Patient Acceptance to Valuing Digital Technologies – A Discrete Choice Experiment

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Background

Digital technologies are increasingly used in healthcare to fulfill patients' unmet needs on their patient journey. However, little is known about patients' acceptance toward these innovations.

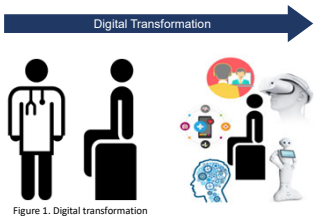


Figure 1. Digital transformation

Study Rationale

Successful implementation of digital technologies depends on **patients' acceptance**. **Patient preference information (PPI)** are assessments of relative desirability or acceptability to patients, of criteria that differ among alternative health states, health interventions, or health services. Besides expected clinical success, technical aspects impact acceptance.

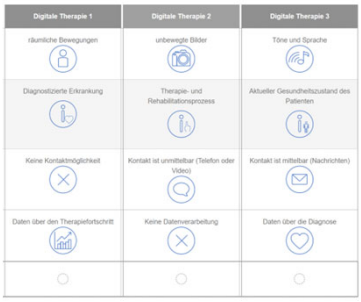
Methods

A discrete choice experiment was conducted with **seven attributes** identified in literature and formative qualitative research. **6 choice tasks** were defined as forced choices with non-labeled objectives. We used **a ranking task in a best-second-best format**. A **partial profile** was selected. **Experimental design** (Software: Sawtooth & Ngene) is a fractional-factorial efficient Bayesian design (D-error). **Two populations** were included: (1) stroke patients (experimental group); (2) general population (control group).

Table 1. Descriptive Framework

Attributes	Levels
Explanation and presentation of therapy exercises	Sounds and speech / Descriptive texts / Images / Videos / Multi-dimensional movements
Information in therapy	No information / Therapy and rehabilitation process / Diagnosed disease / Patient's current health status / Change in health status due to therapy
Contact with healthcare professionals	No contact / contact is indirect (messages) / contact is direct (telephone or video)
Patients' choice in the therapy process	No influence / Selection of therapy exercise with a certain degree of severity / Pace of therapy exercise / Time of therapy (frequency, duration, start) / Place of therapy (e.g., home, clinic, practice)
Data processing	No data processing / Processing of data about the person / Processing of data about the diagnosis / Processing of data about the progress of the therapy
Co-payment per month	80€ per month / 60€ per month / 40€ per month / 20€ per month / No co-payment
Therapy success within 6 months	60 out of 100 patients / 70 out of 100 patients / 80 out of 100 patients / 90 out of 100 patients / 100 out of 100 patients [achieving their therapy goals]

Figure 2. Example Choice Task



Results

We have a total of **1259 completes**. In **experimental group 165 participants** completed the questionnaire. In the **control group 1094 participants** completed the questionnaire. We calculated a conditional logit model (validity check) and **mixed logit model (mean preferences)**.

In total, **relative importance** of ***therapy success*** (60%, coef: -1.45; 100%, coef: 1.47) was rated as most important, followed by ***copayment*** (0€, coef: 0.86; 80€, coef: -0.96) and ***contact with professionals*** (no contact, coef: -0.81; direct contact, coef: 0.54). **Standard deviations** from mixed logit model show significant differences in preferences and indicate **heterogeneity**.

Differences in standard deviations of ***explanation and presentation of the therapy exercises*** indicates different needs due to gain points. Options of participation (***patients' choice in therapy process***), ***information in therapy process*** and ***data processing*** are accepted by patients. Little to no utility differences are observed between the levels, but the non-existence of the options is clearly rejected. The value results from goal attainment, communication, and flexibility (location).

Figure 3. Mean preferences (relative utilities) from mixed logit model with SDs, all N = 1259 completes

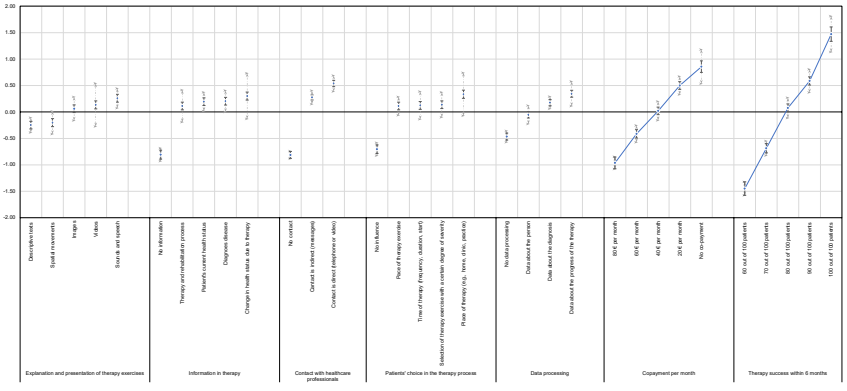
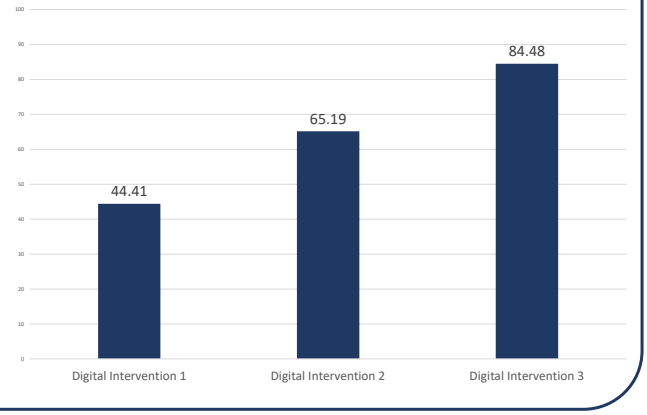


Table 2 – Alternative digital interventions

Attributes	*Digital Intervention 1: Prototype*	*Digital Intervention 2: Further Development*	*Digital Intervention 3: Comparator*
Explanation and Presentation of Therapy Exercise	Sounds and speech	Sounds and speech	Videos
Information in Therapy	Therapy and rehabilitation process	Therapy and rehabilitation process	Change in health status due to therapy
Contact to Healthcare Professional	No contact	No contact	Contact is indirect
Patients Choice in Therapy Process	No influence	Time of therapy	Place of therapy
Data Processing	No data processing	Progress of the therapy	Progress of the therapy
Therapy Success	90 out of 100 patients	90 out of 100 patients	90 out of 100 patients

Figure 4 – Uptake probability of three alternative digital interventions, in %



Discussion

Humanoid robots, digital health apps or telemedical technologies among others can help to provide patients with care that is tailored to their needs and preferences. In the development, implementation and provision of these innovations, decision-makers are often faced with complex decisions in order to promote patient-centered care. Analyzing preferences and deriving information about patient acceptance can inform these decision-making processes.

References: Available upon request.

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Institutional Review Board Statement: The study was conducted according to the Declaration of Helsinki, the BDSG (Deutsches Bundesdatenschutzgesetz, the German Data Protection Act), the EU privacy policy, Guideline on Good Clinical Practice (CPM/ICH/135/95) regarding the obligation to report serious adverse events (SAEs) and approved by the Ethics Committee at Hochschule Neubrandenburg (HSNB/177/21).