**RESEARCH ARTICLE**

# Train 4 Good - an eight-month mindfulness program live on Internet for long-term mental fatigue and emotional distress after an acquired brain injury

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**Abstract**

Long-term psychosocial and emotional difficulties and mental fatigue after stroke and traumatic brain injury (TBI) is common and there is a need for rehabilitation and support. Mindfulness can contribute to well-being and can be delivered in groups and also on Internet. The aim of this feasibility study was to evaluate whether an eight-month mindfulness program, Train 4 Good, could be successfully delivered live on Internet (10 participants) for participants suffering from long-term mental fatigue after a TBI or stroke. A face-to face group was used for comparison (10 participants). The program Train 4 Good, includes cultivation of the four mental states of the Brahma Viharas; metta/loving-kindness, compassion, appreciative joy and equanimity. The Train 4 Good program was designed to enable people suffering from long-term mental fatigue and emotional distress after an acquired brain injury to further explore meditation, enhance well-being and to deepen their meditative practice after having completed a Mindfulness-Based Stress Reduction (MBSR) program. Significant improvement in self-compassion (Self Compassion Scale short form) was achieved after the Train 4 Good program. In conclusion, we suggest that it is possible to deliver the Train 4 Good program live on Internet for people suffering from mental fatigue and emotional distress after an acquired brain injury with a similar alleviation of self-compassion as for a face-to-face group. Mindfulness programs can be a valuable option for rehabilitation after an acquired brain injury when the fatigue and emotional burden can become long-lasting or lifelong. Development of longer mindfulness programs is warranted, since mental health problems only improve slowly and long-term support is requested.

**Key words:** mindfulness, traumatic brain injury, stroke, mental fatigue, compassion, self-compassion

 

## 1. Introduction

Improvement in acute care has contributed to better outcomes in patients after an acquired brain injury, and to more patients surviving. This is promising, but there is also an increased knowledge about the long-term psychosocial and emotional consequences that stroke and TBI can have on people (Draper, Ponsoford, & Schönberger, 2007; Teasdale & Engberg, 2005). This implies a need for long-term support and mental health service.

People who suffer from long-term mental fatigue after an acquired brain injury suffer from lost functions, such as having difficulties in going back to work or taking part in social activities together with family members and friends. Impressions, inner and outer, easily drain them of mental energy. An emotional burden is often added to mental fatigue, as well as subjective or objective cognitive impairments (Johansson & Rönnbäck, 2014b). For many, emotional reactions and cognitive impairments generate negative thinking and rumination. Feelings of hopelessness and despair are common since the desire and striving to get back into ordinary life is not possible for most. Difficulties in coping with stress, not being able to handle more than one task at a time, problems in making decisions and handling time pressure are common symptoms that most suffer from. It can take several years of frustration, self-doubt, despair, anxiety and depression to find the right balance between rest and activity and life in general. For many, this can be a long struggle before they can experience life with less inner fighting and more compassion, gentleness and understanding towards themselves.

Mindfulness can contribute to well-being after a personal crisis and in dealing with who you are and who you will become. Research has proved mindfulness to be effective for a wide range of conditions such as stress, depression, pain, and fatigue, with the potential of helping individuals to cope better with their difficulties (Carlson & Garland, 2005; Grossmana, Niemannb, Schmidtc, & Walachc, 2004; Kabat-Zinn, Lipworth, & Burney, 1985; Smith et al., 2008). Mindfulness can also improve attention and cognitive flexibility (Moore & Malinowski, 2009) and result in changes in the brain (Hölzela et al., 2011; Kilpatrick et al., 2011). Mindfulness can also have an impact on well-being, and could be a therapeutic option for those who have suffered an acquired brain injury and who struggle with long-term problems (Azulay, Smart, Mott, & Cicerone, 2013; Bédard et al., 2003; Johansson, Bjuhr, & Rönnbäck, 2012). For developing and improving levels of mindfulness, mental training such as meditation is required (Chiesa & Malinowski, 2011).

One commonly used definition of mindfulness is Jon Kabat-Zinn's: "paying attention in a particular way; on purpose, in the present moment, and non-judgmentally" (Kabat-Zinn, 2003). In short, this means maintaining a moment-by-moment awareness of an object of experience such as our thoughts, feelings, mental/cognitive formations, bodily sensations, or surrounding environment. Paying attention is in mindfulness something different from the usual way of behaving when paying attention; it is a paying attention to something with an awareness of our tendency to judge the observed. When being mindful one is refraining from reacting automatically and judging the observed; and it is to be more allowing towards what is going on at any given moment, combined with wholesome attitudes like kindness and patience. Mindfulness is about observation without criticism and being compassionate with oneself (Williams & Penman, 2011). When practicing mindfulness, the attitudinal foundations provide a way to hold, investigate and work with whatever comes up in life, and this can be helpful for many who experience a life crisis (Kabat-Zinn, 2001). The attitudinal

foundations of mindful practice are all interconnected as follows. a) Beginner´s mind – to see everything as if it is for the first time and not allowing illusions of knowing prevent us from being present to our experiences. b) Non-judging – being open to any experience, not judging or categorizing into good and bad or positive and negative, and to be aware of how easily judging can result in automatic reactions that often have no objective basis at all. c) Patience – to understand and accept the fact that things unfold in their own time; practicing mindfulness gives us the chance to give time and space to our own growing insight. d) Trust – developing a basic trust in yourself and your feelings. e) Non-striving – having no goals others than being yourself; letting go of the attitude "If I only were/had". f) Acceptance – seeing things as they actually are. g) Letting go of unhealthy thoughts, feelings, or activities; listening to the inner wisdom of what is important. Jon Kabat-Zinn added two more fundamental attitudinal qualities in 2013 (https://www.youtube.com/watch?v=2n7FOBFMvXg). h) Gratitude – slowing down, bringing a sense of delight and focusing on the positive in life. Even when things are bad we can be grateful for surviving them and learning from those events. i) Generosity – there is more happiness found in giving than in clinging on to things, and generosity embodies a warm heart and kind attitude.

Compassion and self-compassion are central parts, they are always present in mindfulness practice and have considerable importance for well-being when life is not what it used to be anymore. Compassion is the awareness of the suffering of oneself and other beings, coupled with the wish and effort to alleviate it. Self-compassion is about opening up to kindness and tenderness towards oneself, rather than self-blame and criticism (Gilbert & Choden, 2013; Neff & Germer, 2017). Self-compassion has been related to mental health (Neff & Germer, 2017), and self-compassion interventions have been found to improve life-satisfaction and happiness, and to decrease depression, anxiety and stress (Neff & Germer, 2013).

All the attitudinal foundations as well as compassion and self-compassion are implicitly taught in the Mindfulness Based Stress Reduction program (MBSR) developed by Jon Kabat-Zinn (Kabat-Zinn, 2001). MBSR has proved to be a clinically effective method for a wide range of conditions such as stress, depression, pain and fatigue, with the potential of helping individuals to cope better with their difficulties. MBSR is not about training to rid oneself of, the unwanted, when this is not doable, but rather to learn to live life to the fullest even with obstacles and the not wanted (Carlson & Garland, 2005; Grossmana et al., 2004; Kabat-Zinn et al., 1985; Smith et al., 2008).

MBSR is a powerful program and can give people a helpful start in their mindfulness practice. For those who want to further explore mindfulness and keep their practice alive, an advanced program over a longer period can be of great support and inspiration. This can be even more important when suffering from mental illness and fatigue, or other health conditions that cause fatigue, as it can take a long time to build a regular mindfulness practice, especially when fatigue hampers the initiation of the practice. After our first study (Johansson et al., 2012), participants also explicitly asked for a continuation of guided mindfulness meetings.

From our experience with the MBSR program with people who had suffered a stroke or traumatic brain injury (TBI)(Johansson et al., 2012), the practice of kindness and compassion, more implicit than explicit in teachings, instructions and exercises in the MBSR program, was observed to be especially nourishing. For most participants, it was a new way of relating to experienced difficulties (Johansson et al., 2012). Re-

sults, observations and comments from participants, assessed after attending the MBSR program, were collated with a purpose to create a program that could fulfill what participants thought of as nourishing and what they wished to explore further. All participants had, through their participation in a MBSR program, acquired basic skills and understanding of mindfulness, stress psychology and physiology, such as how to cope with life in a more wholesome and mindful way. This basic understanding enabled what is described as "bringing the head and heart together". Teaching about cause and effect is combined with practice that aims to develop wholesome states of mind and heart, as in the teaching and training of The Brahma Viharas, also called the sublime states of the mind and/or the limitless qualities of heart (Cullen, 2011; Germer, Siegel, & Fulton, 2005). Cultivation of the Brahma Viharas' four mental/heartfelt states include; metta/loving-kindness, compassion, appreciative joy and equanimity. "These four attitudes are said to be excellent or sublime because they are the right or ideal way of conduct towards living beings. They provide, in fact, the answer to all situations arising from social contact. They are the great removers of tension, the great peace-makers in social conflict, and the great healers of wounds suffered in the struggle of existence. They level social barriers, build harmonious communities, awaken slumbering magnanimity long forgotten, revive joy and hope long abandoned, and promote human brotherhood against the forces of egotism" (Thera, 1999). The Brahma Viharas are predicted to enhance well-being – and has been a suggested practice of importance for laypeople, in the traditional teachings. The Brahma Viharas are a pre-Buddhist concept and were of importance even before the time of Siddhartha Gautama, who then came to integrate the practice of Brahma Viharas with other core teachings in Buddhism. The aim was to combine heartfelt states with a developed and clear seeing mind. Since the practice of Brahma Viharas are possible to cultivate in a practical way in everyday life and by laypeople (Wiltshire 1990), this was therefore decided upon to form the structure for the program we developed (Johansson, Bjuhr, & Rönnbäck, 2015). Metta, compassion and appreciative joy are all aspects of friendliness or basic goodness. Equanimity is the quality to meet life with open-heartedness and appreciate our equality with all beings, and the ability to embrace both pleasant and unpleasant experiences (Germer et al., 2005). Equanimity is often spoken about as the core state that enables the head to heart connection. More recently, equanimity is considered as being highly important to transform our sensory-perceptual and cognitive-emotional systems to widen our perspective on experience, more readily engage incoming sensory information, and more efficiently disengage cognitive-evaluative and emotional-reactive behaviours when appropriate (Desbordes et al., 2015). Metta is often translated into English as loving-kindness but this does not capture the full sense of the word. A more accurate translation, and referred to in the program, is the translation according to many Buddhist scholars that metta is the universal quality of goodwill and boundless friendliness (Peacock, 2008).

The aim of this feasibility study was to evaluate whether the cultivation of the four Brahma Viharas, developed as an eight-month mindfulness program, Train 4 Good, also could be successfully delivered live on Internet. As many people live far away from a center where a mindfulness program is offered, and some suffer from physical or psychological restrictions making it impossible to attend a mindfulness-program in a real and live group, a mindfulness program live on Internet could be the best option. We also wanted to deliver the program live on Internet, since belonging to a group can give participants a wider perspective on their suffering. A shared perspective on

their suffering could lessen feelings of isolation; sharing and learning with others could also contribute to a gentler understanding of suffering as a universal phenomenon. A face-to-face Train 4 Good group was used for comparison. The Train 4 Good program was designed to enable people suffering from long-term mental fatigue and emotional distress after an acquired brain injury to further explore meditation, to deepen their meditative practice after having completed an MBSR program and foremost to enhance wellbeing. With serious illness, virtually every aspect of the person is altered to some degree. Western medicine sometimes fails by not understanding that healing is not possible unless the whole person and every aspect of impaired functioning are addressed. Having experienced a stroke or TBI is not something that just affects part of the brain. If the acquired brain injury causes mental fatigue, this affects the whole person, the relations the person has to others and the capacity to participate in life. Rehabilitation should therefore be directed towards more than just symptom reduction, but to helping the patient to attain the state of well-being that comes from the ability to pursue achievable goals and purposes.

## 2. Methods

### 2.1. Participants

The participants included in this study suffered from long-term mental fatigue after a TBI or stroke and had previously participated in a feasibility study evaluating whether an MBSR program could be successfully delivered live on Internet for people suffering from mental fatigue after a TBI or stroke (Johansson, Bjuhr, Karlsson, Karlsson, & Rönnbäck, 2015). They had participated either in a live on Internet MBSR or a face-to-face MBSR program. Participants were recruited to this previous study, either through an advertisement in a local daily newspaper or through information published on our website www.mf.gu.se. We conducted an initial screening of potential participants via a telephone conversation. The inclusion criteria were: healthy men and women between 20 and 65 years of age, they had been employed prior to suffering a stroke or TBI. They had recovered from any neurological symptoms they might have had, and they had been suffering from pathological mental fatigue above cut-off on Mental Fatigue Scale (MFS)(Johansson & Rönnbäck, 2014a) for at least 6 months before inclusion in the study. Our exclusion criteria included: co-morbidity, including psychiatric or neurological disorders, a history of alcohol or drug abuse, and not having previously attended an MBSR program. It was difficult to recruit the number of participants needed in the Gothenburg region. Therefore, we allowed participants from other areas of Sweden to be included in the Internet MBSR group.

All participants included in this study had finished an MBSR program one to three months before attending the Train 4 Good program (Johansson, Bjuhr, Karlsson, et al., 2015). In the Train 4 Good face-to-face group, 9 had previous experience from a face-to-face MBSR and 3 from MBSR live on Internet. The participants in the Train 4 Good program live on Internet all had experience from a previous MBSR live on Internet. Three participants from the live internet MBSR, who wished to attend the face-to-face Train 4 Good program were allowed to do so, since we wanted the groups to be equal in numbers. From the live Internet MBSR group, three declined to follow the advanced program, and three from the face to-face MBSR also declined. During the Train 4 Good program, one from the face-to-face group discontinued due to lack of time (single parent of a young child); two from the Internet program discontinued, one due to lack of time (parent of young children) and one due to personal event causing

mental distress during the program. Two from the Internet Train 4 Good program did not respond to the questionnaire they had received by e-mail after finishing the Train 4 Good program. They were reminded twice. For the evaluation of the Train 4 Good program we wanted to evaluate mental fatigue, emotional factors and self-compassion in order to find out how these factors were affected after participating in MBSR and the Train 4 Good program. The analysis is based on the participants who had responded on all stages of the assessment; before the start of MBSR, after MBSR, after the Train 4 Good program (Table 1). Those with missing data are excluded from the analysis.

The study was conducted in compliance with the Declaration of Helsinki (1975). All participants provided informed consent. The study was approved by the Ethical Review Board, Gothenburg, Sweden.

**Table 1.** Demographic data of participants attending either the face-to-face or Internet live Train 4 Good program. Age, sex, education, employment status and time since TBI or stroke are shown in the table. Mean values and standard deviation in parenthesis.

| | **Face-to-face** | **Internet** |
|---|---|---|
| Age (years) | 48.0 (10.7) | 47.6 (10.0) |
| Females/males | 10/1 | 10/0 |
| Months since TBI/stroke | 67.3 (80.1) | 110.2 (150.6) |
| Education | 7 university, 3 high school, 1 elementary school | 7 university, 3 high school |
| Employment status % | 60.0 (44.4) | 44.2 (45.8) |

2.2. The Train 4 Good program

The participants were offered an eight-month program with a monthly group meeting. The program concluded with an all-day retreat, structured the same way as the all-day silent retreat day that is taught in the MBSR program. We decided to offer the program over a longer period of time as it takes time to develop mindfulness practice on a daily basis. We also wanted the participants to have time to explore the new practices more deeply since it has been found that the amount of time spent practicing meditation can be crucial to a positive outcome (C. Crane et al., 2014). Mental fatigue can cause multiple symptoms interfering with new activities such as concentration difficulties, slowness of thinking and impaired memory (Johansson & Rönnbäck, 2014b). Therefore, we wanted the participants to have time enough to understand and practice the teachings given on these new themes that are the practice of Brahma Viharas. We also wanted the participants to be able to go deeper into their mindfulness practice by extending the program over eight months. Some evidence suggest that mindfulness training can be a rather robust intervention to improve mental health outcome and especially stress, even when mindfulness is administrated and delivered in a shorter format, online on internet (Spijkerman, Pots, & Bohlmeijer, 2016). Short term mindfulness intervention could be of benefit, but so far shorter mindfulness interventions in rehabilitation are not yet well established (Hardison & Roll, 2016), especially when considering life-long mental health issues. We also wanted to enable for participants to share their experiences, over time and learn from each other by the specific way that inquiry is held during the class by the mindfulness teacher. The inquiry is a specific process and pedagogical

principle, one of the fundamental underpinnings in MBSR as well as in MBCT (Mindfulness Based Cognitive Therapy) (R S Crane et al., 2015).

The curriculum of the Train 4 Good program has been presented in detail previously (Johansson, Bjuhr, & Rönnbäck, 2015). In short, each session lasts for 2 hours, having a specific theme (see below), meditation practice and time for participant's reflections in the specific way an inquiry is held. The pedagogy of inquiry in MBSR is documented and explained in descriptive and theoretical literature (Santorelli, 1999). Inquiry is a complex pedagogy that serves many functions, such as enabling participants, with the aid of the teacher, to move from the individual to the universal; from feeling separated from, to come into relation with, to become more compassionate instead of judging. The process of inquiry is also a complex pedagogy since it is a competence the mindfulness teacher practices until it becomes an embodied quality that serves to aid participants in the integration of top-down and bottom-up neurological processes, proposed to be a primary change mechanism underlying the effectiveness of mindfulness based interventions (Khoury et al., 2017). Teaching MBSR online and live for patients suffering from mental fatigue after stroke or head trauma, we found it just as possible to incorporate inquiry in the teaching (Johansson, Bjuhr, Karlsson, et al., 2015). The internet platform used did not easily support group discussions. This enabled the specific communication style, used in inquiry, where no one interrupts one another and no one gives advice. Mindfulness and deep listening to others as well as to oneself are encouraged.

2.2.1. The Train 4 Good program sessions

It is of importance to point out that since there has been an explosion of various MBI or MBP (Mindfulness Based Interventions or Mindfulness Based Programs), sometimes referred to as second generation MBI/MBP, guidelines have been created to evaluate whether an MBI/MBP fulfills the required qualities to be called a MBI/MBP (R S Crane et al., 2017). The intervention taught in a MBI/MBP and the teacher who is teaching the intervention, constitute an inseparable unit; together this creates an intervention that either holds the right qualities and standards or not. Rigorous attempts, over the last decade have been done to explore and research what is called the "warp and the weft" of mindfulness based interventions and programs, by intense research on the "parent program" MBSR and MBCT (Crane and Brewer et al. 2017). Today, the MBI:TAC (Mindfulness Based Interventions – Teacher Assessment Criteria, is an internationally widespread and researched instrument that serves to aid in the training and assessment of mindfulness teachers, in order to uphold certain standards and integrity when teaching (R S Crane et al., 2013). The Train 4 Good program was developed in adherence with these international standards, maintaining the essential characteristics of the program and the teacher.

Session one: Enhance a more in-depth and sustained awareness of the meditative and mindful skills achieved during MBSR and to further explore the four emotional and heartfelt states of Brahma Viharas, Theme: Exploring compassion for ourselves and for others suffering from mental fatigue and other symptoms caused by stroke or head trauma.

Session two: Friendly yoga session, exploring simple movements with care, compassion and curiosity. Exploring fatigue in inquiry as well as in meditation. Meditation on fatigue inspired by Shinzen Young's approach to pain (Young, 2005). Theme for session two; discovering the difference between constructs and reality: what it feels

like to be tired/fatigued and what is experienced as fatigue in the present moment.

Session three: Further exploration of tiredness and fatigue. Teaching of mindfulness meditation not only being a way to concentration, but just as much a way to cultivate friendliness towards oneself and others. Theme: exploration and practice of "metta" – the innate mental and heartfelt state of boundless friendliness.

Session four: Metta meditation and acceptance: making friends with oneself and being with what is. Introducing appreciative joy meditation on "taking in the good"; noticing pleasant, unpleasant and neutral parts of the body and mind. Theme: Being with what is – with kindness and acceptance.

Session five: Exploration of appreciative joy. Inquiry into the possibility of joy and that each moment holds possibilities of the positive as part of our experience in every moment. Inquiry and dialogue on our capacity to make active choices about what to attend to in each moment: the negative, the neutral, the positive. Appreciative joy meditation on "taking in the good"; in the body and in the mind and the world. Theme: The capacity to choose what to attend to.

Session six: Exploring appreciative joy further and guided instructions on insight dialogue training (Kramer, 2007). Bringing mindfulness into communication and relationships. Exploring deep listening and wise speech. Allowing oneself to slow down. Asking for what is needed; a slower communicative pace. Theme: Communication and relation – how to be a part of communication with others in a beneficial and wise way when suffering from mental fatigue.

Session seven: Further exploration of insight dialogue training (ID). Practicing being in relation and communication through ID, with finding equanimity in levels of energy as the focus of attention. Guided mountain meditation (Kabat Zinn, 2001) to enable this exploration of knowing energy levels internally. Theme: Equanimity and communication.

Session eight: Meditation on equanimity/balance – being peaceful with what is. Safe and neutral places – equanimity and body sensations. Paying attention to that which the person feels at peace with. ID practice: What about the future? How to maintain the work done? Letter to oneself about insights and one's own wise guiding for the future.

Theme: equanimity. More insight dialogue training and working with finding equanimity/balance in levels of energy in relationships and communications. Gratefulness and endings.

The program ended with an all-day retreat, structured the same way as the all-day retreat from the MBSR program, but with a focus on guided meditations on metta, compassion, appreciative joy and equanimity, for people suffering from mental fatigue.

The online course used the Adobe Connect platform for the meetings. The participants logged in to the study website and were thereafter allowed to connect to the live class. All participants used microphones and web cameras, allowing them to interact and converse with the teacher. They were also able to establish contact with the other participants in the group, as they could see and hear all the dialogue after the formal practice had taken place. This enabled the members of the Internet group to experience a sense of belonging to a group, and also to take part in group communication, very similar to the face-to-face group. This learning is important for the formal and informal practices and for implementing mindfulness in daily life (McCown, Reibel, & Micozzi, 2011).

The mindfulness teacher, H. Bjuhr, delivered both the face-to-face and Internet

programs. The groups had their sessions on consecutive days, making it easier for the teacher to deliver the program to both groups in a similar way. Dr. Bjuhr is a clinical psychologist and certified MBSR teacher and qualified Teacher Trainer, trained at The Center for Mindfulness, University of Massachusetts Medical Center. Bjuhr is also a Certified Yoga Teacher.

### 2.3. Measures

The assessments included a self-assessment of mental fatigue using the Mental Fatigue Scale (MFS). The MFS is a multidimensional questionnaire (Johansson, Berglund, & Rönnbäck, 2009; Johansson & Rönnbäck, 2014a; Johansson, Starmark, Berglund, Rödholm, & Rönnbäck, 2010), with a cut-off score of 10.5 (Johansson & Rönnbäck, 2014a). We used the Comprehensive Psychopathological Rating Scale (CPRS) measuring depression and anxiety (Svanborg & Åsberg, 1994). For measuring self-compassion/metta we used the Self-Compassion Scale short form (SCS). The SCS short form has a near perfect correlation with the long scale (Raes, Pommier, Neff, & Van Gucht, 2011). Specific questions designed for this study were developed with the intention to gain information about how participants, after the Train 4 Good course, experience their ability to handle life, their mental fatigue and also how they experienced central Train 4 Good themes practiced during the mindfulness program. For each question, they could choose between the alternatives; worse, no change and better.

### 2.4. Data analysis

We used a General Linear Model, with time as a repeated factor, and group as a between factor for the main analysis. Participants with missing data were excluded from the analysis. Paired t-test was used for post-hoc test. SPSS 21.0 was used for statistical calculations.

## 3. Results

### 3.1. Mental fatigue

Measures from baseline (before start of the MBSR course) are included with the intention to compare results from the MBSR program with the Train 4 Good program. The result showed a significant decrease on MFS rating over time ($F=28.347$, $p<0.001$, partial Eta squared ($\eta_p^2$)=0.599). No interaction was detected. ($F=1.162$, $p=0.324$, $\eta_p^2=0.058$), and no difference between the groups ($F=0.034$, $p=0.856$, $\eta_p^2=0.002$). The post-hoc test showed a significant improvement between baseline and assessment after MBSR ($p<0.001$), but no difference was found between assessment after MBSR and after Train 4 Good program ($p=0.417$).

### 3.2. Depression and anxiety

The result showed a significant decrease on CPRS depression over time ($F=6.976$, $p<0.003$, partial Eta squared ($\eta_p^2$)=0.269). No interaction was detected ($F=0.035$, $p=0.966$, $\eta_p^2=0.002$), and no difference between the groups ($F=1.009$, $p=0.328$, $\eta_p^2=0.050$). The post-hoc test showed a significant decrease from baseline and assessment after MBSR ($p=0.019$), but no difference was found between the assessment after MBSR and after Train 4 Good program ($p=0.234$). A significant decrease on CPRS anxiety over time was found ($F=6.871$, $p<0.003$, partial Eta squared ($\eta_p^2$)=0.266). No interaction was detected ($F=0.441$, $p=0.647$, $\eta_p^2=0.023$), and no difference between the groups ($F=4.303$, $p=0.052$, $\eta_p^2=0.002$). The post-hoc test showed a significant decrease from baseline to assessment after MBSR ($p=0.009$), but no improvement from the assessment after

MBSR and after the Train 4 Good program (p=0.605).

### 3.3. Self-Compassion Scale short form

The analysis of the total Self-Compassion Scale short form did not, with Mauchly´s test of sphericity, hold for the analysis, and an adjusted degree of freedom was used (Greenhouse-Geisser correction). A significant increased rating over time for total self-compassion was detected (F=7.946, p=0.003, partial Eta squared ($\eta_p^2$)=0.295, Figure 1). No interaction was detected (F=0.907, p=0.412, $\eta_p^2$=0.046), and no difference between the groups (F=3.892, p=0.063, $\eta_p^2$=0.170). The post-hoc test showed a significant improvement during the period from start to assessment after MBSR (p=0.02). There was also a significant improvement between the assessment after MBSR and after the Train 4 Good program (p=0.05).

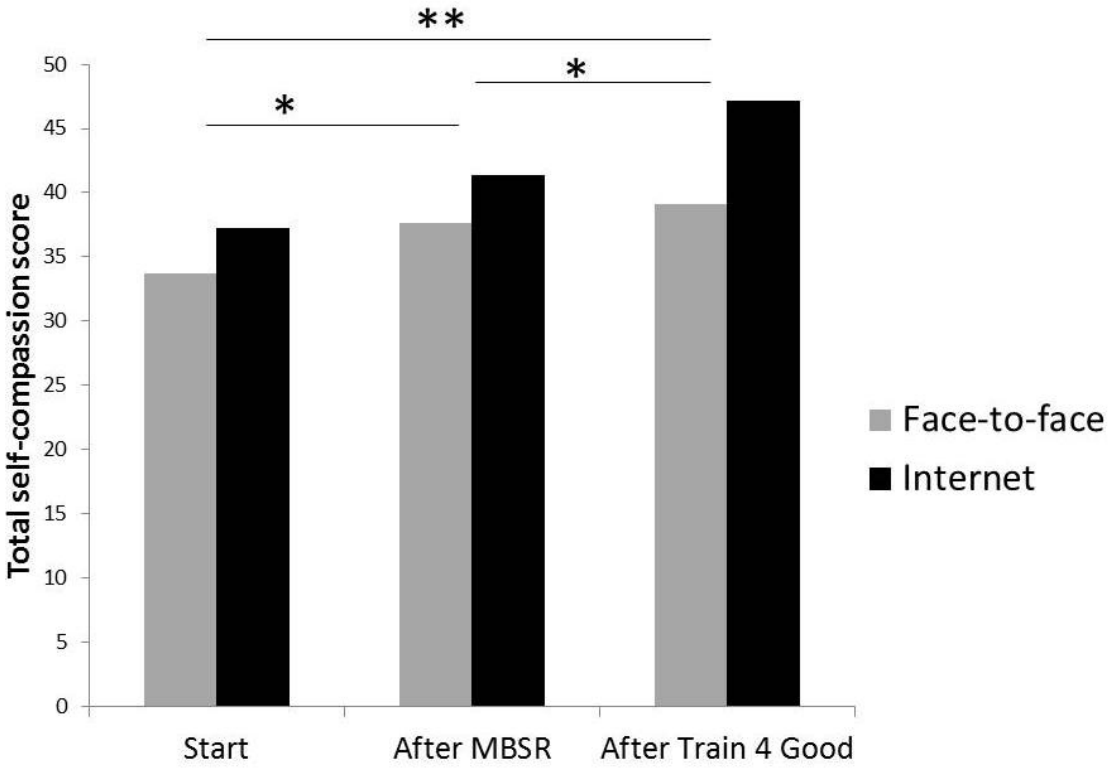


**Figure 1.** Self-compassion Scale, short form, mean ratings at baseline before start of the MBSR program, after MBSR and after the Train 4 Good program for the Internet live and face-to-face group.

### 3.4. Separate questions

The questions specifically designed for this study and the results are shown in Figure 2. In total, 19 participants have answered this questionnaire, and both the face-to-face and live on Internet groups are combined, as no difference between the groups was found. The questions concern how participants after the Train 4 Good program experienced their ability to handle their life and also how they related to central themes practiced during the mindfulness course. This result

indicates only how they experienced changes in central themes and how they experienced the ability to cope with life in a different way. Several abilities were reported as better, while for some no changes were reported. The improvements reported indicate an increased awareness about personal reactions and increased ability to handle life and difficulties in life, including mental fatigue with more compassion and equanimity. The sense of belonging to others has also improved. The questions about joy/happiness, feelings of helplessness and meaningfulness and having a place in the world were not changed. The formulation of these questions was an attempt to explore if participant's subjectively had been influenced by the core themes in the Train 4 Good program.

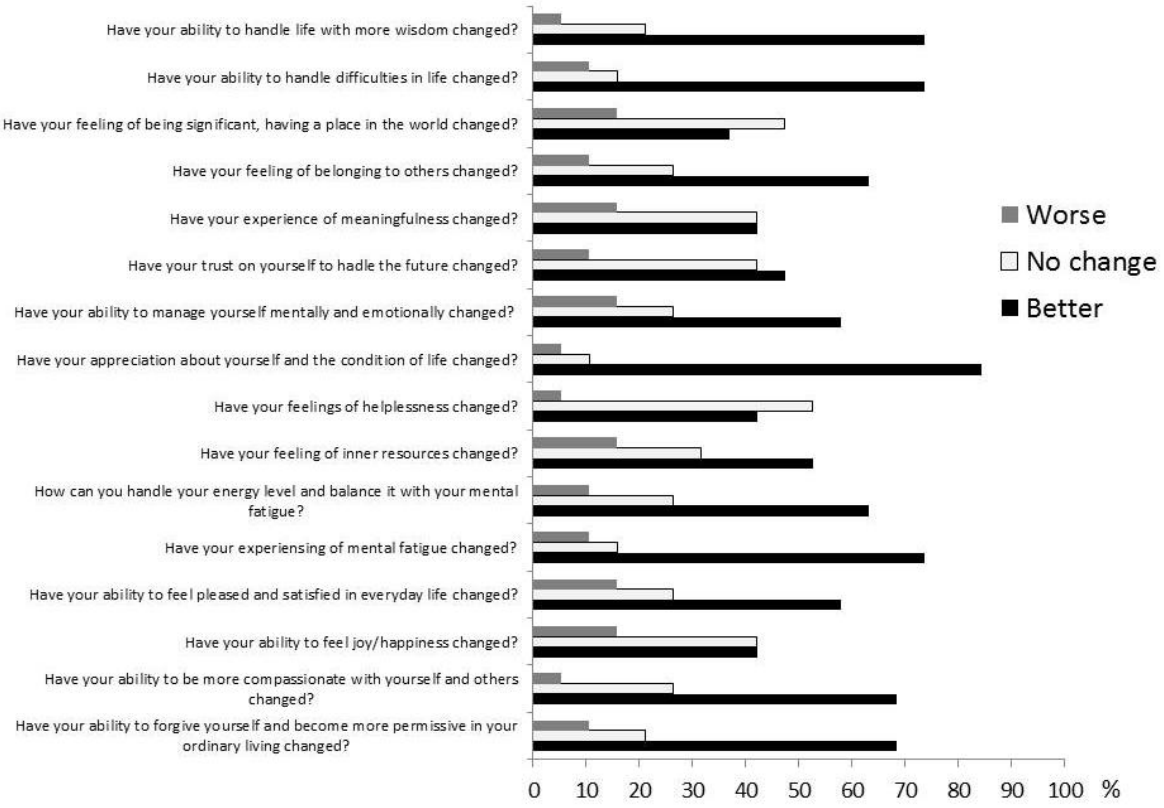


**Figure** 2. Questions answered after the Train 4 Good program. The participants could choose between worse, no change and better. The questions concern how participants after the Train 4 Good program experienced their ability to handle their daily life and also how they related to central themes practiced during the mindfulness course. The answers are reported in percentage. In total, 19 participants have answered this questionnaire, and both the face-to-face and live on Internet groups are combined, as no difference between the groups was found.

## 4. Discussion

This is a feasibility study, and we wanted to explore the possibility to deliver the Train 4 Good mindfulness program live on Internet for participants who suffer from long-term mental fatigue after a TBI or stroke. In regard to people suffering from mental fatigue after TBI and stroke, we have found the MBSR program to be helpful, with improvement in mental energy and improved well-being as the rating on depression and anxiety scales decreased. However, an

MBSR program is short and for integrating mindfulness in life, support can be important, especially when suffering from lack of mental energy and impaired ability to initiate activities. The Train 4 Good program includes the practice of Brahma Viharas' four innate mental and heartfelt states; metta, compassion, appreciative joy and equanimity. These states have been known for centuries to improve overall well-being when transformed into accessible practices in ordinary and everyday life. Thus, they have formed the basic themes, explored and trained, in the Train 4 Good program. Our initial aim when creating the Train 4 Good program, was to explore whether the program could be of further support and help for people suffering from long-term emotional distress and mental fatigue after an acquired brain injury, and who previously had participated in an MBSR program. To enable the cultivation of the four Brahma Viharas, it is necessary to understand, to some degree, how the mind works and how and why we humans so often get stuck in ruminative and anxious thought patterns, thoughts that cause emotional reactions and stress. Attending an MBSR program gives the participant a chance to learn, understand and better cope with stress reactivity of body and mind; enabling a greater extent of wise response to stress. Having attended MBSR training with a qualified and certified MBSR teacher was therefore the most crucial inclusion criteria for participation, apart from suffering from mental fatigue. We also wanted to offer a deepening of the skills implicitly trained in the MBSR program, such as the attitudinal foundations of mindfulness, with even more focus on friendliness towards oneself and others; more of how to find joy in life despite difficulties; and how to cope with life, gaining the ability to embrace both pleasant and unpleasant experiences.

We found it possible to achieve a similar positive result for the Train 4 Good program live on Internet as reached in the face-to-face group. The improvement in mental fatigue, depression and anxiety after an MBSR program, remained on the same level for both groups after the eight-month Train 4 Good program, while improvement in self-compassion was achieved after the Train 4 Good program. The questions designed for this study also showed improvement in how to cope with life and emotions, as well as in being more compassionate towards oneself and others. Participants could handle their mental fatigue in a more balanced way after attending the Train 4 Good program; they reported an increased feeling of belonging to others. The questions asked about joy/happiness, feelings of helplessness and meaningfulness and of having a place in the world were not changed. As they were only questioned about changes, and we do not have knowledge about their original state, it is difficult to interpret these answers.

After the MBSR program, the rating on the SCS short form was improved, together with alleviation of mental fatigue, depression and anxiety, indicating a relationship between mental health and self-compassion (Johansson, Bjuhr, Karlsson, et al., 2015). However, there was a greater degree of improvement in self-compassion after the Train 4 Good program, indicating the possibility to improve self-compassion even further. Self-compassion is reported to be related to mental well-being (Zessin, Dickhäuser, & Garbade, 2015). This may also be an important treatment option for rehabilitation after an acquired brain injury, when life suddenly changes and people struggle with difficulties and inadequacies, resulting in a need for long-term emotional support from the health-care society. Shorter mindfulness programs and inclusion of shorter meditations are frequently reported to be helpful in maintaining calm and focus in the midst of daily stress. However, there is less interest in mindfulness programs lasting over a longer period, stressing the need of long-term support for people suffering from se-

rious physical and mental health problems. We have in this study used a longer mindfulness program, suggesting the importance of longer duration with monthly support as a good option, since rehabilitation, personal change and growth takes time. A longer mindfulness program can also be important for people who have difficulties in upholding a mindfulness practice of their own.

Most mindfulness programs are delivered in an ordinary face-to-face group-setting, but today many courses are also offered on Internet as self-guided mindfulness programs (Boettcher et al., 2014; Faden & Oken, 2016; Glück & Maercker, 2011; Krusche, Cyhlarova, King, & Williams, 2012; Morledge et al., 2013). However, MBSR is performed in a group, and the group environment is thought to be important for sharing experiences with others and learning from group dialogue (McCown et al., 2011). The intention of this study was to enable the participants to feel as though they belonged to a group, giving them the opportunity to share experiences with others, reflect with the teacher and the others, and to receive immediate feedback from the teacher. This is all performed in the specific and disciplined way that guidance, inquiry, dialogues and feedback should be held and taught by a competent, qualified and embodied mindfulness teacher. We suggest that it was also possible for participants to take part and benefit from the program in this manner, live on Internet, since the results for both programs were similar. With a pre-recorded mindfulness course, personal interaction is not possible.

A major limitation of this feasibility study is the fairly small number of attendees and lack of control group. However, larger groups are not recommended for this particular patient group due to their fatigability. Further studies with more participants are warranted and should include more groups and also a control group not receiving a mindfulness intervention.

In conclusion, we suggest that it is possible to deliver the Train 4 Good program live on Internet. This online program could be offered to participants suffering from mental fatigue after an acquired brain injury who live far away from a center where a mindfulness program is offered, or those who face difficulties, due to physical or psychological restrictions, in attending a face-to-face program. It may also be possible to achieve positive effects on well-being. Mindfulness programs can be a valuable option for rehabilitation after acquired brain injuries when the fatigue and emotional burden can become long-lasting or lifelong. There is also a need to develop mindfulness programs that last over a longer time span, since many people require long-term support.

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