RESEARCH PROTOCOL

The added value of an internet-based intervention for treatment of aggression in forensic psychiatric outpatients

Protocol for a multicentre, randomized controlled trial

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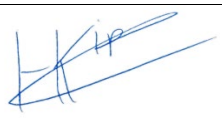
Sponsor or legal representative: *Hanneke Kip, PhD* *Assistant professor*		**01-03-2022**
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LIST OF ABBREVIATIONS AND RELEVANT DEFINITIONS

ABR	**General Assessment and Registration form (ABR form), the application form that is required for submission to the accredited Ethics Committee; in Dutch: Algemeen Beoordelings- en Registratieformulier (ABR-formulier)**
AE	**Adverse Event**
AR	**Adverse Reaction**
AVL-AV	**Aangepaste Versie van de Agressie Vragenlijst**
CA	**Competent Authority**
CCMO	**Central Committee on Research Involving Human Subjects; in Dutch: Centrale Commissie Mensgebonden Onderzoek**
CV	**Curriculum Vitae**
CVTRQ	**Corrections Victoria Treatment Readiness Questionnaire**
DSMB	**Data Safety Monitoring Board**
EU	**European Union**
EudraCT	**European drug regulatory affairs Clinical Trials**
FARE	**Forensisch Ambulante Risico Evaluatie**
GCP	**Good Clinical Practice**
GDPR	**General Data Protection Regulation; in Dutch: Algemene Verordening Gegevensbescherming (AVG)**
IB	**Investigator's Brochure**
IC	**Informed Consent**
IMP	**Investigational Medicinal Product**
IMPD	**Investigational Medicinal Product Dossier**
METC	**Medical research ethics committee (MREC); in Dutch: medisch-ethische toetsingscommissie (METC)**
RCT	**Randomized Controlled Trial**
RESE	**Regulatory Emotional Self-efficacy scale**
(S)AE	**(Serious) Adverse Event**
SPC	**Summary of Product Characteristics; in Dutch: officiële productinformatie IB1-tekst**
Sponsor	**The sponsor is the party that commissions the organisation or performance of the research, for example a pharmaceutical**

	company, academic hospital, scientific organisation or investigator. A party that provides funding for a study but does not commission it is not regarded as the sponsor, but referred to as a subsidising party.
SUSAR	**Suspected Unexpected Serious Adverse Reaction**
TAU	**Treatment as usual**
TWEETS	**TWente Engagement with Ehealth and Technologies Scale**
UAVG	**Dutch Act on Implementation of the General Data Protection Regulation; in Dutch: Uitvoeringswet AVG**
WMO	**Medical Research Involving Human Subjects Act; in Dutch: Wet Medisch-wetenschappelijk Onderzoek met Mensen**

SUMMARY

Rationale: While internet-based interventions have been used for over ten years in Dutch forensic psychiatric outpatient care, no thorough evaluation study has been conducted yet. Studies on internet-based interventions in other mental healthcare sectors show promising results: they can increase the quality and efficiency of care. However, it is not clear if, why and for whom these interventions work in forensic mental healthcare. It is especially important to study whether these interventions are of added value for this complex patient population, known for its low treatment motivation, co-morbidity and low literacy levels.

Objective: The primary objective of this study is to investigate whether the addition of the internet-based intervention 'Aggression' to forensic psychiatric outpatient treatment as usual (TAU) results in better treatment outcomes in terms of self-reported regulatory emotional self-efficacy, treatment readiness, and aggression. Additionally, it is investigated whether the experimental group requires fewer treatment sessions and improves more on dynamic risk factors. Furthermore, to gain more insight into for whom these interventions work, it is investigated whether engagement with the internet-based intervention predicts adherence and effectiveness. Finally, this study aims to explore reasons for the (in)effectiveness of the intervention according to patients and therapists.

Study design: To investigate if the use of internet-based interventions is of added value for treatment of forensic psychiatric outpatients, a multicenter, non-blinded, parallel groups, randomized controlled trial design is used. Patients fill out three short self-report questionnaires four times: at baseline, mid-treatment (+6 weeks), post-treatment (+14 weeks) and at follow-up (+26 weeks). Semi-structured interviews with a randomly selected sample of 20 patients from the experimental condition and with all participating therapists are conducted to explain the results of the RCT.

Study population: The target group of this study consists of forensic psychiatric outpatients, treated in four Dutch organizations for aggression regulation problems.

Intervention (if applicable): This study investigates the existing internet-based intervention Aggression, which was introduced in forensic mental healthcare over ten years ago. However, as is the case with other internet-based interventions, uptake in practice remains relatively low. 'Aggression' is used as an addition to treatment as usual, and thus does not replace any part of treatment in this study. The intervention is earlier developed by the CE-certified company Minddistrict. The last couple of months the intervention has been cosmetically adjusted in close cooperation with therapists, patients and other stakeholders so that it fits the current design and lay-out of Minddistrict. The goals of this intervention are to (1) increasing the motivation to change, (2) acquiring skills for dealing with conflict, and (3) breaking the cycle of aggression by providing knowledge on situational, emotional, cognitive

and physical triggers. It contains ten lessons, each containing written texts, videos and audio files, and short written assignments on which the therapist can give feedback.

Main study parameters/endpoints: All participants fill out three validated, short self-report questionnaires on self-efficacy, treatment readiness and aggression at four points during the study. Participants in the experimental conditions also fill out an engagement questionnaire during the use of the intervention. Dynamic risk factors are assessed via a risk assessment instrument that is already used as a standard part of treatment according to Dutch guidelines and the number of treatment sessions are retrieved from existing systems. The patient and therapist perspective is take in into account by means of semi-structured interviews.

Nature and extent of the burden and risks associated with participation, benefit and group relatedness: Since participants only have to fill out short questionnaires and are compensated for their time, participating in this study is not viewed as a major burden. Furthermore, the interventions of Minddistrict have been used for over ten years in mental healthcare, during which no risks or adverse events have been observed. Because –not all forensic psychiatric patients receive internet-based interventions as part of their standard care and because these interventions are not yet evaluated and are thus not evidence-based, participants in the control condition are not deprived of effective treatment. During the entire study, experienced therapists monitor the patient's progress. Finally, multiple precautions are taken to ensure that patients are aware that the decision to participate does not have any effect on their treatment progress. Consequently, the burdens and risks associated with this study are low or even non-existent.

1. INTRODUCTION AND RATIONALE

Forensic mental healthcare is a complex branch of care which takes place at the intersection of psychiatry and law [1-3]. In forensic psychiatry, patients that show aggressive or sexual delinquent behaviour and have one or more concurrent psychiatric disorders are treated. Both in- and outpatients are often treated mandatory, as part of a sentence, which can result in overall low treatment motivation [4, 5]. Additionally, a relatively large share of the forensic psychiatric patient population has low cognitive and adaptive skills and often suffer from multiple psychiatric disorders [6-9]. These factors highlight the complexity of treating forensic psychiatric patients. While treatment, guided by for example the Risk-Need-Responsivity model, has resulted in lower recidivism rates, there numbers are not as low as desirable [10-12]. Furthermore, when looking at the use of cognitive behavioural therapy (CBT) in this group, effectiveness rates for CBT for aggression are lower than those for treatment of for example anxiety [13, 14]. Besides these complicating factors, there also is a shortage of healthcare providers, while there also is an increase in forensic psychiatric patients that require treatment [15]. In general, it becomes clear that there is room for improvement in treatment for these vulnerable patients.

In clinical practice, eHealth interventions are used to address the aforementioned challenges. The past ten years, Dutch forensic psychiatric organizations have especially invested in internet-based interventions, with the expectation that these interventions can increase efficiency and quality of forensic mental healthcare [16, 17]. Internet-based interventions are often based on evidence-based treatment models such as CBT and present the user with knowledge and skills via multiple lessons with e.g. multi-media such as videos, written assignments and short texts [18]. While users can work on these digital interventions independently, the therapist can provide written feedback on the assignments. Over the past years, different types of these interventions have been introduced and used in Dutch forensic mental healthcare [19, 20]. Existing internet-based interventions are focused on e.g. aggression, offense scripts and prevention plans, addiction, or violence in relationships [21]. Even though these digital interventions have been integrated in forensic mental healthcare for almost ten years, their effectiveness in Dutch outpatients has never been studied. In line with this, a scoping review on technology in treatment of offenders has shown that these interventions are also hardly evaluated in other countries [16]. The very few evaluation studies that were conducted focused on inpatients in for example prisons or clinics, while a large share of the patient population is treated at outpatient clinics. Consequently, this very complex and vulnerable target group is underrepresented in intervention research.

Even though there is an obvious and urgent need for more research on the effectiveness of these interventions in forensic mental healthcare, existing evidence suggests that this form of eHealth might have advantages for forensic patients. In the

aforementioned review, 13 studies evaluated effectiveness of internet-based interventions in experimental designs [16]. Of these studies,10 showed that these interventions were at least as effective as standard care or more effective than a waiting list condition, while 3 studies found no evidence for effectiveness. This means that the most of the few existing studies have shown the effectiveness of these interventions in treatment of offenders. In addition to that, systematic reviews on digital interventions in mental healthcare in general show comparable findings. For example, if used well, internet-based interventions focused on a broad range psychiatric and somatic disorders result in comparable outcomes as face-to-face interventions [22, 23]. Additionally, qualitative research with therapists and patients has identified multiple experienced benefits for patients. Examples are receiving better and more tailored information about the problematic behaviour via multimedia such as videos or assignments, attributing change to one's own work on the intervention as opposed to just the therapist, and acquiring more tools on dealing with aggression by means of tips and assignments [19, 21]. Consequently, while earlier research suggests that these interventions might work for forensic mental healthcare as well [16], there is a need to study them in Dutch forensic outpatient care, since earlier findings cannot simply be generalized to this complex and highly specialized branch of care. Additionally, internet-based interventions are often studied in a fully online way and separately from treatment, while in practice, they are used in a blended way, i.e. integrated in treatment [24].

While no robust effectiveness studies have been conducted on the use of internet-based interventions in forensic outpatient care, earlier research has provided several useful insights and recommendations. First, a straightforward recommendation is to study the effectiveness of internet-based interventions in clinical practice to gain insight into whether they work [17, 19]. However, merely gaining insight in effectiveness does not fully answer all questions that arise from research and practice. Consequently, a second recommendation is related to the use of these interventions. A recent study on implementation of these internet-based interventions in forensic outpatient care has shown that adherence to them is low: most patients don't complete all lessons of a intervention and a large share drops out after one session [21]. While an important reason for this is that therapists forget to introduce these modules to patients and do not integrate and discuss them in treatment sessions, explanations for non-adherence might also be found in patient characteristics. This highlights the importance of research that determines if and how we can predict if a patient drops out of the intervention. A third recommendation is related to the 'what works for whom' question. Therapists indicate that internet-based interventions do not seem to fit the entire forensic psychiatric population, but can be of added value for some patients. However, this is merely based on clinical experiences and subjective estimations: there has not been research on this topic yet. In other words: up until now, there is no clear explanation of why an

intervention might work for one, but not for another patient. Socio-demographics do not provide satisfactory answers to questions regarding what works for whom. Research shows that engagement might be a novel and useful factor that might provide insight into why interventions work for specific patients [25, 26]. Engagement refers to the extent to which someone is involved or occupied with something, and is often related to a positive outcome. In relation to eHealth, it can serve as a predictor for adherence and engagement [25, 26]. However, the role of engagement in internet-based interventions has not been studied in forensic mental healthcare. Fourth, even if internet-based interventions are shown to be effective, it has proven to be very challenging to implement them in clinical practice. Research on the implementation of these interventions in forensic mental healthcare has indeed shown that implementation is suboptimal [21]. Qualitative, in-depth research into experiences and needs of not only patients, but also therapists is required to gain more insight into implementation barriers and potential activities.

It is clear that there is a pressing need for research into if, why and for whom internet-based interventions work. Qualitative research has highlighted several potential benefits of internet-based interventions that require further research [19, 21]. These outcomes were mostly related to aggression regulation, since this is an important and large part of outpatient treatment. In general, therapists did see multiple advantages, but indicated that they did not expect any major improvements due to these interventions: they were mostly expected to slightly bolster the effectiveness of existing treatment, mostly by providing patients with more tools to work on their treatment independently. Because of this, changes might be attributed to the patient's own effort as opposed to that of the therapist, which could benefit ***self-efficacy*** towards behaviour change. Additionally, internet-based interventions offer multiple ways of acquiring knowledge and skills that are tailored to the target group, such as multi-media, written assignments and peer-stories. This is done to accommodate different types of learning that better fit the patient than face-to-face treatment sessions and can thus also increase the patient's confidence in regulating their aggression. Furthermore, therapists also expected that these intervention can positively affect ***treatment readiness*** of patients because they can support the patient in gaining insight into their problems and defining their own goals. Being responsible for their own treatment by working on an internet-based intervention individually, and gaining more insight into their own behaviour, might influence their sense of ownership and motivation to work on their treatment. Therapists, patients and researchers expect that this potential increase in self-efficacy and treatment readiness could facilitate actual behaviour change: ***aggression*** might decrease due to the independence, knowledge, insights and skills that are acquired by means of these interventions [17]. This can result in decreased risk for recidivism, reflected in an improved score on ***risk assessment instruments***. Finally, it is also expect that, if used well, these

interventions might result in more ***efficient treatment*** because part of face-to-face treatment can be replaced by the internet-based intervention [21, 27]. However, for all of these expectations goes that they are based on qualitative research.

Besides potential advantages of internet-based interventions, there are also critical views on these interventions. These are partly related to an expected misfit between the mostly language-driven interventions and relatively low educated and generally unmotivated patient population [21, 27, 28]. In general, therapists identify a broad range of improvements of these interventions, related to their content, the design, and the integration in clinical practice [21]. Robust evaluation research is required to investigate whether these internet-based interventions are of added value for forensic outpatient care and to answer questions about adherence, engagement, effectiveness and implementation barriers

The present study aims to fill the current gap in research on internet-based interventions in forensic psychiatric outpatient care. By evaluating an existing intervention that is already used in practice by means of a robust randomized controlled trial design, this study will have high clinical relevance and impact on practice. We will study the existing, evidence-based internet-based intervention ‘Aggression’, which contains 10 lessons and thus takes 10 weeks. Furthermore, our quantitative and qualitative results will provide valuable points of improvements for the content and design of the intervention and for its integration in forensic outpatient care. This type of research is especially relevant for forensic psychiatric patients: a vulnerable yet underrepresented target group that requires better, more fitting and evidence-based treatment to increase their quality of live, prevent recidivism and thus also protect society.

2. OBJECTIVES

Primary objective

The primary objective of this study is to investigate whether the addition of the internet-based intervention ‘Aggression’ to forensic psychiatric outpatient treatment as usual (TAU) results in better treatment outcomes on the short and long term than patients that only receive TAU.

Secondary objectives

The secondary objectives are:

1. To determine if there is more improvement in improvement regulatory emotional self-efficacy, treatment readiness, and aggression in the experimental than control group during, directly after completing, and three months after completing the internet-based intervention ‘Aggression’.
2. To determine if there is more improvement on dynamic risk in the experimental than the control group after completing the internet-based intervention ‘Aggression’.
3. To determine if the number of face-to-face treatment contacts over a period of 37 weeks is lower in the experimental than the control group.
4. To determine if the level of engagement with the intervention measured at the beginning, halfway and at the end of the internet-based intervention Aggression, and the adherence to the intervention, is a predictor for effectiveness.
5. To map experiences with the internet-based intervention Aggression of forensic psychiatric patients that followed (part of) the intervention.
6. To map experiences with the internet-based intervention Aggression of therapists that used the intervention in at least five patients.

3. STUDY DESIGN

3.1 Study design

Even though internet-based interventions are being used on a large scale and for a fairly long time, there have not been any robust evaluation studies in forensic mental healthcare. There have been small non-scientific pilots in single organizations and several mostly qualitative studies on their implementation [19-21]. A randomized controlled trial (RCT) in which the intervention as an addition to treatment as usual (TAU) compared to a control group that only receives TAU is a suitable research methods to evaluate whether the addition of these types of internet-based interventions adds to the effectiveness of treatment [29]. RCTs are viewed as a suitable research method - even the golden standard - when studying effectiveness of interventions. In order to also gain insight into why this might be the case and what points of improvements are, qualitative data will be collected as well [30]. In this study, interviews with patients and therapists are conducted after data-analysis of the RCT to ask them about reasons for the (in)effectiveness of the internet-based intervention and implementation conditions. In this way, the perspectives of patients and therapists– both essential for successful use of internet-based interventions – are integrated in the study. Furthermore, a multicenter approach is used to increase the feasibility of the study and to ensure that findings are not just based on one outpatient clinic and thus are more generalizable.

Consequently, to investigate if the use of the internet-based interventions Aggression is of added value for in-person treatment of forensic psychiatric outpatients, a multicenter, non-blinded, parallel groups randomized controlled trial design is used.

3.2 Setting of the study

This multicenter study will take place in four Dutch forensic psychiatric organizations that offer forensic psychiatric outpatient care: Stichting Transfore, Kairos, de Woenselse Poort and GGZ Noord-Holland Noord.

This study is initiated and will be coordinated by Stichting Transfore, an organization that has the goal to be frontrunner in developing and providing eHealth in forensic care. Transfore has participated actively on the development of multiple Minddistrict modules and other eHealth interventions. Additionally, Transfore has been inducting multiple implementation- and evaluation research, to – among other things – internet-based interventions. GGZ Noord-Holland-Noord started experimenting with internet therapy in 2001. Nowadays, multiple applications of eHealth are integrated in treatment methods. Together with other GGZ-providers, GGZ Noord-Holland-Noord developed multiple (forensic) modules for the Minddistrict platform. De Woenselse Poort is part of GGzE and is also a frontrunner on

innovation in (forensic) mental healthcare. Many of their projects are focused on eHealth: Minddistrict, mobile apps and virtual reality. Kairos is part of Pompestichting which has been inducting research on multiple areas for many years. Their main focus lies on technology and innovation, and other ways to improve treatment methods.

3.3 Overview of the study design

A schematic overview of the participant flow throughout the RCT, from screening up until follow-up assessment, is provided in Figure 1. The study design is briefly explained after the figure; a more detailed description of the procedure is provided in section 8.3.

The flow of the participants throughout the RCT is visualized in Figure 1. The first step, therapists will first ***screen*** the patients on suitability when they are first discussed in a 'multidisciplinary consultation' [multidisciplinair overleg; MDO]. Once the patient has been deemed suitable for participation, the therapists waits 8 weeks before ***introducing*** the study to the patient and asks for their consent to be contacted by a researcher. The main reason for not directly informing the patients during their intake or initial treatment sessions, is that patients already receive a lot of information at the beginning of their treatment, and thus often feel overwhelmed. Additionally, in practice, Minddistrict is often introduced later in the treatment process, because it often takes time to build a good therapeutic relationship, which is seen as a necessary requirement for starting with blended treatment, especially in a population known for its low treatment motivation.

If the patient agrees to be contacted by a researcher for further information about the study and possible inclusion, they will be contacted by phone, videoconferencing or in-person, depending on the preference of the patient. The researcher will inform them about participation and the consequences on being randomized to either the control or experimental condition. The researcher will clearly communicate that patients who are assigned to the control condition can still use an internet-based intervention after the study is finished. Furthermore, the researcher will clearly indicate that the decision to participate or drop out of the study will not affect their treatment or evaluation of their therapist. After informing the patient by means of a conversation and folder, the researcher will ask for their informed consent in participating. Next, the patient fills out the baseline assessment (T0) and is randomized to the control condition - which comprises forensic psychiatric treatment as usual (TAU) for aggression regulation, or the experimental condition, in which the internet-based intervention 'Aggression' is used as a supplement to TAU.

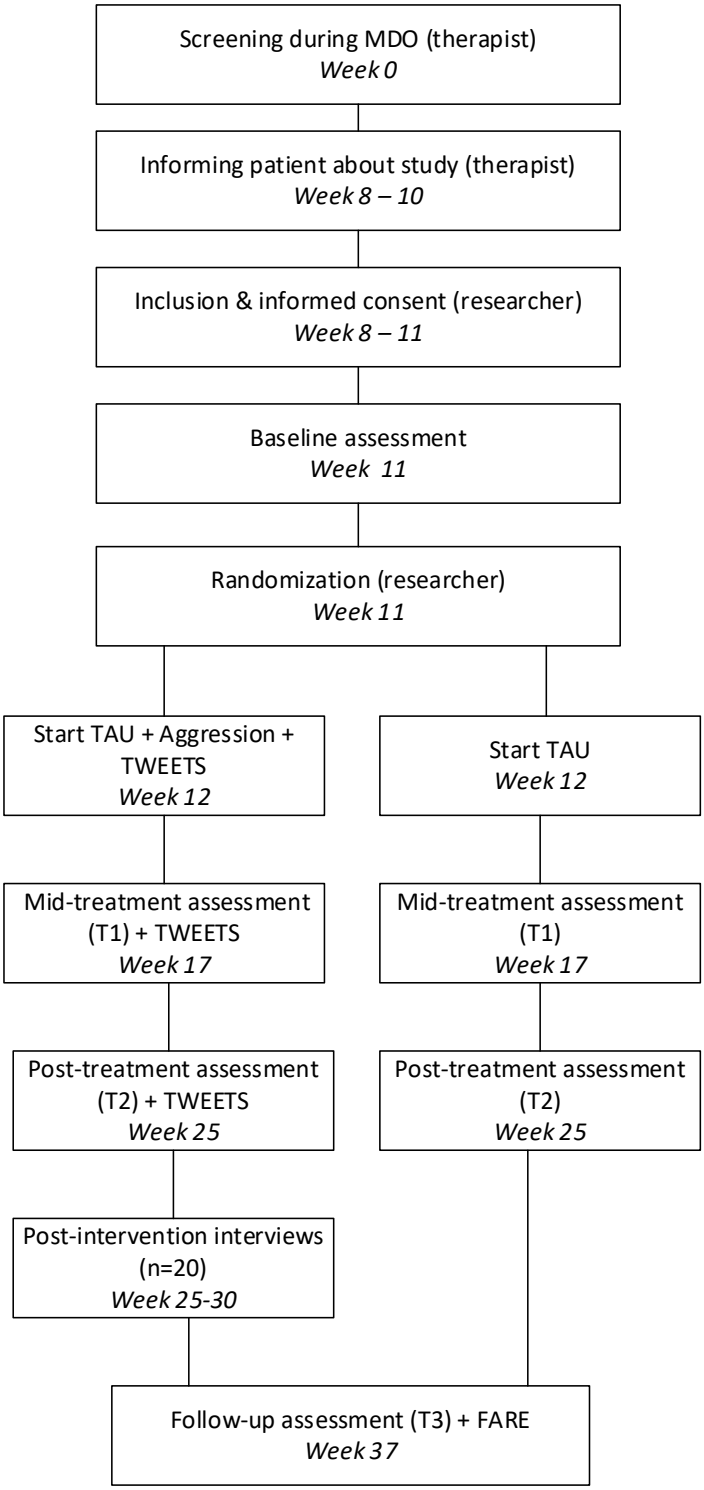
Patients will start with the Aggression module after approximately 12 weeks: this might exceed to a maximum of 14 weeks, if the patient for example is not able to start yet or misses several treatment sessions – which happens often in forensic mental healthcare. Participants are assessed four times throughout the study. They are first assessed at

baseline (T0), i.e. in week 12. A mid-treatment assessment (T1) is conducted when participants are supposed to be halfway throughout the internet-based intervention, i.e. 6 weeks after baseline, so in week 17. After completing the intervention, post-treatment assessment will be conducted. If participants complete a lesson per week, the intervention should be finished after 11 weeks. However, in practice, this often is not the case, for example because the patient misses treatment sessions or other psychosocial crises can arise that have priority. Consequently, post-treatment assessment will take place 14 weeks after baseline, i.e. in week 25. Finally, a follow-up assessment will be conducted. This assessment will take place 3 months after T2, so during week 37 of the entire study.

At all assessment points, patients will fill out three self-report questionnaires via Qualtrics: Regulatory Emotional Self-efficacy (RESE) scale [31], the Corrections Victoria Treatment Readiness Questionnaire (CVTRQ): a validated self-reported questionnaire [32], and the Dutch version of the Aggression Questionnaire (AVL-AV) [33, 34]. Participants in the experimental condition also fill out the the TWente Engagement with Ehealth and Technologies Scale (TWEETS) [35] at the beginning, halfway and at the end of the internet-based intervention Aggression. Furthermore, the scores of the risk assessment instrument 'Forensisch Ambulante Risico Evaluatie (FARE) [36] - which is part of standard procedures – will be used to assess change in dynamic risk factors in all participants .

Additionally, a qualitative interview study with 20 patients will be conducted to gain insight into their experiences, perceived positive and negative points, and points of improvements regarding the internet-based intervention. These participants will be randomly selected from the sample that started the experimental condition by means of a random number generator. These interviews will take place within 5 weeks after post-treatment assessment (T2), i.e. during week 25-30 of this study. Finally, all participating therapists will be sent an open-ended questionnaire to ask them similar questions about experiences, perceived positive and negative points, and points of improvements. These questionnaires will be send at the end of the data collection period, i.e. in Q2 2023.

Figure 1: *Participant flow throughout the RCT*



4. STUDY POPULATION

4.1 Population (base)

Description of the population base

Forensic mental healthcare is focused on people who display aggressive or sexual delinquent behaviour that led or could lead to offending and simultaneously suffer from at least one psychiatric disorder, for example schizophrenia, alcohol abuse, antisocial personality disorder or post-traumatic stress-disorder [1-3]. Due to this combination of offending and psychiatric disorders, forensic mental healthcare - or forensic psychiatry - takes place at the intersect of mental healthcare and the law. Forensic mental healthcare encompasses treatment of both in- and outpatients. Inpatients reside in clinics with different levels of security, ranging from very high levels, where patients are not or almost never allowed to go on leave, to medium or low levels, where patients have more freedom and independence [37]. While relatively many forensic psychiatric patients receive treatment at inpatient clinics, a large share of the patient population comprises outpatients who live at home and receive treatment at an outpatient clinic [38]. Some patients receive treatment voluntarily and not as part of a sentence, for example when a general practitioner refers them to forensic mental healthcare because it fits their aggression regulation problems better than regular mental healthcare. Regardless of the differences between security levels, the main goal of forensic mental healthcare is always to prevent (re)offending and thus to protect society. Treatment of forensic psychiatric patients is viewed as challenging, which can be partly explained by characteristics of the patient population: most forensic psychiatric patients are not that motivated for their treatment [4, 5]. Furthermore, they often have followed no or very little education and many patients have low literacy levels [6-8]. Additionally, co-morbidity is common: patients often have multiple psychiatric disorders [9]. In general, the forensic psychiatric patient population is very heterogeneous, but the main common factor is that for all patients, there is a risk on (re)offending.

This study is focused on people that receive forensic psychiatric outpatient care with a primary focus on aggression. To increase the feasibility and generalizability of this study, inclusion takes place at four large forensic psychiatric organizations that all treat patients at multiple outpatient clinics.

4.2 Inclusion criteria

In order to be eligible to participate in this study, a subject must meet all of the following criteria:

1) The patient is 18 years or older
2) The patient is treated at an outpatient clinic
3) The patient receives one-on-one treatment
4) During the intake, improvement of aggression regulation has been selected as one of the treatment objectives
5) The patient indicates that they are able to read and write simple texts
6) The therapist responsible for treatment of the patient indicates that participating will not result in any harm for the patient
7) The patient voluntarily consents to participation

4.3 Exclusion criteria

A potential subject who meets any of the following criteria will be excluded from participation in this study:

1) The patient has a current psychosis
2) The patient resides in any type of psychiatric inpatient clinic – this can be a forensic, but also another type of clinic
3) The patient receives group treatment focused on aggression regulation (specifically: AR [aggressieregulatie] op maat)
4) The patient is analphabetic, i.e. being unable to read and write
5) The responsible therapists identifies any other valid reason for exclusion

As can be seen in the in- and exclusion criteria, the responsible therapist is actively involved in determining whether participating in the study is safe and possible for the patient. This will first be discussed during the MDO. If, after several treatment sessions, the therapist identifies any reasons for exclusion, this will be communicated to the researcher and the patient will not be invited to participate.

Because the internet-based intervention ‘Aggression’ is transdiagnostic and is not focused on one psychiatric disorder, no psychiatric disorders were used to define the target group. This is also not feasible because forensic psychiatric patients are not enrolled in forensic mental healthcare for a diagnosis, but because of their delinquent behaviour. Additionally, many patients have multiple diagnosis: co-morbidity is relatively high in this target group. By keeping the in- and exclusion criteria relatively broad, patients from a large sample can be included, increasing the feasibility of this study.

4.4 Sample size calculation

This sample size calculation is conservatively based on the ability to detect at least a moderate effect of Cohen's *d* =.50 on the primary outcomes at follow-up (T3). A power analysis was conducted with G*power. The analysis was conducted with a moderate effect size of 0.5, a β-power of .8, a p-value of 5%, and an independent two-sided t-test as method of analysis. This analysis showed that 64 patients need to be included in each condition. This means that a total of 128 patients needs to be included. Accounting for a drop-out of 20%, the goal for inclusion is set at a total of 154 patients. It is important to note that participants in the experimental condition are considered as a 'drop-out' when they don't fill out the questionnaires at all measuring moments, not when they stop using the intervention. In other words: patients can stop using the intervention. In other words: patients can stop using the intervention, but can still complete their participation in the study if they fill out all questionnaires. Adherence to the intervention is not the same as drop-out from the study, since it is a different concept. The main reason for this is that earlier research has shown that patients often stop using these interventions before all lessons are completed, so it is not realistic to expect that all patients fully complete the intervention. In order to account for this, the number of completed lessons will be included as a moderator for effectiveness in the analyses to investigate whether adherence is related to effectiveness. Additionally, a sub-goal of this study is to determine whether engagement is a predictor of adherence and effectiveness to incorporate non-adherence to the intervention in the study. The intended 154 patients will be included at four different organizations that all have multiple forensic outpatient clinics.

To the best of our knowledge, there are no other studies on the evaluation of internet-based interventions in forensic outpatient care. Consequently, the effect size of .50 is based on similar studies. A recent systematic review on internet-delivered CBT for depression and anxiety disorders identified a mean effect size of .80 at follow-up after 3 to 36 months when looking at the post-test difference between treatment and control conditions [39]. However, in forensic mental healthcare, lower effect sizes are expected due to the complexity of improving treatment outcomes in this population. To illustrate: CBT appears to be more effective for treatment of specific disorders such as anxiety or depression than for treatment of aggression [13, 14]. Consequently, the more moderate effect size of the current RCT is set on .5.

4.5 Feasibility of the study

As is the case with any RCT in clinical practice, a potential barrier is the inclusion of enough participants. Especially in forensic mental healthcare, this can be problematic. However, there are multiple reasons and measures that are taken to increase the chance of successful completion of this RCT.

First of all, the intervention that is investigated in the RCT is already introduced in practice, and thus is not new. Consequently, therapists do not require training, already have experience in using similar interventions, and 'teething problems' that often occur when introducing new interventions in practice will not occur because these interventions have been used for over ten years.

Second, implementation research has shown that – while a large share of therapists don't actively use these interventions, there are several therapists that do use these interventions relatively often and thus are quite experienced. In this study, therapists that have experience with and thus are able to successfully use these internet-based interventions will be included. Additionally, qualitative research into needs and wishes from clinical practice regarding technology in forensic mental healthcare has shown a high need for evaluation research of these internet-based interventions. [17, 19]. This finding, combined with experiences from clinical practice, shows that therapists see the urgency and relevance of this study, which is expected to positively contribute to their intrinsic motivation to participate in this study. Third, a common problem with these types of interventions is that they are not used as often as might be expected by most therapists, even though they express the intention to do so and are able to identify multiple potential benefits [21]. The main reason for this 'intention-behaviour gap' is that therapists often forget to introduce these modules to patients, and if they are introduced, they often don't remember to discuss them during treatment sessions. This problem can be addressed by regularly reminding therapists to introduce and keep on using the intervention [24]. Consequently, during data collection, researchers and the secretary of the clinic will send regular reminders to participating therapists via e-mail and phone. Also, the study and accompanying intervention will be integrated as a fixed topic in intakes and multidisciplinary meetings [multidisciplinair overleg, MDO]. Fourth, while this is not as common, it might be that patients do not see the added value of the internet-based intervention. This will be accounted for by providing patients with a flyer and short information video on the content of the intervention. The content of these information materials will be tailored to the reading skills and preferences of patients. Fifth, another barrier might be that patients are not motivated to participate in data collection. To account for this, patients in the experimental and control condition receive a financial compensation. Experience with other

studies with this target group has shown that this can be an additional motivator for patients to participate. In all communication, these rewards will be mentioned to ensure that the patients are aware of the fact that they will be compensated for their invested time. To prevent that patients drop out during data collection, they will receive one voucher halfway, and one after completing all questionnaires. Additionally, when patients don't fill out questionnaires at one of the measurement moments, they will be reminded via e-mail and if that is not effective, the researcher will contact the therapist, who will remind the patient of the questionnaires. Sixth, in line with this, to prevent drop-out due to high time investment, the four selected questionnaires are kept as short as possible and filling them out will only take a couple of minutes. Also, data from risk assessment instruments that are already being administered is used to prevent additional time investment from patients and therapists. Seventh, as is the case with any internet-based intervention, patients might not be fully adherent, meaning that they do not complete the entire intervention. While this is a realistic risk, this does not threaten the feasibility of this study, because this is also an interesting and relevant result. If, even if therapists and patients receive much support in using the intervention, patients still do not complete the intervention, this has implications for its application in clinical practice. Additionally, adherence to the intervention will be used as a predictor for effectiveness to investigate if there is a dose-response relationship. It is important to emphasize that patients that do not fully complete the intervention, but still fill out all questionnaires, are not considered as a drop-out. Finally, it can be challenging to gather large sample sizes in forensic mental healthcare. To overcome this, data collection will take place in four organizations, that all have multiple outpatient clinics where patients can be included. The feasibility of including approximately 38 patients per organization – which all have multiple outpatient clinics - is elaborately discussed with representatives from the organizations that also participate in the project team that coordinates this study. Furthermore, initial contact with therapists has underlined the expectation that the intended number of participants can be reached.

To conclude: while any RCT on internet-based interventions in clinical practice is challenging, the set-up of this project is based on findings of and recommendations arising from research on implementation of these interventions in forensic mental healthcare. Additionally, several researchers with ample experience with RCTs on internet-based interventions and research in forensic mental healthcare are involved in this project, and the study design is based on their experiences and lessons learned from earlier projects. It is expected that, especially due to the fact that these interventions are not new for therapists and that they will receive ample support from the researchers, the intended number of participants will be reached.

5. TREATMENT OF SUBJECTS

5.1 Investigational product/treatment

5.1.1 Intervention: Aggression

In this study, the internet-based intervention 'Aggression' is evaluated. This intervention is part of the eHealth-platform Minddistrict. Minddistrict is a platform that offers over 300 different internet-based interventions, primarily targeted at mental healthcare. The platform contains a broad range of interventions, focused on for example attention deficit hyperactivity disorder (ADHD), mindfulness, autism, healthy lifestyle, and depression. These interventions are used by over 250.000 people in Europe. The entire Minddistrict platform is certified as ISO 27001:2017 and NEN 7510-1:2017 and is certified as a medical device under the Dutch Law on Medical Devices.

All internet-based interventions of Minddistrict via the 'Intervention Mapping' approach [40]. Intervention Mapping is as a planning approach which uses theory and evidence as foundations for taking an ecological approach to intervening in health problems, following a systematic approach. Minddistrict also uses behavioural change techniques, or BCTs. These techniques are specific components designed to change behaviour, such as goal-setting, feedback or behavioural practice and rehearsal. Furthermore, persuasive design methods are applied. By incorporating persuasive features such as personalization, reminders or rewards, the chances of people being adherent to the internet-based intervention and consequent attitude and behaviour change increase. By combining BCTs and persuasive features, attention is paid to the content and design of Minddistrict interventions.

This RCT is focused on the internet-based intervention 'Aggression'. This intervention is used a blended way, i.e. integrated in face-to-face treatment. In this intervention, patients learn to deal with conflict and triggers in a constructive way. The intervention is focused on three main objectives: (1) increasing the motivation to change, (2) acquiring skills for dealing with conflict, and (3) breaking the cycle of aggression by providing knowledge on situational, emotional, cognitive and physical triggers. The module consists of 10 lessons:

1. ***Motivation – where are you now?*** In this lesson, the patient is introduced to the module, amongst other things by means of a video with a therapist and an audio fragment of an expert by experience. The advantages and disadvantages are discussed by means of open-ended questions.
2. ***Where do you want to go?*** In this lesson, the patient is asked to think about the future with and without aggression. They are asked about their goals by means of open-ended questions, on which feedback is provided by the therapist. Finally, the patients works on a diary by means of a daily reminders in which they can monitor their own aggressive behaviour and accompanying triggers.

3. ***Circle of aggression.*** In this lesson, the patient is informed about the circle of aggression by means of written text, illustrations and a video. Next, the patient thinks about their own risk situations and accompanying triggers.
4. ***Thoughts.*** In this lesson, the patient receives information about convictions about their past and thinking styles by means of videos, written texts and short assignments. Attention is paid to different perspectives, convictions, thinking errors and the challenging of thoughts.
5. ***Emotions***. This section starts with information on emotions by means of text and animation. Next, different gradations of emotions are explained, using the metaphor of (over)cooking pans. Via videos, the patient learns about emotions that can lead to aggression.
6. ***Bodily sensations.*** In this lesson, the patient learns more about bodily sensations and risky behaviours that are related to aggression by means of assignments. Additionally, attention is paid to relaxation exercises to deal with bodily sensations.
7. ***Techniques for self-control***. In this lesson, the patient works on their coping skills and self-efficacy for preventing aggression. The patient leans about potential coping skills such as avoidance, stepping out of the situation and time-outs by means of text and videos with experts by experience.
8. ***Asking for help***. In this lesson, the patient learns how to ask for help from others and gains insight via text and video on how to deal with others. Furthermore, the patient is encouraged to practice with these coping strategies in real life.
9. ***Assertiveness***. In this lesson, the patient gains knowledge about reacting in sub-assertive, assertive and aggressive ways. By means of quizzes, text and videos, the patient learns about and can practice with coping skills to deal with aggression.
10. ***Relapse-prevention.*** In the final lesson, the patient learns about relapse prevention plans via texts and videos with experts by experience. The patient creates their own relapse prevention plan and makes plans for their future.

As can be seen, each lesson consists of multiple components, i.e. written text, assignments and videos with therapists and/or experts by experience. After completing each lesson, the patient is rewarded by means of a ‘milestone’. Furthermore, after each lesson, the therapist sends written feedback on the assignments to the patient. Because ‘Aggression’ is a blended intervention, each lesson is briefly discussed in an in-person treatment session. This means that generally, participants work on one lesson per week. See the Appendix for screenshots of ‘Aggression’.

The internet-based module Aggression was developed in 2012 and has been used for approximately 10 years in different branches forensic mental healthcare. Recently, the

intervention has been updated cosmetically to ensure it is in line with current insights in terms of content and design. However, as is the case for most internet-based interventions in Dutch mental healthcare, it hasn't been evaluated on effectiveness. Several years ago, a mixed-methods study on the use of Minddistrict modules in Dutch forensic psychiatric outpatient care was conducted [21]. This study showed that Aggression was one of the most-used interventions of the Minddistrict platform within this organization – Transfore. However, interviews and data on usage showed that there is still much room for improvement in terms of uptake. One of the main reasons for this was that while therapists were able to identify benefits and expressed an intention to use the intervention, they often did not think about using the intervention because it was 'not in their system' . Additionally, if a patient started, therapists often did not integrate the intervention in treatment because of the same reason: they forgot about it. In order to increase the uptake of 'Aggression' in this study, therapists will be supported in remembering to introduce and keep on discussing the intervention with the patient. Finally, in qualitative research, therapists mentioned that limited evidence of these interventions was a barrier for their usage: if they do not know if the intervention works and is evidence-based, they indicated that they are less prone to use it [19, 21]. In line with this, therapists expressed a need for evaluation studies on internet-based interventions in treatment of forensic psychiatric patients to overcome this barrier. Consequently, based on these qualitative findings, it is expected that especially those therapists that require more research are intrinsically motivated to participate – which is underlined by observations from conversations with therapists that are eligible to participate.

5.1.2 Treatment as usual

In this study, the control group will receive treatment as usual. In general, this refers to any form of psychotherapy that is delivered by a licenced psychologist to a patient in a one-on-one setting. The main focus of treatment as usual should lie on aggression regulation. Additionally, patients should receive individual, one-on-one treatment and should not participate in group treatment of aggression during data collection.

Because this is a multi-centre study, there are minor differences between the treatment as usual for aggression between the participating clinics and even between participating therapists. To illustrate, some clinics use the 'AR op Maat' program, while others use 'Grip op Agressie' as the main guidelines for their aggression treatment. While there are minor differences in the form of these types of treatment, they are all based on the same underlying principles and models. All forms of treatment in forensic psychiatry target dynamic risk factors that have been identified by means of risk assessment instruments. In general, treatment of patients with aggressive behaviour is always focused on the improvement of self-regulation to reduce the chance of (re)offending. This is achieved by means of elements

from cognitive behavioural therapy, often combined with techniques from occupational therapy.

Furthermore, because the forensic psychiatric patient population is very heterogeneous - with much variation in e.g. diagnoses and type of offense, there is often also variation in the length of treatment and the exact way it is delivered to individual patients, even when following the same protocol. This is done to ensure that treatment is tailored – in forensic terms, responsive – to the individual patient [41]. Consequently, it is unfeasible and undesirable to offer exactly the same TAU to each patients since this is not in line with guidelines and treatment models that are used in practice. Despite the heterogeneity of the patient population and treatment, it is expected that there will be no major differences in outcomes between the different types of treatment because they are all based on the same principles. Forensic treatment in the Netherlands is always focused on risk assessment and management, grounded in evidence-based treatment protocols such as cognitive behavioural therapy, and underpinned by the risk-need-responsivity model. Additionally, all included patients in this study will receive in-person treatment with weekly sessions with their therapist, focused on aggression regulation, and underpinned by principles of cognitive behavioural therapy.

To summarize: while in general terms, treatment of all patients is based on similar principles and guidelines, there will be minor differences in the way in-person treatment will be delivered between patients in both the control and experimental conditions, this is part of the ecological validity of this study and is not expected to influence results because of the randomization.

6. INVESTIGATIONAL PRODUCT

Not applicable. Minddistrict and the 'Aggression' module are already mentioned and explained in chapter 5.

7. NON-INVESTIGATIONAL PRODUCT

Not applicable. This study won't be using any additional products.

7.1 Name and description of non-investigational product(s)

Not applicable.

7.2 Summary of findings from non-clinical studies

Not applicable.

7.3 Summary of findings from clinical studies

Not applicable.

7.4 Summary of known and potential risks and benefits

Not applicable.

7.5 Description and justification of route of administration and dosage

Not applicable.

7.6 Dosages, dosage modifications and method of administration

Not applicable.

7.7 Preparation and labelling of Non Investigational Medicinal Product

Not applicable.

7.8 Drug accountability

Not applicable.

8. METHODS

8.1 Study parameters/endpoints

In this study, multiple types of data are collected to answer the six research questions. First, a short overview will be provided, after which the specific measurement instruments will be explained in more detail.

The variables for the first research objective – focused on the improvement in regulatory emotional self-efficacy, treatment readiness and aggression – will be collected via short, validated self-report questionnaires that will be administered via Qualtrics. To answer the first research question, three primary outcome measures will be used. The main reason for selecting three outcome measures, is that this is the first RCT on internet-based interventions in forensic outpatient care [16]. Consequently, there are no other RCTs on which the choice for outcome measures can be based. The three main outcome measures are based on qualitative research, combined with insights of therapists and researchers [17, 19, 21, 42]. However, based on these sources, it is not clear which of these outcome measures is best to identify change on the short and long term due to the intervention. The intervention is viewed as potentially effective if the experimental group improves more than the control group on at least one of the outcome measures on T1, T2, and/or T3. The intervention is viewed as effective in case of changes on all three outcome measures on T3.

For the second objective, data from risk assessment instruments that are already administered will be collected at baseline and follow-up. Since risk assessment with the FARE has to be performed twice per year, this form of data collection is in line with existing procedures and thus will not take up additional time of patient and therapist. For the third objective, therapists will be asked to indicate the number of treatment sessions that the patient participated in. Therapists can retrieve these data from their calendar, the electronic patient file or supported by the office assistants, the exact method depending on their own preference. Data for the fourth objective on engagement will only be collected from patients in the experimental condition. The TWEETS engagement questionnaire will be built into the internet-based intervention to ensure that it is filled out a the right point in the intervention, i.e. at the beginning, halfway and at the end. Another reason for this is that, if engagement is a predictor for effectiveness, Minddistrict will integrate the TWEETS in all interventions. The fifth and sixth objective will be addressed by means of qualitative data, collected by means of semi-structured interviews with patients and via questionnaires with open-ended with therapists. Finally, at baseline, patients are asked to fill out several questions on demographics, including their gender, age, marital and employment status and education level. Participants will also be asked if they received forensic and/or regular psychiatric treatment in the past. Additionally, at baseline therapists will be asked to provide information

about the inpatient clinic in which the patient is treated, the main treatment goal, type of offense, and diagnoses. These data will be used to describe the sample and will be collected via Qualtrics.

8.1.1 Main study parameter/endpoint

Regulatory emotional self-efficacy – RESE

A main advantage that is reported in qualitative studies on the use of internet-based interventions in forensic psychiatry, is that patients are working on part of their treatment independently. On top of TAU, internet-based interventions offer additional exercises and information to support the patient in dealing with their undesired aggressive behaviour. This is expected to provide them with more insights and tools to improve their aggression regulation than patients who do not follow an internet-based intervention outside of in-person treatment sessions. It is thus expected that the self-efficacy of patients that follow an additional internet-based intervention will increase more than in TAU. In other words: because they receive additional treatment via the intervention and work on it independently, their confidence in regulating their own emotions can increase.

Consequently, the primary outcome measure of this study is regulatory emotional self-efficacy. This construct is measured by means of the validated, 12-item Regulatory Emotional Self-efficacy (RESE) scale [31]. The RESE scale assesses self-efficacy in managing negative emotions (8 items) and in expressing positive emotions (4 items). Negative emotional self-efficacy refers to the perceived “capability to ameliorate negative emotional states once they are aroused in response to adversity or frustrating events and to avoid being overcome by emotions such as anger, irritation, despondency, and discouragement” [31]. Positive self-efficacy is defined as the perceived capability “to experience and to allow oneself to express positive emotions such as joy, enthusiasm and pride in response to success or pleasant events” [31]. Earlier research has demonstrated the validity and reliability of the RESE scale [31, 43, 44]. Because the RESE scale consists of only 12 items, it is easy to administer and does not require much effort of participants.

Treatment readiness – CVTRQ

Treatment readiness refers to the presence of factors that contribute to engagement with treatment and therapeutic change [12]. This concept is often used in forensic psychiatry and does not only cover motivation and willingness to change, but also responsivity, which refers to the suitability of the treatment program offered. It incorporates internal factors such as personality and cognitive-emotional features of the patient that are related to therapeutic change. Qualitative research has shown that therapists believe that, if used well, internet-based interventions can contribute to treatment readiness because they might fit the needs and wishes of the patient, resulting in better responsivity to treatment. In other words: the use

of internet-based interventions might increase the fit between the treatment and needs of the patient, resulting in higher treatment readiness. Additionally, the patient can gain new insights and skills individually as opposed to because of a therapist, which might contribute positively to their intrinsic motivation and willingness to change [4, 5].

Treatment readiness is assessed by the Dutch version of the Corrections Victoria Treatment Readiness Questionnaire (CVTRQ): a validated self-reported questionnaire [32]. The total scale consists of 20 items, divided into four subscales. The subscale Attitude and Motivation (AM) measures attitudes and beliefs about treatment programs and the desire to change. The scale Emotional reactions (ER) measures emotional responses to the individual's offending behaviour. Offending beliefs (OB) refers to beliefs about personal responsibility for offending behaviour. The subscale Efficacy (EF) measures perceived ability to participate in treatment programs.

Aggression – AVL-AV

The main objective of forensic psychiatric treatment is to prevent (re)offending. Consequently, preventing aggression is an important goal of the entire treatment program. However, reaching this goal, even by means of long and intensive therapy has proven to be difficult. We did not select aggression as a primary outcome measure because a direct impact on changes in aggression might be too much to expect from an internet-based intervention. However, it might be that patients that the expected changes in self-efficacy due to the internet-based intervention result in actual behaviour change, so self-reported aggression is used as a secondary outcome. Self-reported aggression is assessed by means of the Dutch version of the much-used and validated Aggression Questionnaire (Aangepaste Versie van de Agressie Vragenlijst; AVL-AV) [33, 34]. The 12 items of the questionnaire are divided into four subscales: physical aggression, verbal aggression, anger, and hostility. The AVL-AV had been shown to be reliable and valid in earlier research and is easy to administer because it consists of only 12 items.

8.1.2 Secondary study parameters/endpoints (if applicable)

In order to gain more insight into if, how and why the internet-based intervention works, multiple other questionnaires are used.

Risk assessment – FARE

In treatment of all forensic psychiatric patients, risk assessment has to be conducted by means of evidence-based risk assessment instruments. In forensic psychiatric outpatient care, the Dutch standard is the Forensisch Ambulante Risico Evaluatie (FARE), version 2 [36]. The FARE is not only used to estimate the risk on recidivism, but also to monitor

changes in dynamic risk factors and risk of recidivism during treatment. Research into inter-reliability and convergent validity has shown promising results [45]. The FARE is part of Dutch guidelines on risk assessment of forensic psychiatric outpatients. According to these guidelines, the FARE is administered twice a year, i.e. once each six months.

In the FARE, 6 static and 11 dynamic risk factors are assessed. Static risk factors refer to 'unchangeable' characteristics, such as age of the first offense. While they predict the risk of recidivism, they are not changeable by means of targeted interventions. Dynamic risk factors however are more related to the individual behaviour of the person and their social and living situation. Because these 11 factors are influenceable by interventions, they will be included in the analyses of this study. The 11 evidence-based dynamic risk factors that are incorporated in the FARE are: malfunctioning on education/work; financial mismanagement; delinquent social network; limited leisure activities; problematic (former) partner relationship; instable living situation; problematic substance use; limited impulse control; malfunctional coping skills; antisocial attitude; and rule-violating behaviour.

Engagement – TWEETS

Many studies have been conducted to identify why and for whom specific internet-based interventions work. Up until now, the use of sociodemographic factors as predictors has not provided answers to these questions. Engagement is a non-specific factor that can be used to predict effectiveness of and adherence to internet-based interventions [46]. Engagement refers to the extent to which someone is involved or occupied with something, and is often related to a positive outcome, such as effectiveness. In the context of digital behaviour change interventions, engagement contains an affective, behavioural and cognitive component [46]. The affective component is focused on positive or negative feelings towards the intervention and the way in which the intervention fits with a person's identity: do people identify with the design of the technology and what it stands for? Behavioural engagement is focused on the routine that a user has regarding the use of an intervention and the extent to which it requires effort and is part of one's daily life. The cognitive component of engagement refers to the extent to which an intervention supports the user in reaching their goals and is seen as useful for their behaviour change.

In this study, engagement is measured with the TWente Engagement with Ehealth and Technologies Scale (TWEETS). The scale employs a definition of engagement that incorporates behaviour, cognition, and affect, and has been shown to have a good validity and reliability [35]. The TWEETS contains only 9 items – with three items per component of engagement - and has three slightly different versions: one for expected engagement, to be used when someone starts using an intervention, one for current engagement, to be used

during the use of an intervention, and one for past engagement, to be used when a user has completed or stopped using an intervention.

8.1.3 Other study parameters

To describe the characteristics of the sample, information about treatment objectives, diagnoses, age, gender, and the inpatient clinic in which they are treated will be used. These data will be retrieved at T0 from the therapist by means of a Qualtrics questionnaire. In this way, the researchers do not need access to the personal patient file.

Table 1: Overview of study parameters

Variable	Instrument	Assessment point	Invested time
Regulatory emotional self-efficacy	Regulatory Emotional Self-efficacy (RESE) scale [31]	T0, T1, T2, T3	5 min. per assessment point, 20 minutes in total
Treatment readiness	Corrections Victoria Treatment Readiness Questionnaire (CVTRQ) [32]	T0, T1, T2, T3	5 min. per assessment point, 20 minutes in total
Aggression	Aggression Questionnaire [17, 18].	T0, T1, T2, T3	5 min. per assessment point, 20 minutes in total
Risk assessment	Forensisch Ambulante Risico Evaluatie (FARE) [36]	T0 & T3*	N.a. – part of standard procedures
Engagement	TWente Engagement with Ehealth and Technologies Scale (TWEETS) [35]	T0, T1 & T2 (only in the experimental group)	5 min. per assessment point, 15 min. in total (only for experimental group)
Patients' perceived effectiveness and points of improvement	Semi-structured interviews	T2	Ca. 30 min
Therapists' perceived effectiveness and	Open-ended questionnaires (Qualtrics)	T2	Ca. 15 min

points of improvement			

** In this study, the FARE that is administered during the standard treatment trajectory are used to not interfere with standard procedures, meaning that the exact date of FARE administration can slightly differ from the T0 and T3 assessments.*

8.2 Randomisation, blinding and treatment allocation

Because blinding is impossible due to the use of the internet-based intervention in treatment, this study is a non-blinded RCT. After a participant is screened and has given informed consent, they will be randomized by the principal investigator. The randomization will be supported by an online tool (https://sealedenvelope.com/). Participants are not randomized per participating organization or clinic because there are major differences in the number of patients treated by these clinics. Instead, once a patient is included, they receive a participant number, which will be aligned with a random sequence of treatment allocations, i.e. participants are either allocated to the intervention or control group. The first participant included in the study is allocated according to the first treatment allocation on the list, the second participant according to the second allocation, and so forth.

Participating therapists are informed of the group the patient is allocated to and will explain this to the patient. If a patient is randomized into the control condition, the therapist is instructed to provide treatment as usual, and can be contacted by the researcher in case a patient did not fill out questionnaires at T0, T1, T2 or T3. If a patient is randomized into the experimental group, the therapist is asked to start with the intervention ‘Aggression’. Specifically, the therapist will shortly explain the goal, content and nature of the internet-based intervention and explain to the patient that they will receive one lesson per week for the next 10 weeks. Additionally, the therapist will provide written feedback on the assignments of the patients. All participating therapists are trained in the use of these types of interventions and thus know how to provide feedback. To increase the feasibility of this study and reach the intended number of participants, therapists will receive additional support from researchers to remind them to introduce the intervention. The main reason for this is that implementation research on these types of internet-based interventions in Dutch forensic outpatient care has shown that, even though therapists have the intention to use the intervention, they often forget to introduce the intervention. Additionally, if they introduced the intervention, therapists often do not mention it in their treatment sessions. Consequently, participating therapists will be regularly reminded to introduce and keep on discussing the internet-based interventions with the patients in the experimental condition.

8.3 Study procedures

The flow of the participants throughout the study is visualized in Figure 1, in paragraph 3.3. In this section, each step is explained in more detail.

Step 1: Screening – Week 0

Before the inclusion starts, therapists are asked whether they want to participate. In each clinic of the participating organizations, the goal is to involve at least three therapists that want to participate in the study. This number has been discussed with representatives of the four participating organizations and is viewed as feasible.

When a patient is enrolled in treatment, a 'multidisciplinair overleg' (MDO) always takes place in which the case is discussed and a plan for treatment is created. If the patient is allocated to a participating therapist, the treatment team that participates in the MDO discusses whether are patient is eligible for participation in this study based on the in- and exclusion criteria. If this is the case, researchers are notified. This entire process is supported by the office managers of the clinic: they remind therapists about the study before the MDO and notify the researchers.

Step 2: Informing patient – Week 8 – 10

Eight weeks after treatment has started, the therapist first introduces the study by means of a short explanation. The patient also receives a short information folder with information about the study. If this is the case, the patient will sign a consent form to indicate that they are willing to be contacted by one of the researchers, and enters their contact details and the preferred way of being contacted: by e-mail or phone. Therapists are reminded by the office manager to hand these materials and invite patients.

There are multiple reasons for the 'waiting time' of approximately 8 weeks between screening and informing. First of all, therapists indicate that patients receive a lot of information during the first weeks of their treatment and have to fill out a lot of questionnaires that are part of standard procedures in forensic mental healthcare. Participating in the study is expected to be quite overwhelming during this initial phase of treatment. Second, therapists indicate that it is important to take some time to build a therapeutic relationship before starting with an internet-based intervention, which is especially relevant due to the often low treatment motivation of forensic psychiatric patients. Third, it often happens that when patients are enrolled in treatment, there are a lot of urgent problems that require attention: some more practical, e.g. homelessness, some more psychological, e.g. high levels of anxiety or denial of problems. This can make the first phase of treatment quite chaotic. In order to ensure that internet-based interventions are introduced at the right time, inclusion is initiated around week 8. If it is not possible or feasible to introduce the study in

week 8 due to practical or treatment-related reasons, the therapist can also inform the patient up until, but no later than week 10.

Step 3: Inclusion and informed consent – Week 8-11

If the patient agrees to be contacted by the researcher, the researcher will contact them via their preferred way of communication, as indicated on the initial consent form. The patient is asked to participate by the researchers and not by the therapist to prevent that the patient feels obliged to participate if their therapist asks them – which is especially relevant for patients who follow treatment as part of a sentence. The patient will receive information about the goal and relevance of the study, the required effort, the rewards for participating, the consequences of randomization, and the nature of the internet-based intervention. The letter that contains all this information might be difficult to understand, so a short summary in simple language is added to make sure all patients are able to understand the goal and means of this study. Also a short video will be made to ensure that all the information is received and understood. The researcher will clearly communicate that during the data collection period, patients in the control group will not be able to use any of internet-based interventions offered by Minddistrict. However, once the study is finished, the patient can use the intervention. Consequently, if a patient is extremely motivated to use an internet-based intervention, they can decide not to participate in the study. The patient also will be given multiple opportunities to ask questions and to think five days about whether to participate. If it is possible for the researcher to visit the patient in real life at the treatment location, informed consent will be provided in person, after a waiting period of at least five days. If this is not possible, the informed consent form will be sent to the patient via post, after which a signed form an be returned by the patient via an included, stamped envelope. However, due to the psychosocial problems of this target group, it might not be possible or desirable for all patients to receive the informed consent form via post, for example because they don't have a fixed living address at that point in time, or because they don't want their housemates to know about participation in the study and/or in forensic care in general. If this is the case, and if both other options are not feasible, the informed consent will be e-mailed to the patient, after which they have time to read it. After five days, verbal informed consent will be obtained via a recorded videoconferencing session. In this way, the process of informed consent is adapted to the characteristics of the patient.

Throughout the entire process, it will be clearly communicated that participating in this study does not affect the patient's treatment progress or the evaluation of the therapist. It will also be clearly stated that the patient can decide to withdraw from the intervention and/or study at any point in treatment, without any consequences - other than not receiving the financial reimbursement that is part of the study.

Step 4: Baseline assessment (T0) – Week 11

Before they start with the intervention - thus before they are allocated to a condition - all participants will be sent a link to the self-report questionnaires by the researcher to assess self-efficacy, aggression, treatment readiness and to ask several short questions about sociodemographic variables. These questionnaires will be filled out online via the designated program Qualtrics. The patient is asked to fill out these questionnaires in their own time, but as soon as possible, preferably on the same day. If the patient has not filled out these questionnaire, an automated reminder will be sent after two days. If after that, the patient still did not fill out the questionnaires, the patient is contacted by the researcher via e-mail after five days, to remind them of filling out the questionnaires. If after those two reminders the patient has not completed the questionnaire yet, their therapist is contacted. In the upcoming session, the therapist will the patient for the reason for not completing the questionnaires. If this is due to for example difficulties with answering the questions, the researcher will contact the patient and fill the questionnaires out together. If the patient indicates that they do not want to fill out the questionnaire due to any other reason, the therapist will discuss if participation in the study is still an option.

Besides the self-report questionnaires, the risk assessment instrument FARE will be administered by the therapist as part of standard treatment. As mentioned before, because the FARE is embedded in standardized structures of the organization, it might be that this risk assessment instrument is administered several weeks before the questionnaires.

In this week, the therapist will also receive a short questionnaire via Qualtrics about background information regarding the patient (inpatient clinic in which the patient is treated, the main treatment goal, type of offense, and diagnoses).

Step 5: Randomization and start intervention – Week 12

Directly after the patient has provided informed consent, the patient is randomized by the researcher. This is communicated to the therapist, who will let the patient know whether they will start with the intervention ‘Aggression’ or if they will participate in the control group.

After the first session of the internet-based intervention is finished, the TWEETS will be administered to participants in the experimental group via the Minddistrict platform, because the TWEETS is integrated in the intervention.

Step 6: Mid-treatment assessment (T1) – Week 17

In order to assess change during the intervention period, the three questionnaires to asses self-efficacy, aggression and treatment readiness are again administered to participants in the control and experimental group in week 17 of the study period. During treatment, the

therapist indicates that the patient can expect the questionnaires in the upcoming week to ensure that the link to the Qualtrics questionnaires is not overlooked. After that, the researcher e-mails the link to the Qualtrics questionnaires to the patient. If the patient did not complete the questionnaire after two days, a reminder is sent via e-mail. If the patient does not fill out the questionnaire after this reminder, the same procedure as in the baseline is followed.

Furthermore, the TWEETS is again administered, following the same procedures as at T0. Finally, participants will receive the first €10 voucher after completing the baseline assessment via e-mail.

Step 7: Assessment post-intervention (T2) – Week 25

After 15 weeks, the three questionnaires on self-efficacy, aggression and treatment readiness will be administered again, following the same procedures as described before. Furthermore, after finishing the final lesson of the intervention, the patient will fill out the TWEETS on the Minddistrict platform.

Step 8: Qualitative data collection with patients - Week 25 – 30

After the intervention is completed, a randomly selected sample of patients is invited to participate in a post-intervention interview. This sample is generated by means of (https://sealedenvelope.com/). Because the perspective of patients who dropped out of the intervention also is very relevant, the target group of this interview study will consist of patients who completed at least one session of the intervention, i.e. who completed the first TWEETS. Additionally, patients still have to be treated at the outpatient clinic in order to participate. Semi-structured interviews will be conducted in-person or via videoconferencing, depending on the preference of the patient and practical limitations.

Step 9: Follow-up assessment (T3) – week 37

37 weeks after start of treatment, the three questionnaires (self-efficacy, aggression and treatment readiness) will be again administered via Qualtrics. If, at this point, the patient is not being treated at the outpatient clinic anymore, he or she will be contacted by the researchers. This will be clearly communicated in the informed consent form and by the therapist. The FARE that will be administered about 6 months after treatment as part of standard assessment by clinics will be used for the follow-up assessment. Participants will receive the second €10 voucher after completing the this final assessment.

Step 9: Qualitative data collection – therapists

An open-ended questionnaire will be sent to all participating therapists at the final stages of the study period, i.e. in Q2 2023. In this questionnaire, they will be asked about their experiences with the internet-based interventions.

8.4 Time investment of participants

Participants in the experimental and control condition fill out three short questionnaires per measurement moment. This is estimated to take a maximum of 15 minutes. Data collection is kept short intentionally: forensic psychiatric patients are generally considered as hard to involve in research due to low motivation and short attention spans. To increase the feasibility of data collection, only the most relevant questionnaires from a clinical and research point of view are used. Additionally, patients in the experimental condition individually work on the intervention outside of in-person treatment sessions. On average, this is estimated to take about 30 minutes per weekly lesson, but experiences in practice show that this can either take much longer or shorter, depending on the patient and lesson. Furthermore, to increase the feasibility of this study, participants will be compensated for their invested time by means of a voucher of €10 after the mid-treatment assessment (T1) and another voucher of €10 the final post-treatment assessment (T3). Experience with research with this target group has shown that financial rewards can serve as a motivator to participate and complete the study.

Timeline

Depending on the timing of ethical approval, inclusion of participants will start in April 2022 up until February 2023. This means that the final follow-up assessment can take place up until September 2023. Participants will start with the study at any point during between Q2 2022 and Q2 2023. To illustrate: the first participant can start with the study in April 2022, while the last participant can start 8 months later. In the meantime, there will be no changes to the internet-based intervention ‘Aggression’ to ensure consistency. This procedure ensures that patients do not have to wait to start treatment and also increases the feasibility of this study: including participants in forensic mental healthcare has been shown to be challenging.

8.5 Withdrawal of individual subjects

Subjects can leave the study at any time for any reason if they wish to do so without any consequences. The investigator can decide to withdraw a subject from the study for urgent medical reasons. Patients can also be withdrawn in case of a severe psychiatric crisis and/or admission to a (forensic) psychiatric hospital, other type of inpatient clinic, or prison.

8.6 Replacement of individual subjects after withdrawal

To account for withdrawal of subjects, 20% more participants than required according to the power analysis will be included. If patients drop-out, this will be accounted for due to this extra 20%. Patients are considered as a drop-out if they stop filling out the questionnaires before the end of the study. Consequently, if patients stop using the intervention but still fill out the questionnaire, they are not considered a drop-out. A reason for this is that investigating whether non-adherence to these interventions is problematic and related to engagement or effectiveness is part of this study. Data collection will be ended after including the intended 154 patients. If throughout the study, there are signs that more than 20% of the patients drop out, the researchers will re-evaluate the feasibility of the data collection with participating therapists and search for points of improvements.

8.7 Follow-up of subjects withdrawn from treatment

If patients withdraw from treatment entirely, they will be excluded from the study. The main reason for this is that the internet-based intervention has to be studied within the context of treatment, i.e. in a blended way. If participants in the experimental or control group do not receive treatment anymore, their data will not be relevant for the research questions of this study. As mentioned before, patients that stop using the intervention but still participate in data collection will not be considered as drop-outs.

8.8 Premature termination of the study

Based on the absence of risk associated with using internet-based interventions in treatment – which have been used in Dutch outpatient treatment for over ten years, without any incidents – we expect that there will be no reason to expect that the study has to be terminated due to detrimental effects of the intervention.

This study is financed for two years. If the intended number of participants has not been reached after two years and if no additional financing has been found, the study will be terminated, even if the intended N has not been reached. In that case, the data from the already enrolled participants will still be collected. If the study has to be terminated before the desired number of participants is included, analyses will be conducted with the available quantitative and qualitative data of the participants that did complete the study.

9. SAFETY REPORTING

9.1 Temporary halt for reasons of subject safety

In accordance to section 10, subsection 4, of the WMO, the sponsor will suspend the study if there is sufficient ground that continuation of the study will jeopardise subject health or safety. The sponsor will notify the accredited METC without undue delay of a temporary halt including the reason for such an action. The study will be suspended pending a further positive decision by the accredited METC. The investigator will take care that all subjects are kept informed.

9.2 AEs, SAEs and SUSARs

9.2.1 Adverse events (AEs)

Adverse events are defined as any undesirable experience occurring to a subject during the study, whether or not considered related to the study. All adverse events reported spontaneously by the subject or observed by the investigator or his staff will be recorded. All involved therapists will be required to report adverse events to the main researcher, who will record them.

9.2.2 Serious adverse events (SAEs)

A serious adverse event is any untoward medical occurrence or effect that

- results in death;
- is life threatening (at the time of the event);
- requires hospitalisation or prolongation of existing inpatients' hospitalisation;
- results in persistent or significant disability or incapacity;
- is a congenital anomaly or birth defect; or
- any other important medical event that did not result in any of the outcomes listed above due to medical or surgical intervention but could have been based upon appropriate judgement by the investigator.

An elective hospital admission will not be considered as a serious adverse event. If SAEs occur, the sponsor will report the SAEs through the web portal *ToetsingOnline* to the accredited METC that approved the protocol, within 7 days of first knowledge for SAEs that result in death or are life threatening followed by a period of maximum of 8 days to complete the initial preliminary report. All other SAEs will be reported within a period of maximum 15 days after the sponsor has first knowledge of the serious adverse events.

SAEs due to the internet-based intervention are not expected because it does not influence the physical state of the participant in any way.

If any SAEs occur, they will be reported by the sponsor the web portal *ToetsingOnline* to the accredited METC that approved the protocol, within 7 days of first knowledge for SAEs that result in death or are life threatening followed by a period of maximum of 8 days to complete the initial preliminary report. All other SAEs will be reported within a period of maximum 15 days after the sponsor has first knowledge of the serious adverse events.

9.3 Annual safety report

Not applicable.

9.4 Follow-up of adverse events

All AEs will be followed until they have abated, or until a stable situation has been reached. Depending on the event, follow up may require additional tests or medical procedures as indicated, and/or referral to the general physician or a medical specialist. SAEs need to be reported till end of study within the Netherlands, as defined in the protocol

9.5 Data Safety Monitoring Board (DSMB) / Safety Committee

Not applicable.

10. STATISTICAL ANALYSIS

10.1 Primary study parameter(s)

Data will be analysed using IBM SPSS software (version 24.0) and significance was accepted at 0.05 or lower. Analyses will be done on intention to treat (ITT) basis.

Research objective 1: Self-efficacy, treatment readiness, and aggression

To identify whether there are changes in dependent variables between the experimental and control group on baseline (T0), during the intervention (T1), post-intervention (T2) and follow-up assessment (T3), multilevel repeated-measures linear mixed models will be used. This analysis method accounts for autocorrelation within participants and missing data. Time and group will be used as fixed factors, along with their interactions, and participants are modelled as random factor. Interaction effects will be studied to identify whether the changes over time differed between groups. Main effects for time will be used to investigate whether the scores of all participants changed over time. In order to provide more insight into the main findings, Least-significant difference (LSD) post-hoc independent t-tests with Bonferroni correction will be performed to test for significant between-group differences and changes over time per group.

Determining effectiveness

In order to determine whether the internet-based intervention Aggression is effective, multiple scenarios are possible.

First of all, it is possible that the scores of the experimental groups do not increase more than those of the control group on all three primary outcome measures at all measurement points (T1, T2 and T3). In that case, the intervention is viewed as ineffective. Second, there might be a significant improvement of the experimental group compared to the control group on one or more of the outcome measures on T1 (so halfway the intervention), but not on T2 and T3. This indicates that the intervention shows some promise, but cannot be viewed as effective. Further research on why the effects are not maintained until the end of the intervention and on the long term is then warranted. These questions will be partly answered by means of the interviews at T3. Third, there might be a change on T2 - so directly after completing the intervention - on one or more of the outcome measures in the experimental group compared to the control group, which is not maintained at T3. In that case, the intervention is viewed as promising and potentially useful for clinical practice because participants did experience benefits, but not effective because the effects are not maintained on the long term. In that case, future research into why these effects are not maintained and what this means for the usefulness of these interventions in forensic outpatient care is necessary. Fourth, there might be an improvement of the experimental group compared to

the control group on T3 on one or two outcome measures. In that case, the intervention is viewed as effective since it leads to benefits on the long term. However, future research is again warranted to investigate why these changes did not occur on the other outcome measure(s). Finally, if the experimental group outperforms the control group on all three outcome measures at T3, the conclusion will be that the intervention is effective and no future research is warranted. However, this of course does not mean that future research is not desirable for the sake of replicability.

When interpreting the results and answering the first research questions, nuance will be added by investigating when and how long changes within and between groups take place. This will not just be done by post hoc analyses and visualizations of data, but also by means of qualitative research with patients and therapists, i.e. the interviews that will take place at T3. By means of these interviews, more insight will be gained into why changes are or are not observed, whether the selected outcome measures were suitable, if and how the intervention can cause changes on the short and long term, and whether it is of added value for clinical practice.

10.2 Secondary study parameter(s)

Research objective 2: Treatment contacts

To determine if the number of face-to-face treatment contacts over a period of 37 weeks (i.e. 9 months) is lower in patients who received the 'Aggression' intervention, compared to those who received TAU, a t-test with group as the independent variable and number of received treatment sessions as the dependent variable.

Research objective 3: Dynamic risk factors

To determine if there is more improvement on dynamic risk factors as measured by a risk assessment instrument in patients who received the internet-based intervention 'Aggression' as an addition to TAU, compared to those who only receive TAU. For this research objectives, the same analysis as for research objective 1 will be used.

Research objective 4: Engagement

To investigate whether engagement predicts effectiveness, simple linear regression analyses will be run for three variables: regulatory emotional self-efficacy, treatment readiness, and aggression. The score on the TWEETS on T0, T1 and T2 will be used as independent variables in three different regression analyses. The change scores (i.e. difference between scores on T2 and T0, and the difference between scores on T3 and T0) for all relevant variables (self-efficacy, treatment readiness and aggression) will be used as dependent variables for two regression analyses. These scores will be added in a second analysis to

measure whether it adds predictive value on the dependent variables. Furthermore, in order to investigate if the TWEETS scores predict adherence, three analyses with the TWEETS score on T0 and T1 as dependent variables are run, this time with the number of finished lessons of the intervention as dependent variable.

10.3 Other study parameter(s)

Research objective 5 & 6: Patient and therapist perspective

To explore reasons for the effectiveness or ineffectiveness of the internet-based intervention Aggression according to forensic psychiatric patients and therapists, qualitative data will be collected. Anonymized transcripts will be created of these data. These transcripts will be analysed via an inductive approach, using the method of constant comparison [47]. First, relevant fragments will be extracted from the anonymized transcripts. Based on these fragments, two researchers will create an initial version of a coding scheme, one per research question. These coding schemes will contain main and subcodes and a first version of a definition for each code. These coding schemes will be applied to five transcripts by two researchers. After discussion amongst both coders, the coding scheme will be updated to ensure that it optimally fits the data. After that, both researchers will again code five transcripts and discuss whether any further changes are necessary. This process continues up until all transcripts are coded and the coding scheme covers all fragments. Intercoder reliability will be calculated, with a goal of at least 80% agreement.

11. ETHICAL CONSIDERATIONS

11.1 Regulation statement

The study will be conducted according to the principles of the Declaration of Helsinki 2013 (World Medical Association, 2013) and in accordance with the Medical Research Involving Human Subjects Act (WMO).

11.2 Recruitment and consent

The principal investigator is primarily responsible for recruitment of participants. Recruitment will take place in the four participating organizations and will start in April 2022. In order to ensure the feasibility of the study, researchers will actively work together with staff of Transfore, De Woenselse Poort, Kairos and GGZ Noord-Holland Noord. First, patients are informed about the study in a very general sense by their healthcare provider, after which they are asked if they consent to be contacted by a researcher. The researcher will contact the patient by the preferred means of communication – i.e. phone, e-mail or videoconferencing - and will fully inform them about the goal and nature of participating in the study. After this initial contact, the patient will have five days to consider participation, during which they are encouraged to contact the researcher if they have any remaining questions. After five days, the patient is contacted again by the researcher and is asked if they want to participate and if so, if they want to sign the informed consent form. The role of the researcher in this process is a deliberate choice to avoid any potential role conflicts. Patients might feel that their treatment progress can be affected by the decision to (not) participate, which might result in a situation in which they do not feel free to decline a request for participation from their therapist. To prevent this, informed consent is always asked by the researcher. Additionally, it is clearly communicated to the patient by both the therapist and researcher that participation does not affect their treatment progress in any way. Furthermore, it is made clear to potential participants that they can drop out of the study at any moment, without giving a reason for this. Communication about these conditions is done verbally and via the information folder that patients will receive from their therapist. To summarize, multiple precautions are taken to ensure that the patient does not feel forced in any way to participate in this study, and that the decision to participate is made on a voluntary basis.

11.3 Objection by minors or incapacitated subjects (if applicable)

Not applicable.

11.4 Benefits and risks assessment, group relatedness

11.4.1 Benefits for patients, therapists and forensic mental healthcare

For participants in the experimental condition, the main advantage can be that they can follow a potentially effective intervention that can provide them with more skills to effectively deal with their aggression regulation problems. Explorative, qualitative research has shown that these internet-based interventions can have multiple potential benefits for patients, such as receiving more information and exercises on their disorder(s) or behaviour compared to TAU, an accompanying increase of knowledge and skills to deal with their problems, and an increased sense of ownership and accounting improvements to themselves instead of the therapist due to working on a part of their treatment independently [19, 21]. A tangible benefit for all participants – also those in the control condition - is that they are compensated with two vouchers of a total of €20 to compensate for their invested time and effort.

A more abstract, indirect benefit – especially relevant for participating therapists - is that this study can contribute to better forensic mental healthcare. The importance of this study is illustrated by a recent study amongst Dutch forensic mental healthcare professionals, which clearly showed the need for more robust evaluation studies of eHealth interventions [19]. Especially considering the fact that internet-based interventions have been present in Dutch forensic mental healthcare for about ten years, is quite surprising that their effectiveness has not been studied yet. Consequently, it is essential to study the effectiveness of these modules, especially in a domain in which evidence-based practice is a core value. If the web-based interventions prove to be effective, this can be an additional impulse for implementation in clinical practice. In that way, these modules provide an effective way to provide additional care to vulnerable patients, which might reduce the overall changes of recidivism and quality of care. In line with this, the effectiveness of these interventions might provide an additional impulse for implementation, since professionals working in forensic mental healthcare indicate that the absence of evidence is one of the experienced implementation barriers [19, 21]. If this study shows no proof for effectiveness, this should be a starting point for a broader discussion in forensic mental healthcare: is it worthwhile to invest much time, money and other resources in the implementation of these modules, or should these resources be focused on other, more promising technological additions to care? In any case, this study will contribute to evidence-based practice and thus the most optimal form of treatment for forensic psychiatric outpatients.

11.4.2 Risk assessment

As mentioned before, the web-based intervention Aggression has been used since 2012. No adverse effects have been reported by any of the organizations that have been using the module Aggression and other comparable interventions to developer Minddistrict.

Furthermore, qualitative research in the Dutch forensic field via questionnaires and interviews has also shown no negative consequences of these modules [19]. A potential negative consequence that was mentioned was that working on self-reflection exercises might result in an excessive amount of negative feelings in patients [21]. While this can be therapeutic, a negative consequence might be that patients are not able to successfully manage these emotions. However, all exercises and texts in the Aggression intervention are developed by psychologists, in collaboration with experienced therapists to prevent these types of issues. Furthermore, the intervention is used in a blended way, which means that therapists regularly monitor how the patient is doing and can address unhelpful negative feelings and identify ways to deal with these. Finally, throughout all the years that these types of interventions have been used, no observable negative consequences of independently working on these modules have been identified.

The control group of this study will not receive the Aggression intervention, or any other type of internet-based intervention, during the data collection period. After that, these interventions can be used, which will be clearly communicated. Not following these interventions is not expected to have a negative impact on the quality of treatment of the participants in the control condition. First of all, at this point in time, it is not yet clear whether internet-based interventions Aggression actually result in better treatment outcomes in Dutch forensic mental healthcare. This means that participants in the control condition are not denied evidence-based care, simply because these interventions are not evidence-based yet. Furthermore, research with log data and interviews has shown that at this point, many patients do not have access to internet-based interventions at all, mostly because their therapist does not introduce these modules. To specify: one study showed that only 54% of all therapists working at an organization used the modules, of which the largest part used it with very few patients [21]. This implies that the use of internet-based interventions is not a part of standard care yet, meaning that participants in the control condition are not denied standard care procedures.

To summarize: in order to be able to deliver high-quality, evidence-based care, it is essential to investigate whether internet-based interventions that have been used for several years are indeed effective.

11.5 Compensation for injury

The University of Twente has a liability insurance which is in accordance with article 7 of the WMO. However, since there are no risk associated with the study, the University of Twente has asked for an exemption of the liability insurance in accordance with article 7 of the WMO.

11.6 Incentives (if applicable)

Participants in both groups will receive a total amount of €20 for their participation, of which €10 will be provided at T1, and €10 after completing the follow-up measurement (T3). An accompanying risk regarding the ecological validity of these results is that patients might complete the intervention due to the financial reward, even though they might not want to work on the intervention anymore. This is accounted for in multiple ways. First, it will be made clear that the financial reward is dependent on completing the questionnaires, and not the internet-based intervention. Patients thus can stop using the intervention, but can still receive the financial compensation if they complete all questionnaires. Second, adherence to these interventions in 'real life' is an important topic. In order to account for this, another study that it out of scope of this proposal will be conducted to determine the adherence to these types of interventions outside of a study context. By means of log data, insight will be gained into the way these interventions are used in clinical practice. These analyses will be conducted before this RCT is completed, which allows the researchers to use these findings on adherence from the 'real world' and compare them to the adherence of the participants in this study. Third, in line with this, researchers will account for problems with ecological validity in this study when interpreting these results.

12. ADMINISTRATIVE ASPECTS, MONITORING AND PUBLICATION

12.1 Handling and storage of data and documents

All data generated during screening and the study itself will be handled confidentially and anonymously in accordance with the EU General Data Protection Regulation and the Dutch Act on Implementation of the General Data Protection Regulation. Personal data will be coded with an individual ID-code, which is not relatable to the participant. A list will be created, which contains the ID-codes, stored on a separate drive on a computer and maintained by the principal investigator at her office in the Department of Psychology, Health and Technology of the University of Twente. Both the office, the drive, the computer, and the file containing the ID-codes will be locked with a key and password. All collected data will be stored in a file containing only the identification code to be able to match the data of the same person across different measurement points. These data will be stored and collected on a shared drive that is password protected and only accessible to the researchers. The key of the research data will be stored at the local centra that are participating.

During the research period the coded research data will be stored at the University of Twente. After the research is completed, the data will be stored in a long time storage at Data Archiving and Networked Services (DANS) by the Royal Dutch Academy of Sciences (KNAW) after which the ID codes key file ownership and maintenance is transferred to the secretary of the department of Psychology, Health and Technology of the University of Twente. After 15 years the data will be deleted.

Participants who want to be informed about their personal data or who want their data deleted can send a request to the principal investigator. For this, no reason is needed, since participants always have the right to be informed about their personal data. After the personal data is deleted, informing participants about their personal data is no longer possible.

12.2 Monitoring and Quality Assurance

The study is executed by L. Klein Haneveld (researcher). The study is closely monitored by dr. H. Kip (project leader/daily supervisor), dr. Y.H.A. Bouman (supervisor) and dr. S.M. Kelders (supervisor). This research group has contact on a weekly basis.
To ensure the feasibility and fit with clinical practice, a project team with four practitioners from the four participating organizations was established, consisting of drs. B. Roelofsen (specialized nurse GGZ-NHN), drs. Inge Korfage (clinical psychologist & director Transfore), drs. John Cuijpers (clinical psychologist and manager de Woenselse Poort), and drs. Naomi Elders (psychologist Kairos). The entire project team, consisting of researchers and practitioners, meets on a monthly basis to discuss the progress of the study. Furthermore,

every three months, a progress report is sent to dr. Premika Boedhoe, scientific advisor of funder KFZ, to monitor the study progress.

12.3 Amendments

Amendments are changes made to the research after a favourable opinion by the accredited METC has been given. All amendments will be notified to the METC that gave a favourable opinion.

12.4 Annual progress report

The principal investigator/sponsor will submit a summary of the progress of the trial to the accredited METC once a year. Information will be provided on the date of inclusion of the first subject, numbers of subjects included and numbers of subjects that have completed the trial, serious adverse events/ serious adverse reactions, other problems, and amendments.

12.5 Temporary halt and (prematurely) end of study report

The University of Twente will notify the accredited METC of the end of the study within a period of 8 weeks. The end of the study is defined as the last patient's last measurement. The sponsor will notify the METC immediately of a temporary halt of the study, including the reason of such an action.

In case the study is ended prematurely, the University of Twente will notify the accredited METC within 15 days, including the reasons for the premature termination. Within one year after the end of the study, the University of Twente will submit a final study report with the results of the study, including any publications/abstracts of the study, to the accredited METC.

12.6 Public disclosure and publication policy

The involved researchers aim to publish two papers about this study. First of all, in line with guidelines on open science, a protocol paper of the study design will be written. The second paper will report on the results of this study. Prior to any publications, the trial will be registered in the Netherlands National Trial Register (NTR) (TrialRegister.nl). All articles will be submitted to international, open access, scientific peer- reviewed journals. Finally, a Dutch report and accompanying factsheet will be written for the funder (Kwaliteit Forensische Zorg; KFZ) which can also be accessed freely.

13. STRUCTURED RISK ANALYSIS

Not applicable.

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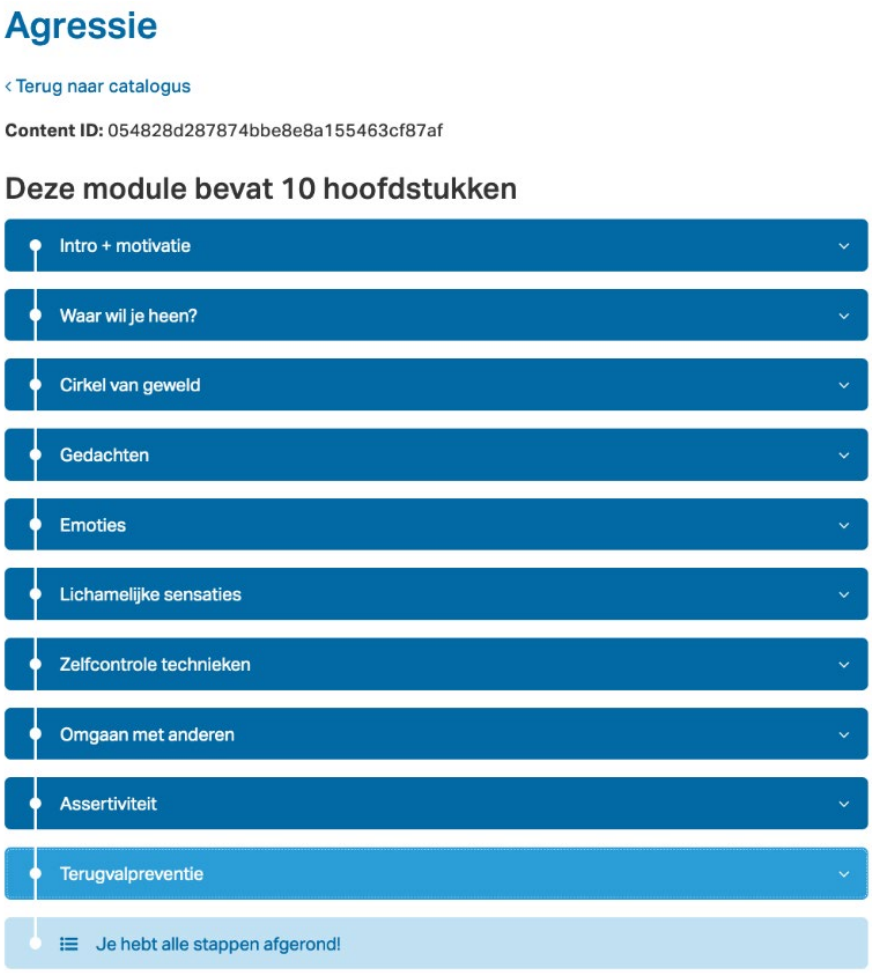
15. APPENDIX

Screenshot 1: Table of contents 'Aggression'



Screenshot 2: Example of written assignment in 'Aggression'

Screenshot 3: Example of written text in 'Aggression'

Terugvalpreventie

Terugvalpreventie is bedoeld om je voor te bereiden op een mogelijke terugval, zodat je weet wat je moet doen op een voor jou stressvol moment. Er nu al over nadenken, levert je straks voordeel op. In een situatie van stress of spanning heb je meestal geen tijd of rust meer om na te denken over hoe je jouw probleem aan gaat pakken.

Het voordeel van terugvallen
Aan terugval zit ook een positieve kant: je kunt alleen maar terugvallen als je daarvoor vooruit bent gegaan. Vat terugval op als een leermoment. Net als een kind dat leert fietsen. Dat gaat ook met vallen en opstaan. Terugval kun je zien als een uitdaging om het geleerde weer in praktijk te brengen.

Volgende

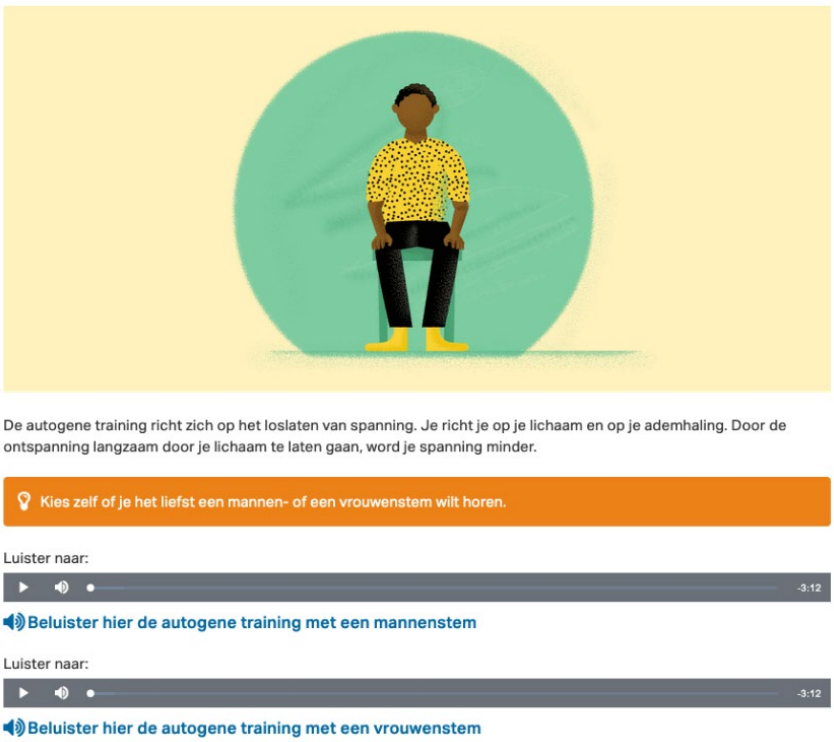
Screenshot 4: Example of video fragment in 'Aggression'

De rol van je gedachten

De gedachten die je in een bepaalde situatie hebt kunnen een belangrijke rol spelen in de cirkel van geweld. Net als iedereen heb jij in allerlei situaties gedachten die je gevoel en gedrag beïnvloeden, zowel in positieve als in negatieve zin. Van de meeste gedachten ben je jezelf niet bewust; je hebt ze in bepaalde situaties zo vaak gedacht dat het nu automatisch gaat. Bekijk de video hierover.

FILMPJE over de rol van je gedachten

Screenshot 5: Example of audio fragment in 'Aggression'



Screenshot 6: Example of visualization in 'Aggression'