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ORIGINAL RESEARCH PAPER

Change in occupational burnout measures in emergency medical service workers after a psychedelic experience induced by a single self-administered dose of psilocybin mushrooms

ANA SOFIA MACHADO FERREIRA[1,2*], SHARON MARTINDALE[1] and DAVID LUKE[1,3]

[1] Alef Trust, UK

[2] Faculty of Health, Education and Society, University of Northampton, UK

[3] Centre for Mental Health, Faculty of Education, Health and Human Sciences, University of Greenwich, UK

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ABSTRACT

Background and Aims: This naturalistic mixed methods field study, aimed to assess the potential of a psilocybin induced experience, to help Emergency Medical Service Workers (EMSW) to address psychological and stress related symptoms stemming from a challenging working environment, known to contribute to occupational burnout (OB). *Methods:* This exploration was conducted with an intentional sample of five participants, recruited through an online survey who self-administered a therapeutic dose of psilocybin mushrooms to manage psychological symptoms resulting from their work as EMSW, allowing the authors to assess the outcome. To measure the impact of the experience, changes in OB measures were assessed with psychometric instruments previously used in this population at three timepoints, before and after the session. The subjective impact of the psychedelic experience, through psychological insights and emotional breakthroughs, was also assessed, and two follow-up interviews were conducted to collect further data. *Results:* The results showed that, two weeks after the session, a visible improvement was noticed in several measures of pre-existent OB, that remained stable after two months. Additionally, most participants reported a strong subjective impact, that they perceived as fundamental for the positive outcome. *Conclusions:* After one therapeutic psylocibin session, several measures of OB showed an encouraging level of improvement and may constitute an important step towards finding alternative and innovative solutions to address high rates of psychological distress experienced by EMSWs, also benefiting the organization and the quality of patient care. The limitations and implications of the study and suggestions for future research are discussed.

KEYWORDS

non-ordinary states of consciousness, psychedelics, mental health, emergency medical service workers, occupational burnout

INTRODUCTION

The essential nature of the care and treatment carried out by emergency medical service workers (EMSW) is indisputable as it "addresses the needs of patients with acute illness and injury" (Mitchell et al., 2022, p. 1). However, in the effort of fulfilling their role, their level of exposure to critical incidents, defined as "potentially traumatizing events that may cause psychological distress" (Loef et al., 2021, p. 2), has been reported to be between 80 and

*Corresponding author.
E-mail: sofiamachadoferreira@yahoo.com

100% (Donnelly & Siebert, 2009), significantly impacting their mental health and wellbeing (Gallagher & McGilloway, 2008). The regular exposure to distressing situations, accident scenes, death, trauma, and violence, puts the population of emergency responders at a higher risk of suffering from more mental health problems, compared to the general population (Sharp et al., 2020). Furthermore, workplace culture and organizational stressors such as inadequate support, excessive and unpredictable workloads, shift work, decreasing numbers of staff, productivity and effectiveness demands, and increasing social accountability, have been shown to play a strong interactional effect with critical incidents, in detriment of their mental and physical health and well-being (Lawn et al., 2020). This negative feedback loop is at the source of symptoms of post-traumatic stress disorder (PTSD) burnout, depression, and exhaustion (Stevelink et al., 2020), but also of high-risk coping strategies, with studies referring to alcohol and drug use rates as high as 40% within EMSWs (Donnelly & Siebert, 2009).

A concept of particular importance is '*occupational burnout*' (OB), defined as "exhaustion due to prolonged exposure to work-related problems" (Guseva Canu et al., 2021, p. 95). Kaplan, Frith, and Hubble (2023) and Petrino, Riesgo, and Yilmaz (2022) reported concerning rates of exhaustion due to prolonged exposure to work-related problems, at around 60% in samples of clinicians and EMSWs, that include symptoms of: fatigue, emotional and physical exhaustion, cynicism, and irritability, often directed towards the patients, and reduced feelings of personal accomplishment. The development of OB due to external factors has a clear impact at the organizational level, leading to absenteeism, misjudgments and errors, and higher job turnover rates (Johnson et al., 2018; Morse, Salyers, Rollins, Monroe-DeVita, & Pfahler, 2012; Suner-Soler et al., 2013), all leading to overall reduced capability and a concerning worsening of the quality of patient care, according to a recent meta-analysis (Garcia et al., 2019a, 2019b). Another well-known consequence known to compromise the quality of patient care is '*compassion fatigue*' (Cocker & Joss, 2016), "the emotional and physical burden felt by those helping others in distress, leading to a reduced capacity and interest in being empathetic towards future suffering" (Bellolio et al., 2014, p. 629), a particular type of stress to which EMSWs are susceptible to, arising when secondary traumatic stress disorder merges with burnout. Compassion fatigue can also lead to more serious mental health conditions such as depression, anxiety, and PTSD (Bellolio et al., 2014), a psychiatric condition (APA, 2013) estimated to be meaningfully high among first responders, and with rates above 20% in active workers (Donnelly & Siebert, 2009; Lewis-Schroeder, 2018; McKeon et al., 2022).

Despite the high prevalence of intense levels of OB and associated psychological challenges, it is believed that less than 40% of EMSW seek help, even when mental health services are available, with barriers thought to be a lack of perceived need for treatment, fears regarding confidentiality, negative career impact, work overload, but also a widespread distrust and generalized pessimism for mainstream methods that require commitment, consistency and considerable periods of time to become effective, which can potentially lead to worsening post-trauma psychopathology (Haughen, McCrillis, Smid, & Nijdam, 2017; Jones, Agud, & McSweeney, 2020). Several indicators suggest that workers in the ambulance services experience more health problems than workers in other health occupations, putting them at a higher risk for developing work-related health problems (Sterud, Ekeberg, & Hem, 2006), with a survey conducted in the UK, revealing that 75.8% had personal experience of mental health issues (MIND for Better Mental Health, 2019). The high frequency of OB and the high prevalence of common mental disorders among EMSWs, points to the need for further studies to better understand the actual picture and design innovative strategies to intervene on a series of well-recognized OB predictors (Shoman et al., 2021), and at the end of the line, assure high quality patient care.

With the recent resurgence of psychedelics as a 're-emerging therapeutic paradigm' (Tupper, 2015), showing promising results in clinical research (Elsey, 2017; Sessa, 2012), by successfully addressing symptoms of psychological distress in a short period of time, it is feasible to consider psychedelic therapy as a favorable option to address the mental health challenges that EMSW face. From a clinical perspective, there are now numerous studies demonstrating that, where conventional psychiatric medications need to be administered over long periods of time without being sufficient for most patients (Insel, 2009), single supported therapeutic doses of psychedelic substances have been shown to drastically reduce symptoms of mental health conditions, including: ayahuasca for addiction (e.g., Fábregas, González, Fondevila, & et al, 2010; Loizaga-Velder & Verres, 2014); MDMA for PTSD (e.g., Chabrol, 2013; Feduccia et al., 2018; Gorman et al., 2020; Mithoefer et al., 2018, 2019) and social anxiety (e.g., Grob et al., 2013); psylocibin for depression, anxiety and obsessive compulsive disorder (e.g., Carhart-Harris et al., 2017; Goodwin et al., 2022; Griffiths et al., 2016; Grob et al., 2011; Gukasyan et al., 2022; van Rotz et al., 2023), and for alcohol and tobacco addiction (e.g., Bogenschutz et al., 2015; Johnson, Garcia-Romeu, Cosimano, & Griffiths, 2014, 2017); LSD for anxiety caused by life-threatening diseases (e.g., Gasser, Kirchner, & Passie, 2015) and ketamine for mood disorders (e.g., Newport et al., 2015; Sanacora et al., 2017). As a result, psychedelic assisted psychotherapy has been considered as a "potential breakthrough treatment for several types of mental illnesses" (Belouin & Henningfield, 2018, p. 7), with psilocybin and MDMA "having already received Food and Drug Administration 'breakthrough therapy' designation for the treatment of resistant major depression disorder and PTSD, respectively" (Bird, Modlin, & Rucker, 2021, p. 229).

Currently, there has been a lack of psychedelic research with EMSW, although in 2022, a pandemic-era open-label uncontrolled study was conducted with front-line workers using microdose ketamine, that showed promise in combating anxiety, stress, and burnout (Atoian et al., 2022), in comparison to conventionally offered treatment options (Hutten, Mason, Dolder, & Kuypers, 2019). However, little

research has been conducted into how psychedelics can affect the workforce (Korman, 2024), although psychedelic use has been shown to not lead to motivationally-based workplace absenteeism generally (Korman, 2023b), although overtime was found to be reduced following the use of psilocybin (Korman, 2023a), but as a probable benefit to employee well-being. Additionally, studies with higher, therapeutic doses of psychedelics have been demonstrated to be effective in treating army veterans and first responders for severe mental health challenges, showing significant decreases in PTSD symptomatology severity after the application of active doses of MDMA with adjunctive psychotherapy (Mithoefer et al., 2018), and immediate and long-term symptom reductions in trauma symptoms with psilocybin (Smith, Neill, & Wainwright, 2022). Psilocybin's favorable safety profile (Lowe et al., 2021) and its increasing popularity as a viable treatment option for immediate and long-term improvements in psychiatric symptomatology (Danforth et al., 2018; Wolfson et al., 2020), has caused an increase in its use, even outside research settings (Cameron, Nazarian, & Olson, 2020; Yockey & King, 2021).

These results not only encouraged the creation of the 'Heroic Hearts Project', a charity working with researchers to improve veterans' access to psychedelic programs (Gould, 2019), but the publication of a special edition of the 'Journal of Military, Veteran and Family Health' (Shore, 2023) supporting the therapeutic use of psychedelics in military and veteran populations. Eventually, such interventions could be applicable, *mutatis mutandis,* to first responders, including ambulance workers, as military and emergency services share similar rates of negative health impacts (Doody et al., 2021).

The conceptualisation for the present study and how the participants were recruited came about after indicating that they were planning a therapeutic dose of psilocybin in a near future, in their responses to an anonymous online multiple-choice questionnaire named "*Psychedelics Awareness and Attitudes Within Emergency and Primary Care Settings*" created with the aim of collecting data about psychedelic substances knowledge, attitudes, and uses within the EMSW population. The survey gathered 113 complete responses from 113 participants, with 37.2% answering yes to the question '*Have you ever consumed any psychedelic substance?* '; 54.5% considering such experiences as potentially life-changing, 57.5% supporting therapeutic applications, and 21.2% supporting recreational uses. Additional results showed that EMSWs, even if they did not have any personal experience with psychedelics, considered the need for further specialized training in supporting psychedelic crisis important (95.6%), and would be prepared to further their knowledge as extracurricular learning in their own time (91.1%) considering the lack of practical guidance available for health care professionals.

The present naturalistic mix-method, study represents an effort to add to the existing knowledge regarding the use of psychedelics to address mental health challenges outside a clinical setting, by using a set of pre-approved instruments to measure aspects of occupational burnout like symptoms of PTSD, compassion satisfaction and fatigue, and work-related stress in a sample of EMSWs. The participants, in an attempt to find relief to severe mental health challenges and encouraged by favorable examples from veterans who used psychedelics successfully, decided to use a single self-administered dose of psilocybin mushrooms, in a natural, nonclinical, and noncontrolled setting. A secondary goal was to observe if any possible changes were related to the quality of the experience, namely phenomenology, and possible psychological insights and emotional breakthroughs, using psychometric tools and follow-up interviews.

METHOD

Design

A naturalistic mixed methods field study was conducted, with longitudinal psychometric measures and follow up qualitative interviews, in an intentional sample of five self-selected participants from a pool of 113 EMSWs. All data was collected through two follow-up interviews and psychometric measures, for which the volunteers were given instructions and provided with the respective materials, at a baseline point before the planned day for the experience, one day after, and approximately two weeks and two months later:

a) Before the experience they were asked about basic demographics, microdosing and intentions for the session, and asked to fill the following psychometric instruments to collect short-term data regarding changes in occupational burnout measures: Impact of Event Scale – Revised (IES-R), Short PTSD Rating Interview (SPRINT), Professional Quality of Life Scale (PROQUOL), and (EMSCSI) The Emergency Medical Services Chronic Stress Questionnaire (EMS-CSQ);
b) One day after the experience, they were asked to fill the (EBI) Emotional Breakthrough Inventory, and the (PIQ) Psychological Insight Questionnaire to assess a range of psychological effects;
c) Approximately two weeks and two months later the pre-test measures were repeated, to collect mid-term data with the same instruments referred in a);
d) Approximately two weeks and two-months after the experience, follow-up interviews were facilitated.

Participants

The five participants of the intentional sample of this study were selected from a group of EMSWs, either paramedics or ambulance technicians working in the United Kingdom (UK) as UK nationals, with ages ranging from 32 to 46 years old, three man and two women, with a mean age of 38.6, and years of EMSW experience ranging from 2 to 15, with a mean of 7.4. All participants were recruited after indicating that they were planning a therapeutic dose of psilocybin in the near future in their responses to an anonymous online multiple-choice questionnaire described in the introduction section. Six (6) respondents declared they were microdosing with psilocybin, after

gaining knowledge regarding positive outcomes in war veterans suffering from PTSD. They also declared they planned to take a therapeutic dose of psilocybin on their own, with the support of a sitter they sought out and found on their own, in a non-controlled, naturalistic setting, and expressed their interest in participating in a naturalistic study when they would do this. They predominantly hoped that a higher dose of the same substance they had already found beneficial, would help them to manage mental health challenges and workplace stress-related symptoms (see Supplementary Material 1).

All participants reported suffering from undiagnosed psychiatric conditions coming from a combination of unresolved traumatic life situations and organizational stressors, which constituted the main reason why they started microdosing. As the decision to take the substance was not influenced by the researchers, there were no applicable exclusion criteria. The participants filled in an informed consent form and were guaranteed anonymity and full confidentiality during the procedure, as well as the possibility of withdrawing at any time, and given suitable suggestions for support organizations, should they need them. Participants were not compensated for their participation. There were initially six participants but one participant dropped out before completing the follow up measures and interviews without providing reasons for withdrawing, leaving a total of five.

During the two months following their therapeutic dose all participants refrained from consuming psilocybin at any dose, and four out of the five returned to their usual EMSW work directly following their therapeutic dose. The other participant, who had been off work on long term sick leave due to stress prior to participating, returned to work within two months, citing the psilocybin as "a game-changer".

Measures

Four instruments were used to assess common OB predictors within the EMSW population: IES-R- Impact of Event Scale-Revised (Weiss & Marmar, 1997), SPRINT-Short Post-Traumatic Stress Disorder Rating Interview (Connor & Davidson, 2001), PROQOL-Professional Quality of Life Scale (Stamm, 2009), EMS-CSQ-The Emergency Medical Services Chronic Stress Questionnaire (Donnelly, Chonody, & Campbell, 2014). Two other instruments were used to assess psychological and emotional features of the psychedelic experience that might be associated with changes in the impact of events, psychological well-being and stress related indicators: EBI-the Emotional Breakthrough Inventory (Roseman et al., 2019) and PIQ-the Psychological Insight Questionnaire (Davis et al., 2021). Two follow-up interviews were facilitated, where participants were retrospectively inquired about the phenomenological contents and overall subjective impact of the experience, if and how it addressed initial intentions and possible challenges or negative consequences. For more information regarding the instruments, *see* Supplementary Material 2.

Ethical aspects

To ensure legality and to comply with ethical boundaries, throughout the entire project, the participants were not encouraged to engage in any illegal activity nor were supplied, sold, dealt, or shared any controlled psychoactive substance for their experience, being fully responsible for the substances they possessed and used. The study conformed to and complied with the ethical guidelines of the British Psychological Society.

RESULTS

The Table 1 below presents post-treatment ratings of relevant OB measures at approximately 2-weeks and 2-months, compared against those collected at baseline (before the session). For detailed individual results and follow-up interview summaries, *see* Supplementary Materials 3 and 4.

DISCUSSION

The present non-interventional study, conducted with in an intentional sample of five EMSWs showed that, two weeks after the self-administration of a single, therapeutic dose of psilocybin mushrooms, a visible improvement occurred in all selected measures of OB, that was mostly sustained at two months, except for the organizational stressor's subscale, which showed a decrease at two weeks, but then a slight increase to that at two months. All volunteers showed less intense levels of reactivity to specific events and occupational stressors, less intense PTSD symptomatology, lower levels of job burnout and secondary traumatic stress and higher levels of compassion satisfaction, fulfilling enough criteria to demonstrate some level of efficacy in the self-administrated treatment condition. The perceived successful outcome was mostly (4/5) attributed by the participants to emotional breakthroughs and psychological insights that occurred within the session. However, it should be mentioned that an improvement in the intensity of disturbing psychological symptoms had been already noticed after they started microdosing (Fadiman, 2011) with psilocybin for a period between 4 weeks and 6 months prior to the full dose, even inconsistently, with this being the main reason why they decided to experiment with a higher dose. Their perceptions were consonant with studies accounting for perceived positive effects of microdosing in psychological functioning (e.g., Anderson et al., 2019; Atoian et al., 2022, Hutten et al., 2019; Johnstad, 2018; Prochazkova, Lippelt, Colzato et al., 2018; Rootman et al., 2021; 2022), and might be responsible for any perceived improvements regarding the intensity of pre-session symptoms, notwithstanding current debates about placebo and expectation effects accounting for perceived microdosing benefits (e.g., Cavanna et al., 2022; Kaertener et al., 2021; van Elk et al., 2022).

Further, the results of the IES-R (Weiss & Marmar, 1997), SPRINT (Connor & Davidson, 2001), and PROQOL

Table 1. Pre- and post-treatment psychometric measure scores

Mean scores	I Pre-test	II Two weeks after	III Two months after
(IES-R) Impact of event scale – revised (Weiss and Marmer, 1997)			
Subjective stress score	2.2	0.5	0.3
Avoidance	2.0	0.9	0.3
Intrusion	1.9	0.3	0.4
Hyperarousal	2.5	0.5	0.4
(SPRINT) Short post-traumatic stress disorder rating interview (Connor & Davidson, 2001)			
PTSD Core symptoms	2.0	0.5	0.4
Well-being since treatment	60%	92%	95%
Symptom improvement since treatment	4.0	4.8	4.8
(PROQUOL) Professional quality of life scale (Stamm, 2009)			
Compassion satisfaction	27.6	31.6	32.0
Job burnout	32.4	23.8	19.2
Secondary traumatic stress	21.6	17.2	15.6
(EMS-CSQ) The emergency medical services chronic stress questionnaire (Donnelly et al., 2014)			
Overall score	4.6	2.7	2.6
Organizational stressors	5.0	2.9	3.2
Operational stressors	4.1	2.5	2.4

(EBI) Emotional breakthrough inventory (Roseman et al., 2019)						
Overall score (6 items)	Item 1 *I faced emotionally difficult feelings that I usually push aside*	Item 2 *I experienced a resolution of a personal conflict/ trauma*	Item 3 *I felt able to explore challenging emotions and memories*	Item 4 *I had an emotional breakthrough*	Item 5 *I was able to get a sense of closure on an emotional problem*	Item 6 *I achieved an emotional release followed by a sense of relief*
49.7	72.4	52.4	59.2	22.0	66.6	25.8

(PIQ) Psychological insight questionnaire (Davis et al., 2021)	
Overall scale	3.7
Avoidance and maladaptive patterns insights	3.4
Goals and adaptive patterns insights	3.6

Summary Table: Scores in subscales of IES-R, SPRINT; PROQUOL; EMS-CSQ, EBI and PIQ as within-subject dependent variables and outcomes of interest at baseline, 2-weeks, and 2-months after the psychedelic session, as the independent variable.

(Stamm, 2009), showed that the impact of critical incidents on EMSWs decreased and their mental health status improved, through a noticeable decrease in pre-test scores of PTSD symptomatology (APA, 2013), along with decreases in indicators of '*Job Burnout*', and '*Secondary Traumatic Stress*' and increases in '*Compassion Satisfaction*', the opposite pole of compassion fatigue (Cocker & Joss, 2016). High pre-test phase values confirmed the prevalence of several mental health and well-being challenges in EMSWs, compared to the general population (Donnelly & Siebert, 2009; Guseva Canu et al., 2021; Kaplan et al., 2023; Lewis-Schroeder, 2018; McKeon et al., 2022; Petrino et al., 2022), as result of an interaction of pre-existing psychological distress and exposure to firsthand trauma experiences of others.

The EMS-CSQ (Donnelly et al., 2014) scores, after two weeks, showed a clear decrease in two measures of self-perceived work-related chronic stress, through organizational and operational stressors subscales, supporting the observation that EMSWs are strongly affected by workplace stressors (Donnelly & Siebert, 2009; Sterud et al., 2006; Stevelink et al., 2020). However, a small increase was noticed from the second to the third assessment cycle in the organizational stressor indicator, showing that any regained tolerance decreased in some volunteers, impacting the overall result.

This observed increase might be in alignment with anecdotal stories from psychedelic users, accounting for the occurrence of big shifts in attitudes towards difficult work environments or radical shifts in jobs or careers, when changing the attitude is not enough. A recent study observed that psychedelic uses "may help promote better health and a sustainable lifestyle in the workplace" (Viña & Stephens, 2023, p. 7), which might be one of the expressions of how these substances affect the way people relate to their environment, during and after the acute psychedelic state (Harthogsen, 2017). Stable increases in nature relatedness or connectedness (Carhart-Harris, Erritzoe, Haijen, Kaelen, & Watts, 2018; Nour, Evans, & Carhart-Harris, 2017; Watts, Day, Krzanowski, Nutt, & Carhart-Harris, 2017), which are correlated with increases in psychological wellbeing (Ketner et al., 2019) have been reported. The other side of the coin, might translate in how psychedelic uses may affect the way people relate to unhealthy, unnatural, man-made environments and inherent societal rules, by developing acute sensitivities to places where an opposing disconnection with a long-lost natural world, detrimental to mental health and well-being, is blatantly present. Participant #5, who reported a heightened empathy but also an increased sensitivity to workplace stressors, declared that this ambivalence might lead him to a career change – as is evident from as many as 16% of psychedelic users making ecological career changes following experiences (Luke, 2019) – suggesting that further investigation on the topic of increased sensitivity to non-natural environments and inherent stressors is needed, to explain life-changing decisions after psychedelics.

The participants attributed the improvement of OB symptoms to microdosing in the first place, that opened them up to the possibility of doing a higher dose, but mostly to the fact that their intentions were largely met within the psychedelic space, through significant emotional breakthroughs and psychological insights, measured by EBI (Roseman et al., 2019) and PIC (Davis et al., 2021), respectively, with the exception of volunteer #5. This latter volunteer chose to undergo the experience while medicated with an SSRI antidepressant that has been said to attenuate and alter the effects of psilocybin mushrooms (Gukasyan, Griffiths, Yaden, Antoine, & Nayak, 2023), being the reason why previous withdrawal is a common prerequisite for taking part in clinical trials (Goodwin et al., 2023). Accordingly, he did not report emotional breakthroughs or strong psychological insights (Davis et al., 2021; Roseman et al., 2019), even if he noticed psychological benefits in his personal and professional life, and fully withdrew from antidepressant medication at 2 months. His results seem to support that, on the one hand, the mediation of meaningful subjective effects might not be needed to produce therapeutic responses (Olson, 2021), but they may be needed for the responses to be whole and enduring (Yaden & Griffiths, 2021): in fact, he reported that after the 2 month follow-up, upon feeling the waning of positive effects he was feeling the need to take a second therapeutic dose. No such need came from any other participant, even if it cannot be excluded that the removal of medication might have had an impact that, however, was not felt by Participant#4 who also withdrew from psychiatric medication other than SSRI's.

The other participants, in contrast, were positively overwhelmed that the experience allowed them to have life-changing psychological insights over adaptative and maladaptive patterns (Davis et al., 2021), face difficult feelings, and explore challenging emotions and memories without resisting, to the point of achieving significant breakthroughs, encountering novel solutions and apparent closure for enduring personal issues (Roseman et al., 2019), and positively impacting their lives, as confirmed by follow-up interviews (Supplementary Material 3). The themes that showed up in their experience, typically of a more psychological than mystical nature (e.g. inner child, shadow work, attachment wounds; trauma healing), had subjective relevance and meaning which, as other studies reported, seemingly produced substantial increases in mood and well-being (Griffiths, Richards, McCann, & Jesse, 2006, 2011, 2016, 2018). The emerging insights and breakthroughs manifested into some of the themes that Belser et al. (2017) identified in patient's descriptions of psilocybin-assisted psychotherapy sessions, reinforcing the essential importance of the quality of experience as a crucial element of treatment efficacy, beyond the intensity of drug effects (Garcia-Romeu, Griffiths, & Johnson, 2015; Griffiths et al., 2016; Roseman, Nutt, & Carhart-Harris, 2018).

The overall results are in alignment with a recent prospective study using a large sample of naturalistic psilocybin users, supporting its potential to produce lasting improvements in a range of mental health conditions, general wellbeing, and psychological distress (Nayak et al., 2023). The findings are also congruent with clinical studies showing successful results in laboratory settings using psilocybin for conditions sharing some degree of symptomatology with the mental health challenges that EMSWs face (e.g., Carhart-Harris et al., 2017; Goodwin et al., 2022; Griffiths et al., 2016; Grob et al., 2011; Gukasyan et al., 2022; Moreno et al., 2006; van Rotz et al., 2023). The findings are also congruent with studies showing improvement of PTSD symptoms using MDMA assisted psychotherapy (Gorman et al., 2020; Jerome et al., 2020; Mithoefer et al., 2018), and with positive reports of self-medicated veterans using psilocybin for trauma, suggesting the potential viability of this treatment option (Smith et al., 2022).

Despite the small intentional sample, the reported results are encouraging and supportive of theories defending the application of early preventive intervention strategies on established OB predictors (Shoman et al., 2021), within which psychedelic substances might have a role and be considered, in the future, as part of therapeutic programs to address a diversity of various mental health challenges that EMSWs face in fulfilling essential duties. Such as those arising from being exposed to critical incidents on a daily basis (Donnelly & Siebert, 2009; Gallagher & McGilloway, 2008; Mitchell et al., 2022; Sharp et al., 2020), and suffering the effects of a strong interactional effect between them and workplace culture (Lawn et al., 2020), on top of having to deal with the same mental health challenges that the general population is exposed to.

With just one session, in a naturalistic setting, several predictors of OB showed some level of improvement and, as with military populations (Shore, 2023), these results can constitute an initial first step towards finding alternative solutions to address high rates of mental distress and illness, and all the cascade of cumulative negative effects, whether at an individual or at an organizational level, experienced by the first responder workforce, even when the stressful nature and conditions of the work remain the same, and no major changes are implemented in organizational structures.

Nevertheless, the study has numerous limitations, including the size of the sample, which prevents the meaningful use of inferential statistics, and is also likely not representative of the EMSC population in the United Kingdom (UK). Additionally, the participants reported that they were already microdosing with psilocybin prior to the therapeutic dose (though not afterwards), which may have impacted the findings in ways that were not controlled for. Also, the results were not measured over a period longer than two-months, so we cannot exlcude that time might have influenced the outcome in different ways. But mostly, the naturalistic nature of the study, and the fact that the experiences took place in natural settings chosen by the volunteers with different types and degrees of support, did not allow to control several variables that are known to be relevant for explaining outcome variation, including dosages and everything related to *set and setting* (Harthogsen, 2017), including what is known about more favourable results having been obtained under supportive conditions (Griffiths et al., 2006, 2011, 2016, 2018). Furthermore, as with similar studies, the naturalistic study and the lack of a randomised control condition, prevents robust causative inferences to be made (van Elk & Fried, 2023). All considered, further research is required to form conclusions regarding the therapeutic potential of psilocybin for this group. But, observing that some indicators potentially improve and impact others by creating positive feedback loops, makes us hopeful that this intervention might eventually be considered as part of integrated support systems, that consider the mental health and physical well-being of EMSWs as a priority and, in the end, enhance the quality of patient care.

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SUPPLEMENTARY DATA

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