Exploration of the Acceptability of Eforto® in Acute Geriatric Healthcare at ZGT Almelo

MSc. Health Sciences

Faculty of Science and Technology

Universiteit Twente

C.E. van Rijswijk

Graduation Committee

dr. A. van Dongen	University of Twente
K.A. Ramsey, PhD	University of Twente
R.E.M. Bekhuis, MSc	Ziekenhuisgroep Twente

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UNIVERSITY OF TWENTE.

Abstract

Background

The world population is rapidly ageing, which leads to challenges in the healthcare system. Elderly people are more likely to end up in the hospital after a trauma has occurred. To assess the rehabilitation capacity of a geriatric patient, the intrinsic capacity (IC) can be used to determine a person's physical and mental abilities. The vitality IC can be measured through the grip work (GW) of a patient. The Eforto® is a handgrip monitoring device that can measure this GW. Currently, the Eforto® has not been implemented into the geriatric hospital care. The aim of this study is to explore the acceptability of the Eforto® in acute geriatric healthcare at Ziekenhuis groep Twente in Almelo and to gain a deeper understanding of health care professionals' perceptions regarding its use using the UTAUT model.

Method

An exploratory qualitative study has been conducted, consisting of two sub-studies. The first sub-study consisted of twelve interviews with health care professionals from the acute geriatric care departments Cardiology, Intensive Care Unit and Geriatrics. The second sub-study consisted of a focus group with six participants and two in-depth interviews which included participants from the same departments as sub-study 1 with an addition of the Centre for Geriatric Traumatology. The sessions were recorded and transcribed. For the data analyses, the transcriptions were coded according to a deductive analysis using the UTAUT constructs.

Results

The participants of both sub-studies anticipated three potential benefits of using Eforto® in the acute geriatric healthcare: gaining insight into the patient's intrinsic capacity, monitoring the patient's progress, and predicting the patient's capacity and progression. The participants did not anticipate that Eforto® would reduce their decision-making time, but rather that it would help objectify their observations. The participants of both sub-studies agreed that the Eforto® tests should be performed by the physiotherapist or the nurse. There was no definitive answer about the number of tests that should be taken during a hospital stay. According to the participants, some support from colleagues was appreciated yet not necessary to adopt the Eforto®. An exception on this was the head of the department, because they influence the choice for implementing new medical technologies. For the facilitating conditions, it was important that there would be technical support available, an automatic connection is made to the electronic health records of the patient to store the measurements and an in-person education to learn about the working of the Eforto®.

Conclusion

In conclusion, this study demonstrates the acceptability of the Eforto® in acute geriatric care according to the health care professionals based on the UTAUT constructs. The results show the possible benefits and barriers expected and could be used for further research into implementing the Eforto®.

Contents

1. Introduction

The world population and the age distribution among her habitants are rapidly changing [1]. According to the World Health Organization (WHO), 1 in 6 people will be age 60 years or older by 2030. At the same time, life expectancies are predicted to rise to a mean age of 83 around 2040 [2]. The aging of the population creates a challenge for the healthcare system and its costs [3,4]. Older patients aged 65 and above are associated with a higher risk of hospital admission and a more extended hospital stay. In the Netherlands in 2022, around 50% of the trauma patients admitted to the hospital were 70 years or older [5]. When compared to the younger population, the elderly population stays longer in the hospital and requires more resources after discharge from the hospital with trauma injuries [6].

Frailty and the existence of comorbidities in the elderly contribute to rising healthcare costs as well [4]. Frailty is a common condition associated with aging and characterized by a decline in functioning [7]. An elderly frail person can have a decline in physiological functions and is less resistant to stressors [8–10]. An example of a stressor may be a trauma such as a bike accident or fall. The prevalence of frailty in the geriatric hospital population can range from 18% to 40% of the patients [11]. Besides that, 89% of the elderly trauma patients in 2016 who were admitted to the hospital had comorbidities [12]. The existence of comorbidities is also associated with an increase in hospital visits and an increase in hospital costs [13,14].

After an acute stressor occurs, the elderly must recover to their functional state prior to the stressor happened [15]. Geriatric rehabilitation focuses on optimizing individuals' abilities and well-being [16]. Geriatric rehabilitation faces some challenges, as a study shows that only 80% of the patients in the Netherlands will return home after being discharged from the rehabilitation facility [14]. For the other 20%, the study shows that it can be challenging to determine the correct rehabilitation path during or after their hospital stay [17]. As functional decline progresses, more organized techniques should be used to customize the appropriate rehabilitative therapies based on the functional capacity after a stressor of elderly patients [18].

1.1 Physical resilience

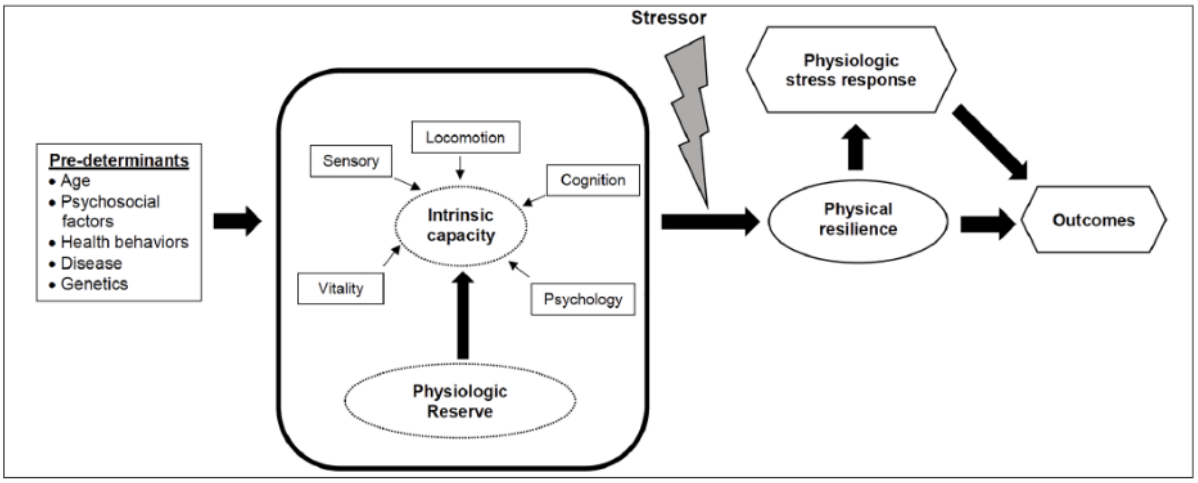
The challenges in geriatric healthcare led to the WHO advocating for the focus on healthy aging, enabling people to maintain mental and physical health, quality of life, and independence [19–21]. An important yet relatively new concept related to maintaining function for healthy ageing as elderly, is the physical resilience [15]. The physical resilience (PR) is the “ability to withstand or resist decline from stressors” [21]. For example, these stressors can be acute or chronic illnesses, injuries, or surgery [22]. The PR can be influenced by pre-determinants, such as age and environment [21]. These pre-determinants can caption a baseline for individual resilience without any stressors. Besides the pre-determinants, the PR focuses on an individual's functional recovery after a stressor.

The difference between frailty and PR is the time of occurrence [23]. Frailty is focused on the decline of functioning in the elderly, whereas the PR of an individual results in a degree of recovery after a stressor, which can range from complete recovery to death [21,24]. When there is an insight into the PR of an individual, health care professionals can determine a personalized rehabilitation plan to improve the outcome after a stressor [23]. For the elderly, a comprehensive geriatric assessment is currently performed to declare the capacities of the individual [25]. This assessment consists of eight domains ranging from cognition to mobility and malnutrition and consists of physical tests and the individual answering questions, which can lead to limited reliability due to the subjective nature where patients overestimate their abilities [26–28]. An objective measurement tool could support insight into an individual's PR and functional rehabilitation for a better reliability [21].

1.2 Intrinsic capacity

To determine an individual's capacity, the WHO introduced the term intrinsic capacity (IC), which has been defined as "the composite of all the physical and mental capacities of an individual" [29,30]. IC is a determinant of PR and can determine a person's functional ability, as can be seen in Figure 1 [31,32]. The IC is focused on the functional abilities of an individual that are still possible and can be measured over an extended period [21,33]. The IC is also not an individual's fixed value but can be improved after a stressor [34]. Therefore, measurements of the IC can provide information to develop rehabilitative interventions and give insight into these interventions' impact on the individual [32,34].

Figure 1. Relation between Intrinsic Capacity and Physical Resilience with the Pre-Determinants of Physical Resilience



Source: Chhetri et al [21]

The IC of a patient can be evaluated in five domains based on the International Classification of Functioning, Disability, and Health framework [35]. The five domains are locomotion, cognition, vitality, psychological, and sensory capacities. Assessments are possible for each of these domains, such as the chair rise test (locomotion), weight loss measurements (vitality), and memory tests (cognition) [21]. Together with the physiologic reserve of someone, these domains determine the IC and is therefore a measure of a patient's PR.

1.3 Grip work

The measurement of the vitality domain of IC can be done by measuring the grip work of a patient [36]. The grip work (GW) is a parameter that includes an individual's grip strength and fatigue resistance [37]. Calculating grip work provides insight into muscle endurance.

Handgrip strength has often been used for screening muscle weakness and can be seen as an indicator of overall strength capacity and the ability to rehabilitate [37–41]. The grip strength (GS) is predictive for determining a deterioration in an adult's physical and mental capacity [42]. An example is the studies that have shown that elderly individuals with lower GS after a hip fracture and surgery had a higher disability and mortality rate [43,44]. A minimum level of muscle strength is necessary to perform daily tasks, where muscle strength loss is the most critical determinant of physical function deterioration [45]. It is known that a natural deterioration of GS will occur throughout the years, as shown in Figure 2 [46].

Figure 2. Deterioration in Absolute Grip Strength (kilogram)

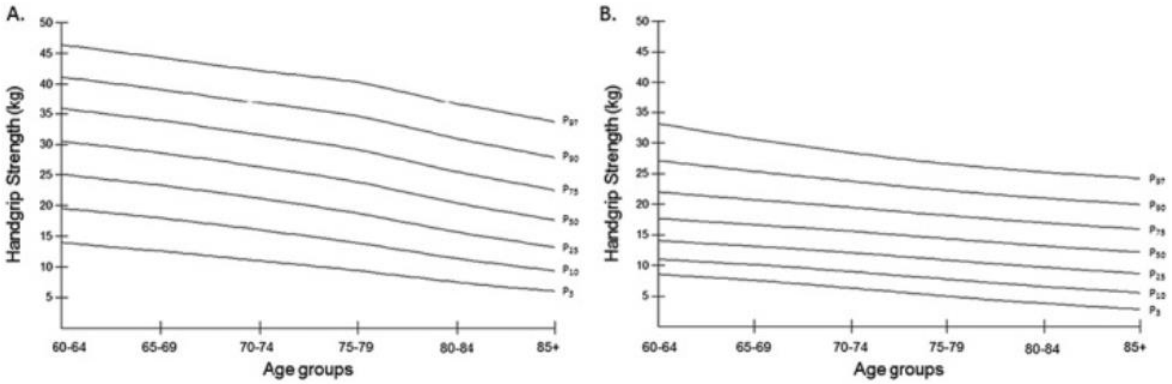


Figure 2.A shows the deterioration in absolute grip strength for men in Colombia of the age of 60. Figure 2.B shows the deterioration in absolute grip strength for women in Colombia of the age of 60. Source: Ramírez-Vélez et al [42]

Currently, there are no reference value that determine a "healthy" GS [47]. Research has been done into different backgrounds that may influence the median GS, such as gender, ethnicity, or socioeconomic status. However, the values for the median GS differ hugely [46–50]. An example is the difference between countries where China has a mean age-adjusted GS among 50+ elderly of 28,5 kg and South Africa with a mean GS of 40,9 kg [47]. Another example of the same research is in Russia, which has a mean GS of 30,9 kg with a mean GS man of 41,5 kg and a mean GS woman of 25,4 kg.

Besides the GS, the GW also takes the fatigue resistance of the muscles into account. Muscle fatigue is defined as "a decline in the capacity of the muscle to generate force" [51]. It is possible to measure muscle fatigue by assessing fatigue resistance. This fatigue resistance is the time that an individual can hold a minimum of 50% of their GS [37]. This combination makes the GW parameter an important indicator of IC in the vitality domain [21,52].

1.4 State of the art

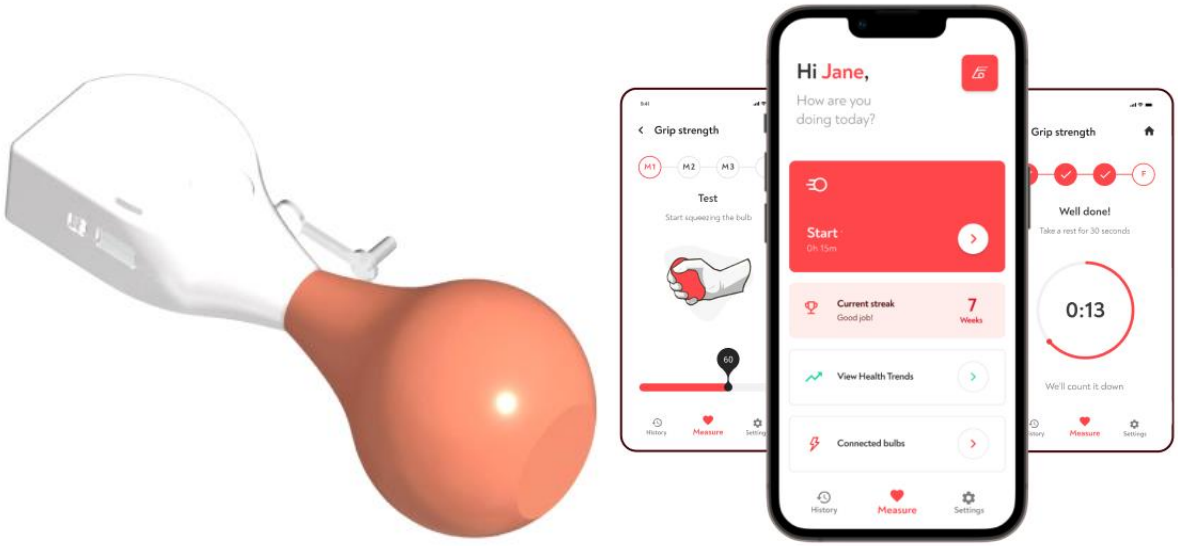
The current golden standard for measuring the GS is the JAMAR-Dynamometer, whereas for geriatric patients the standard is the Martin Vigorimeter [53–55]. These devices both measure the maximum GS (GS_{max}) but cannot be self-administered and are mostly analog devices [56]. Both of these devices do not take muscle endurance into account and, therefore, do not measure GW.

1.4.1 Eforto®

The Eforto® is a pneumatic handgrip monitoring system that can be independently used by an adult [57]. The device consists of a rubber bulb connected to a housing for an analog Honeywell TruStability HSCMANN100PGAA3 gauge-type pressure sensor [56]. The measured values are transmitted via Bluetooth to the Eforto® application on a smartphone. In Figure 3, the Eforto® device and application can be seen. The application consists of a professional and a self-test mode. During the professional modus, the test assessor will provide the patient with instructions on carrying out the test during the multiple steps. The assessors can also encourage the patient during the measurement while live viewing the measured GS of the patient on the smartphone. The self-test mode gives the responsibility for reading the intention of the test by the patient self. They will follow the process alone and cannot view their measured strength during the test themselves. After the test, the patients are shown an overview of the achieved results during their measurement. The plan is to save the measurements to

the electronic health record of the patient, which can lead to insights into the progression or deterioration of the patient's GS.

Figure 3. The Eforto® Device (left) and the Eforto® Application on a Mobile Device (right)



Source: Eforto® [57]

The measurement consists of the two parts of GW: GSmax and endurance [56]. During the first part, the patient will squeeze the rubber bulb with their maximum strength for five seconds, with 30 seconds rest between each of the three measurements. The highest GS measured during these three moments is the new GSmax. The second part focuses on fatigue resistance, where the patient squeezes the rubber bulb with maximum strength for the longest period possible until the values drop below 50% of GSmax. A 30-second rest period is given to the patient between the first and second tests. This endurance test is a new addition to the golden standard of GS devices [56].

Currently, research has been conducted to determine the validity and reliability of Eforto® as an intervention in hospital healthcare [56]. At Ziekenhuisgroep Twente in Almelo (ZGT Almelo) in the Netherlands, the Eforto® has been implemented as a trial in the Centre for Geriatric Traumatology (CvGT) for the RESilience Hip fracture patients' study (RESHAPE). This study included participants who were 70 years or older and who were surgically treated for a hip fracture. Besides the RESHAPE study, two more studies are researching the validity of the Eforto® with different study populations. At Radboud University Medical Centre in Nijmegen, participants were included in the Bedside Resilience Registry (BRR) study when they were admitted to the geriatric ward and were 65 years or older. In the Vrije Universiteit Brussel and the Universitair Ziekenhuis Brussel, the BrUssels sTudy on The Early pRedictors of FraiLtY (BUTTERFLY) has been recruiting healthy older participants who were 80 years or older. Through the three different research populations, the validity of the Eforto® has been analyzed against the Martin Vigorimeter, the standard machine for measuring GS [56].

The RESHAPE study is being conducted at the CvGT department in ZGT Almelo. The study included participants who met the following criteria: age over 70 years old, have had surgery for a hip fracture without receiving a total hip replacement, do not have a pathological or periprosthetic fracture, do not

have severe cognitive impairment, and do not have a terminal illness with a limited life expectancy. Eligible patients were invited to participate in the study one day after surgery. Researchers conducted Eforto® tests on the participants twice a day during their hospital stay. The RESHAPE study has currently collected all the data and is working on the data analysis.

1.5 Research aim

Researchers at ZGT Almelo in CvGT are studying the impact of Eforto® in geriatric traumatology care. They specifically focus on its validity and predictive relationship between GW and IC. Once the validity and benefits of using Eforto® in geriatric trauma care have been established, the next step would be to integrate the device into the CvGT. Expanding the use of Eforto® to other departments at ZGT Almelo is also a possibility. However, it is unknown whether other departments are open to implementing Eforto® into their care pathways, as they have not been introduced to it.

Furthermore, there is no information about the potential use of Eforto® in departments with patient populations different from the population of CvGT. To gather this information, a study must be conducted in the other departments at ZGT Almelo. Understanding the acceptability and intention to use Eforto® can shed light on the opportunities and challenges for its potential adoption in different departments at ZGT Almelo. This study aims to explore the acceptability of Eforto® in geriatric healthcare at ZGT Almelo and to gain a deep understanding of health care professionals' perceptions regarding its use. This will attribute to determining the potential of implementing the Eforto® to measure the vitality intrinsic capacity in geriatric healthcare.

2. Theoretical framework

Both acceptability and acceptance among health care professionals are challenges and prerequisites for the successful implementation of the Eforto®. Achieving acceptability is a condition for the effectiveness of an intervention, but is not sufficient in itself [58,59]. Different definitions of acceptability and acceptance have been proposed. In this study, the acceptability of a technology is defined as “the mental representation that the possible user has of the tool before using the tool” [60]. Acceptance is “the perception of the technology after the first use” [61]. During this study, the focus will be on the acceptability of Eforto®, as the study population is generally unfamiliar with the device [60].

2.1 Technology acceptance models

The Unified Theory of Acceptance and Use of Technology (UTAUT) is a widely used technology acceptance model for understanding why users accept or reject a specific technology and can be used for acceptability studies [62,63]. The UTAUT model was designed based on eight existing acceptance models, namely the Theory of Reasoned Action, Technology Acceptance Model, Motivational Model, Theory of Planned Behaviour, Combined Technology Acceptance Model and Theory of Planned Behaviour, Model of PC Utilization, Innovation Diffusion Theory and the Social Cognitive Theory [64]. In assessing and analyzing those models, the literature identified important factors as predictors of technology adoption and usage behavior [64]. The theoretical model of UTAUT suggests that the actual use of the technology is predicted by one's behavioral intention, as seen in Figure 4 [62]. Behavioral intention is defined as "the user's intention that influences the technology usage behavior” [65]. It can also be seen as the indicator of the effort the user will devote to the technology usage. The use of user behaviour is “the intensity and frequency of consumers' use of the technology” [66]. How users utilize technology is significantly affected by how they perceive the system. The UTAUT model contains four key constructs influencing a person's behavioural intention and use behaviour. Three constructs directly influence behavioural intention: performance expectancy, effort expectancy and social influence [64]. One construct directly influences the use behavior, namely the facilitating conditions.

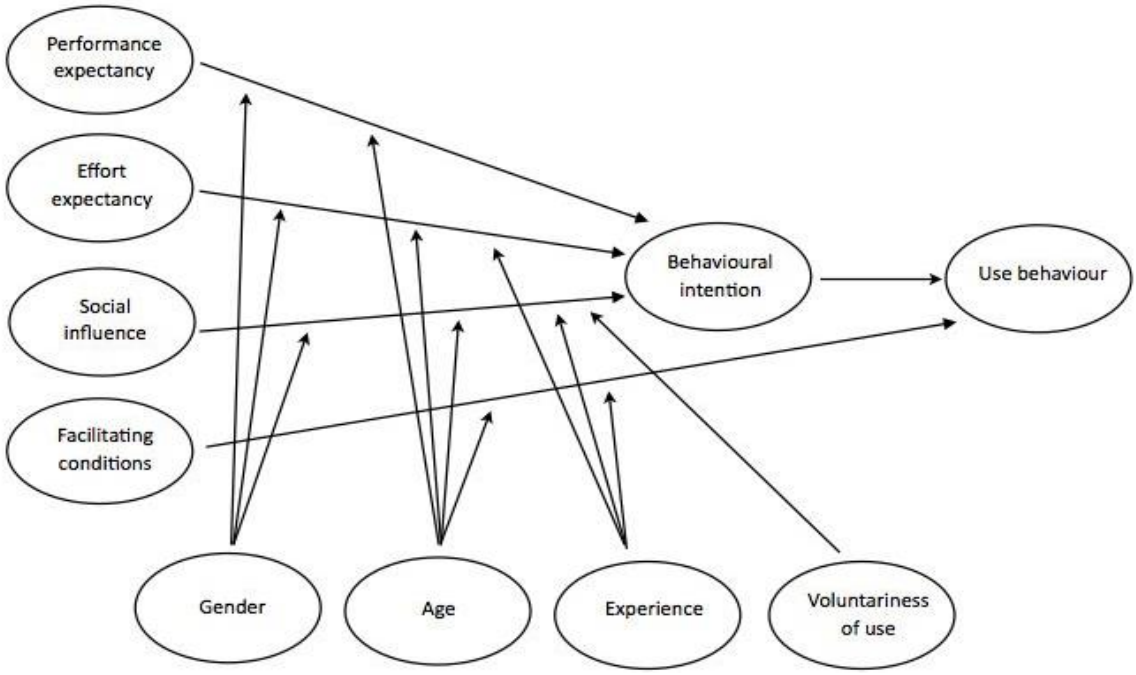
Performance expectancy is "the degree to which an individual believes that using the system will help him or her to attain gains in job performance" [64]. When care workers believe that technology improves the quality of care and leads to more efficient work processes, they are considerably more likely to use the technology than when it interrupts workflows [67]. Health care providers adopt favorable attitudes about technology if they believe it to be dependable and useful.

Effort expectancy is "the degree of ease associated with using the system" [64]. It is regarded as a critical factor that influences the behavioural intention to use the device[68]. The ease of use can create the idea that the technology benefits the user. Additionally, when people perceive less effort is required when applying the new technology, it supports the idea that it helps and benefits their daily activities.

Social influence is "the degree to which an individual perceives that important others believe they should use the new system" [64]. People are easily driven to adhere to social standards around the acceptance of technology when the behavior is viewed as standard [69].

Facilitating conditions is defined as "the degree to which an individual believes that an organization and technical infrastructure exists to support the use of the system" [64]. Each technology has different functional needs, such as infrastructure or support systems. If users had adequate support facilities, such as mobile devices with stable internet access and tech support, they would accept new applications with more ease [68].

Figure 4. Overview of the UTAUT Model



Source: Venkatesh et al [64]

Besides the four key constructs, four parameters can be seen as a significant influence on the acceptance of technology: gender, age, experience, and voluntariness of use [70]. These factors must be taken into account, as they can significantly impact the relationships between the key constructs. For instance, gender can affect the relationships between performance expectancy, effort expectancy, and social influence, with literature suggesting that performance expectancy has a more substantial influence on the behavioral intention of women than men [71,72]. This influence underlines the importance of considering these factors in technology acceptance research, as they can provide valuable insights into user behavior.

2.2 Choice UTAUT model

As discussed earlier, many technology acceptance models can be utilized to understand why users accept or reject a specific technology. In this study, the UTAUT model was chosen as the primary model after comparing the characteristics of the different possible acceptance models.

The UTAUT model is partly based on the Technology Acceptance Model. Both models can be utilized to predict technology usage by researching the factors that influence the acceptance of that technology [73]. According to studies related to the Technology Acceptance Model, the UTAUT model was developed using the Technology Acceptance Model as one of the building foundations and is therefore seen as the follow-up model. In 2012, the UTAUT2 model was developed in addition to the existing UTAUT model [74]. This model focuses on the consumer's acceptance of technology instead of an organizational use setting by adding three new determinants: hedonic motivation, habit, and price value. It was assumed that health care professionals would need more knowledge and expertise to respond to questions regarding habit and price. Therefore, the UTAUT2 model was deemed unsuitable for this research.

3. Method

3.1 Study design

The research is an exploratory qualitative study based on interviews in sub-study 1 with health care professionals about the acceptability and intention to use the Eforto®, followed by a focus group discussion and in-depth interviews in sub-study 2. The theoretical framework utilized for this qualitative study, is the UTAUT model.

3.1.1. Interview

A semi-structured interview series was conducted to better understand the elements impacting healthcare professionals' acceptability and intention to use the Eforto®. These interviews were the first introduction for health care professionals to the Eforto® device, with questions designed based on the UTAUT constructs. The topics of performance expectancy, effort expectancy, social influence, facilitating conditions, the participants' general attitude towards the Eforto®, and anticipated issues and challenges in implementing Eforto® were discussed.

3.1.2. Focus groups and in-depth interviews

Focus groups can provide valuable insights into the acceptability of the Eforto®, are less time-consuming than taking interviews, and allow testing possible hypotheses from the results of the interviews [75,76]. The focus group has been designed to further investigate the acceptability, intention to use, and possible barriers of the Eforto®. The focus group offers the opportunity to initiate discussions and enable direct exploration of variances among departments and professions. Besides that, the focus group offers the opportunity to experience the device in person.

For the participants who were not able to attend the focus group, a second in-depth interview was held. In these interview sessions, it was possible to explore and clarify earlier statements and contradictions from the first round of interviews and focus group.

3.1.3 Study assumptions

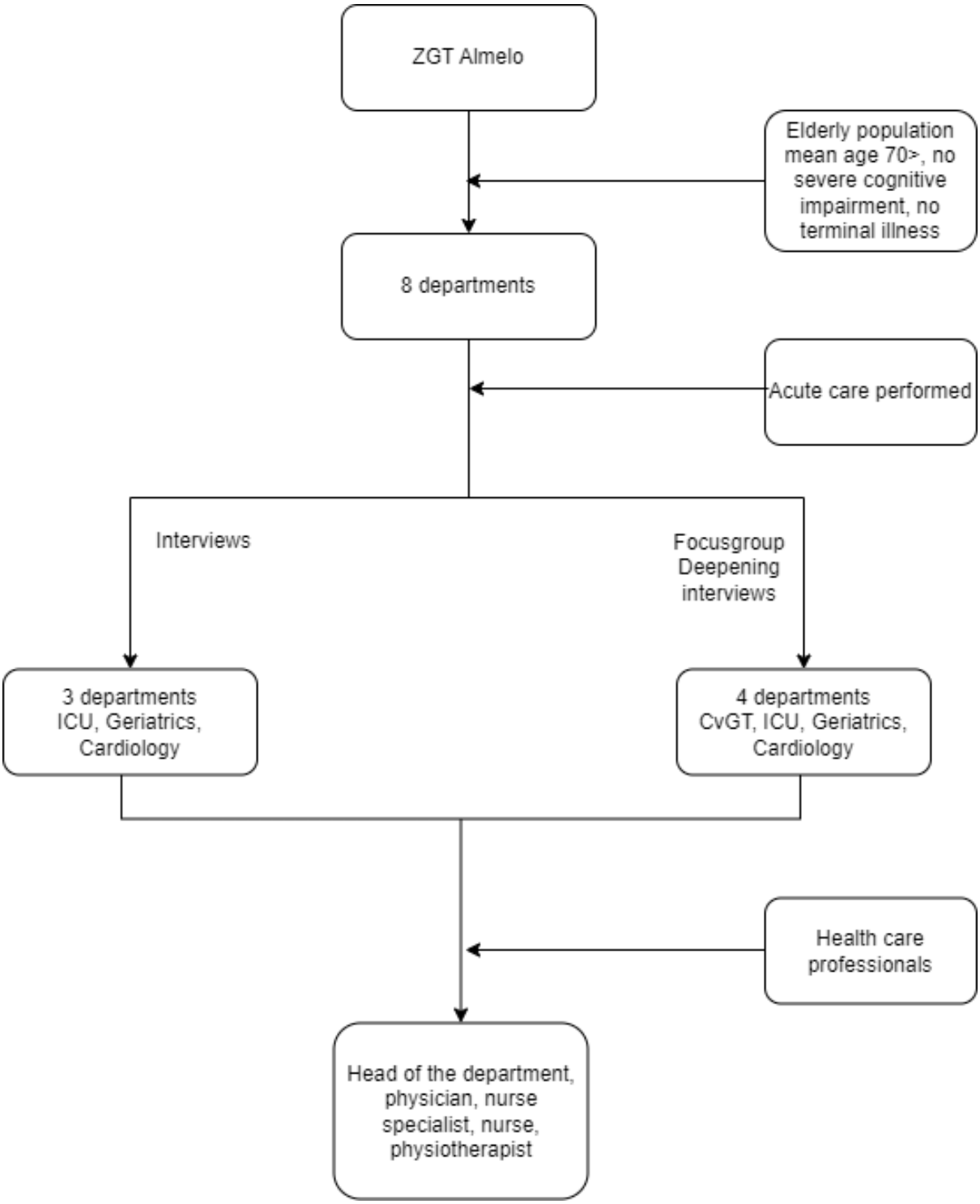
This study is a continuation of the RESHAPE study that is currently conducted in ZGT Almelo to determine the validity and reliability of the Eforto® to monitor grip strength and muscle fatigability as a measure for hip fracture recovery and insight into resilience in older hip fracture patients [77]. The preliminary results of the RESHAPE study show promising results about the validity of the Eforto® in geriatric traumatology patients [56]. Based on the insights gathered from the RESHAPE study, two assumptions for this study were formulated to set a baseline for the UTAUT interviews about the validity of the Eforto® for all participants.

- The Eforto® device is effective in measuring the grip work of an elderly patient.
- The Eforto® device accurately shows the relation between grip work and an elderly patient's intrinsic capacity (a determinant of physical resilience).

3.2 Participants

All the participants in this study were health care professionals working at ZGT Almelo. The Eforto® is currently only used at CvGT. For this study, health care professionals from other geriatric acute care departments were interviewed to collect their perspectives and the acceptability of the Eforto®. Figure 5 provides a schematic overview of the departments and health care professionals included in the interviews, focus groups and in-depth interviews.

Figure 5. Schematic Overview of the Departments and Health Care Professionals Included in the Eforto® Acceptability Study



3.2.1 Interviews

The departments for the interviews were selected based on the inclusion and exclusion criteria of the Eforto® research itself. The inclusion and exclusion criteria for patients in the RESHAPE study are:

- Admitted in ZGT Almelo at CvGT;
- Surgically treated for a hip fracture without having a total hip replacement;
- An expected hospital stay of > two days;
- 70 years of age or older;
- No pathological or periprosthetic fracture;
- No severe cognitive impairment;
- No terminal illness with life expectancy;
- Being physically unable to perform the hand grip measurements.

Because this study will be conducted in other departments, the inclusion and exclusion criteria have been redesigned to fit these departments. Based on these criteria, the departments that treat patients who fit the criteria were selected.

- 70 years of age or older;
- No severe cognitive impairment;
- No terminal illness with life expectancy.

The eight departments that fit the above criteria were CvGT, Intensive Care Unit (ICU), Oncology, Geriatrics, Diabetes, Cardiology, Physiotherapy, and Pulmonary Medicine. Due to the limited time and resources for this study, an additional inclusion criterion was formulated to narrow the number of departments included in the interviews, specifically those that need to provide acute care. In earlier stages of the RESHAPE study, professionals working at CvGT were interviewed about the acceptability of the Eforto® based on the UTAUT constructs. Therefore, this department has been excluded from participation in sub-study 1. In addition to the previously mentioned patient criteria, the CvGT is a department that provides acute care. Therefore, the selected departments must provide acute care for patients. This criterion resulted in the inclusion of the ICU, Geriatrics, and Cardiology departments in sub-study 1.

From the included departments, different employee professions were asked to participate according to purposive sampling; this sampling method is used to select participants who are knowledgeable about an experience or technology or could provide information to achieve the study's objective [88]. This method allowed for gathering information from different standpoints about the acceptability and intention to use Eforto®. From each included department, a head of the department, physician, nurse specialist, nurse, and physiotherapist were asked to participate. After concluding the inclusion criteria, the health care professionals were personally contacted to participate in the study.

3.2.2 Focus group and in-depth interviews

The interviews from sub-study 1 were followed up by one focus group discussion and two in-depth interviews where the same participants from the first sub-study were asked to participate. Furthermore, health care professionals from the CvGT were also included because of their earlier participation in the RESHAPE study. Health care professionals at the CvGT have not been working directly with the device because the researcher of the RESHAPE study performed the measurements on the included patients. The CvGT was included to gather more insight into their views and expectations regarding the acceptability and intention to use the Eforto®. For this department, the same distribution of professionals was included in the focus group and in-depth interviews: a head of

the department, a physician, a nurse specialist, a nurse, and a physiotherapist. These participants selected were already well known with the Eforto® through earlier research.

3.3 Data collection

3.3.1 Interview

The semi-structured interviews were physically conducted between December 2023 and April 2024. They lasted approximately 40 minutes and were audio-recorded using a dictaphone. During every interview, the researcher took notes of the session.

The interview consisted of two parts, as can be found in Appendix A. First, the participants were asked about their demographic characteristics. After that, the Eforto® technology and goal of implementing the Eforto® according to the studies were explained, and questions were asked about the acceptability and intention to use the Eforto® [56,78]. The interview questions were based on the UTAUT constructs, and similar studies into the acceptability of technology that have been conducted since then [64,79,80].

3.3.2 Focus group and in-depth interviews

In March 2024, the focus group was physically conducted. The focus group lasted approximately 90 minutes. One researcher arranged and chaired the focus group discussions. The focus group was audio recorded while two researchers observed and took notes of the session.

The focus group consisted of three parts: an introduction, a simulation, and a discussion, as found in Appendix B. The introduction consisted of a question based on the Diffusion Theory of Innovation [86]. The participants were asked which of the five types of adopters they were based on statements. The simulation consisted of the opportunity to get familiar with the Eforto® device through a presentation of the Eforto® itself and the possibility of testing the Eforto® by the participants by presenting two different cases of patients and usage. As a result of this, the interaction with the device and approach can be studied, for example, the easiness to use. Because the basis of this study is the acceptability and intention to use the Eforto®, a thinking-aloud method was used to study the interaction with the device. After the simulation, a discussion with the participants was held to gather insight into the acceptance and possible use of the Eforto® in geriatric acute healthcare based on the results found in the interviews. Different answers to the interview questions and new questions were brought up to discuss the reason for the difference and the possible impact on the adoption of the Eforto®. The discussion also focused on more practical adoption questions, such as the number of tests taken per patient per period and who is responsible for the test-taking according to the insights of the health care professionals.

In April 2024, two in-depth interviews were conducted in person. Each interview was with a professional who were unable to attend the focus group, lasted approximately 30 minutes and was recorded using a dictaphone. The researcher took notes during each interview. The design of the in-depth interviews can be found in Appendix C. The in-depth interview consisted of an introduction, a chance to test the Eforto® device, and a discussion. The discussion covered mostly the same topics as the focus group and included findings from the focus group. The professionals were asked to discuss the benefits of using Eforto® in geriatric acute hospital care and the practicality of implementing it.

3.4 Data analysis

3.4.1 Data storage

To protect the privacy of the participants and their recorded data, a dictaphone was used to record the interviews and focus group discussions. Following the session, the voice files were uploaded directly to a secure data storage server, where only the researchers could access them. The files were immediately coded with a number as were the corresponding notes per session.

3.4.2 Analysis

First, the interviews and focus group were transcribed verbatim using Amberscript. Each participant was assigned a unique code to ensure anonymity, as seen in Tables 1 and 2. Participants participating in both sub-studies received the same unique code in both studies. The verbatim transcriptions were coded according to a deductive analysis with the UTAUT constructs as basis with the six steps from Braun and Clarke as a base method [81]. The researcher read and reread the transcripts to ensure familiarisation. After thoroughly reading the interview transcripts, an initial coding tree was generated. Step three consists of searching for themes within the UTAUT constructs, step four consists of reviewing the themes, and step five consists of defining and naming the subthemes. The last step consists of analyzing the data and presenting the results. The coding tree was adopted and extended as necessary, with more subcategories according to the new findings in the transcripts. For both sub-studies, the same coding tree was used. Therefore, the combined results of both sub-studies could give insight into the possible acceptability and intention to use the Eforto® in ZGT Almelo.

To ensure the reliability of the coding process, a second coder independently coded two transcripts. The results were compared to the results of the first coder, and any discrepancies were discussed. This rigorous process was repeated until data saturation was reached, and no new themes were found in the transcripts, indicating the thoroughness of the research.

Table 1. Overview of the Conducted UTAUT Interviews in Sub-study 1

Participant code	Date of interview	Profession	Duration of interview (minutes)
A	28-12-2023	Nurse specialist	29:03
B	02-01-2024	Nurse	33:51
C	18-01-2024	Physiotherapist	39:27
D	19-01-2024	Head of department	38:02
E	22-01-2024	Nurse	31:24
F	22-01-2024	Physician	40:22
G	22-01-2024	Physiotherapist	39:34
H	30-01-2024	Physician	37:06
I	31-01-2024	Head of department	42:00
J	06-02-2024	Nurse	35:18
K	22-02-2024	Physiotherapist	30:27
L	19-04-2024	Physician	41:27

Table 2. Overview of the Conducted Focus Groups and In-depth Interviews in Sub-study 2

Session	Date of session	Participant code and profession	Duration of session (minutes)
Focus group	07-03-2024	B, C, G, K, M (physiotherapist), N (nurse)	01:23:05
In-depth interview 001	18-04-2024	I	29:09
In-depth interview 002	18-04-2024	O (physician), P (research coordinator)	34:43

3.5 Ethical approval

Before the study started, the Humanities & Social Sciences Ethics Committee of the University of Twente (number 230643) approved conducting this research. The participants provided written informed consent and were informed about their right to withdraw at any time. The information letter and consent forms for the sub-studies can be found in Appendices D and E.

4. Results

4.1 Participants

4.1.1 Sub-study 1: interviews

In total, 12 professionals working in the ICU or at the department of cardiology or geriatrics participated in the semi-structured interviews. Overall, two nurse specialists (16,7%), three nurses (25%), three physiotherapists (25%), two physicians (16,7%), and two heads of the included acute care departments (16,7%) participated. In Table 3, an overview of the different participants and their professions and departments can be found.

Table 3. Overview of the Departments and Professions of Participants in Sub-study 1, n = 12

Department	**Value, n *(%)***	**Profession of participants**
Cardiology	2 (16,7)	Nurse, physiotherapist
Geriatrics	6 (50)	Head of department, physician, nurse specialist, nurse, two physiotherapists
ICU	4 (33,3)	Head of department, physician, nurse specialist, nurse

The characteristics of the 12 participants can be found in Table 4. The mean age of the participants was 41,6 (SD = 8,09) years, and 83,3% identified as female. The number of years of clinical experience relates to the current profession in which they were included in this study, ranging from <1 years to 15-20 years of experience.

Table 4. Demographic Characteristics of Participants in Sub-study 1, n = 12

Participant code	**Profession**	**Age**	**Gender**	**Years of clinical experience**
A	Nurse specialist	37	Female	1
B	Nurse	42	Female	15
C	Physiotherapist	31	Male	5
D	Head of department	52	Female	<1
E	Nurse	33	Female	<1
F	Physician	43	Male	4
G	Nurse specialist	46	Female	<1
H	Physiotherapist	35	Female	4
I	Head of department	54	Female	<1
J	Nurse	44	Female	20
K	Physiotherapist	54	Female	6
L	Physician	36	Female	3

4.1.2. Sub-study 2: focus group and in-depth interviews

During sub-study 2, nine participants participated, divided into one focus group and two in-depth interviews. Overall, one head of a department (11%), one physician (11%), two nurses (22%), four physiotherapists (44%) and one research coordinator (11%) participated, as can be seen in Table 5.

Table 5. Overview of the Departments and Professions of Participants in Sub-study 2, n = 6

Department	Value, n *(%)*	Profession of participants
Cardiology	1 (11,1)	Physiotherapist
CvGT	4 (44,4)	Physician, nurse, physiotherapist, research coordinator
Geriatrics	2 (22,2)	Two physiotherapists
ICU	2 (22,2)	Head of department, nurse

The focus group consisted of six participants. Four participants were also participants in the interviews of sub-study 1, and two were new to this sub-study, as seen in Table 6. Two participants were nurses (33%), and four were physiotherapists (67%). To gain insight into the participants' degree of (technological) innovativeness, they were asked which type of innovator they are according to the Personal Innovativeness Scale, derived from Rogers' Diffusion of Innovation Theory. Three participants identified as early majority, whereas one identified as an early adopter. Two participants did not answer which type of innovator they identified as during the session.

Table 6. Demographic Characteristics of Participants in the Focus Group of Sub-study 2, n = 6

Participant code	Profession	Gender	Type of innovator
B	Nurse	Female	Early Majority
C	Physiotherapist	Male	Early Adopter
H	Physiotherapist	Female	Early Majority
K	Physiotherapist	Female	
M	Physiotherapist	Female	Early Majority
N	Nurse	Female	

In addition to the focus group, in-depth interviews were held with three professionals. One of the in-depth interviews was a duo interview with two participants. These participants either already participated in the interviews or were included according to the inclusion criterion of the CvGT inclusion. Table 7 shows that the three participants had three different professions of head of a department, physician and a research coordinator.

Table 7. Demographic Characteristics of Participants in the In-depth Interviews of Sub-study 2, n = 3

Participant code	Deepening interview	Profession	Gender	Years of clinical experience
I	001	Head of department	Female	<1
O	002	Physician	Male	19
P	002	Research coordinator	Female	<1

4.2 Attitude towards technology

It is noteworthy that all participants expressed a positive attitude towards the use of technology in their practices, underscoring the unanimous support for technological integration in healthcare.

The participants mentioned that the positive attitude stems from the opportunities of incorporating technology in healthcare settings. Technology has been perceived to have various utilities in the care setting. For instance, it could assist in diagnosing and monitoring patients and support health care professionals in making diagnoses.

> *"I welcome that (technology) with open arms because I think it will help us in the future. ... And I think that is a dire necessity for the future when you see what our population growth looks like and in relation to all the elderly people who come our way and the working people who are still a lot fewer. So, I do not think we can escape it, and I also think it could be a big part of what is coming our way now."* [Respondent D, head of a department]

While almost all participants had some experience with technology in healthcare, their knowledge about different technologies varied. Some were well-versed in the technologies used in their own practice, while one participant mentioned being less aware of the technologies in use at ZGT.

However, most participants also mentioned some scepticism about the use of technology, especially its dependence on and the replacement of the human touch. The professionals experience that they are highly dependent on the functioning of technology. Losing access to it can lead to being unable to do their job. For example, losing the hospital ID card leads to the impossibility of gaining access to the changing room and the medicine cabinet. In addition, participants mentioned that they were uncertain about the balance between the use of technology in the future and the human aspect of patient care.

> *"I just think it is a very social profession. If you work in nursing, you can never approach the patient like a human being. … But sometimes you just have that nursing gut feeling. If all the numbers are correct, but you still think something is wrong. And then a few days later, it turns out to be wrong."* [Respondent A, nurse specialist]

4.3 UTAUT findings

The results are reported according to the four main constructs of the UTAUT model, describing performance expectancy, effort expectancy, social influence and facilitating conditions. General findings from the participants were collected during both sub-studies. The results are supported with quotes from the interviews and focus group that are verbatim shown.

4.3.1 Performance expectancy

Potential benefits

All the participants in the interviews and focus group expected that the Eforto® would be a useful addition to their current healthcare practice. However, the potential benefits of using Eforto® differed between the participants. Three main benefits are distinguishable.

One potential benefit of the device was insight into the patient's intrinsic capacity, which is currently not possible. This could be combined with the other data the professionals collect, such as oxygen saturation and ability to walk, to form an impression about the patient's capacity and health status.

> *"I think it is straightforward to use to get a general impression of how your patient is doing. Suppose you have these [the Eforto®] in the department, and you have certain values from the day before. You see whether today's value corresponds somewhat with yesterday's value. In that case, you can make a better estimate based on the patient's load capacity."* [Respondent C, physiotherapist]

The second added benefit mentioned was monitoring the elderly patient's progression with an objective value in different circumstances, such as a rehabilitation process. The Eforto® could be seen as a monitoring tool for patients after their admission to the hospital by monitoring their GW during their hospital stay.

> *"I think it is, of course, great for rehabilitation processes. If you had that device, if it worked like that, you could indicate what someone can do and see progress, and of course, you know that you are on the right track or still need guidance."* [Respondent A, nurse specialist]

The third benefit mentioned was using the Eforto® as a predictor for the resilience of a patient to handle a specific treatment or operation, for example, in the prehabilitation process. In some doubtful cases, the geriatrics physician would assess the patient to determine if they were fit enough to proceed with the treatment. According to the participants, the Eforto® could objectify these results of the assessment. This objectification could be done by making the patient's IC a value that could be visualized and explained through the measurements taken by the Eforto®. It was mentioned multiple times that this benefit could especially be the case for oncology patients.

> *"You can estimate whether someone is fit enough for the operating room, chemo treatment, or radiation. I think handgrip strength says a lot about what someone can handle functionally. That measurement can give a patient a good answer."* [Respondent E, nurse]

Four participants mentioned that the possible benefit of using the Eforto® as a predictor could be used as an argument for the reason to stop treatment. If the patient shows a rapidly declining GW value or has a GW below a certain threshold needed to survive, according to literature and clinical experience, the GW values could be discussed with the patient and their family. This GW value would give the patient an objective value that would show their capacity, and therefore, advice could be given to continue or stop the treatment. In addition, the focus group participants mentioned the possibility of using the predictive value to anticipate the care necessary after the hospital stay. This would apply next to the care in the hospital that was mentioned earlier.

Three participants did not think that the Eforto® would help decrease their time coming to insights or decisions. However, the participants agreed that it would objectify the observations made. Right now, the observations of a patient's capacity are, for example, done by a walking test or asking about their fitness history to their family. The results of the Eforto® would not replace the current methods used to gather insights into the patients' capacity, however, it could be used as an additional objective measurement.

> *"Does it save time? There is never just one measurement (to make a choice) because it also depends on what the patient wants. What does the family want? What are the lab results? ... I think it provides more insight and allows you to process the results better to show what is needed now. Then you can, of course, better justify to the patients and their families why, for example, you want to provide home care or why the physio should be involved. This makes it easier for you to start a conversation."* [Respondent E, nurse]

Potential barriers

All participants mentioned the interpretation of the measured data as a potential barrier to the possible implantation of the Eforto®. This interpretation consists of two parts: the normal values and the actions corresponding to the measured GW values.

According to the participants, data interpretation was the most crucial piece of knowledge about Eforto® before it could be implemented. The participants stressed that it was of utmost importance that the measured values could be interpreted in some way that added knowledge, insights, or strategies into their practice. The method of taking the measurements and tests was straightforward for the participants, except the interpretation of the data was unclear. They mentioned that they lack knowledge about IC and GW in general and, therefore, could not interpret the data of the Eforto®.

> *"The most important thing is that you know how to interpret it. You must know what to expect. A 90-year-old person needs to be able to squeeze less than a 70-year-old person, and you can expect more from a 70-year-old man than a 70-year-old woman. You want to keep a table of what you can expect from a patient. The correct interpretation is essential. Otherwise, such a device is of no use."* [Respondent L, physician]

To achieve this interpretation of data, the participants mentioned that some standard values for the GW needs to be established. According to the participants, this would be needed for different patient populations, including those with different symptoms and ages. Besides the average values, the participants also asked about the follow-up. Almost every participant asked: "What does it mean when the patient has a low GW value?". This information would be necessary for the professionals to determine the course of action after taking the Eforto®measurement. It is mentioned as an absolute requirement for the usefulness of the Eforto®.

Patient population

A topic mentioned in several interviews and the focus group was the patient population that would be eligible to use Eforto®. For some patients, the professionals saw an advantage in using Eforto®. These were the patients who fit the stated inclusion criteria for this study.

The participants were asked about the patients and departments where the Eforto® could be an added advantage. The participants of sub-study 2 agreed that the Eforto® could be of added benefit to the care path of departments with vulnerable elderly patients. The professionals did have some specific reasons why the Eforto® may be difficult for some patients, for example, patients who are very weak or on ventilation. They also mentioned that it would be unnecessary to use the device on patients who are there for a very short period, such as a one-night stay. In this case, taking the test would take longer than necessary and would not directly provide them with insights into the treatment.

> *“(The Eforto® could be used for) The patient who is there for a long time. ... But it is those patients who are there for a long period of time whom I would like to monitor: what is happening, are we going in the right direction, are we going the other way and what should happen next? As support for the policy.”* [Respondent I, head of a department]

4.3.2 Effort expectancy

All participants agreed that the Eforto® should be easy to use. This agreement was mainly due to the short time it takes to administer the Eforto® test. The professionals noted that this device would be easy to use because of its low weight, small handgrip, and the possible digital data collection capabilities. The focus group and in-depth interviews participants agreed with the easiness of use of the Eforto® after testing the Eforto® themselves.

> *"It is straightforward. Three times as hard as possible - very briefly - and then once as long as possible, which I understand. It is simple to use, from what I hear."* [Respondent J, nurse]

Practical use of the Eforto®

All the participants were asked about the number of times the Eforto® test should be taken to gather the insights they wanted about the patient. The participants answered differently, ranging from once a week to every six weeks. Their reasoning for the number of tests was based on their patient group and how often they would like to receive insights into the patients' capacity. The consensus was that a daily measurement would not say much, as many factors could contribute to a patient feeling stronger or weaker that day, such as the time of day, lack of sleep or the number of family visits. The individual measures would, therefore, say less, but the trend of someone's capacity improving or decreasing would be interesting to gather. The participants could not give a definitive answer to the necessary number of tests in a certain period but answered based on their experience and wishes for the Eforto®.

> *"Well, I do not think more than once a day, more like once a week or so. I think you see that the trend would be more interesting than the measurement."* [Respondent F, physician]

The participants from sub-study 2 agreed to use the Eforto® at the beginning of the treatment or hospital stay, once around the middle of the treatment, and once at the end to monitor the progression and capacity of the patient. The participants would not use the Eforto® as a determinant to send a patient home but as a conformation in combination with the other observations and measurements. In addition to the number of tests taken for the Eforto®, the participants were asked who should take the test. All participants argued that the nurse or physiotherapist would be responsible for taking the test. The nurse could take the tests during patient rounds, while the physiotherapist could take them during daily visits. If the physiotherapist was concerned about this, they could use the results from the tests directly in their rehabilitation plan.

> *"The nurse. In the department, the physio can take the test. However, in the outpatient clinic, the nurse. It has something to do with function and power."* [Respondent E, nurse]

> *"Well, I think that is a very nice task for a physiotherapist because, ultimately, they also have to do something with those values to change, modify, adapt, et cetera, the treatment plan regarding rehabilitation."* [Respondent C, physiotherapist]

Two participants also mentioned the care assistant as a possible test taker. The care assistant would help to support the nurses with this task. The participants were not definitive about the care assistant however mentioned this profession as a possibility to be explored.

Potential barriers

The participants of both sub-studies mentioned some potential barriers. One is to ensure that the Eforto® will continue to be used and not be forgotten after a few weeks. Participants commented that it had happened before: after a certain period, they would forget to use the new technology and go back to their old habits. They did not offer any strategies to prevent this even though they did mention it.

During sub-study 2, the participants made a few remarks about the practical use of Eforto®. The application normally starts with a 20-question questionnaire that the patient must fill in about the patients, for example, how they slept and felt. It is possible to skip a question, however, it is impossible to skip it altogether. The six participants noted that this took a long time and did not see the importance of always asking these questions when administering a test. They also noted that most of the questions looked alike and that they did not understand the difference between

the different questions. The participants would not let the patient fill in the questionnaire but would let the professional do that to save time.

The participants of the focus group mentioned that they would not provide the patient with the app and would recommend that the professional use it. Letting the patient do it themselves would lead to confusion and misunderstandings about the steps they need to take and how to take these steps. According to the professionals, the results would lose validity if the test was taken differently. By letting the patient do the test themselves, they would not be able to determine the reliability.

Some other practical recommendations were made about the Eforto® device, application, and test-taking. The focus group participants mentioned the measurement ball on the Eforto®. Different patients of different hand sizes will use this device. Currently, this ball is made in one size. According to the participant, knowing if the different hand sizes and one ball size influence the measurements and results is essential. Besides this barrier, the need for the possibility of increasing the font size of the text in the application was mentioned.

Participants of the focus group raised concerns about the endurance test, particularly the need to repeat it if the patient fails to reach the required GS level to start the test. They noted that patients often refuse to repeat the test, leading to incomplete results. The participants mentioned the need for a more patient-friendly approach to the endurance test.

4.3.3 Social influence

Most participants agreed that some support from colleagues was appreciated, where the support would be the acceptance of the Eforto®. It did not matter that much which of their colleagues would be the support except for the head of the department. They would be necessary because of the financial matters regarding implementing a new device.

> *"In any case, our head of department must support it because he finances it. … We also have two coordinators. It would be lovely if they supported Eforto®, and I would like it if you had one or two colleagues with whom you could set it up together so that they are also well-informed. This way, people would initially turn to those one or two colleagues or come to you because you are the point of contact in the department if there is a problem. "* [Respondent J, nurse]

Some departments have working groups to research the possibility of implementing a new technology. In that case, a working group could be provided to research the steps needed after the Eforto® has been validated according to the participants. These working groups consist of professionals who have an affinity with innovation or the specific technology of that working group.

The participants were also asked if the non-support of colleagues would influence their decision to use the Eforto®. Three of the participants answered that it would not matter to their own decision as long as they believed in the added value of the device, and it was possible to receive a device.

> *"I look at what it does for my target group. We already use something like this (device), which is more convenient and less heavy. For that reason, I am positive about it. I do not care what the rest of the group says because we already use one."* [Respondent E, nurse]

4.3.4 Facilitating conditions

The participants identified several requirements for implementing the Eforto® in geriatric healthcare practices. One of these requirements was the availability of technical support whenever needed. The participants suggested that this could be accomplished by providing documentation on how the Eforto® works and potential issues, as well as having a technical support person available as a backup.

HiX compatibility

One requirement that was stated as absolute necessary by all of the participants, was the compatibility with the electronic patient system, HiX. The values collected from the tests taking with Eforto®, should be automatically saved in the system. This would save paperwork and time from the test takers.

Education

All participants were asked about the kind of education they would like to receive about the Eforto®. The consensus was that the participants would like to receive some form of physical education where they could see the Eforto® and how they would need to use the device. They were against e-learning or any other digital form, because of the amount they already need to do of this form.

> *"I would do a course or a training in the afternoon. Then you can see whether you are really using it properly, what that 90-degree angle is, and you can practice with each other. If you do not take the measurement properly, you cannot get correct values. Too much depends on that. I think you should be well trained in this."* [Respondent E, nurse]

Besides that, the participants are interested in the practical workings of this device, which they felt would be best achieved with a form of a practical session. The participants followed the app and the instructions for test taking during sub-study 2, but still had some questions about the position of the patient needed to take the test and the role differentiation between the professional and the patient, for example the questions asked in the application.

> *What I would like to know, are there more instructions for the test taking? For example, do they need to have both feet on the ground, can their elbow be supported by something? … May the back of a patient be supported. Can the test be taken lying down?"* [Respondent H, physiotherapist]

4.4 Comparison professionals

The findings showed that there was little variation in expectations regarding the use of Eforto® among different professionals and departments. While there were distinct accents among the professionals, which they considered important prior to potentially implementing Eforto®, the overall results were consistent. Head of the departments highlighted the costs of Eforto® and stressed the importance of conducting a cost-benefit analysis before deciding on its implementation. Physicians and physiotherapists emphasized the significance of interpreting the data and understanding the implications of Eforto® test results in making treatment decisions.

The results also indicated minimal differences among the departments, with most of them agreeing about the potential benefits of Eforto®. However, professionals from the ICU department suggested that Eforto® could be employed to assess the situation whether to continue with specific treatments, not as the primary reason, but as a complementary tool to objectify their observations and assess treatment possibilities. Other departments did not mention this potential use of Eforto®.

5. Discussion

The aim for this study was to explore the acceptability of the Eforto® in the geriatric healthcare in ZGT Almelo and to gain an in-depth understanding of the perceptions of health care professionals before the use of the Eforto®. The findings from the semi-structured interviews and in depth focus groups provide an understanding into the benefits and barriers expected of the Eforto® according to the UTAUT constructs.

5.1 Main findings

Most health care professionals expressed a positive judgment towards the Eforto®, highlighting its potential to provide valuable insights into patient intrinsic capacity. Despite the lack of previous experience with the device, they recognized the possible advantages of integrating it into healthcare practice, particularly with the outcomes of gaining insight into patient capacity, monitoring progress, and predicting outcomes. These professionals foresee the Eforto® as a tool to objectify their observations.

Health care professionals expressed uncertainty about the validity of the measured data. At this stage of research, the validity and effectiveness of the Eforto® in measuring the proposed outcomes remain unknown. However, the device's validity and reliability in measuring grip strength and muscle fatigability for the geriatric population have been confirmed [56]. The ongoing RESHAPE, BRR, and BUTTERFLY studies could provide further evidence of the device's validity and effectiveness.

Another barrier mentioned in the results of the performance expectancy is the intended patient population for which the Eforto® could be used. During this study, the participants were given patient inclusion criteria for the use of Eforto®, which were adopted from the criteria of the RESHAPE study [56]. Many participants had questions about the possibility of using the Eforto® on different patient groups, such as patients with a very low GS, on ventilation, or with a short hospital stay. There are no guidelines for these patients in the in- and exclusion criteria. These uncertainties for which patients the Eforto® could be beneficial can lead to problems with the acceptability and eventual implementation of the Eforto®, such as designing an effective education method for health care professionals. Besides the educational aspect, clear patient inclusion guidelines can help to tailor the use of the Eforto® to enhance results for suitable patients and avoid over- and misuse of the technology [82,83]. Looking further into the implementation process, the definition of the patient population who will adopt the Eforto® is also essential for the market adoption, such as the manufacturers and health care providers [84]. The patient population can influence the market price and market access. By further defining the intended patient population, these possible barriers during implementation could be resolved.

The facilitating factors required for the acceptability of the Eforto® are technical support, HiX connection, and an in-depth education about the use of the Eforto®. Similar factors have been reported in earlier studies, such as the connection to the electronic health record and the availability of resources [85–87]. Access to appropriate and easily available education is also mentioned as essential, and the anticipated benefits and understanding should be discussed [86]. Not all these studies are done in a geriatric setting, however, the results from the previous studies are consistent. Therefore, this indicates that the facilitators and barriers affecting the implementation of health technology are probably transferable to other healthcare settings.

Most participants mentioned that the interpretation of the data is one factor that must be further explored before the Eforto® can be implemented. During this study, they were unsure what the measurements would imply about the patient's capacity when a measurement differs from the

'normal' or expected measurements and what the treatment plan would be based on. According to the literature, an instrument's results should easily be interpreted to convey the clinical meaning of the results [88]. To ensure the reliability and comparability of the measured data, standards, reference methods, and calibration should be available, including confidence intervals and within-group changes [89]. The presentation of this data can help health care professionals determine their treatment plans and communicate this to patients. This study does not entirely clarify how this data interpretation and presentation should be done. Before the implementation of the Eforto® can be achieved, an effectiveness-implementation trial could be performed to determine the accurate presentation and interpretation of data as well as the effectiveness of the Eforto® based on the wishes of the health care professionals [90].

In recent studies, different acceptability studies of the Eforto® have been conducted in ZGT Almelo, for example, with patients with a hip fracture, physiotherapists, and health care professionals on CvGT [91–94]. The health care professionals on the CvGT department were also interviewed based on the UTAUT constructs [92]. The results of that study match the results in this study. The professionals expected an added advantage in predicting and monitoring the rehabilitation of patients, with the test taker being the nurse or physiotherapist. For the facilitating conditions, the participants require a connection with Hix and a clear presentation of the measured data as well.

To the knowledge of the researcher, this is the first study to research the acceptability of Eforto® according to health care professionals in ZGT Almelo for geriatric acute care patients besides traumatology patients. These results can help to determine the possibility of implementing the Eforto® into the geriatric healthcare system after proving the validity and effectiveness of the device.

5.2 Strengths and limitations

As with all studies, this acceptability study has some limitations. One limitation is related to the participants. As described in the method, the aim was to include 15 participants in the interviews. These participants would be equally divided across the three departments Cardiology, ICU and Geriatrics. Due to time constraints of the possible participants, this goal was not reached. Instead, twelve participants were interviewed, not evenly divided across the three included departments. The participants for the focus groups did also differ from the method. The study was designed to split the participants from the interviews into four different groups based on their profession, where nurses and nurse specialists would be combined. The professionals from CvGT would be included in the focus groups as well, in the group of their profession. Due to less participants in the interviews and even more time constraints, this method was not possible. Therefore, the choice was made to organise one focus group, with the professionals that could attend, and two in depth interviews with the professionals that wanted to participate though were not able in the focus group. The reason to split the focus group into the professions, was to protect the different participants from possible hierarchy influences [95]. It happened naturally that in this focus group only nurses and physiotherapists participated.

According to literature, it is difficult to determine an accurate sample size and data saturation in qualitative research [96,97]. A sample size that is too small could lead to problems with the generalization and validity of the results. Determining an adequate sample size could be a matter of one's judgment and the purpose of the study [98]. The data from the twelve interviews lead to code saturation, which also applies to sub-study 2. Therefore, it could be argued that this study had enough participants to reach a sample size saturation. However, due to the differences in the characteristics of the participants and the heterogeneity of the participants group, the saturation cannot be concluded with certainty. Because of this study's explorative nature, the study's results can still be used to develop insight into the possible implementation of the Eforto® in ZGT Almelo.

Another bias that could have occurred in this study, is the interviewer bias [99]. According to literature, there are a few leading features that could occur during interview questions such as introduced content and presupposition [100]. During the introduced content, the researcher tried to introduce the topic of Eforto® as neutral as possible to prevent bias of the interviewee. If the bias has occurred, it is possible that the interviewee adopted the researcher's terms and therefore affecting the trustworthiness of the findings. With presupposition, it is possible that the questions presupposed a logical relationship between two or more items that were not specified explicitly by the interviewee. This presupposition could lead to an influence on the answer of the interviewee and therefore adopting the new outcome. The researcher has tried to their best ability to prevent the biases from occurring, however, it remains a possibility.

A strength of this study is the design. The UTAUT model is usually used in a quantitative study setting. This study chose a qualitative research approach because of the small sample size and the opportunity to explore factors contributing to the acceptability and intention to use the Eforto®. An exploratory qualitative study can be used in a setting where the literature shows a deficit in the necessary knowledge and, therefore, requires a study into the selected topic [101]. Previous to this study, the acceptability of the Eforto® by health care professionals in the acute geriatric care were unknown. Through this study, more information about the selected topic was gathered, fitting the criteria for the study design. The UTAUT is a suitable model for this study to explore and identify the determinants of influence into the technology acceptance [102].

Another strength of this study is the use of semi-structured interviews and focus groups. The advantage of semi-structured interviews is that the researcher has guidelines to support the focus of the interviews and enables the possibility to explore based on the answers given [99]. A disadvantage of the semi-structured interview is that not every participant will receive the same questions, which can make it difficult to compare the collected data and to draw conclusions. Still, the option to explore different focus points based on the answers is valuable. The use of focus groups gives the opportunity to explore previous results further and for participants to discuss and clarify opinions [103]. The risk of using focus groups can be the social judgment for a given answer and the orderliness that can easily be disturbed by talking through each other. Combining both methods in a study can lead to enhanced data richness [104]. In this study, an opportunity was created to do research into the acceptability of the Eforto® through the interviews and use the focus groups as a method to check these results. Points of contradiction were able to be discussed in a group setting to form a consensus. Besides these clarifications, the participants had the opportunity to test out the Eforto® device during the focus group, leading to new insights in the practical use after the expected outcomes were discussed during the interviews.

5.3 Recommendations

As mentioned, there are some uncertainties about the use of Eforto® by the health care professionals, mainly the effectiveness and interpretation of the data. To answer the questions about the interpretation of the data, it is important to determine the desired outcome expectancy of the Eforto®. Based on this outcome, the interpretation wishes for the data may differ and different studies must be done. The interpretation of the data is also based on the outcome desired to achieve with the measurements of Eforto®. If monitoring is the outcome expectancy, target values become less relevant, yet the trend of a patient is important to be shown. If the outcome expectancy is rehabilitation or prevention, the comparison between other patients with the same characteristics will be necessary to determine what is a normal and abnormal value for the GW for the intended patients.

The Eforto® will hopefully not only be used by health care professionals in the hospital setting, but also by different professionals throughout the different levels of healthcare, as the previous Eforto® studies show. It is therefore important to aim for a consensus of the outcome expectancy of the Eforto® and the added advantages to the healthcare. Based on this consensus, the questions raised about the patient population inclusion criteria and possible target values can be researched. The results of this research should be thoroughly communicated to all health care professionals involved.

In this study, the departments that perform acute care in ZGT Almelo have been included in this study. Besides these departments, ZGT Almelo has more departments with an elderly population. However, these departments are mainly focused on non-acute care. During the interviews, the professionals mentioned prehabilitation and especially the oncology department as a possibility where the Eforto® could be an added advantage. Because of the scope of this study, these departments have not been included yet. For a following study around the Eforto®, it can be valuable to research the acceptability of the Eforto® in the non-acute hospital care.

6. Conclusion

The aim of this study was to explore the acceptability of the Eforto® in the acute geriatric healthcare in ZGT Almelo and to gain an in-depth understanding of the perceptions of health care professionals before use of the Eforto®. To achieve this, exploratory qualitative research has been done based on the UTAUT constructs.

It can be concluded that the health care professionals see an added advantage for using the Eforto®. With the use of the Eforto®, the professionals can get insight into the intrinsic capacity of a patient and use this information to monitor the patient's progression and predict the course of treatment. The professionals found the Eforto® easy to use, both for themselves and the patient. With technical support and a physical education about the use of Eforto®, the professionals see the possibility for using the Eforto® in the elderly healthcare. To conclude the possibility of implementing the Eforto® in ZGT Almelo, more research is needed into the interpretation of data and the patient inclusion. This research also needs to be done in the departments that were not included in this study, especially the non-acute care departments. After researching the other departments, a conclusion can be drawn about the acceptability of the Eforto® in ZGT Almelo. If the study into the validation and effectiveness of the Eforto® also concludes a positive result, the next step can be taken for implementing the Eforto®.

The study shows that the acceptability of the Eforto® is mainly based on the performance and effort expectancy of the Eforto® according to the included health care professionals. The results are a step into determining the acceptability of the Eforto® by health care professionals in ZGT Almelo.

References

[1] Ageing and health n.d. https://www.who.int/news-room/fact-sheets/detail/ageing-and-health (accessed July 10, 2023).

[2] Rahman MS. Health Care in Aged Population: A Global Public Health Challenge 2019. doi:10.3329/jom.v20i2.42010.

[3] De Foor J, Senterre C, Leclercq P, Martins D, Pirson M. Profile of hospitalised elderly patients in Belgium—Analysis of factors affecting hospital costs. The Journal of the Economics of Ageing 2020;15:100209. doi:10.1016/J.JEOA.2019.100209.

[4] van der Vlegel M, Haagsma JA, Geraerds AJLM, de Munter L, de Jongh MAC, Polinder S. Health care costs of injury in the older population: a prospective multicentre cohort study in the Netherlands. BMC Geriatr 2020;20:1–11. doi:10.1186/S12877-020-01825-Z/TABLES/4.

[5] Bureau Landelijk Netwerk Acute Zorg (LNAZ). Landelijke Traumaregistratie 2018-2022 2023.

[6] Keller JM, Sciadini MF, Sinclair E, O'Toole R V. Geriatric Trauma: Demographics, Injuries, and Mortality. J Orthop Trauma 2012;26:e161–5. doi:10.1097/BOT.0B013E3182324460.

[7] Hoogendijk EO, Afilalo J, Ensrud KE, Kowal P, Onder G, Fried LP. Frailty: implications for clinical practice and public health. The Lancet 2019;394:1365–75. doi:10.1016/S0140-6736(19)31786-6.

[8] Zhao H, Tu J, She Q, Li M, Wang K, Zhao W, Huang P, Chen B, Wu J. Prognostic significance of frailty in hospitalized elderly patients with community-acquired pneumonia: a retrospective cohort study. BMC Geriatr 2023;23:1–8. doi:10.1186/S12877-023-04029-3/FIGURES/3.

[9] Vermeiren S, Vella-Azzopardi R, Beckwée D, Habbig AK, Scafoglieri A, Jansen B, Bautmans I, Bautmans I, Verté D, Beyer I, Petrovic M, De Donder L, Kardol T, Rossi G, Clarys P, Scafoglieri A, Cattrysse E, … Jansen B. Frailty and the Prediction of Negative Health Outcomes: A Meta-Analysis. J Am Med Dir Assoc 2016;17:1163.e1-1163.e17. doi:10.1016/J.JAMDA.2016.09.010.

[10] Kojima G, Liljas AEM, Iliffe S. Frailty syndrome: implications and challenges for health care policy. Risk Manag Healthc Policy 2019;12:23. doi:10.2147/RMHP.S168750.

[11] Cunha AIL, Veronese N, de Melo Borges S, Ricci NA. Frailty as a predictor of adverse outcomes in hospitalized older adults: A systematic review and meta-analysis. Ageing Res Rev 2019;56:100960. doi:10.1016/J.ARR.2019.100960.

[12] LTR FACTSHEET VAAK COMORBIDITEIT n.d.

[13] Soley-Bori M, Ashworth M, Bisquera A, Dodhia H, Lynch R, Wang Y, Fox-Rushby J. Impact of multimorbidity on healthcare costs and utilisation: a systematic review of the UK literature. The British Journal of General Practice 2021;71:e39. doi:10.3399/BJGP20X713897.

[14] van Zuilekom S, Schut RM, van Munster BC, Spies PE. Geriatrische revalidatiezorg na triage op de Spoedeisende Hulp: Patiëntkarakteristieken en revalidatie-uitkomsten. Tijdschr Gerontol Geriatr 2019;50:8–14. doi:10.36613/TGG.1875-6832/2019.01.02.

[15] Li J, Chhetri JK, Ma L. Physical resilience in older adults: Potential use in promoting healthy aging. Ageing Res Rev 2022;81:101701. doi:10.1016/J.ARR.2022.101701.

[16] Cowley A, Goldberg SE, Gordon AL, Kerr M, Logan P. Exploring rehabilitation potential in older people living with frailty: a qualitative focus group study. BMC Geriatr 2021;21:1–11. doi:10.1186/S12877-021-02107-Y/TABLES/1.

[17] Everink I. Geriatric rehabilitation: Development, implementation and evaluation of an integrated care pathway for patients with complex health problems 2017.

[18] Intiso D, Rienzo F Di, Russo M, Pazienza L, Tolfa M, Iarossi A, Maruzzi G. Rehabilitation strategy in the elderly QUALITY OF LIFE 2012. doi:10.5301/jn.5000138.

[19] World Health Organization, Pan American Health Organization. Healthy Aging n.d. https://www.paho.org/en/healthy-aging (accessed January 10, 2024).

[20] Bautmans I, Knoop V, Amuthavalli Thiyagarajan J, Maier AB, Beard JR, Freiberger E, Belsky D, Aubertin-Leheudre M, Mikton C, Cesari M, Sumi Y, Diaz T, Banerjee A. WHO working definition of vitality capacity for healthy longevity monitoring. Lancet Healthy Longev 2022;3:e789–96. doi:10.1016/S2666-7568(22)00200-8.

[21] Chhetri JK, Xue QL, Ma L, Chan P, Varadhan R. Intrinsic Capacity as a Determinant of Physical Resilience in Older Adults. J Nutr Health Aging 2021;25:1006. doi:10.1007/S12603-021-1629-Z.

[22] Colon-Emeric C, Schmader K, Cohen HJ, Morey M, Whitson H. Ageing and physical resilience after health stressors. Stress and Health 2023;39:48–54. doi:10.1002/SMI.3241.
[23] Chhetri JK, Ma L, Chan P. Physical Resilience: A novel approach for healthy aging. J Frailty Sarcopenia Falls 2022;7:29. doi:10.22540/JFSF-07-029.
[24] Colon-Emeric C, Schmader K, Cohen HJ, Morey M, Whitson H. Ageing and physical resilience after health stressors. Stress and Health 2023;39:48–54. doi:10.1002/SMI.3241.
[25] Startpagina - Comprehensive geriatric assessment (CGA) - Richtlijn - Richtlijnendatabase n.d. https://richtlijnendatabase.nl/richtlijn/comprehensive_geriatric_assessment_cga/startpagina_-_comprehensive_geriatric_assessment_cga.html (accessed April 2, 2024).
[26] Geriatrisch assessment (GA) bij CGA - Richtlijn - Richtlijnendatabase n.d. https://richtlijnendatabase.nl/richtlijn/comprehensive_geriatric_assessment_cga/geriatrisch_assessment_ga_bij_cga.html (accessed April 2, 2024).
[27] Shephard RJ. Limits to the measurement of habitual physical activity by questionnaires. Br J Sports Med 2003;37:197–206. doi:10.1136/BJSM.37.3.197.
[28] Figueredo DJ, Jacob-Filho W. Comparison between subjective and objective evaluations of self-care performance in elderly inpatients. Einstein 2018;16:eAO3987. doi:10.1590/S1679-45082018AO3987.
[29] Beard JR, Officer AM, Cassels AK. The world report on ageing and health. Gerontologist 2016;56:S163–6. doi:10.1093/geront/gnw037.
[30] Rudnicka E, Napierała P, Podfigurna A, Męczekalski B, Smolarczyk R, Grymowicz M. The World Health Organization (WHO) approach to healthy ageing. Maturitas 2020;139:6. doi:10.1016/J.MATURITAS.2020.05.018.
[31] Cesari M, De Carvalho IA, Thiyagarajan JA, Cooper C, Martin FC, Reginster JY, Vellas B, Beard JR. Evidence for the Domains Supporting the Construct of Intrinsic Capacity. The Journals of Gerontology: Series A 2018;73:1653–60. doi:10.1093/GERONA/GLY011.
[32] George PP, Lun P, Ong SP, Lim WS. A Rapid Review of the Measurement of Intrinsic Capacity in Older Adults. J Nutr Health Aging 2021;25:774–82. doi:10.1007/S12603-021-1622-6.
[33] Beard JR, Jotheeswaran AT, Cesari M, Araujo De Carvalho I. The structure and predictive value of intrinsic capacity in a longitudinal study of ageing. BMJ Open 2019;9:e026119. doi:10.1136/BMJOPEN-2018-026119.
[34] Organization WH. WHO clinical consortium on healthy ageing: topic focus: frailty and intrinsic capacity: report of consortium meeting, 1–2 December 2016 in Geneva, Switzerland 2017.
[35] WHO. International Classification of Functioning, Disability and Health (ICF) n.d. https://www.who.int/classifications/international-classification-of-functioning-disability-and-health (accessed April 16, 2024).
[36] Knoop V, Costenoble A, Debain A, Vella Azzopardi R, Vermeiren S, van Laere S, Jansen B, Scafoglieri A, Bautmans I, Verté D, Beyer I, Petrovic M, De Donder L, Kardol T, Rossi G, Clarys P, Cattrysse E, de Hert P. The interrelationship between grip work, self-perceived fatigue and pre-frailty in community-dwelling octogenarians. Exp Gerontol 2021;152:111440. doi:10.1016/J.EXGER.2021.111440.
[37] Bautmans I, Onyema O, Van Puyvelde K, Pleck S, Mets T. Grip work estimation during sustained maximal contraction: Validity and relationship with dependency and inflammation in elderly persons. J Nutr Health Aging 2011;15:731–6. doi:10.1007/S12603-010-0317-1.
[38] Benton MJ, Spicher JM, Silva-Smith AL. Validity and reliability of handgrip dynamometry in older adults: A comparison of two widely used dynamometers. PLoS One 2022;17:e0270132. doi:10.1371/JOURNAL.PONE.0270132.
[39] Alonso AC, Ribeiro SM, Silva Luna NM, Peterson MD, Bocalini DS, Serra MM, Brech GC, D'Andréa Greve JM, Garcez-Leme LE. Association between handgrip strength, balance, and knee flexion/extension strength in older adults. PLoS One 2018;13:e0198185. doi:10.1371/JOURNAL.PONE.0198185.
[40] Hershkovitz A, Yichayaou B, Ronen A, Maydan G, Kornyukov N, Burstin A, Brill S. The association between hand grip strength and rehabilitation outcome in post-acute hip fractured patients. Aging Clin Exp Res 2019;31:1509–16. doi:10.1007/S40520-019-01200-Y/METRICS.
[41] Beloosesky Y, Weiss A, Manasian M, Salai M. Handgrip strength of the elderly after hip fracture repair correlates with functional outcome. Https://DoiOrg/103109/09638280903168499 2010;32:367–73. doi:10.3109/09638280903168499.

[42] Ramírez-Vélez R, Correa-Bautista JE, García-Hermoso A, Cano CA, Izquierdo M. Reference values for handgrip strength and their association with intrinsic capacity domains among older adults. J Cachexia Sarcopenia Muscle 2019;10:278. doi:10.1002/JCSM.12373.

[43] Selakovic I, Dubljanin-Raspopovic E, Markovic-Denic L, Marusic V, Cirkovic A, Kadija M, Tomanovic-Vujadinovic S, Tulic G. Can early assessment of hand grip strength in older hip fracture patients predict functional outcome? PLoS One 2019;14. doi:10.1371/JOURNAL.PONE.0213223.

[44] Pérez-Rodríguez P, Rabes-Rodríguez L, Sáez-Nieto C, Alarcón TA, Queipo R, Otero-Puime Á, Gonzalez Montalvo JI. Handgrip strength predicts 1-year functional recovery and mortality in hip fracture patients. Maturitas 2020;141:20–5. doi:10.1016/J.MATURITAS.2020.06.013.

[45] Muhammad T, Hossain B, Das A, Rashid M. Relationship between handgrip strength and self-reported functional difficulties among older Indian adults: The role of self-rated health. Exp Gerontol 2022;165:111833. doi:10.1016/J.EXGER.2022.111833.

[46] Ramírez-Vélez R, Correa-Bautista JE, García-Hermoso A, Cano CA, Izquierdo M. Reference values for handgrip strength and their association with intrinsic capacity domains among older adults. J Cachexia Sarcopenia Muscle 2019;10:278. doi:10.1002/JCSM.12373.

[47] Arokiasamy P, Selvamani Y, Jotheeswaran AT, Sadana R. Socioeconomic differences in handgrip strength and its association with measures of intrinsic capacity among older adults in six middle-income countries. Scientific Reports 2021 11:1 2021;11:1–10. doi:10.1038/s41598-021-99047-9.

[48] Ribom EL, Mellström D, Ljunggren Ö, Karlsson MK. Population-based reference values of handgrip strength and functional tests of muscle strength and balance in men aged 70-80 years. Arch Gerontol Geriatr 2011;53. doi:10.1016/J.ARCHGER.2010.07.005.

[49] Wang YC, Bohannon RW, Li X, Yen SC, Sindhu B, Kapellusch J. Summary of grip strength measurements obtained in the 2011-2012 and 2013-2014 National Health and Nutrition Examination Surveys. J Hand Ther 2019;32:489–96. doi:10.1016/J.JHT.2018.03.002.

[50] Mendes J, Amaral TF, Borges N, Santos A, Padrão P, Moreira P, Afonso C, Negrão R. Handgrip strength values of Portuguese older adults: a population based study. BMC Geriatr 2017;17. doi:10.1186/S12877-017-0590-5.

[51] Almashaqbeh SF, Al-Momani S, Khader A, Qananwah Q, Marabeh S, Maabreh R, Al Badarneh AAB, Abdullah K. The Effect of Gender and Arm Anatomical Position on the Hand Grip Strength and Fatigue Resistance during Sustained Maximal Handgrip Effort. J Biomed Phys Eng 2022;12:171. doi:10.31661/JBPE.V0I0.2009-1197.

[52] Muneera K, Muhammad T, Pai M, Ahmed W, Althaf S. Associations between intrinsic capacity, functional difficulty, and fall outcomes among older adults in India. Sci Rep 2023;13. doi:10.1038/S41598-023-37097-X.

[53] De Dobbeleer L, Theou O, Beyer I, Jones GR, Jakobi JM, Bautmans I. Martin Vigorimeter assesses muscle fatigability in older adults better than the Jamar Dynamometer. Exp Gerontol 2018;111:65–70. doi:10.1016/J.EXGER.2018.07.004.

[54] Sipers WMWH, Verdijk LB, Sipers SJE, Schols JMGA, van Loon LJC. The Martin Vigorimeter Represents a Reliable and More Practical Tool Than the Jamar Dynamometer to Assess Handgrip Strength in the Geriatric Patient. J Am Med Dir Assoc 2016;17:466.e1-466.e7. doi:10.1016/j.jamda.2016.02.026.

[55] Neumann S, Kwisda S, Krettek C, Gaulke R. Comparison of the Grip Strength Using the Martin-Vigorimeter and the JAMAR-Dynamometer: Establishment of Normal Values. In Vivo 2017;31:917–24. doi:10.21873/INVIVO.11147.

[56] De Dobbeleer L, Swart MM, Geerds MAJ, Baggen RJ, Jansen AJS, Tielemans R, Silva H, Lieten S, Barbé K, Peeters G, Vollenbroek-Hutten MMR, Melis RJF, Bautmans I. Validity and reliability of Eforto®, a system to (self-)monitor grip strength and muscle fatigability in older persons. Aging Clin Exp Res 2023;35:835–45. doi:10.1007/S40520-023-02365-3/TABLES/4.

[57] Eforto - Eforto: innovative self-test for monitoring grip strength and muscle fatigability n.d. https://eforto.com/ (accessed July 12, 2023).

[58] Sekhon M, Cartwright M, Francis JJ. Acceptability of healthcare interventions: an overview of reviews and development of a theoretical framework. BMC Health Serv Res 2017;17. doi:10.1186/S12913-017-2031-8.

[59] Diepeveen S, Ling T, Suhrcke M, Roland M, Marteau TM. Public acceptability of government intervention to change health-related behaviours: a systematic review and narrative synthesis. BMC Public Health 2013;13:756. doi:10.1186/1471-2458-13-756.

[60] Alexandre B, Reynaud E, Osiurak F, Navarro J. Acceptance and acceptability criteria: a literature review. Cognition, Technology and Work 2018;20:165–77. doi:10.1007/S10111-018-0459-1/FIGURES/2.

[61] Nadal C, Sas C, Doherty G. Technology acceptability, acceptance and adoption-definitions and measurement n.d. doi:10.1145/nnnnnnn.nnnnnnn.

[62] Philippi P, Baumeister H, Apolinário-Hagen J, Ebert DD, Hennemann S, Kott L, Lin J, Messner EM, Terhorst Y. Acceptance towards digital health interventions – Model validation and further development of the Unified Theory of Acceptance and Use of Technology. Internet Interv 2021;26:100459. doi:10.1016/J.INVENT.2021.100459.

[63] Decormeille G, Rouleau G. Theoretical models to evaluate acceptability of technology. Science Talks 2023;5:100112. doi:10.1016/J.SCTALK.2022.100112.

[64] Venkatesh V, Morris MG, Davis GB, Davis FD. User acceptance of information technology: Toward a unified view. MIS Q 2003;27:425–78. doi:10.2307/30036540.

[65] Bozan K, Parker K, Davey B. A closer look at the social influence construct in the UTAUT Model: An institutional theory based approach to investigate health IT adoption patterns of the elderly. Proceedings of the Annual Hawaii International Conference on System Sciences 2016;2016-March:3105–14. doi:10.1109/HICSS.2016.391.

[66] Simatupang L, Solvia I, Kaban K, Lestari S, Nasution R. Analysis Of Factors Affecting The Acceptance Of Hospital Information System Using Utaut Method In Budi Kemuliaan Hospital Batam Year 2021. International Journal of Health and Pharmaceutical (IJHP) 2022;3:133–45. doi:10.51601/IJHP.V3I1.135.

[67] Brandsma T, Stoffers J, Schrijver I. Advanced Technology Use by Care Professionals. Int J Environ Res Public Health 2020;17. doi:10.3390/IJERPH17030742.

[68] Utomo P, Kurniasari F, Purnamaningsih P. The Effects of Performance Expectancy, Effort Expectancy, Facilitating Condition, and Habit on Behavior Intention in Using Mobile Healthcare Application. International Journal of Community Service & Engagement 2021;2:183–97. doi:10.47747/IJCSE.V2I4.529.

[69] Joa CY, Magsamen-Conrad K. Social influence and UTAUT in predicting digital immigrants' technology use. Behaviour and Information Technology 2022;41:1620–38. doi:10.1080/0144929X.2021.1892192.

[70] Khechine H, HagerKhechine C, Sawsen Lakhal sioulavalca. TECHNOLOGY AS A DOUBLE-EDGED SWORD: FROM BEHAVIOR PREDICTION WITH UTAUT TO STUDENTS' OUTCOMES CONSIDERING PERSONAL CHARACTERISTICS 2018;17. doi:10.28945/4022.

[71] Tsourela M, Roumeliotis M. The moderating role of technology readiness, gender, and sex in consumer acceptance and actual use of Technology-based services. The Journal of High Technology Management Research 2015;26:124–36. doi:10.1016/J.HITECH.2015.09.003.

[72] Terblanche N, Kidd M. Adoption Factors and Moderating Effects of Age and Gender That Influence the Intention to Use a Non-Directive Reflective Coaching Chatbot. Sage Open 2022;12. doi:10.1177/21582440221096136/ASSET/IMAGES/LARGE/10.1177_21582440221096136-FIG4.JPEG.

[73] Ammenwerth E. Technology Acceptance Models in Health Informatics: TAM and UTAUT. Stud Health Technol Inform 2019;263:64–71. doi:10.3233/SHTI190111.

[74] Venkatesh V, Thong JYL, Xu X. Consumer acceptance and use of information technology: Extending the unified theory of acceptance and use of technology. MIS Q 2012;36:157–78. doi:10.2307/41410412.

[75] Gundumogula M, Gundumogula M. Importance of Focus Groups in Qualitative Research. International Journal of Humanities and Social Science (IJHSS) 2020;8:299–302. doi:10.24940/THEIJHSS/2020/V8/I11/HS2011-082.

[76] Plummer-D'Amato P. Focus group methodology Part 1: Considerations for design. Https://DoiOrg/1012968/Ijtr200815228189 2013;15:69–73. doi:10.12968/IJTR.2008.15.2.28189.

[77] RESilience in Hip frActure Patients measured with the Eforto(R) measurement n.d.

[78] Weerbaarheid in heupfractuurpatiënten gemeten met het Eforto meet- en monitoringsysteem. | Onderzoek met mensen n.d. https://onderzoekmetmensen.nl/nl/trial/49900 (accessed July 25, 2024).

[79] Ifenthaler D, Schweinbenz V. The acceptance of Tablet-PCs in classroom instruction: The teachers' perspectives. Comput Human Behav 2013;29:525–34. doi:10.1016/J.CHB.2012.11.004.

[80] Gruzd A, Staves K, Wilk A. Connected scholars: Examining the role of social media in research practices of faculty using the UTAUT model. Comput Human Behav 2012;28:2340–50. doi:10.1016/J.CHB.2012.07.004.
[81] Braun V, Clarke V. Using thematic analysis in psychology. Qual Res Psychol 2006;3:77–101. doi:10.1191/1478088706QP063OA.
[82] Gagliardi AR, Alhabib S. Trends in guideline implementation: a scoping systematic review. Implement Sci 2015;10:54. doi:10.1186/S13012-015-0247-8/TABLES/1.
[83] Hamburg MA, Collins FS. The Path to Personalized Medicine. New England Journal of Medicine 2010;363:301–4. doi:10.1056/NEJMP1006304/SUPPL_FILE/NEJMP1006304_DISCLOSURES.PDF.
[84] Garrison LP, Towse A. Value-Based Pricing and Reimbursement in Personalised Healthcare: Introduction to the Basic Health Economics. J Pers Med 2017;7. doi:10.3390/JPM7030010.
[85] Kraaijkamp JJM, Persoon A, Aurelian S, Bachmann S, Cameron ID, Choukou MA, Dockery F, Eruslanova K, Gordon AL, Grund S, Kim H, Maier AB, Pérez Bazan LM, Pompeu JE, Topinkova E, Vassallo MA, Chavannes NH, … Van Dam van Isselt EF. eHealth in Geriatric Rehabilitation: An International Survey of the Experiences and Needs of Healthcare Professionals. J Clin Med 2023;12:4504. doi:10.3390/JCM12134504.
[86] Ross J, Stevenson F, Lau R, Murray E. Factors that influence the implementation of e-health: A systematic review of systematic reviews (an update). Implementation Science 2016;11:1–12. doi:10.1186/S13012-016-0510-7/TABLES/3.
[87] Schreiweis B, Pobiruchin M, Strotbaum V, Suleder J, Wiesner M, Bergh B. Barriers and Facilitators to the Implementation of eHealth Services: Systematic Literature Analysis. J Med Internet Res 2019;21. doi:10.2196/14197.
[88] Firth A, Bryant D, Menetrey J, Getgood A. Health Measurement Development and Interpretation. Basic Methods Handbook for Clinical Orthopaedic Research: A Practical Guide and Case Based Research Approach 2019:111–20. doi:10.1007/978-3-662-58254-1_13.
[89] Macdonald R, Mieke S. Metrology in Medicine. Digital Encyclopedia of Applied Physics 2011:383–408. doi:10.1002/3527600434.EAP704.
[90] Peters DH, Adam T, Alonge O, Agyepong IA, Tran N. Implementation research: what it is and how to do it. BMJ 2013;347:731–6. doi:10.1136/BMJ.F6753.
[91] Benschop ML. Veerkracht na een heupfractuur : De acceptatie van het Eforto® systeem door heupfractuurpatiënten. 2023.
[92] Letink M. Herstel in de acute fase na een heupfractuur : De adoptie van het Eforto® meetsysteem voor het voorspellen en monitoren van functioneel herstel door zorgverleners van klinische heupfractuurpatiënten 2022.
[93] Kruschka R. Physiotherapists' Acceptability Towards a Monitoring Tool for Muscle Fatigability in Hip Fracture Clients 2023.
[94] Hove P ten. Eforto® voor herstel op de geriatrie 2022.
[95] Essex R, Kennedy J, Miller D, Jameson J. A scoping review exploring the impact and negotiation of hierarchy in healthcare organisations. Nurs Inq 2023;30:e12571. doi:10.1111/NIN.12571.
[96] Boddy CR. Sample size for qualitative research. Qualitative Market Research 2016;19:426–32. doi:10.1108/QMR-06-2016-0053/FULL/PDF.
[97] Vasileiou K, Barnett J, Thorpe S, Young T. Characterising and justifying sample size sufficiency in interview-based studies: Systematic analysis of qualitative health research over a 15-year period. BMC Med Res Methodol 2018;18:1–18. doi:10.1186/S12874-018-0594-7/TABLES/3.
[98] Sandelowski M. Sample size in qualitative research. Res Nurs Health 1995;18:179–83. doi:10.1002/NUR.4770180211.
[99] Adeoye-Olatunde OA, Olenik NL. Research and scholarly methods: Semi-structured interviews. Journal of the American College of Clinical Pharmacy 2021;4:1358–67. doi:10.1002/JAC5.1441.
[100] Cairns-Lee H, Lawley J, Tosey P. Enhancing Researcher Reflexivity About the Influence of Leading Questions in Interviews. Journal of Applied Behavioral Science 2022;58:164–88. doi:10.1177/00218863211037446.
[101] Hunter D, McCallum J, Howes D. Defining Exploratory-Descriptive Qualitative (EDQ) research and considering its application to healthcare 2019. doi:10.5176/2345-7198_4.1.202.

[102] Dwivedi YK, Rana NP, Jeyaraj A, Clement M, Williams MD. Re-examining the Unified Theory of Acceptance and Use of Technology (UTAUT): Towards a Revised Theoretical Model. Information Systems Frontiers 2019;21:719–34. doi:10.1007/S10796-017-9774-Y/TABLES/1.
[103] Acocella I. The focus groups in social research: Advantages and disadvantages. Qual Quant 2012;46:1125–36. doi:10.1007/S11135-011-9600-4/METRICS.
[104] Lambert SD, Loiselle CG. Combining individual interviews and focus groups to enhance data richness. J Adv Nurs 2008;62:228–37. doi:10.1111/J.1365-2648.2007.04559.X.

Figure references

Figure 1

[21] Chhetri JK, Xue QL, Ma L, Chan P, Varadhan R. Intrinsic Capacity as a Determinant of Physical Resilience in Older Adults. J Nutr Health Aging 2021;25:1006–11. doi:10.1007/S12603-021-1629-Z.

Figure 2

[42] Ramírez-Vélez R, Correa-Bautista JE, García-Hermoso A, Cano CA, Izquierdo M. Reference values for handgrip strength and their association with intrinsic capacity domains among older adults. J Cachexia Sarcopenia Muscle 2019;10:278. doi:10.1002/JCSM.12373.

Figure 3

[57] Eforto - Eforto: innovative self-test for monitoring grip strength and muscle fatigability n.d. https://eforto.com/ (accessed July 12, 2023).

Figure 4

[64] Venkatesh V, Morris MG, Davis GB, Davis FD. User acceptance of information technology: Toward a unified view. MIS Q 2003;27:425–78. doi:10.2307/30036540.

Abbreviation index

Abbreviation	Definition
IC	Intrinsic capacity
GW	Grip work
WHO	World Health Organization
PR	Physical resilience
GS	Grip strength
GSmax	Maximum grip strength
ZGT Almelo	Ziekenhuisgroep Twente Almelo
CvGT	Centre for geriatric traumatology
RESHAPE	RESilience Hip fracture patiEnts study
BRR	Bedside Resiliance Registry
BUTTERFLY	BrUssels sTudy on The Early pRedictors of FraiLtY
UTAUT	Unified theory of acceptance and use of technology
ICU	Intensive Care Unit

Appendix A: UTAUT interview scheme – Dutch

Voorafgaand

U heeft de informatiebrief ontvangen met hierin het doel van dit onderzoek. Heeft u nog vragen over iets uit de informatiebrief of het onderzoek in het algemeen?

Voordat het interview start, zou ik uw toestemming willen vragen voor het afnemen van dit interview en het maken van een audio opname. *Geef consent formulier mocht die nog niet ondertekend zijn.*

Introductie

Start opname

Welkom bij dit interview. Allereerst bedankt dat u deel wilt nemen aan het onderzoek naar de acceptatie van de Eforto® in het ZGT.

Algemene vragen

Om te beginnen, zijn er eerst wat algemene achtergrond vragen.

- Wat is uw leeftijd?
- Met welk geslacht identificeert u zich?
- Wat is uw titel / beroep?
- Hoe lang werkt u in uw huidige professie?
- Hoe staat u tegenover het gebruik van technologie in de ziekenhuiszorg?

Technologie vragen

Naast wat algemene achtergrondvragen, zijn we benieuwd naar uw ervaringen met medische technologie in het algemeen.

De definitie van medische technologie is: medische technologie gaat over producten, technologieën en toepassingen, die worden gebruikt bij de diagnose, behandeling en ondersteuning van ziekten en gebreken

1. Welke ervaringen of kennis heeft u met het gebruik van medische technologie?
2. Hoe komt u achter het bestaan van nieuwe medische technologie?
3. Wat is volgens u het belang van medische apparaten in de ziekenhuiszorg?
4. Wat is de visie van inzet van medische technologie en apparatuur op uw afdeling?
    a. Sluit deze visie aan bij uw persoonlijke visie?
5. Wanneer u denkt aan het gebruik van medische technologie in de ziekenhuiszorg: welke factoren zijn voor u van belang bij maken van een keuze voor het een of andere technologie?

Eforto® uitleg

Dit onderzoek focust zich op de Eforto. De Eforto® is een handgrijpkracht apparaatje, waarbij de handgrijpkracht van de patient gemeten kan worden. Dit gebeurt door te knijpen in de bol, waarna de gemeten waarde zichtbaar zijn op de bijbehorende app. De metingen bestaan uit drie keer een

maximale kracht meting en eenmaal een uithoudingsmeting, waarbij geprobeerd moet worden om zo lang mogelijk ten minste 50% van de maximale handgrijpkracht vast gehouden wordt.

De waardes van de handgrijpkracht kunnen inzicht geven in de intrinsieke capaciteit van een patient. De intrinsieke capaciteit verwijst naar de combinatie van iemands fysieke en mentale vermogen. Hoe beter de intrinsieke capaciteit van iemand is, hoe beter hij/zij kan functioneren in het dagelijks leven.

Op dit moment wordt er onderzoek gedaan naar de Eforto® en de relatie van de handgrijpkracht en intrinsieke capaciteit. De eerste resultaten van de afdeling CvGT beloven een positief oordeel over het gebruik van de Eforto® om de intrinsieke capaciteit van ouderen te monitoren. Daarom gaan we vanaf hier ook uit van:

- Het Eforto®-apparaat is effectief in het meten van de grijpkracht van een oudere patiënt.

- Het Eforto®-apparaat geeft nauwkeurig de relatie weer tussen grijpkracht en de intrinsieke capaciteit van een oudere patiënt.

Acceptatie vragen

De komende vragen gaan over de intentie om de Eforto® op de werkvloer te gebruiken. Deze vragen gaan over wat u zou verwachten of welke ondersteuning er nodig is om de Eforto® te kunnen toepassen.

(schuin gedrukte worden worden niet zo genoemd, maar geven structuur aan de interviewer)

Uitkomstverwachting

- Zou u het gebruiken van de Eforto® nuttig vinden tijdens u werk?
- Zou het gebruik van de Eforto® u in staat stellen om taken sneller te voltooien?
- Zou het gebruik van de Eforto® uw productiviteit verhogen?

Inspanningsverwachting

- Zou het omgaan met de Eforto® duidelijk en begrijpelijk voor u zijn?
- Is het voor u gemakkelijk om met de Eforto® om te gaan?
- Is het voor u gemakkelijk om de Eforto® te hanteren?
- Is het voor u gemakkelijk om vaardig te worden in de Eforto?

Faciliterende condities

- Verwacht u de benodige middelen beschikbaar te hebben om gebruik te maken van de Eforto?
- Verwacht u de kennis te hebben om gebruik te maken van de Eforto?
    - Wat heeft u hiervoor nodig om deze kennis te verkrijgen?
- Verwacht u dat de Eforto® compatibel is met andere apparaten die u gebruikt?
- Verwacht u dat er een persoon of groep aanwezig moet zijn voor ondersteuning bij het gebruik van de Eforto® waar nodig?
    - Zijn er vooroplopers of ambassadeurs op jouw afdeling die als aanspreekpunt/ondersteuning kunnen/willen dienen voor de inzet van Eforto'?

Sociale invloed

- Welke mensen beïnvloeden uw keuze voor het gebruik van een medisch technologie?

- Zouden mensen die uw gedrag beïnvloeden vinden dat u gebruik moet maken van de Eforto?
- Zouden mensen die voor u belangrijk zijn vinden dat u gebruik moet maken van de Eforto?
- Wat zou de directie van uw afdeling vinden van het gebruik van de Eforto?
- Over het algemeen, zou deze organisatie het gebruik van de Eforto® steunen?

Open vragen

Is uw afdeling klaar voor de inzet van de Eforto? Welke stappen moeten hiervoor nog ondernomen worden?

Welke barriers (kennisgebrek, taal, vaardigheden etc.) zouden er mogelijk zijn tijdens het gebruik van de Eforto?

Hoe zou u instructie willen ontvangen over het gebruik van de Eforto? (*lessenpakket, cursus, 1-op-1 instructie, individueel, groep)*

Algemene afsluitende vraag

Om het interview af te sluiten, stellen we de laatste vraag.

Heeft u nog vragen en/of opmerkingen over dit interview?

Dankjewel voor uw deelname. Dit geeft ons meer inzicht in de mogelijke draagvlak van de Eforto® binnen het ZGT. De komende tijd zullen we deze resultaten verwerken en publiceren. Dit wordt in de algehele Forto studie meegenomen om de validiteit van de Eforto® te bepalen.

Appendix B: Focus group scheme – Dutch

1. Welkom
2. Introductie
3. Zelf werken met Eforto
4. Discussie
    a. Zelf werken
    b. Verdieping interviews

Benodigdheden

- Ruimte
- Consentformulieren
- Eforto® x2 of x3
- Pennen
- Koffie/thee
- Cake/koek
- Audio recorder x2 of x3
- Aantekeningblad
- Scenario's uitgeprint

Tijdsplanning

08.30	Inloop
08.40	Start welkom + consentformulier + start audio
08.45	Welkom heten + introductie rondje
08.50	Uitleg doel vandaag en herhaling Eforto
08.55	Start zelf oefenen met Eforto
09.05	Start scenario nadoen met Eforto
09.15	Discussie (terug in cirkel)
09.55	Afsluiting en bedankrondje

Focusgroep onderdelen

Welkom

Consentformulieren

Uitleg consent en tekenen formulieren

- Iedereen welkom heten
- Koffie/thee/koek
- Nogmaals voorstellen
    - Naam, functie, leeftijd
- Rogers's vraag (via dia)

Introductie

Welkom bij deze focus group! De afgelopen tijd hebben er interviews plaatsgevonden over de Eforto® op de afdelingen IC, Cardio en Geriatrie. Via deze weg nogmaals erg bedankt hiervoor!

Doel vandaag

Aan de hand van deze interviews willen we vandaag gebruiken om een verdiepende slag te maken rondom de Eforto. Dit zullen we doen door jullie zelf kennis te laten maken met de Eforto® waarna een gesprek plaats vindt rondom een aantal zaken van de Eforto.

Herhaling uitleg Eforto

Dit onderzoek focust zich op de Eforto. De Eforto® is een handgrijpkracht apparaatje, waarbij de handgrijpkracht van de patient gemeten kan worden. Dit gebeurt door te knijpen in de bol, waarna de gemeten waarde zichtbaar zijn op de bijbehorende app. De metingen bestaan uit drie keer een maximale kracht meting en eenmaal een uithoudingsmeting, waarbij geprobeerd moet worden om zo lang mogelijk ten minste 50% van de maximale handgrijpkracht vast gehouden wordt.

De waardes van de handgrijpkracht kunnen inzicht geven in de intrinsieke capaciteit van een patient. De intrinsieke capaciteit verwijst naar de combinatie van iemands fysieke en mentale vermogen. Hoe beter de intrinsieke capaciteit van iemand is, hoe beter hij/zij kan functioneren in het dagelijks leven.

Op dit moment wordt er onderzoek gedaan naar de Eforto® en de relatie van de handgrijpkracht en intrinsieke capaciteit. De eerste resultaten van de afdeling CvGT beloven een positief oordeel over het gebruik van de Eforto® om de intrinsieke capaciteit van ouderen te monitoren. Daarom gaan we vanaf hier ook uit van:

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- Het Eforto®-apparaat geeft nauwkeurig de relatie weer tussen grijpkracht en de intrinsieke capaciteit van een oudere patiënt.

Zelf werken met Eforto

1. Werk zelf met de Eforto® zonder instructie. Volg de stappen vanuit de app en denk hardop over wat je merkt/ziet/voelt/vindt
2. Volg een van de scenario's vanuit jouw rol als zorgprofessional. Denk hardop over wat je merkt/ziet/voelt/vindt

Scenario 1 – prehabilitatie

De heer Jansen (73 jaar oud) bereidt zich voor op een oncologische operatie en ondergaat prehabilitatie om zijn lichaam zo goed mogelijk voor te bereiden op de ingreep en het herstel daarna. De heer Jansen heeft onlangs de diagnose van darmkanker gekregen en zijn medische team heeft besloten dat een operatie noodzakelijk is om de tumor te verwijderen.

Met de steun van zijn medische team en zijn dierbaren heeft de heer Jansen zich toegewijd aan een prehabilitatieprogramma om zijn lichaam te versterken en zijn algehele gezondheid te optimaliseren voor de operatie. Dit programma omvat een combinatie van fysiotherapie, voedingsadvies en mentale ondersteuning.

De fysiotherapeut heeft een op maat gemaakt trainingsprogramma opgesteld om de spierkracht, mobiliteit en uithoudingsvermogen van de heer Jansen te verbeteren. Hij volgt regelmatig sessies waarin hij oefeningen uitvoert om zijn spieren te versterken en zijn conditie te verbeteren, waardoor hij beter in staat zal zijn om de operatie te doorstaan en het herstel daarna te versnellen.

De fysio zet de Eforto® wekelijks in om te meten hoe het ervoor staat met de handgrijpkracht van de heer Jansen. Dit geeft de fysio inzicht in de revalidatie na de operatie.

Scenario 2 – verminderdere kracht

Mevrouw De Vries (82 jaar oud) ligt op de intensive care (IC) van het ZGT nadat ze een ernstige respiratoire infectie heeft opgelopen. Mevrouw De Vries heeft al geruime tijd last van verminderde kracht en mobiliteit als gevolg van haar leeftijd en onderliggende gezondheidsproblemen, waaronder diabetes type 2 en hartfalen. Haar toestand verslechterde snel, waardoor ze op de IC werd opgenomen voor intensieve zorg en monitoring.

Op de IC wordt mevrouw De Vries continu bijgestaan. Ondanks de beste zorg en behandelingen, heeft mevrouw De Vries nog steeds weinig kracht en energie. Ze heeft moeite met eenvoudige dagelijkse taken zoals zichzelf omdraaien in bed of het vasthouden van voorwerpen.

Sinds de start van de opname, neemt een verpleegkundige dagelijks een Eforto® test af om de intrinsieke capaciteit te monitoren. De gemeten kracht blijft telkens erg laag.

Discussie

<u>Ervaring van net</u>

- Wat vond je van het gebruik van de Eforto?
- Wat ging gemakkelijk?
- Wat ging gemoeilijk?
- Zouden je patiënten ermee om kunnen gaan?
- Geeft de Eforto® toegevoegde informatie?

<u>Verdieping interviews</u>

- Wat zou de Eforto® toevoegen?
    - Globale indruk
    - Onderbuikgevoel
- Wat wil je dat de Eforto® toevoegt?
- Verschilt de Eforto® met wat je al dagelijk ziet / meet

- Voldoet de Eforto® aan jouw gestelde eisen?
    - Patientvriendelijk
    - Robuust
    - Effectief
    - Makkelijk in gebruik
    - Korte afname
    - Brede inzetbaarheid
    - Draagvlak binnen team

- Hoe is de rolverdeling bij de Eforto?
    - Wie doet wat?
- Wat is de rol van de patiënt bij de Eforto?
    - Zelf redzaam
    - Ondersteunend
- Wie zou deze test af moeten nemen?
    - Zorgassistent
- Hoe vaak moet de Eforto® afgenomen worden?

- Voor welke doeleinden zou de Eforto® ingezet kunnen worden?
    - Prehabilitatie
    - Bepalen einde behandeling

- Wat heb je nodig om met de Eforto® aan de slag te kunnen?
    - Koppeling HIX
- Om het onder de knie te krijgen, wat heb je hiervoor nodig?
    - E Learning
    - Training
    - Hulpbank

Appendix C: Deepening interviews design – Dutch

Welkom

Consentformulieren

Uitleg consent en tekenen formulieren

Introductie

Welkom bij deze focus group! De afgelopen tijd hebben er interviews plaatsgevonden over de Eforto® op de afdelingen IC, Cardio en Geriatrie. Via deze weg nogmaals erg bedankt hiervoor!

Doel vandaag

Aan de hand van de afgenomen interviews willen we vandaag gebruiken om een verdiepende slag te maken rondom de Eforto. Dit zal gebeuren door dieper in te gaan op wat jullie van de Eforto® denken en dat te vergelijken met de resultaten.

Herhaling uitleg Eforto

Dit onderzoek focust zich op de Eforto. De Eforto® is een handgrijpkracht apparaatje, waarbij de handgrijpkracht van de patient gemeten kan worden. Dit gebeurt door te knijpen in de bol, waarna de gemeten waarde zichtbaar zijn op de bijbehorende app. De metingen bestaan uit drie keer een maximale kracht meting en eenmaal een uithoudingsmeting, waarbij geprobeerd moet worden om zo lang mogelijk ten minste 50% van de maximale handgrijpkracht vast gehouden wordt.

De waardes van de handgrijpkracht kunnen inzicht geven in de intrinsieke capaciteit van een patient. De intrinsieke capaciteit verwijst naar de combinatie van iemands fysieke en mentale vermogen. Hoe beter de intrinsieke capaciteit van iemand is, hoe beter hij/zij kan functioneren in het dagelijks leven.

Op dit moment wordt er onderzoek gedaan naar de Eforto® en de relatie van de handgrijpkracht en intrinsieke capaciteit. De eerste resultaten van de afdeling CvGT beloven een positief oordeel over het gebruik van de Eforto® om de intrinsieke capaciteit van ouderen te monitoren. Daarom gaan we vanaf hier ook uit van:

- Het Eforto®-apparaat is effectief in het meten van de grijpkracht van een oudere patiënt.

- Het Eforto®-apparaat geeft nauwkeurig de relatie weer tussen grijpkracht en de intrinsieke capaciteit van een oudere patiënt.

Zelf werken met Eforto

3. Werk zelf met de Eforto® zonder instructie. Volg de stappen vanuit de app en denk hardop over wat je merkt/ziet/voelt/vindt
4. Volg een van de scenario's vanuit jouw rol als zorgprofessional. Denk hardop over wat je merkt/ziet/voelt/vindt

Discussie

<u>Ervaring van net</u>

- Wat vond je van het gebruik van de Eforto?
- Wat ging gemakkelijk?
- Wat ging gemoeilijk?
- Zouden je patiënten ermee om kunnen gaan?
- Geeft de Eforto® toegevoegde informatie?

<u>Verdieping interviews</u>

Waar verwacht jij de meerwaarde van de inzet van Eforto?

Wat is het doel van de Eforto® in de dagelijkse praktijk?

- Prehabilitatie
- Keuze behandeling door zetten of niet
- Monitoren revalidatie
- Beloop patiënt
- Voorspellende waarde

Knijpkracht kan dienen als een indicatie voor het nemen van het besluit om al dan niet over te gaan tot een ingreep.

De knijpkrachtmeting kan worden ingezet als onderdeel van het 'shared decision making' proces.

    - Bepalen einde behandeling

- Wat zou de Eforto® toevoegen?
- Wat wil je dat de Eforto® toevoegt?
- Verschilt de Eforto® met wat je al dagelijk ziet / meet
- Voldoet de Eforto® aan jouw gestelde eisen?
- Hoe is de rolverdeling bij de Eforto?
    - Wie doet wat?
- Wat is de rol van de patiënt bij de Eforto?
- Wie zou deze test af moeten nemen?

Zou de Eforto® iets toevoegen voor de patientengroep op de IC

- Waarom wel of niet?
    - *Ziet niet direct de meerwaarde voor IC-patiënten.*
    - *Mogelijk veel beïnvloede factoren bij toepassing op IC patiënten, bijv. invloed van pijnmedicatie op de handknapkracht*
    - *Mogelijk meerwaarde van de meeting zou gezocht kunnen worden in het ook pre-operatie meten van de handknijpkracht (thuismetingen voorafgaand op de opname op de IC) om als indicator mee te kunnen nemen in het behandelbesluit.*

- Wat heb je nodig om met de Eforto® aan de slag te kunnen?
    - Koppeling HIX

- Om de Eforto® onder de knie te krijgen, wat is er nodig voor het personeel?
    - Scholing

Interview 002

Welkom

Consentformulieren

Uitleg consent en tekenen formulieren

Introductie

Welkom bij deze focus group! De afgelopen tijd hebben er interviews plaatsgevonden over de Eforto® op de afdelingen IC, Cardio en Geriatrie.

Doel vandaag

Aan de hand van de afgenomen interviews willen we vandaag gebruiken om een verdiepende slag te maken rondom de Eforto. Dit zal gebeuren door dieper in te gaan op wat jullie van de Eforto® denken en dat te vergelijken met de resultaten.

Herhaling uitleg Eforto®

Dit onderzoek focust zich op de Eforto®. De Eforto® is een handgrijpkracht apparaatje, waarbij de handgrijpkracht van de patient gemeten kan worden. Dit gebeurt door te knijpen in de bol, waarna de gemeten waarde zichtbaar zijn op de bijbehorende app. De metingen bestaan uit drie keer een maximale kracht meting en eenmaal een uithoudingsmeting, waarbij geprobeerd moet worden om zo lang mogelijk ten minste 50% van de maximale handgrijpkracht vast gehouden wordt.

De waardes van de handgrijpkracht kunnen inzicht geven in de intrinsieke capaciteit van een patient. De intrinsieke capaciteit verwijst naar de combinatie van iemands fysieke en mentale vermogen. Hoe beter de intrinsieke capaciteit van iemand is, hoe beter hij/zij kan functioneren in het dagelijks leven.

Op dit moment wordt er onderzoek gedaan naar de Eforto® en de relatie van de handgrijpkracht en intrinsieke capaciteit. De eerste resultaten van de afdeling CvGT beloven een positief oordeel over het gebruik van de Eforto® om de intrinsieke capaciteit van ouderen te monitoren. Daarom gaan we vanaf hier ook uit van:

- Het Eforto®-apparaat is effectief in het meten van de grijpkracht van een oudere patiënt.

- Het Eforto®-apparaat geeft nauwkeurig de relatie weer tussen grijpkracht en de intrinsieke capaciteit van een oudere patiënt.

Algemeen Eforto

Wat is jouw indruk over de Eforto?

Waar verwacht jij de meerwaarde van de inzet van Eforto?

- Voorspellende waarde?
- Wat zou de Eforto® toevoegen?
    - Globale indruk
    - Onderbuikgevoel
- Wat wil je dat de Eforto® toevoegt?
- Verschilt de Eforto® met wat je al dagelijk ziet / meet
- Voldoet de Eforto® aan jouw gestelde eisen?

Wat is het doel van de Eforto® in de dagelijkse praktijk?

- Prehabilitatie
- Keuze behandeling door zetten of niet
- Monitoren revalidatie
- Beloop patiënt
- Voorspellende waarde

Voor welke patiënten zou de Eforto® een toegevoegde waarde?

Inzet Eforto

- Wie?
    - Fysiotherapeut
    - Verpleegkundige in kliniek
- Hoe vaak?
    - Max 3 keer
    - Rondom operatie
    - Vlak voor ontslag
        - Hoe kan je hem dan als voorspellende waarde gebruiken?
    - Spierveranderingen eens in de zes weken
- Wanneer?
    - Voor de lunch
        - Maar aantal onderzoeken al uitgevoerd en bijv. nachtrust kan de test beïnvloeden.
- Link tussen dokters en verpleegkundige / fysio

Andere afdelingen

- Welke afdelingen zijn geschikt?
    - Hoe verschilt de patientgroep hierbij?
- Is er een verschil tussen de acute en niet – acute zorg?

Appendix D: Information letter and consent forms interviews – Dutch

Proefpersoneninformatie voor deelname aan wetenschappelijk onderzoek

Forto studie

De acceptatiebereidheid onder zorgprofessionals in het ZGT om veerkracht in oudere patiënten te meten met het Eforto® meet- en monitoringsysteem

Geachte heer/mevrouw,

Met deze informatiebrief willen we u vragen of u wilt meedoen aan een wetenschappelijk onderzoek. Participatie is vrijwillig.

U leest hier om wat voor onderzoek het gaat, wat het voor u betekent, en wat de voordelen en nadelen zijn. Wilt u de informatie doorlezen en beslissen of u wilt meedoen?

Stel uw vragen

Mocht u na het lezen van deze informatiebrief nog vragen hebben, dan kunt u deze vragen altijd aan de onderzoekers stellen.

Doel van het onderzoek

Dit onderzoek wordt uitgevoerd als master thesis door Arina van Rijswijk. Supervisors zijn Anne van Dongen (Universiteit Twente) en Robin Bekhuis (ZGT – Smart up Innovation)

Het doel van dit onderzoek is om de gebruiksintentie van de Eforto® te onderzoeken binnen Ziekenhuis Groep Twente – Almelo voor het meten van de intrinsieke capaciteit (een maat voor alle fysieke en mentale capaciteiten van een persoon) bij ouderen in de ziekenhuiszorg.

De onderzoeksgegevens zullen toegepast worden in het Eforto® project: Forto 2.0: Het ontwikkelen van een meet- en monitoringplatform met een geïntegreerde slimme zelfevaluatie om "Veerkrachtdoelstellingen bij ouderen te monitoren" met projectnummer 735200001. De verzamelde data en verkregen resultaten zullen voorkomen in de publicaties voort komend uit dit onderzoeksproject.

Hoe gaan we te werk?

U neemt deel aan een onderzoek waarbij we informatie zullen vergaren door:

- U te interviewen en uw antwoorden op te nemen via een audio-opname. Er zal ook een transcript worden uitgewerkt van het interview.

Potentiële risico's en ongemakken

- Er zijn geen fysieke, juridische of economische risico's verbonden aan uw deelname aan deze studie. U hoeft geen vragen te beantwoorden die u niet wilt beantwoorden. Uw deelname is vrijwillig en u kunt uw deelname op elk gewenst moment stoppen.

Vergoeding

U ontvangt voor deelname aan dit onderzoek geen vergoeding.

Vertrouwelijkheid van gegevens

Wij doen er alles aan uw privacy zo goed mogelijk te beschermen. Daarvoor worden uw gegevens zoveel mogelijk geanonimiseerd, tenzij u in ons toestemmingsformulier expliciet toestemming heeft gegeven voor het vermelden van uw functie, bijvoorbeeld bij een quote.

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De onderzoeksgegevens worden bewaard voor een periode van 10 jaar. Uiterlijk na het verstrijken van deze termijn zullen de gegevens worden verwijderd.

De onderzoeksgegevens worden indien nodig (bijvoorbeeld voor een controle op wetenschappelijke integriteit) en alleen in anonieme vorm ter beschikking gesteld aan personen buiten de onderzoeksgroep.

Tot slot is dit onderzoek beoordeeld en goedgekeurd door de ethische commissie van de faculteit BMS (domain Humanities & Social Sciences) en maakt deel uit van de studie Forto 2.0 project.

U heeft de mogelijkheid om toestemming te geven of de resultaten van dit onderzoek gebruikt mogen worden voor andere onderzoeken binnen de Forto 2.0 studie. Te allen tijde zullen de gegevens geanonimeerd gedeeld worden.

Vrijwilligheid

Deelname aan dit onderzoek is geheel vrijwillig. U kunt als deelnemer uw medewerking aan het onderzoek te allen tijde stoppen, of weigeren dat uw gegevens voor het onderzoek mogen worden gebruikt, zonder opgaaf van redenen. Het stopzetten van deelname heeft geen nadelige gevolgen voor u.

Als u tijdens het onderzoek besluit om uw medewerking te staken, zullen de gegevens die u reeds hebt verstrekt tot het moment van intrekking van de toestemming in het onderzoek gebruikt worden.

Wilt u stoppen met het onderzoek, of heeft u vragen en/of klachten? Neem dan contact op met de onderzoeksleider.

Onderzoeksleider:

Dr. Anne van Dongen

Email: a.vandongen@utwente.nl of telefonisch op +31 53 4893116.

Voor bezwaren met betrekking tot de opzet en of uitvoering van het onderzoek kunt u zich ook wenden tot de Secretaris van de Ethische Commissie / domein Humanities & Social Sciences van de faculteit Behavioural, Management and Social Sciences op de Universiteit Twente via ethicscommittee-hss@utwente.nl. Dit onderzoek wordt uitgevoerd vanuit de Universiteit Twente, faculteit Behavioural, Management and Social Sciences. Indien u specifieke vragen hebt over de omgang met persoonsgegevens kun u deze ook richten aan de Functionaris Gegevensbescherming van de UT door een mail te sturen naar dpo@utwente.nl.

Tot slot heeft u het recht een verzoek tot inzage, wijziging, verwijdering of aanpassing van uw gegevens te doen bij de Onderzoeksleider.

1. **Bijlagen bij deze informatie**

A. Contactgegevens

B. Toestemmingsformulier

Bijlage A: Contactgegevens voor Ziekenhuisgroep Twente

Onderzoekers

Arina van Rijswijk

- Student
- c.e.vanrijswijk@student.utwente.nl

Anne van Dongen

- Universiteit Twente begeleiding
- a.vandongen@utwente.nl

Robin Bekhuis

- ZGT Almelo begeleiding
- ro.bekhuis@zgt.nl

Onafhankelijk deskundige

Dr. E. Folbert, verpleegkundig specialist 088-708 3997, e.folbert@zgt.nl

Functionaris voor de Gegevensbescherming

D. Oldenkotte 088-708 7878, gegevensbescherming@zgt.nl

Klachten

Klachtenbemiddeling ZGT, Postbus 7600, 7600 SZ Almelo.

De klachtenbemiddelaars zijn bereikbaar via telefoonnummer 088 708 5783. Als u dringende vragen heeft kan u deze stellen door een e-mail te sturen naar: klachten@zgt.nl.

Bijlage B: Toestemmingsformulier deelnemer

Door dit toestemmingsformulier te ondertekenen erken ik het volgende:

1. Ik ben voldoende geïnformeerd over het onderzoek door middel van een separaat informatieblad. Ik heb het informatieblad gelezen en heb daarna de mogelijkheid gehad vragen te kunnen stellen. Deze vragen zijn voldoende beantwoord.

2. Ik neem vrijwillig deel aan dit onderzoek. Er is geen expliciete of impliciete dwang voor mij om aan dit onderzoek deel te nemen. Het is mij duidelijk dat ik deelname aan het onder- zoek op elk moment, zonder opgaaf van reden, kan beëindigen. Ik hoef een vraag niet te beantwoorden als ik dat niet wil.

Naast het bovenstaande is het hieronder mogelijk voor verschillende onderdelen van het onderzoek specifiek toestemming te geven. U kunt er per onderdeel voor kiezen wel of geen toestemming te geven. Indien u voor alles toestemming wil geven, is dat mogelijk via de aanvinkbox onderaan de stellingen.

Ik geef toestemming om de gegevens die gedurende het onderzoek bij mij worden verzameld te verwerken zoals is opgenomen in het bijgevoegde informatieblad.	Ja ☐	Nee☐
Ik geef toestemming om een audio opname te maken van het interview en deze te verwerken tot een transcriptie.	Ja ☐	Nee☐
Ik geef toestemming om mijn antwoorden geanomiseerd te gebruiken voor quotes in de onderzoekspublicaties	Ja ☐	Nee☐
Ik geef toestemming om mijn gegevens te bewaren om dit te gebruiken voor ander onderzoek binnen het Forto project, zoals in de informatiebrief staat.	Ja ☐	Nee☐
Ik geef toestemming om mij eventueel na dit onderzoek te vragen of ik wil meedoen met een vervolgonderzoek.	Ja ☐	Nee☐

Ik wil meedoen aan dit onderzoek.

Mijn naam is (deelnemer):

Handtekening: Datum: ____ / ____ / ____

Ik verklaar dat ik deze proefpersoon volledig heb geïnformeerd over het genoemde onderzoek.

Als er tijdens het onderzoek informatie bekend wordt die de toestemming van de proefpersoon zou kunnen beïnvloeden, dan breng ik hem/haar daarvan tijdig op de hoogte.

Naam onderzoeker (of diens vertegenwoordiger):

Handtekening: Datum: ____ / ____ / ____

Appendix E: Information letter and consent forms focus groups – Dutch

Proefpersoneninformatie voor deelname aan wetenschappelijk onderzoek

Forto studie

De acceptatiebereidheid onder zorgprofessionals in het ZGT om veerkracht in oudere patiënten te meten met het Eforto® meet- en monitoringsysteem

Geachte heer/mevrouw,

Met deze informatiebrief willen we u vragen of u wilt meedoen aan een wetenschappelijk onderzoek. Participatie is vrijwillig.

U leest hier om wat voor onderzoek het gaat, wat het voor u betekent, en wat de voordelen en nadelen zijn. Wilt u de informatie doorlezen en beslissen of u wilt meedoen?

Stel uw vragen

Mocht u na het lezen van deze informatiebrief nog vragen hebben, dan kunt u deze vragen altijd aan de onderzoekers stellen.

Doel van het onderzoek

Dit onderzoek wordt uitgevoerd als master thesis door Arina van Rijswijk. Supervisors zijn Anne van Dongen (Universiteit Twente) en Robin Bekhuis (ZGT – Smart up Innovation)

Het doel van dit onderzoek is om de gebruiksintentie van de Eforto® te onderzoeken binnen Ziekenhuis Groep Twente – Almelo voor het meten van de intrinsieke capaciteit (een maat voor alle fysieke en mentale capaciteiten van een persoon) bij ouderen in de ziekenhuiszorg.

De onderzoeksgegevens zullen toegepast worden in het Eforto® project: Forto 2.0: Het ontwikkelen van een meet- en monitoringplatform met een geïntegreerde slimme zelfevaluatie om "Veerkrachtdoelstellingen bij ouderen te monitoren" met projectnummer 735200001. De verzamelde data en verkregen resultaten zullen voorkomen in de publicaties voort komend uit dit onderzoeksproject.

Hoe gaan we te werk?

U neemt deel aan een onderzoek waarbij we informatie zullen vergaren door:

- Uw deelname aan een focusgroep en uw gesprek op te nemen via een audio-opname. Er zal ook een transcript worden uitgewerkt van de focusgroep.

Potentiële risico's en ongemakken

- Er zijn geen fysieke, juridische of economische risico's verbonden aan uw deelname aan deze studie. U hoeft geen vragen te beantwoorden die u niet wilt beantwoorden. Uw deelname is vrijwillig en u kunt uw deelname op elk gewenst moment stoppen.

Vergoeding

U ontvangt voor deelname aan dit onderzoek geen vergoeding.

Vertrouwelijkheid van gegevens

Wij doen er alles aan uw privacy zo goed mogelijk te beschermen. Daarvoor worden uw gegevens zoveel mogelijk geanonimiseerd, tenzij u in ons toestemmingsformulier expliciet toestemming heeft gegeven voor het vermelden van uw functie, bijvoorbeeld bij een quote.

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Onderzoeksleider:

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2. **Bijlagen bij deze informatie**

   C. Contactgegevens

   D. Toestemmingsformulier

Bijlage A: Contactgegevens voor Ziekenhuisgroep Twente

Onderzoekers

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Anne van Dongen

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Mijn naam is (deelnemer):

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Naam onderzoeker (of diens vertegenwoordiger):

Handtekening: Datum: ____ / ____ / ____

Code group	Sub group	Sub sub group	Definition
Background			
	Attitude towards technology		What is their attitude towards technology
		Positive attitude	Positive attitude and their attributes
		Negative attitude	Negative attitude and their attributes
		Dependence	How do they experience the dependence on the technology
	Age		Years of age of participant
	Factors choosing new technology		What factors influence the decision for choosing a new technology
		User-friendly for professional	
		Benefits and costs	
		Effective for patient	
		User-friendly for patient	
		Other	
	Profession		
		Current profession	What is their current profession
		Years of experience	
		Patient group	What is their average patient, characteristics of their patient group
		Experience with hand grip strength	What is their experience with hand grip strength
		Background profession	What is their background
	Initator of technology		At what rate do they adopt to new technologies
		Initator	They lead and initiate
		Waiting intiator	They wait for someone else and then follows
		Reluctant	They wait for the majority
	Experiencies technology		What is the experiences with technology
		Experience with technology	Their overall experience with technology
		Finding new technology	How do they find new technologies

Code group	Level 1	Level 2	Definition
Performance expectancy			
	Outcome expectancy		What do they think the Eforto will bring as an outcome
		Insight capacity patient	Insight into the patients capacity
		Monitoring progression	Monitoring the patients progression
		Motivator rehabilitation	Motivator for the rehabilitation
		Predictive for treatment	Can be used as predictor for treatment course
	Added advantages		What is the added advantage to use the Eforto in daily practice
		Objectifying observations	How can the Eforto help to objectify the observations
		Productivity	What is the influence of the Eforto on the productivity of the professionals
		Usefullness	How would the Eforto be of use for the professionals and/or patients
		Gap solution	Where would the Eforto be of use that currently is not possible
	Barriers		What are the barriers for using the Eforto
		Validity	The validaity of the measured data
		Interpretation of data	How to interpretent the measured data and the results
	Department		For which patients can the Eforto be used
		Patient group	For which group of patients can the Eforto be used
		Patient characteristics	For which patient characteristics can the Eforto be used

Code group	Level 1	Level 2	Definition
Effort expectancy			
	Use of Eforto		What do they think of the use of the Eforto
		Positive expectation	They expect a positive experience
		Negative expectation	They expect a negative experience
		Postive experience	They experienced a positive experience
		Negative experience	They experienced a negative experience
		Future experiences	What would influence the continuous use of Eforto
	Practical use		
		Test taker	Who takes the Eforto tests
		Time of test taking	How much time will the Eforto need
		Frequency of test taking	How often should the Eforto test be taken
		Moment of test taking	When do they expect the Eforto test to be taken
		Data presentation	How do they want the data to be presented
		Historic data	How would they proceed with historic data of the Eforto
	Eforto		What do they mention about the Eforto it self
		Device	The mentions about the device itself
		Device user friendliness	How user friendly is the Eforto
		Goal of Eforto	What do they mention about the overall goal of the Eforto itself

Code group	Level 1	Level 2	Definition
Social influence			
	Colleagues		How would the support of colleagues influence their choice for the Eforto
		Colleagues general	What did the participants describe about the colleagues in general, not necessary the support
		Positive support	The influence and possibility of positive support
		Negative support	The influence and possibility of negative support
	Influence professions		Which professions would influence their use
		Unithead	The influence of the unithead
		Working groups	The influence of the working groups
		No influence	No influence needed or expected
		Other influence	Influence of others

Code group	Level 1	Level 2	Definition
Facilitating conditions			
	Support		What would they need in terms of support
		Technical support	Some form of technical support
		Other support	Other support needed
	Requirements		What is required to implement the Eforto
		Required interpretation of data	How to interpretend the measured data
		HIX connection	A connection with HiX
		Treatment instructions	How to take the test from the patient
		Other	Other requirements
	Compatability		Is the Eforto compatable with the other technology
	Education		What kind of education would they like to receive
		Practical education	The mentions about practical education
		E-Learning	The mentions about e-learning
		Other education	Other types of education mentioned
	Barriers		What kind of barriers would be there for implementing
	Future wishes		What kind of future wishes do they have for the Eforto