys | 32 (71) | (Ames et al., 2019; Nazli Bashi et al., 2020; Amberly Brigden et al., 2020; Kei Long Cheung et al., 2019; Anna Cox et al., 2017; M. F. De La Cruz Monroy & A. Mosahebi, 2019; Jacqueline Susan Feather et al., 2016; Joseph Firth & John Torous, 2015; Fouquet & Miranda, 2020; Ingemann et al., 2020; Sakib Jalil et al., 2015; Lauren Jones & Carol Grech, 2016; Emily G Lattie et al., 2019; Christopher Lemon et al., 2020; A.-C. L. Leonardsen et al., 2020; Clare Liddy et al., 2016; Siew Lim et al., 2019; Mukhtiar Memon et al., 2014; Guillermo Molina-Recio et al., 2020; Deborah Morrison et al., 2014; O’Keefe et al., 2021; Ramya Sita Palacholla et al., 2019; Esther Rincon et al., 2017; Kristin L Rising et al., 2018; Dawn K Sakaguchi-Tang et al., 2017; Søgaard Neilsen & Wilson, 2019; Simen A Steindal et al., 2020; Randi Stokke, 2016; Swanepoel & Hall III, 2010; Yanxia Wei et al., 2020; Werder, 2015; Linda MP Wesselman et al., 2019) |
| Interviews | 31 (69) | (Ames et al., 2019; Barello et al., 2016; Tina Lien Barken et al., 2019; Amberly Brigden et al., 2020; Brunton et al., 2015; Wonchan Choi et al., 2020; Anna Cox et al., 2017; M. F. De La Cruz Monroy & A. Mosahebi, 2019; Jacqueline Susan Feather et al., 2016; Fouquet & Miranda, 2020; Ingemann et al., 2020; Sakib Jalil et al., 2015; Lauren Jones & Carol Grech, 2016; Kuijpers et al., 2013; Emily G Lattie et al., 2019; Christopher Lemon et al., 2020; A.-C. L. Leonardsen et al., 2020; Clare Liddy et al., 2016; Siew Lim et al., 2019; Mukhtiar Memon et al., 2014; Guillermo Molina-Recio et al., 2020; Katherine Morton et al., 2017; Dawn K Sakaguchi-Tang et al., 2017; Helen Slater et al., 2017; Søgaard Neilsen & Wilson, 2019; Simen A Steindal et al., 2020; Randi Stokke, 2016; Swanepoel & Hall III, 2010; Rachael C Walker et al., 2019; Yanxia Wei et al., 2020; Linda MP Wesselman et al., 2019) |
| Focus groups | 19 (42) | (Ames et al., 2019; Nazli Bashi et al., 2020; Amberly Brigden et al., 2020; Brunton et al., 2015; Wonchan Choi et al., 2020; M. F. De La Cruz Monroy & A. Mosahebi, 2019; Fouquet & Miranda, 2020; Ingemann et al., 2020; Lauren Jones & Carol Grech, 2016; Siew Lim et al., 2019; Guillermo Molina-Recio et al., 2020; Katherine Morton et al., 2017; O’Keefe et al., 2021; Dawn K Sakaguchi-Tang et al., 2017; Helen Slater et al., 2017; Søgaard Neilsen & Wilson, 2019; Randi Stokke, 2016; Rachael C Walker et al., 2019; Yanxia Wei et al., 2020) |
| Observations | 17 (38) | (Ames et al., 2019; Brunton et al., 2015; Wonchan Choi et al., 2020; Fouquet & Miranda, 2020; Greenhalgh & Shaw, 2017; Ingemann et al., 2020; Sakib Jalil et al., 2015; Lauren Jones & Carol Grech, 2016; Kuijpers et al., 2013; Clare Liddy et al., 2016; Siew Lim et al., 2019; Guillermo Molina-Recio et al., 2020; Katherine Morton et al., 2017; Dawn K Sakaguchi-Tang et al., 2017; Simen A Steindal et al., 2020; Swanepoel & Hall III, 2010; Rachael C Walker et al., 2019) |
| Log data | 13 (29) | (M. F. De La Cruz Monroy & A. Mosahebi, 2019; Joseph Firth & John Torous, 2015; Sakib Jalil et al., 2015; Kuijpers et al., 2013; Christopher Lemon et al., 2020; Mukhtiar Memon et al., 2014; Deborah Morrison et al., 2014; Dawn K Sakaguchi-Tang et al., 2017; Søgaard Neilsen & Wilson, 2019; Simen A Steindal et al., 2020; Randi Stokke, 2016; Swanepoel & Hall III, 2010; Rachael C Walker et al., 2019) |
| Open-ended questions | 10 (22) | (Ames et al., 2019; Barello et al., 2016; Amberly Brigden et al., 2020; Anna Cox et al., 2017; Jacqueline Susan Feather et al., 2016; A.-C. L. Leonardsen et al., 2020; Siew Lim et al., 2019; Guillermo Molina-Recio et al., 2020; Helen Slater et al., 2017; Linda MP Wesselman et al., 2019) |
| Likert scales | 10 (22) | (Nazli Bashi et al., 2020; Kei Long Cheung et al., 2019; Jacqueline Susan Feather et al., 2016; Kuijpers et al., 2013; Emily G Lattie et al., 2019; Clare Liddy et al., 2016; Guillermo Molina-Recio et al., 2020; Esther Rincon et al., 2017; Simen A Steindal et al., 2020; Linda MP Wesselman et al., 2019) |
| Usability testing | 8 (18) | (Wonchan Choi et al., 2020; M. F. De La Cruz Monroy & A. Mosahebi, 2019; Jacqueline Susan Feather et al., 2016; Emily G Lattie et al., 2019; Guillermo Molina-Recio et al., 2020; Ramya Sita Palacholla et al., 2019; Søgaard Neilsen & Wilson, 2019; Gaby Anne Wildenbos et al., 2018) |
| Diaries | 6 (13) | (Ames et al., 2019; Jacqueline Susan Feather et al., 2016; Deborah Morrison et al., 2014; Dawn K Sakaguchi-Tang et al., 2017; Rachael C Walker et al., 2019; Yanxia Wei et al., 2020) |
| Contextual inquiry | 5 (11) | (Ames et al., 2019; Jacqueline Susan Feather et al., 2016; Fouquet & Miranda, 2020; Sakib Jalil et al., 2015; Helen Slater et al., 2017) |
| Needs assessment | 5 (11) | (Anna Cox et al., 2017; Jacqueline Susan Feather et al., 2016; Fouquet & Miranda, 2020; Emily G Lattie et al., 2019; Søgaard Neilsen & Wilson, 2019) |
| Performance tests | 5 (11) | (Wonchan Choi et al., 2020; Kuijpers et al., 2013; Christopher Lemon et al., 2020; Swanepoel & Hall III, 2010; Linda MP Wesselman et al., 2019) |
| Field notes | 4 (9) | (Brunton et al., 2015; Sakib Jalil et al., 2015; Helen Slater et al., 2017; Rachael C Walker et al., 2019) |
| Workshops | 4 (9) | (Emily G Lattie et al., 2019; Guillermo Molina-Recio et al., 2020; Søgaard Neilsen & Wilson, 2019; Yanxia Wei et al., 2020) |
| Forms | 3 (7) | (Jacqueline Susan Feather et al., 2016; Emily G Lattie et al., 2019; Swanepoel & Hall III, 2010) |
| Think-aloud method | 3 (7) | (Jacqueline Susan Feather et al., 2016; Sakib Jalil et al., 2015; Yanxia Wei et al., 2020) |
| Benchmark testing | 2 (4) | (Fouquet & Miranda, 2020; Christopher Lemon et al., 2020) |
| Human impact assessment methodologies | 1 (2) | (Randi Stokke, 2016) |
| Personas | 1 (2) | (Fouquet & Miranda, 2020) |

**Table 9. Data analysis approaches of evaluating the digital patient experience.**

| **Data analysis approaches** | **Studies, n (%)** | **References** |
| --- | --- | --- |
| Statistical analysis | 15 (33) | (Barello et al., 2016; Amberly Brigden et al., 2020; Harman Chaudhry et al., 2021; Wonchan Choi et al., 2020; Eze et al., 2020; Joseph Firth & John Torous, 2015; Lauren Jones & Carol Grech, 2016; Kuijpers et al., 2013; Emily G Lattie et al., 2019; Christopher Lemon et al., 2020; Clare Liddy et al., 2016; Deborah Morrison et al., 2014; Simen A Steindal et al., 2020; Swanepoel & Hall III, 2010; Linda MP Wesselman et al., 2019) |
| Thematic analysis | 11 (24) | (Ames et al., 2019; Tina Lien Barken et al., 2019; Brunton et al., 2015; Anna Cox et al., 2017; Greenhalgh & Shaw, 2017; Sakib Jalil et al., 2015; Lauren Jones & Carol Grech, 2016; Christopher Lemon et al., 2020; Helen Slater et al., 2017; Randi Stokke, 2016; Rachael C Walker et al., 2019) |
| Content analysis | 9 (20) | (Ames et al., 2019; Tina Lien Barken et al., 2019; Anna Cox et al., 2017; Jacqueline Susan Feather et al., 2016; Lauren Jones & Carol Grech, 2016; Siew Lim et al., 2019; O’Keefe et al., 2021; Helen Slater et al., 2017; Rachael C Walker et al., 2019) |
| Grounded theory | 7 (16) | (Ames et al., 2019; Tina Lien Barken et al., 2019; Brunton et al., 2015; Jacqueline Susan Feather et al., 2016; Christopher Lemon et al., 2020; Helen Slater et al., 2017; Rachael C Walker et al., 2019) |
| Framework analysis | 5 (11) | (Ames et al., 2019; Tina Lien Barken et al., 2019; Brunton et al., 2015; Helen Slater et al., 2017; Rachael C Walker et al., 2019) |
| Heuristic analysis | 4 (9) | (Ames et al., 2019; Fouquet & Miranda, 2020; Christopher Lemon et al., 2020; Guillermo Molina-Recio et al., 2020) |
| Cost analysis | 4 (9) | (Eze et al., 2020; Greenhalgh & Shaw, 2017; Clare Liddy et al., 2016; O’Keefe et al., 2021) |
| Task analysis | 3 (7) | (Fouquet & Miranda, 2020; Christopher Lemon et al., 2020; Søgaard Neilsen & Wilson, 2019) |
| Text analysis | 2 (4) | (Tina Lien Barken et al., 2019; Ingemann et al., 2020) |
| Document analysis | 2 (4) | (Ames et al., 2019; Simen A Steindal et al., 2020) |
| Failure analysis | 2 (4) | (Fouquet & Miranda, 2020; Søgaard Neilsen & Wilson, 2019) |
| Inductive analysis | 2 (4) | (Helen Slater et al., 2017; Rachael C Walker et al., 2019) |
| Deductive analysis | 1 (2) | (Helen Slater et al., 2017) |
| Formal analysis | 1 (2) | (Mukhtiar Memon et al., 2014) |
| Decision analytic approach | 1 (2) | (Clare Liddy et al., 2016) |