Exploring the effect of self-monitoring of grief reactions in recently bereaved people on depression by means of experience sampling methodology: a randomized controlled trial

Master's Thesis Psychology

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Abstract

Background: A small number of people develop depression after losing a loved one. In regard to that, experience sampling methodology (ESM) has shown to increase self-monitoring and self-insight. This in turn can elicit empowerment to get more involved in the treatment of depression and in the process of becoming healthier (van Os et al., 2017). The objective of this study was to examine whether utilizing ESM for self-monitoring of grief reactions would result in a reduction of depressive symptoms. This was compared to individuals in a waitlist control group, who have recently experienced the loss of a loved one.

Method: Seventy Dutch adults, bereaved three to six months earlier, were randomly allocated to the ESM condition ($n = 28$) or the waitlist control condition ($n = 42$). Telephone interviews were conducted to assess depressive symptoms at baseline, post-ESM, and post-waiting period. The interviews consisted of questionnaires such as PHQ-9 to assess depressive symptoms. Participants in the ESM condition received five assessments per day for a period of two weeks. The ESM questions consisted of 11 prolonged grief items and six contextual items. The analysis of covariance (ANCOVA) was conducted to analyse depression levels between the two studied groups.

Results: ANCOVA revealed no significant differences in depression symptoms between the ESM condition and the waitlist condition after ESM or waiting while taking baseline depression levels into account ($F(1, 69) = 0.46$, $p < .50$).

Discussion: The key finding was that there is no difference regarding depression levels between participants who participated in ESM and participants who waited. Previous studies have shown the influence of reactivity effects. People are more aware of themselves and learn from the study they participate in (Capellan et al., 2017). It could have been the case that the participation in this study could have influenced depressive symptoms of participants – no matter which condition they were allocated to.

Exploring the effect of self-monitoring of grief reactions in recently bereaved people on depression by means of ESM: a randomized controlled trial

Many people have lost loved ones at a certain point in their lives, and some struggle more with their grief than others. For instance, people who struggle more with grief can develop depression after losing a loved one (Kendler et al., 2003; Simon et al., 2007). Being genetically susceptible to depression or experiencing life stressors such as loss can trigger the disorder (Taymur et al., 2016; Telford et al., 2011). Additionally, it was found that people experiencing severe symptoms of depression after six months following loss are more likely to suffer from these symptoms for at least 18 months (Galatzer-Levy & Bonanno, 2012).

A longitudinal study by Maccallum et al. (2015) investigated bereavement-related depression and found four different trajectories of depression after losing a spouse or a child. It was found that 69.3% of the participants had low levels of depression at pre- and post-loss and only 11.7% showed high levels of depression post-loss. In line with that, 9.5% of the participants had high levels of depression at pre-loss, which decreased over time. 9.4% of the participants had high levels of depression at pre-loss as well as at post-loss (Maccallum et al., 2015). Additionally, it was found that having experienced child loss as well as not having graduated from high school predicted whether people would experience high levels of depression at post-loss.

When grief becomes persistent and interferes with the life of an individual, there might be a risk of developing prolonged grief disorder (PGD) (Lundorff et al., 2017). Further studies found that people who experience prolonged grief show higher levels of depression and it is important to note that there might be a potential comorbidity (Bonanno et al., 2002; Lenferink, Franzen et al., 2022; Wan et al., 2022). A study by Komischke-Konnerup et al. (2021) found that 63% of people who suffer from PGD also experience depressive symptoms. Depression and PGD can especially overlap if individuals experienced a traumatic,

accidental, or violent loss (Wan et al., 2022). Moreover, these disorders are also similar regarding feelings of self-worth, self-identity, and relationships (Djelantik et al., 2020). An example for this is the depressive symptom of feeling worthless and the PGD symptoms of being confused about one's role in life and having difficulty trusting others (Djelantik et al., 2020). Therefore, these symptom overlaps may explain co-occurrence of PGD and depression (Komischke-Konnerup et al., 2021).

People reporting elevated depression severity can be helped through certain interventions like cognitive behavioural therapy (NHS website, 2022). However, there are some barriers in treating depression or PGD and these include the lack of mental health services, high costs, stigma, and social exclusion (Thornicroft et al., 2017). Because of these barriers, researchers tried finding alternative interventions that do not require high costs or a therapist. In regard to that, it was found that mobile apps can alleviate mental health problems such as depression (Wang et al., 2018). For example, a study by Hensler et al. (2021) showed that an app on reducing mental health issues reduced depressive symptoms while comparing it to a waitlist control group. A possible tool or intervention for depression, that can be applied through a mobile app, might be experience sampling methodology (ESM). ESM is done by completing momentary questionnaires a few times a day over a course of a several days or weeks (Myin-Germeys et al., 2018).

ESM has been used before as an add-on treatment in depression to make people aware of implicit thoughts, behaviours, or experiences and thereby enhance resilience (van Os et al., 2017). Furthermore, research has shown that ESM, but only as add-on to feedback which enhanced positive affect, can reduce depressive symptoms (Kramer et al., 2014). A possible reason for this was because people are self-monitoring their symptoms and therefore increase their momentary emotional awareness (Kramer et al., 2014). For example, van Os et al. (2017) interpreted ESM data from several populations, namely data on healthy controls,

people at risk for psychotic disorders, patients with depression, psychotic disorders, or relatives of patients with psychotic disorders. It was found that self-monitoring, a main component of self-management, leads to self-insight which in turn positively changes behavioural patterns (van Os et al., 2017; Wichers et al., 2011). A reason for this was that self-monitoring and self-insight made people aware of their symptoms and emotions which elicited some kind of empowerment to get more involved in the data collection, treatment and their own process of becoming healthier (van Os et al., 2017). It also seems like ESM reduces the risk of retrospective recall bias which is why ESM leads to recording more authentic symptoms and hence less overgeneralizations of the memory (Lenferink, van Eersel et al., 2022; Telford et al., 2011). Lastly, another advantage of using ESM as self-monitoring tool to reduce psychological distress is that there is a low cost, no therapist needs to be involved and it is very flexible due to only needing a smartphone (van Os et al., 2017; Wichers et al., 2011).

Even though ESM studies mostly show positive effects on mental health outcomes, there might be some concern about the negative effects. People with depression often suffer from ruminative thinking and focus their attention on themselves and ESM in turn may increase these patterns (Telford et al., 2011). In addition, people who are severely depressed often have motivational impairment which can make ESM too demanding (Wichers et al., 2011). Moreover, not knowing when the next assessment will be can also be a burden to participants which might decrease compliance (Myin-Germeys & Kuppens, 2021). Another disadvantage of ESM might be for example, issues with electrical devices such as a software bug or incompatibility of the ESM application.

Lastly, there has been promising research about treating MDD with therapy and/ or ESM as add-on treatment (Kramer et al., 2014). However, long waiting times for therapeutic interventions as well as the cost and time to commitments necessary for such treatments, are

well-documented issues in mental health care (Thornicroft et al., 2017). Despite the potential efficacy of ESM (Kramer et al., 2014; Lenferink, van Eersel et al., 2022) in ameliorating depressive symptoms there exists a significant research gap pertaining to its application in the context of bereavement-related depression, particularly in relation to a control group. Therefore, it is important to find out whether ESM indeed reduces depressive symptoms and compared to a control group that does not receive ESM. Since self-monitoring has been proven to elicit self-empowerment and self-insight (van Os et al., 2017), it is vital to explore whether self-monitoring grief reactions also lead to a reduction of depressive symptoms. Because of that, for this thesis the research question is 'To what extent does self-monitoring of grief reactions by means of ESM lead to a decrease in depression compared to a waitlist condition in people who have recently lost a loved one?'. In line with the research question, a hypothesis is set up:

H1: People participating in the ESM, report a decrease in depression compared to people in the waiting list condition who have recently lost a loved one.
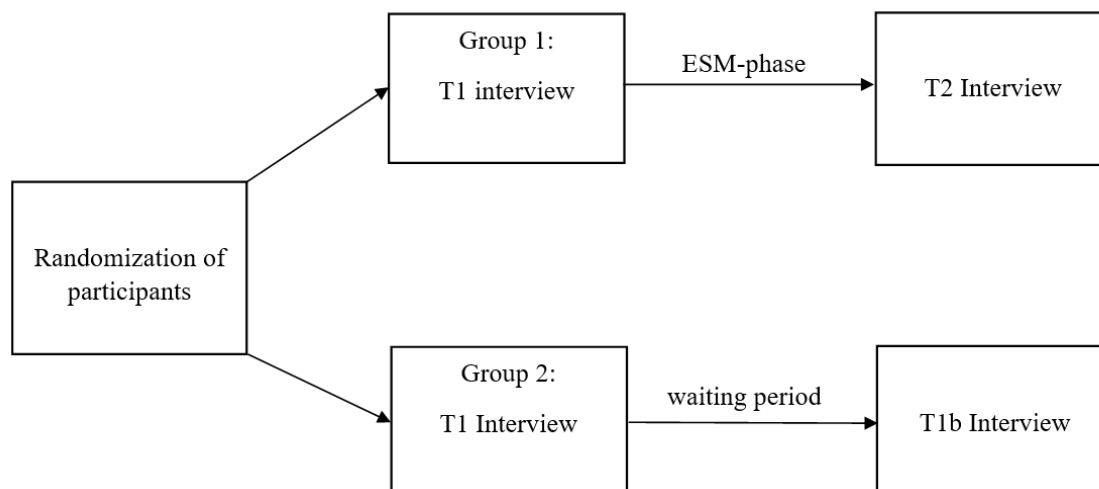
Method

Design

For this study a randomized controlled trial design was used. Participants were able to participate in the study were randomized to the ESM-phase condition or the waitlist control condition (see Figure 1). With each participant the first telephone interview (T1) was conducted. The ESM-phase condition had their second interview (T2) after two weeks of the ESM-phase and the waiting list condition had their second interview (T1b) after two weeks of waiting. Lastly, this study was approved by the BMS ethical committee of the University of Twente.

Figure 1

Overview of the study design

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                    ┌──────────────┐                      ┌──────────────┐
                    │  Group 1:    │   ESM-phase          │              │
                    │  T1 interview│ ───────────────────► │  T2 Interview│
                    └──────────────┘                      └──────────────┘
      ┌──────────────┐
      │ Randomization│
      │ of           │
      │ participants │
      └──────────────┘
                    ┌──────────────┐                      ┌──────────────┐
                    │  Group 2:    │  waiting period      │              │
                    │  T1 Interview│ ───────────────────► │ T1b Interview│
                    └──────────────┘                      └──────────────┘
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Participants

The telephone interviews were administered by students from the University of Twente and the Erasmus University of Rotterdam. These participants were recruited through www.rouwbehandeling.nl. On this website, people were able to receive information about grief and bereavement. They were also able to participate in the traumatic grief inventory (TGI-SR+) survey as self-monitoring tool. The TGI-SR+ is a valid and reliable self-report survey to assess DSM-5-TR PGD severity (Lenferink, van Eersel et al., 2022). After finishing the TGI-SR+, people could read one of four texts that contained brief standardized information about the intensity of their grief. Depending on the total score of the survey, some advice on options for bereavement care was presented. Then, at the end of the advice, people could state whether they want to participate in future research related to grief.

However, in order to participate in the study, a few criteria were set. Participants were eligible if they lost a spouse, family member or friend three to six months earlier, had access to a smartphone, were at least 18 years old and had sufficient Dutch language skills. Moreover, people who were suicidal or had been diagnosed with a psychotic disorder by a

psychologist, psychotherapist, or psychiatrist, were not able to participate. These exclusion criteria were also assessed during the first interview (T1) with the participant.

Procedure

After an invitation via e-mail was sent to potential participants, the people who responded and signed the informed consent were called and it was agreed on an appointment for the first interview, T1. The first interview was conducted within the first week after signing the informed consent and it took approximately 30 to 45 minutes. The result of the randomization was given to the participant directly after T1. Participants in the ESM condition used an app, namely Ethica, where the data was gathered from. After T1, participants were sent an e-mail with instructions about how to download and use the Ethica app. They had to register for the study with a code. After that, the participants started with the ESM-phase a day after they finished these steps. The ESM-phase lasted for a period of 14 days. As in the study from Lenferink, van Eersel et al. (2022), the app sent five signals a day with 17 questions of which 11 were PGD related as described in the DSM-5-TR and six questions were contextual. The first beep was sent randomly between 8.30 and 9.30 AM. After that, participants randomly received a notification every three hours at semi-random time intervals (i.e., between 11.30 AM – 12.30 PM, 2.30 – 3.30 PM, 5.30 – 6.30 PM and 8.30 – 9.30 PM) (Lenferink, van Eersel et al., 2022). People got a reminder after 10 and 20 minutes when they had not filled out the questionnaire yet. In total they had 60 minutes to complete the ESM-survey. Every questionnaire took around 1 to 2 minutes to complete. Participants who missed more than three surveys on one day got a reminder and encouragement to complete the app via e-mail. The ESM condition had their second interview (T2) after 14 days when they finished the surveys. The waitlist control condition had to wait for 14 days before they had their second interview (T1b). The appointments for

the second interview were directly made after T1. The second interview took approximately 30 minutes.

Materials

T1 interview, T1b interview and T2 interview

The three interviews, namely T1, T1b and T2, were similar to each other. An overview of the questionnaires can be seen in Table 1. Inquiries were collected using the following questionnaires: Patient Health Questionnaire (PHQ-9), Traumatic Grief Inventory (TGI-CA), Posttraumatic Stress Disorder Checklist (PCL-5), Work and Social Adjustment Scale (WSAS), Self-Reflection and Insight Scale (SRIS), Reactions to Research Participation Questionnaire (RRPQ) and the suicide protocol (see Table 1).

Table 1

Overview of content of T1, T1b and T2 interview

Content/ Questionnaire	Interview
Depression (PHQ-9)	T1, T1b, T2
PGD (TGI-CA)	T1, T1b, T2
PTSD (PCL-5)	T1, T1b, T2
Diagnosis psychotic disorder	T1
Impairment in daily functioning (WSAS)	T1
Self-reflection (SRIS)	T1, T1b, T2
Suicidality	T1
Reactions to participation (RRPQ)	T2
Dropout	T2

Note. PHQ-9 = Patient Health Questionnaire; PGD = Prolonged Grief Disorder; TGI-CA = Traumatic Grief Inventory; PTSD = Posttraumatic Stress Disorder; PCL-5 = Posttraumatic

Stress Disorder Checklist; WSAS = Work and Social Adjustment Scale; SRIS = Self-Reflection and Insight Scale; RRPQ = Reactions to Research Participation Questionnaire.

This study primarily focused on bereavement-related depression which is why the PHQ-9 was most relevant. PHQ-9 had 9 items in which participants had to answer how often they experienced certain symptoms on a 4-point Likert scale (1 = not at all, through 4 = nearly every day). The items were phrased into questions such as 'Over the past two weeks, how often have you been bothered by having little interest or pleasure in doing things?'. According to Kroenke et al. (2001), PHQ-9 is a reliable (α=0.89) and valid questionnaire to measure the severity of depression. Moreover, a minimum score of 10 with a 4-point Likert scale (0 = not at all, through 3 = nearly every day) was established as the threshold for clinical depression (Kroenke et al., 2001). Since this study used a scale from 1 through 4, the threshold for clinical depression would be 19. Internal consistency in the current study were acceptable at T1 (α=.71) and T2 (α=.76).

ESM-phase

The ESM-phase consists of 11 PGD items and six contextual items. All items were previously designed by Lenferink, van Eersel et al. (2022) and were drawn from the TGI-SR+. Subsequently, it was examined which items corresponded to the criteria outlined in DSM-5-TR. Every item was then discussed and presented to experts through the use of cognitive interviewing (Lenferink, van Eersel et al., 2022). In Table 2, an overview of the PGD-items can be found. Participants answered these items on 7-point Likert scale ranging from 0 to 6 (0 = totally not through 6 = totally).

Table 2

Overview of the PGD-items

In the past three hours…

1. I experienced intense yearning/longing for the deceased person

2. I was preoccupied with thoughts or memories of the deceased person

3. I was feeling as though part of oneself has died

4. It felt unreal that he/she is dead

5. I avoided reminders that the person is dead

6. I experienced feelings of sadness

7. I felt anger about his/her death

8. I had difficulty moving on

9. I felt numb because of his/her death

10. I felt that life is meaningless because of his/her death

11. I felt alone because of his/her death

Note. Contextual items in the ESM-phase can be found in the Appendix Table 1

Data analyses

For the data analyses SPSS version 28.0 was used, and significance levels were set at $\alpha = .05$. First, it was looked at the missing data. Consistent with typical ESM protocols and following the approach taken by Kraiss et al. (2022), participants who did not complete at least 50% of the daily assessments were removed from the analysis. Based on this decision, the data of 70 participants were eligible to examine the difference of depression in the ESM condition compared to the waitlist condition. Four participants that had participated in the study were excluded because they completed less than 50% of the ESM assessments. This resulted in 28 participants in the ESM condition and 42 participants in the waitlist condition.

After excluding people from the analyses with >50% missing ESM-data, descriptive statistics such as frequencies, percentages, means and standard deviations of the background information of the deceased loved one were calculated. Differences between the ESM condition and the waitlist condition regarding demographic factors (e.g., gender and

educational level), loss-related characteristics (e.g., number of losses, kinship to deceased and cause of death), receiving help from a psychologist, psychotherapist or psychiatrist at this point in time and baseline depression were assessed with a chi-square test and independent samples t-test. If the analyses show differences between the ESM condition and the waitlist condition, these variables can be taken into account when answering the research question of the study.

A one-way ANCOVA was performed to examine whether there was a significant difference in depression levels at T2 between the ESM condition and the waitlist condition, while accounting for the initial depression levels at T1. Depression levels at T2 were included as dependent variable. The ESM condition versus the waitlist condition was included as independent variable. T1 of depression levels were included as covariate.

Results

Characteristics of participants

The participants' ages ranged between 25 and 84 ($M = 56.12$, $SD = 12.60$) years. The majority of participants identified as women (77.1%), were born in the Netherlands (92.9%) and graduated with a college/ university degree (61.4%). Moreover, most participants had lost a partner (54.3%) or a parent (28.6%), mainly due to a physical illness (80%). Of the 70 participants, 28 (40%) have received help from a psychologist, psychotherapist or psychiatrist because of the death of their loved one. 23 (32.9%) of the 28 who have received help because of their loss, still received professional help while participating in this study. The participants' depression levels at T1 ranged between 11 and 30 ($M = 18.69$, $SD = 4.86$) which shows that the mean was just under the threshold of clinical depression (≤ 19). Additional characteristics of the ESM condition and waitlist condition can be seen in Table 3.

Table 3

Socio- demographic and loss-related characteristics of the sample and the ESM condition versus the waitlist condition

Characteristic	Total sample (N = 70)		ESM condition (N = 28)		Waitlist condition (N = 42)	
Age (in years), *M* (*SD*)	56.12	(12.6)	57.22	(12.45)	55.39	(12.79)
Gender, *N* (%)						
Female	54	(77.1)	21	(75.0)	33	(78.6)
Male	16	(22.9)	7	(25.0)	9	(21.4)
Nationality, *N* (%)						
Dutch	65	(92.9)	27	(96.4)	38	(90.5)
German	3	(4.3)	1	(3.6)	2	(4.8)
Belgian	1	(1.4)	0	(0.0)	1	(2.4)
Algerian	1	(1.4)	0	(0.0)	1	(2.4)
Education, *N* (%)						
College/ University	43	(61.4)	16	(57.1)	27	(64.3)
Vocational education	20	(28.6)	9	(32.1)	11	(26.2)
High school	7	(10.0)	3	(10.7)	4	(9.5)

Kinship to deceased, *N* (%)

Partner	38	(54.3)	17	(60.7)	21	(50.0)
Parent	20	(28.6)	8	(28.6)	12	(28.6)
Child	5	(7.1)	1	(3.6)	4	(9.5)
Friend	2	(2.9)	0	(0.0)	2	(4.8)
Sibling	1	(1.4)	1	(3.6)	0	(0.0)
Grandchild	1	(1.4)	0	(0.0)	1	(2.4)
Other	3	(4.3)	1	(3.6)	2	(4.8)

Cause of death, *N* (%)

Physical illness	56	(80.0)	23	(82.1)	33	(78.6)
Accident	2	(2.9)	2	(7.1)	0	(0.0)
Homicide	0	(0.0)	0	(0.0)		
Suicide	5	(7.1)	1	(3.6)	4	(9.5)
Other	7	(10.0)	2	(7.1)	5	(11.9)

Getting help from psychologist,

psychotherapist or psychiatrist

after bereavement, *N* (%)

Yes	28	(60)	13	(46.4)	15	(35.7)
No	42	(40)	15	(53.6)	27	(64.3)

Getting help from psychologist,

psychotherapist or psychiatrist

at this point in time, *N* (%)

Yes	23	(82.1)	11	(84.6)	12	(80.0)
No	5	(17.9)	2	(15.4)	3	(20.0)

Symptom levels at T1, *M* (*SD*)

Depression	18.69	(4.86)	18.04	(4.46)	19.12	(5.11)

A chi-square test was performed to assess differences between the ESM condition and waitlist condition. Specifically, it was analysed whether participants differed regarding demographic factors (e.g., gender and educational level), loss-related characteristics (e.g., number of losses, kinship to deceased and cause of death), and baseline depression. Table 4 shows no differences in these variables in regard to the two conditions.

Table 4

Chi-Square test and independent sample t-test for Socio- demographic and loss-related characteristics and depression levels at baseline for the ESM condition versus the waitlist condition

Characteristic	Test	df	p-value
Age	t = .592	68	.978
Gender	$X^2 = .12$	1	.727
Nationality	$X^2 = 1.45$	3	.693
Education	$X^2 = .37$	2	.830
Kinship to deceased	$X^2 = 4.74$	6	.577
Cause of death	$X^2 = 4.24$	3	.237
Getting help from psychologist, psychotherapist or psychiatrist at this point in time	$X^2 = .10$	1	.750
Symptom levels at T1			
Depression	t = -.913	68	.629

Note. df= degrees of freedom. * $p < .05$.

Differences in depression symptoms between the ESM condition and the waitlist condition after ESM or waiting while taking T1 depression levels into account

ANCOVA revealed no significant differences in depression levels at T2 for participants in the ESM condition (M = 15.93, SD = 3.93) compared to the waitlist condition (M = 17.19, SD = 4.90), when taking T1 depression levels into account, F(1, 69) = 0.46, p < .50.

Figures 2 and 3 illustrate the variations that exist among individuals in terms of their baseline depression levels (T1 depression) and depression levels at T2 for the ESM condition and the waitlist condition. The green lines indicate a lower score of depression levels at T2, the orange line indicates no difference between the two different time points, and the red line shows a higher score of depression levels at T2. Figure 2 reveals that 75% of the participants in the ESM condition (SD = 4.46) show a lower score of depression levels at T2 when comparing baseline depression levels to depression levels at T2. The other 25% either show higher depression levels or show no difference between the two different time points.

Figure 3 reveals that 67% of the participants in the waitlist condition (SD = 5.11) show a lower score of depression levels at T2 when comparing baseline depression levels to depression levels at T2. The other 33% either show higher depression levels or show no difference between the two different time points. In total, 14.7% of the participants in the study show higher depression levels or no difference at all between the two different time points. The receding 85.3% show smaller depression levels at T2 (SD = 4.86).

Figure 2.

Differences between baseline depression and T2 depression of individuals participating in

the ESM condition.

Note. Green lines indicate lower depression levels at T2 compared to T1, orange lines

indicate no difference between the two different time points, and red lines indicate higher

depression levels at T2 compared to T1.

Figure 3.

Differences between baseline depression and T2 depression of individuals participating in

the waitlist condition.

Note. Green lines indicate lower depression levels at T2 compared to T1, orange lines

indicate no difference between the two different time points, and red lines indicate higher

depression levels at T2 compared to T1.

Discussion

The aim of this randomized controlled trial (RCT) was to explore the effect of self-

monitoring of grief reactions in recently bereaved people on depression by means of ESM.

Specifically, the intention was to determine whether self-monitoring of grief reactions by the

means of ESM lead to a decrease in depression compared to a waitlist condition in people who have recently lost a loved one. This study is, to the best of my knowledge, the first that examined the effect of self-monitoring of grief reactions through ESM on bereavement-related depression.

The key finding of this study reveals that there was no significant difference between people who have been self-monitoring their grief reactions by means of ESM and people who have waited during that period. Meaning there is no difference regarding depression levels between participants who participated in ESM and participants who waited. Nevertheless, it also indicates that depressive symptoms have neither decreased nor increased substantially after completing five surveys per day for a period of 14 days. Previously, there have been concerns that multiple assessments per day would be too burdensome or could worsen symptoms because of the constant reminders of grief and their bereaved loved one (Lenferink, van Eersel et al., 2022; Telford et al., 2011). However, this study, as the study of Lenferink, van Eersel et al. (2022), confirms that completing multiple assessments per day did not worsen depressive symptoms.

Despite finding no substantial differences between the ESM condition and the waitlist condition, most participants showed lower depressive levels. When looking at the progress of every individual in the ESM condition it can be said that 75% of the participants showed that the depression levels were lower after participating in the ESM assessments. For the waitlist condition, 67% of the participants showed lower depression levels after waiting for two weeks. Participants in the ESM condition may have shown a greater decrease than the waitlist condition, because they were self-monitoring their grief reactions during the ESM assessments which may have increased momentary emotional awareness (Kramer et al., 2014). It might be possible that people actively processed their grief.

In addition to that, it could have been the case that participants modified their responses because of their awareness of being studied – meaning there could have been a reactivity effect (Jiménez-Buedo, 2021). For example, during the interviews, some participants explained that they felt guilty when they did not give a high score to certain questions. Participants may have felt that it was expected of them to be extremely sad after the death of their loved one, which in turn could have influenced their responses (Jiménez-Buedo, 2021).

Furthermore, a reactivity effect to the intake could explain why participants, especially people in the waitlist condition, mostly improved regarding their depressive symptoms. For example, a RCT study by Capellan et al. (2017) researched the effect of self-monitoring on measurement reactivity. The study consisted of people with long-term indwelling urinary catheters and included intervention groups and control groups. The control groups learned more about paying attention to their catheter problems by the questions that were asked during the monthly interviews (Capellan et al., 2017). The interviews also made participants think more about their daily catheter care. Therefore, participants in the current study may have showed decreased levels in depression partly due the interviews – which could have had an impact on their thinking and feeling. In addition to that, during the first interviews, participants often mentioned that they rarely think about these questions and that the interviews made them reflect on their grieving and thus increased their momentary awareness. Therefore, the interviews themselves could have influenced the levels of depressive symptoms.

Moreover, a previous RCT study of Kramer et al. (2014) found that ESM as add-on influences the levels of depressive symptoms. Kramer et al. (2014) included three groups of depressed outpatients that participated over a course of six weeks. The groups included an experimental group who received weekly feedback sessions as add on to ESM assessments, a

pseudo-experimental group who only participated in ESM, and a control group. The experimental group showed a significant decrease in depressive symptoms whereas the pseudo-experimental group only showed a significant decrease in depressive symptoms in the beginning of the RCT (Kramer et al., 2014). After the course of six weeks, the levels of depressive symptoms of the pseudo-experimental group did not differ to the control group. A reason for the significant decrease of depressive symptoms in the beginning of the study might be a placebo response, because participants may have thought that they were receiving the experimental intervention (Kramer et al., 2014). The current study did inform participants in which group they would be in at the end of the first interview, which may have reduced the chance of a placebo response since they knew the course of the study. Therefore, this could also be a reason why there was no significant difference between the ESM condition and the waitlist condition because there may have been a reduced chance of placebo response.

A notable strength of this study is that the interviews which assessed the symptom levels of depression were examined through telephone interviews. By answering questions through a phone call, the threshold to share thoughts and feelings could have been lowered (Lenferink et al., 2023). This is because interviewer and participant have never met each other which meant that there was no dependent relationship between the two (Lenferink et al., 2023). Additionally, telephone interviews are more popular compared to face-to-face interviews due to enhanced cost-effectiveness, no travel time, and the ability to maintain a personal interaction between the interviewer and the participant (Milton et al., 2017). The downside of a telephone interview could be the lack of non-verbal communication which potentially results in interviewers failing to recognize cues and not asking further questions (Lenferink et al., 2023).

Another strength is the semi-random sampling scheme of the ESM assessments, because there is comparatively low participant burden and low consequences in regard to

compliance (Myin-Germeys & Kuppens, 2021). In a semi-random sampling scheme, participants can predict how often they receive a notification to complete an assessment and they can also roughly tell when the notification will come, as in this case approximately every three hours. If participants do not know when to expect a notification there is a higher risk of decrease in compliance (Myin-Germeys & Kuppens, 2021). In this study, only four participants had to be excluded from the analysis because of low compliance during the ESM assessments. Normally, the compliance rate is around 70-80% (Myin-Germeys & Kuppens, 2021; Vachon et al., 2019). In the study of Lenferink, van Eersel et al. (2022), the compliance rate was 60%, whereas the compliance rate in this study was around 94.5%. Additionally, participants received a reminder via e-mail if they missed three assessments on one day, which could help maintaining compliance (Vachon et al., 2019).

On the other hand, this study conveys several limitations. For example, the sample consisted mostly of women, which restricts the generalizability of this research, because women are generally more expressive and engaging with their emotions (Stroebe et al., 2001). However, in bereavement research, this is a common problem (Johannsen et al., 2019). Furthermore, this study compared two groups with each other, while ESM is normally used to research the within-person variation (Myin-Germeys & Kuppens, 2021). Thus, conclusions were drawn from a group level – not from an individual perspective – and thereby eliminating individual differences. The data does show that there are individual differences, some people show an increase in depressive levels while others show a decrease in depressive levels. It could be important to find out what the difference between these individuals is because questions remain open by just focusing on group levels.

Regarding the use of ESM in the future, several implications can be made. First, the use of ESM could provide a contribution to bereavement-related research by using a real-time assessment approach because ESM decreases the risk of retrospective recall bias (Lenferink,

van Eersel et al., 2022; Telford et al., 2011). The study of Maccallum et al. (2015) studied trajectories of depression following bereavement and mentioned that their reliance on retrospective reporting was a major limitation. This is important to note, because especially people with depression often have the tendency to overestimate the severity of their depressive symptoms (Lenferink, van Eersel et al., 2022). On the other hand, people without depression are more likely to underestimate their depression levels when questioned about depressive symptoms during the past weeks (Lenferink, van Eersel et al., 2022). ESM may be an important tool to further study bereavement-related depression, since the research on this topic, to this day, is scarce.

Lastly, further research should enhance better understanding of the dynamic between grief and depression. It could be interesting to look at individual differences between participants. For example, future research should investigate why some participants show an increase in depression levels, whereas others show a decrease in depression levels. During the current study, several participants would have liked to write notes during their assessments. Giving people the opportunity to say something about their symptoms during the day could convey valuable information in this regard.

To conclude, this study has shown that there is no decline in depressive symptoms for people who have been self-monitoring their grief reactions by means of ESM compared to people who have waited during that period. However, it also became apparent that the ESM assessment were not too burdensome since this was a potential risk. Moreover, when looking at individuals, the data shows that most participants show less depressive symptoms at the end of the study which raises the question which factors play a role in the decrease and/ or increase of depressive symptoms. Further research may be relevant to investigate individual differences in bereavement-related depression.

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Appendix

Table 1

Overview contextual items

In the last three hours…	Answer options
Where were you?	1. Home
	2. School
	3. Work
	4. None of the above
What activity did you spend the most time on?	1. Resting/ sleeping
	2. Working/ studying/ volunteering
	3. Household chores (e.g., cooking, cleaning)
	4. Sports (e.g., running, walking, cycling, team sports)
	5. Hobbies/ recreation (e.g., reading, gardening, drawing, playing an instrument for fun, concert, dinner)
	6. Watch TV/computer (or smartphone) to to use (e.g. web surfing, gaming, social media, Netflix
	7. Travel (e.g., train, drive, fly)
	8. Spiritual (e.g., church attendance, meditation, prayer)
	9. Something intimate (e.g. hugging, sex)
	10. Social contact (face-to-face, by phone or Skype)
	11. Taking care of children, parents or others
	12. Other (any behaviour not in 1-11)

How did you like the activities?	Very unpleasant --- very pleasant
Were you with other people?	1. Yes, with one other person 2. Yes, with multiple others 3. No, I was alone
What is your relationship with the person you had most contact with?	1. Relationships/ partner/ lover 2. Children 3. Father/ mother 4. Brother/ sister 5. Friend in a non-romantic sense 6. Acquaintance 7. Colleague/ fellow student 8. Otherwise
How would you evaluate the contact?	Very unpleasant --- very pleasant
Did an important event take place today (where you experienced a lot of emotions)?	Yes/no (namely…)
Did a 'major' event take place today that had a big impact on you?	