Praxis Psy

Praxis Psy
Invierno 2022, Nº37, 1 - 94.
ISSN 2735-6957
32995/praxispsy.v23i37.176

A MIXED METHODS PILOT STUDY OF A 6 MONTH WEEKLY TAI JI (TAI CHI) GROUP FOR SURVIVORS OF ACQUIRED BRAIN INJURY.

UN ESTUDIO PILOTO DE MÉTODOS MIXTOS DE UN GRUPO DE TAI JI (TAI CHI) SEMANAL DE 6 MESES DE DURACIÓN PARA SUPERVIVIENTES DE LESIONES CEREBRALES ADQUIRIDAS.

YEATES, GILES*[1]; SMITH, ALISON[2]; NAGRANI, SONAM[3]; KHAN, EACHELLE[3]; DORNEY-SAVAGE, JENNY[3]

*** Correspondencia:**
Yeates Giles
drgilesyeates@gmail.com

Recibido: Abril 2022 | Publicado: Julio 2022

Physical and psychological benefits of tai chi (TJ) have been demonstrated for survivors of acquired brain injury (ABI). However investigators have framed TJ primarily as a physical intervention, with an absent underlying theoretical framework to conceptualise psychological gains from the practice. Traditional sampling strategies have optimised homogenous samples in many studies, in contrast to ABI groups with diverse physical, cognitive and emotional needs that commonly use community-based ABI services. This study aims to use both qualitative and quantitative methods to highlight both shared gains and diversity in responses to a standard TJ group intervention in a typical ABI community service sample. These preliminary findings will be used to develop a rationale for bespoke adaptation of TJ learning/practice to optimise psychological gains across survivors. 9 Survivors of ABI using community services were recruited to attend a weekly class of TJ over six months. The instructor offered some physical adaptations to learning and practice. Questionnaire measures of anxiety/depression, fatigue and QoL were administered at baseline, repeated every 4 sessions and at the end of the last session. A focus group was held half-way and at the end of the intervention. Quantitative data was analysed using single-case pre-post comparisons (RCI), and a thematic analysis was performed on the qualitative data. While clinical gains in reduced anxiety, depression and fatigue and improved QoL was observed for some participants, no changes or deterioration on some measures were evident in others. Focus group data highlighted shared gains in increased energy, relaxation and social group identification, alongside idiosyncratic challenges for each participation from the class environment, cognitive and physical demands of learning TJ. This study has provided both quantitative and qualitative data which highlight diverse experiences and challenges for survivors of ABI when learning and practicing TJ, although there are also indications of shared benefits in fatigue management and social group membership.

Keywords: Tai Chi; Tai Ji; Qi Gong; Meditation; Brain Injury; Stroke; Mixed Methods; Community; Rehabilitation.

Se han demostrado los beneficios físicos y psicológicos del tai chi (TJ) para los sobrevivientes de una lesión cerebral adquirida (LCA). Este estudio pretende utilizar métodos cualitativos y cuantitativos para poner de relieve tanto los beneficios compartidos como la diversidad de respuestas a una intervención grupal estándar de TJ en una muestra típica de servicios comunitarios de LCA. Estos resultados preliminares se utilizarán para desarrollar una justificación para la adaptación a medida del aprendizaje/práctica de TJ para optimizar los beneficios psicológicos. 9 sobrevivientes de LCA que utilizan los servicios comunitarios fueron reclutados para asistir a una clase semanal de TJ durante seis meses. El instructor ofreció algunas adaptaciones físicas para el aprendizaje y la práctica. Se administró un cuestionario de ansiedad/depresión, fatiga y calidad de vida al inicio, repetido cada 4 sesiones y al final de la última sesión. Se realizó un grupo de discusión a mitad y al final de la intervención. Los datos cuantitativos se analizaron mediante comparaciones pre-post (RCI), y se realizó un análisis temático de lo cualitativo. Mientras que en algunos participantes se observaron ganancias clínicas en la reducción de la ansiedad, la depresión y la fatiga, así como una mejora de la calidad de vida, en otros no se observaron cambios o hubo un deterioro en algunas medidas. Los datos del focus group resaltaron aumento compartido en incremento de energía, relajación e identificación de grupo social, junto con retos idiosincráticos para cada participación desde el entorno de la clase y demandas cognitivas y fisicas de aprender TJ. Este estudio ha proporcionado datos cuantitativos y cualitativos que ponen de relieve las diversas experiencias y desafíos para los sobrevivientes de LCA cuando aprenden y practican TJ.

Palabras claves: Tai Chi, Tai Ji; Qi Gong; Meditación; Lesión Cerebral; Métodos mixtos; Comunidad; Rehabilitación.

[1]Centre of Movement, Occupation & Rehabilitation Sciences (MOReS), Oxford Brookes University

[2]Tai Chi for Everyone, Buckinghamshire

[3]Community Head Injury Service, Buckinghamshire Healthcare NHS Trust

Praxis Psy
Invierno 2022, Nº37, 1 - 94.
ISSN 2735-6957
32995/praxispsy.v23i37.176

INTRODUCTION:

Adult survivors of acquired brain injury (ABI, e.g., traumatic brain injury, stroke, hypoxia, infection, post-tumour resection, toxicity) often experience enduring difficulties in multiple domains of functioning (physical, cognitive, emotional, social) simultaneously. The specific combination and constellation of difficulties across these domains will vary significantly across survivors as a function of lesion location, underlying neuropathology, premorbid vulnerabilities and post-injury factors. These complicated needs are situated within a wider context of diminishing service provision and support available within community settings over time. Some survivors of ABI report profound disruptions to identity and self-experience, such as being 'in fragments' (Nochi, 1997), living in a 'shattered world' (Luria, 1979), experiencing a pendulum identity of function to dysfunction (Charmaz, 1990) and living as 'a shell of a person' (Yeates, 2019 a,b,c).

There is a need therefore, for community-based interventions that simultaneously focus on physical and psychological needs, and also confer the psychosocial benefits of community leisure group membership noted for survivors of ABI (Haslam et al., 2008). In actuality, in many countries of the world, physical, psychological and social interventions are offered in isolation from one another, uninformed by the other, and all within time-limited durations that are not commensurate with the enduring nature of post-injury difficulties (DoH, 2005).

Given these trends, there is a current interest in the application of Eastern mind-body interventions within neuro-rehabilitation, such as mindfulness meditation (Johansson et al., 2012) and yoga (Yeates et al., 2015). These approaches have been associated with both physical and psychological benefits for survivors, and are suited to be offered on a longer-term basis in a community setting. An additional approach that has been subject to many investigations in the ABI literature is Tai Ji (Tai Chi, hereon abbreviated as TJ). TJ is characterised by slow, fluid movements, regulated breathing and a diminution of self-reflective experience. The historical background, cultural and theoretical framework of TJ is provided in Yeates (2015; 2019a). Within ABI, both physical and psychological benefits of TJ for survivors of traumatic brain injury have been reported in small group studies and anecdotal case reports (Blake & Batson, 2006; Gemmell & Leathem, 2006; Yeates, 2019 a,b,c). The evidence is strongest for stroke survivors, where across large group studies and highlighted in several meta-analyses, TJ has been shown to be a safe practice (Taylor-Pliae & Coull, 2012; Winser et al., 2018), and produce replicable gains in balance, mobility, falls reduction, plus reduction in fatigue, anxiety and low mood (Lyu et al., 2018; Zheng et al., 2016). TJ is therefore supported as one promising modality of support and participation, to simultaneously address the physical and psychological needs of survivors following differing forms of ABI. Future studies using robust research methodologies are awaited for ABI subtypes other than stroke.

While there is an encouraging basis for recommending the use of TJ with ABI, there are limitations to extending the results of these studies to the aforementioned group of service users who have complex needs spanning multiple domains. Firstly, some of the stroke studies actively screen out survivors with comorbid cognitive impairment (e.g., Taylor-Piliae et al., 2014). Few authors have outlined how the learning and ongoing practice of TJ is adapted for physical disabilities such as vestibular problems, hemiplegia, or bilateral lower limb immobility (Hwang et al., 2017, being an exception). While these trends are consistent with conventional sampling and protocol strategies to optimise homogeneity within study samples, this approach puts the resultant data adrift from many users of ABI services. In a similar vein, the evaluation of brief TJ group durations (commonly 4-6 weeks, Yeates, 2015) in a post-acute hospital setting limits expectations of the impact of a longer-term group in a community setting, which is closer to how the majority of TJ is taught and practiced in the general population. Furthermore, the development of a knowledge-base of necessary adaptation of TJ learning and practice in response to both physical and cognitive needs is not stimulated by a current absence of relevant preliminary data.

Furthermore, the conceptualisation of the relationship between TJ practice and mental wellbeing in practitioners following ABI is absent. TJ has been studied and reported primarily as a physical intervention for balance and mobility in stroke survivors, although secondary outcomes such as improvements in fatigue, anxiety and depression have also been noted (see reviews by Lyu et al., 2018). While improvements in physical functioning will undoubtedly be associated with positive mental wellbeing, TJ has been shown to produce a positive effect on psychological outcomes over matched exercise programs (Zheng et al., 2016).

Few frameworks have been postulated in the ABI TJ evaluation studies to account for this relationship. In a TJ

Praxis Psy
Invierno 2022, Nº37, 1 - 94.
ISSN 2735-6957
32995/praxispsy.v23i37.176

study on people with multiple-sclerosis, Burschka and colleagues (2014) have used a mindfulness framework to conceptualise the effect of TJ on psychological health, and some mindfulness stroke studies have indeed used TJ and related qi gong movements within their intervention protocols. Yeates (2015; 2019 a,b,c) has argued that the concept of flow state experience (Csíkszentmihályi, 1990; 1997 – a reduction of self-analytical experience whilst immersed in a particular activity) is a closer fit with the spiritual frameworks in Daoism, which guides TJ practice for many masters in China who use this for holistic development and cultivation, encompassing, physical, psychological and spiritual dimensions of experience. Hung and colleagues (2021) have found support for a useful overlap of Flow dimensions and those in the embodied experience of TJ and related Chinese mind-body practices.

Yeates (2015; 2019 a,b,c) has advocated that this lens on TJ practice can be used to apply such to a wide range of survivor needs (including making TJ a potential element of the underdeveloped scope of neuro-rehabilitation for users' spiritual needs). In addition, Yeates has argued that the same framework can be used to direct the adaptation of TJ learning and practice in a bespoke fashion to survivors' unique constellation of physical, cognitive, emotional and social needs.

A programme of accumulated evidence for such an approach to adaptation is arguably subsequent to initial data that demonstrates the significance of survivor diverse needs for the implementation of a standardised, unadapted TJ intervention that is commonly used in the ABI TJ literature. The primary aim of this paper is to report on such an intervention. Specifically, the authors wanted to make it relevant to a longer-term community setting, in which it is argued that TJ is ideally-placed, As such, we are reporting on a weekly TJ group of 6 months (24 sessions in duration). Given the previous omissions in the ABI TJ literature, fatigue and psychological outcomes are of primary interest.

To explore diversity in needs within a typical community ABI sample, no selective or matching sampling criteria were used (see method, below, for more details). In addition, the data from the recruited group of participants with diverse physical, cognitive and emotional needs were not aggregated within a group comparison analysis. Instead, the rich nuances of similarities and differences in impact of TJ participation on the sample was subject to both a single case quantitative analysis and a qualitative focus group methodology within a mixed methods design. Both types of data were used in a manner appropriate to the limitations of each, and also triangulated to inform the other as an approach to study the impact of survivor diversity in needs on TJ practice (and the benefits or otherwise gained from this practice). To date, three case studies with positive outcomes (Yeates, 2019 a,b,c) have been published from this sample, which have been used to illuminate an underlying theoretical framework underpinning TJ practice following ABI. Here we report data from the whole sample, noting all trends that can be conservatively identified given the limitations of the data.

METHOD:

2.1. Recruitment & Service Context:

Recruitment posters were posted in three community organisations that support survivors of ABI in the community within the county of Buckinghamshire in the UK: The Community Head Injury Service (CHIS, Buckinghamshire Healthcare NHS Trust), the Buckinghamshire Community Neurological Rehabilitation Team (CNRT) and Enrych Bucks. All services provide long-term support for survivors of ABI, and follow a social model of support. CNRT and CHIS are health-based rehabilitation services. In addition, CHIS offers multi-disciplinary community rehabilitation support over a long-duration of time and is organised by a social model of disability (Tyerman, 1999). CHIS and CNRT refer many of its users to Enrych Bucks, a third sector charitable organisation, to access ongoing leisure and socialising opportunities with other survivors of ABI and other disabilities in the Buckinghamshire area.

Service users of all three services were made aware of the TJ group via an information poster and signposting by keyworkers. As such, those who elected to attend the group were representative of survivors of ABI in the community, who would find TJ a meaningful opportunity to work within a group setting on their physical and mental health needs, learn a new skill and meet new people (consistent with the replicated outcomes of TJ participation published in the literature).

Survivors of ABI using these services are typically 16 years plus in age, 1 year post-injury or greater, and have sustained a traumatic brain injury, stroke, infection, hypoxia or post-tumour resection. They commonly are managing multiple domains of post-injury sequelae, including physical, cognitive, emotional and social difficulties.

Praxis Psy
Invierno 2022, Nº37, 1 - 94.
ISSN 2735-6957
32995/praxispsy.v23i37.176

2.2. Tai Ji Group Format:

The group was conducted in a church hall within a suburb of Aylesbury, UK. Participants were provided with hospital transport to the venue, or made their own way to each session. 24 sessions were held over 6 months. Each session was 90mins in duration, and included a first 40 minute section of warm-up exercises and tai ji form practice, all learned and performed together as a group. Then a tea break and socialising opportunity was included, lasting 20-30 minutes. This left a final section of 20-30 minutes for further form practice and cool-down exercises. The main Tai Ji form used was taken from Paul Lam's tai ji for health conditions syllabus, which is accessible to learn from a cognitive perspective and includes versions for those standing and chair-based. There was no requirement for participants to practice the movement in between the weekly sessions.

As such, the option of performing the movements while standing or seated represented one generic adaptation of TJ for those with physical restrictions. Repetition and a slow pace of learning was a parallel adaptation for cognitive needs. One participant spontaneously recorded a video of the learning content on his phone, so support his decision to practice at home. However no other bespoke adaptation were made by the organisers, for specific vestibular, dyspraxia, sensory or modality-specific cognitive difficulties, such as those suggested by Yeates (2015; 2019 a,b,c) were included.

2.3. Participants

Ten survivors responded to the recruitment process from the 3 participating services, and nine of these participated in the sessions. The demographics and injury-related data of the sample are summarised in table 1 below.

Typical of ABI service users, the majority (89%) were male. There is a range of ages and the range of time post-injury highlights participants as representative of users of long-term community services, the target of our TJ intervention. Four different forms of acquired brain injury are represented: ischaemic and haemorrhagic stroke; traumatic brain injury and post-tumour resection surgery. The sample fulfilled our aims of having a heterogenous sample for disability type, as diverse forms and combinations of physical, cognitive and emotional needs were evident across participants (this information gained from a combination of clinical interviews, standardised questionnaire assessment and standardised cognitive and physical ability assessment as part of the recruiting services' core clinical activities). No participant had significant experience of TJ prior to the study - two participants had previously tried lasses for the general population, but not continued. The difficulties in physical, cognitive, emotional and social domains highlighted for each participant were identified using both formal physiotherapy and neuropsychological standardised tests in the clinical services, and also self-report by survivors.

2.4. Analysis

Given the small numbers of participants, a mixed-methods methodology was used to generate rich data and inform the design of future studies. Firstly, each participant completed a range of self-report standardised questionnaires on mood, fatigue and quality of life, prior to the first TJ session and following the last session. These measures are reported below. Single case pre-post quantitative comparison was undertaken to assess statistically-reliable change (using the Reliable Change Index, Jacobson & Truax, 1992) The clinical significance of any statistically-significant, reliable change is indicated by an improved score passing a cut-off threshold for healthy functioning as specified in the literature.

In addition, participants completed a focus group interview, a) half-way through the intervention and also b) following the last session. Details are provided below. The qualitative data derived from both focus groups was analysed using thematic analysis (ref). Both the questionnaires and focus groups were administered by assistant psychologists (SN and EK) in a research role, who did not deliver the TJ group itself. The small participant numbers did not permit a group analysis.

2.4.1. Standardised Questionnaire Measures

Anxiety and depression for survivors of ABI was measures using the Hospital Anxiety and Depression Scale (HADS, Zigmond & Snaith, 1983), noted for its sensitivity to mood difficulties following ABI independent of non-mood related post-injury changes. Fatigue was assessed using the Modified Fatigue Impact Scale (M-FIS, Fisk et al., 1994), which yields a total fatigue score, plus subscores for physical, cognitive and psychosocial fatigue. These measures were administered before the first session, after the last session, and every 4 weeks during the 6 month duration of the classes. In addition participants completed a Quality of Life (Quality of Life after Brain Injury Inventory, QOLiBRI, Von Steinbüchel et al. 2010) at the

Praxis Psy
Invierno 2022, Nº37, 1 - 94.
ISSN 2735-6957
32995/praxispsy.v23i37.176

Table 1: Participant Demographics

Participant	Gender	Age	Injury Type	Time Post-Injury (years)	Physical Impairments	Cognitive Deficits	Psychosocial Needs
Raymond	M	48	Haemorrhagic RMCA Stroke	4	Left hemi-paresis involving lower and upper limbs Mobility restrictions (wheelchair user) Fatigue	Initiation Planning & organising Attention Left visual neglect	Anxiety Separation with wife Social isolation
Andy	M	44	Ischaemic LMCA Stroke	6	Right hemi-paresis involving lower and upper limbs Fatigue	Expressive aphasia Attention Memory Formation of goals when planning	Low mood Anxiety Social isolation Substance dependency
Mark	M	44	Tumour resection (involving right temporal lobe & cerebellum); post-operative CSF leak and meningitis	17	Balance Fatigue	Speed of information processing Selective attention Sustained Attention Working memory Cognitive flexibility Goal-directed planning	Anxiety Obsessive-Compulsive Disorder Relationship strain with partner Social isolation
Neal	M	65	Ischaemic RMCA Stroke	7	Balance Bilateral sensory loss in fingers Fatigue	Speed of information processing Attention Memory Ideomotor dyspraxia Executive functioning	Anxiety Depression Anger Relationship strain with wife and adult children Social isolation
Bill	M	64	Ischaemic RMCA Stroke	5	Left hemi-paresis involving lower and upper limbs Mobility restrictions (wheelchair user) Fatigue	Initiation Planning & organising Attention Memory Left visual neglect	Low mood Anxiety Social isolation
Roger	M	28	Space-occupying cyst in childhood	25	None	Memory Executive functioning (goal formation and implementation) Social cognition (emotion recognition, mentalising, social inference)	Social anxiety Social isolation Breakdown of relationships in the community and workplace
Dale	M	56	Ischaemic RMCA Stroke		Left hemi-paresis involving lower and upper limbs Mobility restrictions (wheelchair user) Fatigue	Speed of information processing Attention Implementation of plans Left visual neglect	Low mood Anxiety Separation with wife Relationship strain with children Social isolation
Seema	F	35 28	Sub-arachnoid Haemorrhage		Balance Fatigue	Speed of information processing Attention Working memory Cognitive flexibility	Anxiety Worry/rumination Anger/frustration Depression Social isolation Strained relationships with others, including professionals
Simon	M	55	Traumatic Brain Injury (Right Frontal Contusions, GCS 5/15)		None	Attention Initiation Planning and organising Social cognition (emotion recognition)	Anxiety Social isolation Breakdown of relationships in the community and workplace

Praxis Psy
Invierno 2022, Nº37, 1 - 94.
ISSN 2735-6957
32995/praxispsy.v23i37.176

first and final time point only. A sub-set of these measures were completed by participants once a month for the duration of the six month group, to enable visual plotting of trends over time (see results).

Participant scores on the questionnaires were not shared in the whole group or in the focus group sessions. Where clinical levels of psychological distress were identified, individual participants were offered an opportunity to speak to a key psychological practitioner within their respective clinical services.

2.4.2. Focus Group Interviews

The interview consisted of open-ended and follow-up focused questions exploring participants' experiences of attending the sessions, the learning process, experienced gains/benefits, experienced barriers, and the social dimension of group attendance. The interview process was adapted for participants' cognitive and communication deficits, following the guidelines of Patterson & Scott-Findlay (2002). The collected data was analysed using Thematic Analysis (Braun & Clarke, 2006), which involved line by line coding of transcripts, and these codes collated and contrasted within higher-order salient themes, that reflected the face content of participants' responses (in contrast to a theoretical or interpretive-focused qualitative analytical approach). All participants were anonymised and any personally-identifiable places, names or other biographical information was changed to protect participant confidentiality.

RESULTS:

3.1. Participant Retention

Of the 9 participants that started the TJ group 3 (33%) had stopped attending by the end of two months. Reasons cited were focused on difficulties travelling to the venue and clashes with medical appointments. The remaining 6 participants (66%) completed an average of 80% (range 50-92%) of the 24 (6 months) of classes, with occasional sessions missed due to illness and holidays.

3.2. Self-Report Questionnaires

The questionnaire total scores for all 9 participants who started the study are highlighted in Table 2, along with session attendance. These scores are those measured pre-TJ group and at the same time point a week after the TJ group, for all of the original 9 participants. Changes in total pre-post scores are indicated, together with the direction, statistical-reliability and clinical significance of any change.

Of those changes that were identified as statistically-reliable using Jacobson and Truax's (1991) Reliable Change Index method, 2 participants demonstrated reduced levels of fatigue on the MFIS (Raymond and Bill, with Bill's clinically-significant reduction in scores moving from the clinical to the normal range), and 1 participant demonstrated reliable and clinically-significant reduced levels of depression symptomatology on the HADS depression scale (Andy, whose scores passed from the moderate to normal range). 1 participant's (Bill) scores on the QoLiBrI reliably improved.

There were no reliable changes for any participants on measures of anxiety. 4 participants demonstrated no reliable changes on any measures, all of whom had attended 50% or less of the sessions. Two participants demonstrated a negative trajectory across the duration of the TJ group, with depression scores on the HADS increasing from the sub-clinical (Neal) and mild (Mark) ranges to the moderate range.

Given the variability in pre-post change on all measures across the participants, trends in changing scores on the HADS and MFIS every 4 weeks over time for the 5 participants who attended the majority of TJ sessions over the six months. The scores for HADS Anxiety, HADS Depression, MFIS Total, MFIS Physical subscale, MFIS Cognitive subscale and MFIS psychosocial subscale are graphed in figures 1-6 below.

There is significant spread and diversity in the trajectory of scores for each measure across the 5 participants. The MFIS Physical Subscale score trajectories demonstrate a greater level of uniformity relative to the other measures, with indications of a decreasing trend in scores for most participants.

3.2. Qualitative Thematic Analysis of Focus Group Interviews

All participants within the focus groups were happy to complete each session. Using the methodology suggested by Braun and Clarke (2006), the thematic analysis of the interview data from both the mid-intervention focus group (7 participants: Raymond, Andy, Mark, Neal, Bill, Roger, Seema) and the post-intervention focus group (6 participants: Raymond, Andy, Mark, Neal, Bill, Roger) yielded the following superordinate and subordinate themes: *benefits of group participation* (including *i) increased energy alongside relaxation; ii) group social cohesion); challenges during practice (*including *i) physical; ii) cognitive and emotional; iii) environmental); the learning process;* and *travel to classes* (represented in figure 7).

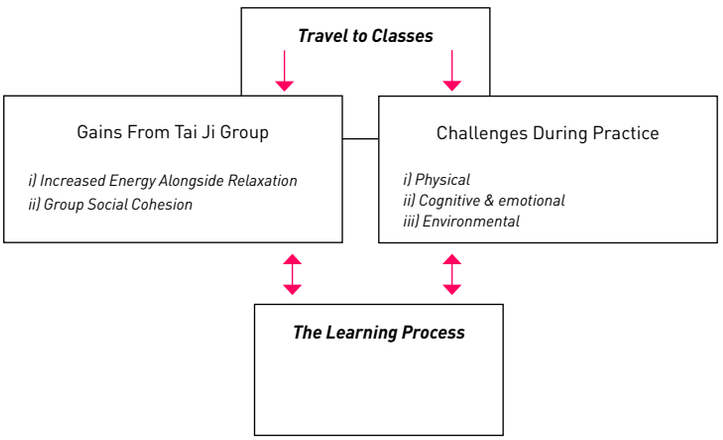
Praxis Psy
Invierno 2022, Nº37, 1 - 94.
ISSN 2735-6957
32995/praxispsy.v23i37.176

Table 2: Pre- & Post-Intervention Scores on Main Questionnaire Measures Per Participant

Participant	% Sessions Attended	HADS Pre	HADS Post	Pre-Post Diff (RCI)	MFIS Pre Total Subscales	MFIS Post Total Subscales	Pre-Post Diff (RCI)	QoLiBrI T-Score Total Pre	QoLiBrI T-Score Total Post	Pre-Post Diff (RCI)
Raymond	92	A 8 D 6	A 6 D 8	1.19^ -1.15^	T 51 Ph 20 C 27 Ps 4	T 39 Ph 14 C 22 Ps 3	**2.02***	60	59	0.13
Andy	88	A 9 D 11	A 9 D 6	0 **2.88*^**	T 60 Ph 35 C 17 Ps 8	T 51 Ph 30 C 19 Ps 2	1.52	29	44	0.65
Mark	71	A 17 D 7	A 14 D 12	1.79^ **-2.88*^**	T 67 Ph 28 C 31 Ps 8	T 64 Ph 25 C 32 Ps 7	0.51	80	79	-0.13
Neal	92	A 8 D 5	A 10 D 12	-1.19 **-4.02*^**	T 37 Ph 14 C 20 Ps 3	T 40 Ph 10 C 26 Ps 4	-0.51	57	48	-1.17
Bill	88	A 2 D 4	A 0 D 2	1.19 1.15	T 34 Ph 26 C 3 Ps 5	T 6 Ph 6 C 0 Ps 0	**4.72*^**	69	85	**2.08***
Roger	50	A 8 D 5	A 8 D 6	0 -0.58	T 27 Ph 5 C 19 Ps 3	T 22 Ph 7 C 12 Ps 3	0.84^	55	66	1.43
Dale	33	A 8 D 9	A 7 D 8	0.60^ -0.58	T 53 Ph 25 C 23 Ps 5	T 54 Ph 20 C 26 Ps 8	-0.16	49	na	na
Seema	25	A 14 D 13	A 17 D 13	-1.79^ 0	T 59 Ph 30 C 22 Ps 7	T 62 Ph 28 C 27 Ps 7	-0.51	37	na	na
Simon	16	A 9 D 17	A 7 D 14	1.19^ 1.72^	T 71 Ph 34 C 29 Ps 8	T 64 Ph 24 C 33 Ps 7	1.18	39	na	na

Praxis Psy
Invierno 2022, Nº37, 1 - 94.
ISSN 2735-6957
32995/praxispsy.v23i37.176

Figure 7: Thematic Analysis Summary of Focus Group Interviews



These are summarised below with illustrative quotes from participants.

1.Benefits of Group Participation:

Participants identified important gains from attending the sessions for the mind, relaxation and wellbeing:

(First focus group):
Mark: "I think that tai chi in itself is actually good for you because of the breathing. The fact that you're, you know you're trying to do movements sort of smoothly and you're breathing smoothly and I think that really helps your mind. Yeah I think it's just good for it, your mind".

(Second focus group):
Mark: "it teaches you how to relax...if you can sit down and relax, it teaches you how to kind of ... let go and slow down"
Roger: "I did cricket training like, it's in the evening but I always feel after this ...just so relaxed
Neal: "it improves wellbeing I think, overall wellbeing"
Group: "yeah".
Mark: "I feel calmer after it"
Andy: "Yeah calmer"
Raymond: "I feel relaxed, yes, very relaxed"
Bill: "always looking forward to the next week"
Raymond: "It's the only day I get up with a purpose. It's the only day."
Roger: "it's sets you up for the rest of the week"
The specific gains clustered around two main benefits as a majority consensus for participants. First, several participants described a simultaneous feeling of both increased energy following the sessions, alongside an experience of relaxation:

(First Focus Group):
Roger: "...I find it relaxing, it's really relaxing. Considering I will go from, after this I will go sit, chill out for about half an hour at home when I get back. I then feel like the motivation I can do, oh I can do the washing, I can do this, this and this. I can then go and do my shopping as well, so I feel better for it."
Neal: "Oh that's right yeah and erm I enjoy doing the form together as a group, as a whole. I find that quite energising. I don't know. I tend to get energy of the others as well."

Bill, who demonstrated a reliable, clinically-significant reduction in fatigue over the course of the intervention, noted a contradiction of being both tired but also revitalised:
Bill: "hmm yeah I said drained earlier but I did mean drained as well, but equally at the same time I know it's a bit of an opposite but I do feel re-invigorated with life. it's difficult to describe but it's both ends of the spectrum."

Secondly, a core dimension of gain endorsed by all participants was the social experience of attending – feeling close as a group, forging friendships and practicing together:

(second focus group):
Neal: "the social aspect is good"
Bill: "yes, a nice group of people"
Roger: "therapeutic"
Raymond: "and I feel that I've got half a dozen more friends than I had before, because I've only really got one friend and that's my girlfriend, so it is good...yeah"

2. Challenges During Practice:

In contrast to the benefits, participants diverged in identifying specific challenges to attending the group, with the exception of memory. The different challenges identified by participants have been organised under the headings of *physical; cognitive and emotional;* and *environmental* categories.

Physical challenges included fatigue for some, either alongside or in contrast to the energising benefits reported by others above:
(first focus group)
Bill: "... it is very tiring doing an hour's worth of tai chi"

Praxis Psy
Invierno 2022, Nº37, 1 - 94.
ISSN 2735-6957
32995/praxispsy.v23i37.176

Figure 1: HADS Anxiety Scores Per Participant Over the Duration of the Intervention

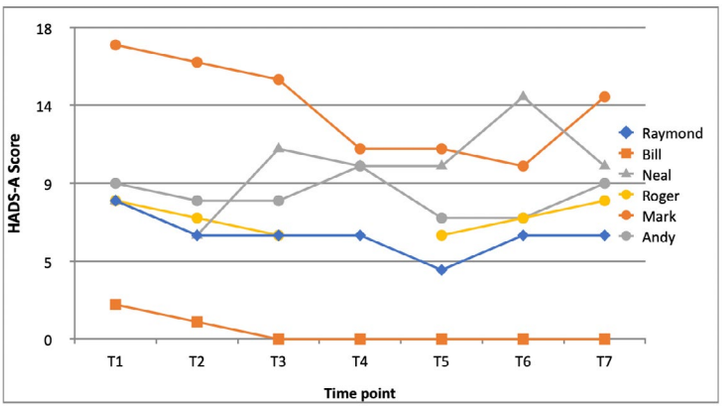


Figure 2: HADS Depression Scores Per Participant Over the Duration of the Intervention

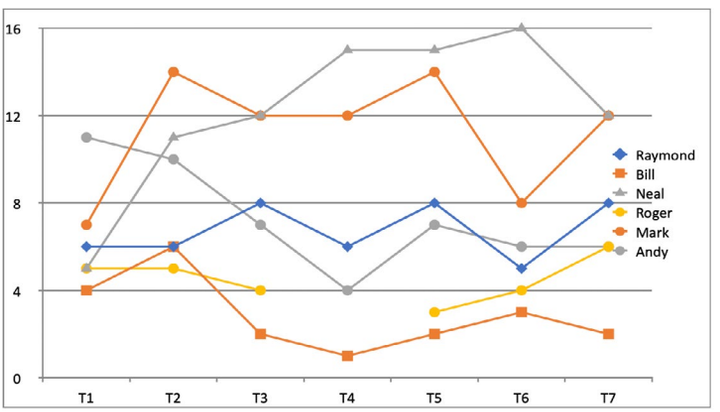


Figure 3: MFIS Scores Per Participant Over the Duration of the Intervention

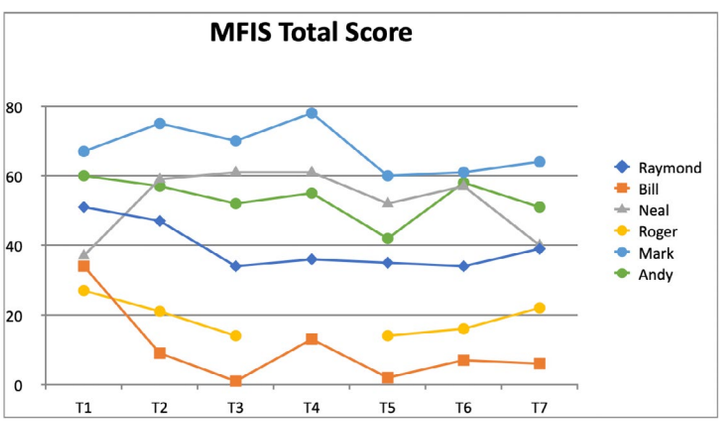


Figure 4: MFIS Scores Per Participant Over the Duration of the Intervention

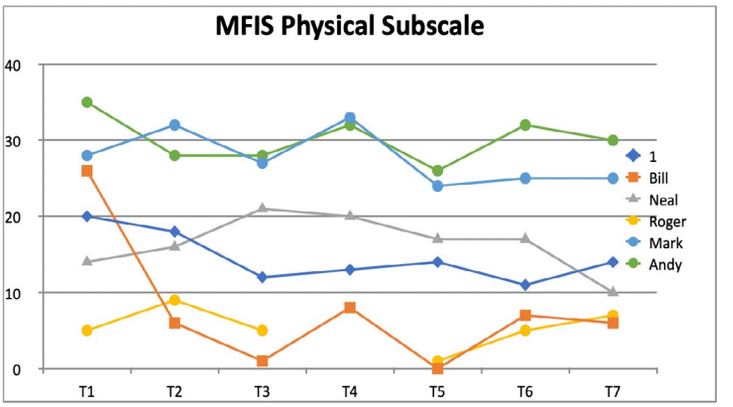


Figure 5: MFIS Scores Per Participant Over the Duration of the Intervention

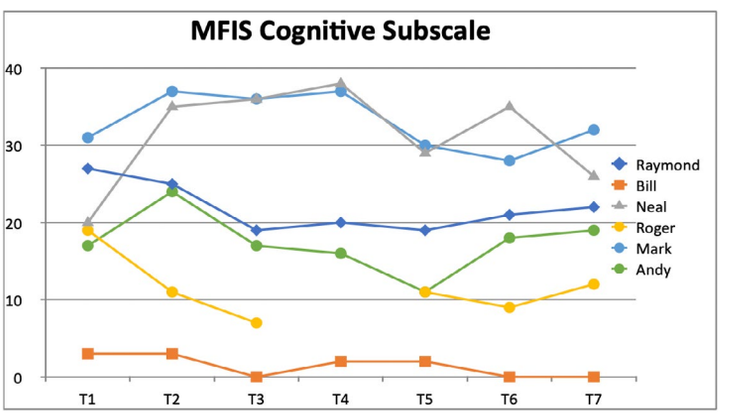
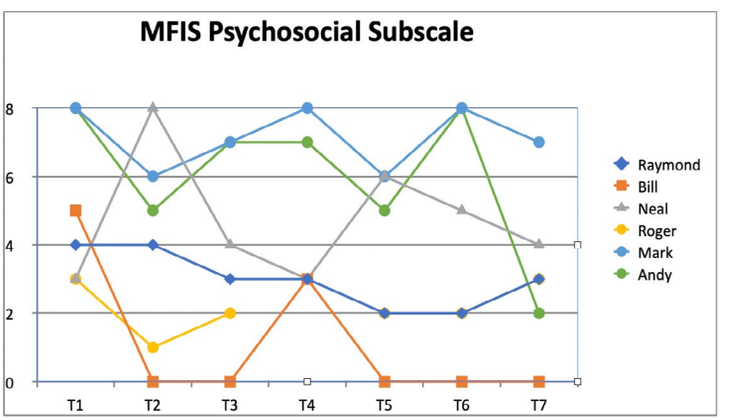


Figure 6: MFIS Scores Per Participant Over the Duration of the Intervention



Praxis Psy
Invierno 2022, Nº37, 1 - 94.
ISSN 2735-6957
32995/praxispsy.v23i37.176

Seema: "Oh yeah again like you were saying, because the session is so long I feel exhausted by the second half"
Mark: "Yeah I have to sleep for a bit when I get home before I can do anything. it's taking on the information rather than the physical thing I think."

Furthermore, there were unique challenges for participants with mobility restrictions during the sessions:
Bill: "For me, for me, sorry, yes. I mean being in a wheelchair, it's more difficult for me because of that. And Raymond probably as well. But I do find it a bit limiting not being able to stand up and do any of the moves safely. But I do.... even though I'm sitting in the wheelchair trying to do as much as I can, I still really enjoy it and it's a challenge."

The internal dimensions of *cognition and emotion* were key also. There was greater consensus across participants on the influence of memory limitations on group experience:

(first focus group)
Andy: "Memory, yeah that's the main thing"
Roger: "more complex moves, so that bit right at the end, going from that to that (gestures movements) I'm still trying to remember, am I doing it right and other than that it's just time. I wish there was more time to do it, so if we had like an hour's break and two hours of tai chi just to try and save.... not too tight"

(Second focus group)
Bill: "I found it, as I said before, it is quite a long form that we have to learn. I found it quite challenging to remember the form."
Neal: "yeah I think it's just learning the form ... I can't bloody learn it"
Interviewer: You mean the memory aspect of it?
Neal: "yeah, yeah"
Roger: "pretty much the same, it's just remembering it, remembering all of the sequence".

An additional cognitive challenge identified by the group was information processing and concentration for the new material that was least familiar at the beginning of the 6 months group:
Bill: "It's got very much more intense, I mean as we've gone over the last, over the sessions and it's been added to and added to, I have found it very very difficult to keep up with it sometimes and sometimes when it goes a bit too quick I lose out on the middle bits – erm I get lost."
Andy: "..much better I think – erm before I was a bit slow and oh that's not right, that's not right but I remembered so."
Neal: "But the only concern I have is if the group ever got any bigger that there would be too much going on in the room to be able to concentrate on what I need to concentrate on, which is the instructor."
These challenges were not raised at the end of the 6 months. Emotional challenges within the early phase of TJ group participation were identified by two of the participants:

(first focus group):
Roger: "Mines more of a frustration. I wish I could do more in the time that I had."
Andy: "I was very, very nervous. People I don't know. it's helped me, it's a lot ... I liked it and I still like it now."

The final challenge within the classes identified by some was the physical environment, specifically the temperature and acoustics of the hall in which the TJ classes were being provided:

(first focus group):
Seema: "that is such a massive hindrance because since my brain injury I no longer have the ability to block out background noise"
Neal: "The acoustics in the room aren't helpful at all. Even when there's just the instructor speaking, because of the echo, I find that very difficult to cope with....yes the sound in the hall. Acoustics."
It is interesting to note that Seema stopped coming to the weekly sessions soon after the mid-intervention focus group, and Neal's self-reported depression scores worsened over time over the course of the 6 months.

3. The Learning Process:
Participants reflected on dimension of learning and the familiarisation of practice throughout the six months.

(second focus group):
Raymond: "It's got much easier. That's probably because I've learnt how to do it."
Mark: "yeah it's starting to sink in."
Bill: "it's quite a long and complicated form we do now and it's taken me quite a long time to get into it as far as I have,

Praxis Psy
Invierno 2022, Nº37, 1 - 94.
ISSN 2735-6957
32995/praxispsy.v23i37.176

but I still find some bits I'm not very good at, but with time hopefully it will…I'll improve. But it is quite a complicated complex subject ermm…thing to do. It takes me a long time these days to get into it and master it."

The role and requirements of memory in participation and sense of progression in the group was debated.

Mark: "I found it quite good that there wasn't too much pressure to remember stuff like it was just the usefulness of doing the exercise in itself rather than having to learn… normally do I feel that I'd be letting the teacher down if I didn't. Yeh here it doesn't matter, sort of what you remember or not."
Bill: "I was a bit concerned of to start with was trying to remember all the moves in the form, but I know Alison kept on saying we don't need to remember it at all…. I felt I needed to have a lot of it in my memory to be able to carry out the sequence, but really it does just flow now. When I do join in with the form now, it does just come back quite quickly, although there are still bits that I do forget readily."

Participants spontaneously referred to the idea of flow, for moments in the session free of the aforementioned barriers:

Roger: "I think it has improved. I think I've got more into the flow of things."

Elements within the classes that supported this state of mind included moments when participants were following the TJ instructor, becoming absorbed in the present moment:
(first focus group):
Seema: "I don't think as such my tai chi practice has improved but I think I find it easier to do the form – not because ive remembered any of it in my head. I still don't. But I found it easier to follow the teacher and just automatically do, know what's coming next."

(second focus group)
Mark: "main thing for me is to be able to follow Alison (instructor)"
Participants differed in their attempts to practice the TJ movements at home, in between the classes. Memory difficulties and strategies to manage these were key determinants:

(first focus group)
Neal: "I still try every week to replicate what we learn in the class."
Seema: "what stops me from doing it is I just can't seem to remember."
Andy: "I remember the moves, I … every 2 days I ….." (Interviewer: practice at home?) "Yeah yeah."
Neal: "I try and practice every day if I can find the time, but what I do find helpful is the recording I did of Alison doing the form on my phone."
Mark: "No I don't" (slight laughter). (Interviewer: No ok and what stops you?). "It's memory I think because I don't even remember."

4. Travel to Classes:
The final dimension of influence were the journeys to and from the TJ classes. Hospital transport was provided to facilitate access to the classes for those who did not have their own form of transport. However hospital transport journeys were long, and pick-ups were inconvenient relative to the times of the classes themselves. This had an impact on fatigue for participants:

(first focus group):
Neal: "Transport is a big issue. If transport mucks up basically you've got anxiety even before you even got here."
Bill: "yeah transport."

(second focus group):
Mark: "what's challenging about the actual doing the day is, for me is, the fatigue…with the coming in on transport, ermm they get us here very early and so it makes the day quite long and I have to sleep sort of all afternoon after it."
These challenges withstanding, two members of the group who had previously attempted generic TJ classes in the community contrasted the value of the ABI TJ group:

Neal: "I attended a tai chi class mainstream and I didn't get on with it, because of the memory factor and the way the course had been put across. I thought of doing it through the Enrych Cambourne scheme would be more adapted delivery for people with brain injury."
Mark: "same reason as Neal really, I do a course in (town), but with my balance issues and I guess difficulties with the memory as well so I wanted to do something that was more

Praxis Psy
Invierno 2022, Nº37, 1 - 94.
ISSN 2735-6957
32995/praxispsy.v23i37.176

tailored to people with balance problems or mobility problems. So it's not so much standing on one leg."

SUMMARY & CONCLUSION

Results have been shared from a pilot of a weekly Tai Ji group for survivors of acquired brain injury. The sample size is small and there are significant limitations on the generalisations that can be made from this data. However, the diversity in types of ABI and combinations of physical, cognitive and emotional difficulties evident in this small sample is commensurate with other population of acquired brain injury survivors using community resources (including healthcare resources, where available) on a long-term basis following the post-acute phase of their injuries. Detailed case study accounts of the needs and progress made by Raymond, Andy and Mark during the group are provided by Yeates (2019 a,b,c).

The findings from this study cannot be generalised, given the small sample. The tentative findings from this data that survivors responded differently to a TJ group intervention that was adapted only minimally for gross physical differences (standing versus seated practice), requires further elaboration and clarification in large sample studies. This diversity of response on standardised quantitative self-report measures included those who benefited in some domains, those that exhibited no clear benefit and 2 participants who demonstrated a negative trend (a reduction in mood) during the course of the six months). A third of participants left the group prematurely. Retention rates and contrasts of participants' response trajectories in future larger sample studies would be illuminative, rather than solely aggregated data.

The qualitative focus group data highlighted how participants experienced both common gains (relaxation alongside energy and enhanced social cohesion), but beyond the shared perceived challenge of memory during the classes, there was significant diversity across participants in identified challenges (physical, cognitive and emotional, environmental). The experience of the learning process was key to the location of gains versus challenges, and travel/transport to and from classes was identified as a key influence on the in-class and post-class experience.

When comparing both qualitative and quantitative data across participants, the majority consensus in the focus group of increased energy across those participants who completed the 6 month course was supported to a certain extent by common reductions in physical fatigue on the Modified Fatigue Impact Scale (Fisk et al., 1994) for those participants over the six months. The co-existence of tiredness and revitalisation was noted by one participant. These trends are consistent with findings across large sample studies demonstrating a replicated finding of mind-body interventions such as TJ, yoga and mindfulness meditation being associated with significant benefits in fatigue and/or sleep disturbance for people with neurological conditions (e.g., Cramer et al., 2014; Grosman et al., 2010; Johansson et al., 2012; Lyu et al., 2018; Yeates et al., 2015). Fatigue was not the primarily outcome in many of these studies however and as such future well-designed mind-body intervention studies are required that target this domain of post-injury functioning in particular.

Increased social cohesion was also a commonly identified gain by participants in the focus groups. No ABI TJ group studies to date have operationalised social cohesion/group membership as a core outcome. Given both the prioritisation of this dimension for post-injury identity reconstruction and psychological wellbeing (Haslam et al., 2008) and the prioritisation of this aspect by the focus-group responses from participants in this study, social group membership and its relationship to wellbeing should be a target for future TJ studies.

Two participants who uniquely identified significant challenges from the physical learning environment demonstrated negative quantitative outcomes (an increase in depression scores for Neal, and a premature leaving of the group sessions for Seema, who also did not demonstrate any improvement on any measure over the duration of the study). The offering of mind-body interventions within community and healthcare settings, either face-face or remotely, needs to be planned with the learning environment in mind for future intervention projects, and the role of the learning environment needs to be considered when interpreting results of mind-body evaluations in future research studies.

The diversity of participant responses and experienced benefits versus challenges to a standardised 6 month weekly TJ group with minimal adaptations to learning and practice supports the call for bespoke adaptation to be central to future TJ initiatives for ABI survivors. Yeates (2015; 2018; 2019 a,b,c) has provided a range of suggestions of how adaptations can be made to the learning and practice of TJ for different physical, cognitive, and psychological needs for each survivor within a group class format. Furthermore, the principle of optimising Flow State Experience (Csikszentmihalyi, 1997) is offered as a

Praxis Psy
Invierno 2022, Nº37, 1 - 94.
ISSN 2735-6957
32995/praxispsy.v23i37.176

conceptual framework to guide this adaptation process for each survivor. Future well-designed studies are recommended to investigate the physical, psychological and social gains of this new approach to TJ learning and practice for survivors of ABI. Comparisons of 1:1 versus group delivery formats are welcome in future studies, as are differing models for optimising bespoke adaptation within group formats.

Finally, while these adaptations have been conceptualised for the delivery of face to face TJ classes, the social distancing requirements in the current post-COVID 19 context require alternatives to shared physical space for TJ and other community interventions. At the same time, enduring post-viral difficulties in fatigue, pain, cognition, and mental health for COVID 19 patients (Rogers et al., 2020) and the evidence of ABI as a post-COVID 19 outcome itself make this new population (likely to overlap with survivors from non-COVID 19 related ABI) a relevant group for the potential benefits of TJ. Therefore, the evolution of adapted TJ within the literature will need to include remote modes of delivery to survivors in their homes. This virtual delivery of adapted TJ offers both a solution to the negative influences of travel to a TJ class, but suffers from different access issues for people with disabilities and offers fewer opportunities for social cohesion.

REFERENCES:

Blake, H., & M. Batson. 2006. Exercise intervention in brain injury: a pilot randomized study of Tai Chi Qigong. *Clinical Rehabilitation 23,* 589–98.

Braun, V. & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology, 3*(2), 77-101.

Burschka, J. M., P. M. Keune, U. Oy, P. Oschman and P. Kuhn. 2014. Mindfulness-based interventions in multiple sclerosis: beneficial effects of Tai Chi on balance, coordination, fatigue and depression. *BioMedCentral Neurology 14,* 165–174.

Charmaz, K. (1990). ``Discovering'' chronic illness: Using grounded theory. *Social Science & Medicine*, *30*, 1161-1172.

Cramer, H., R. Lauche, H. Azizi, G. Dobos & J. Langhorst. 2014. Yoga for multiple sclerosis: a systematic review and meta analysis. *PLoS One 9,* e112414.

Csikszentmihalyi, M. 1990. Flow: The Psychology of Optimal Experience. New York: Harper and Row.

Csikszentmihalyi, M. 1997. Finding Flow: The Psychology of Engagement with Everyday Life. New York: Basic Books.

Department of Health. (2005). The National Service Framework for Long-term Conditions. Retrieved from the World Wide Web http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_4105361

Fisk, J. D., P. G. Ritvo, L. Ross, D. A. Haasem, T. J. Marrie & W. F. Schlech. 1994. Measuring the functional impact of fatigue: initial validation of the fatigure impact scale. *Clinical Infectious Disease 18(Suppl. 1,* s79–83.

Gemmell, C., & J. M. Leathem. 2006. A study investigating the effects of Tai Chi Chuan: individuals with traumatic brain injury compared to controls. *Brain Injury 2,* 151–6.

Grossman, P., Kappos, L., Gensicke, H., D'Souza, M., Mohr, D. C., Penner, I. K., & Steiner, C. (2010). MS quality of life, depression, and fatigue improve after mindfulness training: a randomized trial. *Neurology*, *75*(13), 1141-1149.

Praxis Psy
Invierno 2022, Nº37, 1 - 94.
ISSN 2735-6957
32995/praxispsy.v23i37.176

Haslam, C., A. Holme, S. A. Haslam, A. Lyer, J. Jetten & W. H. Williams. 2008. Maintaining group memberships: social identity continuity predicts well-being after stroke. *Neuropsychological Rehabilitation 1,* 671–91.

Hung S-H, Hwang C-Y, Chang C-Y (2021) Is the Qi experience related to the flow experience? Practicing qigong in urban green spaces. *PLoS ONE 16(1),* e0240180. https://doi.org/10.1371/ journal.pone.0240180

Hwang, I., R. Song, S. Ahn, M. Lee, P. Wayne & M. K. Sohn. 2017. Exploring the adaptability of Tai Chi to stroke rehabilitation. *Rehabilitation Nursing.* Published online. doi:10.1097/ rnj.0000000000000110.

Jacobson, N. S. & P. Truax. 1991. Clinical significance: A statistical approach to defining meaningful change in psychotherapy research. *Journal of Consulting and Clinical Psychology 59,* 12–19.

Johansson, B., H. Bjhur & L. Rönnbäck. 2012. Mindfulness-based stress reduction (MBSR) improves long-term mental fatigue after stroke and traumatic brain injury. *Brain Injury 26*, 1621–8.

Luria, A. R. 1975. *The Man with a Shattered World*. Harmondsworth, UK: Penguin Books.

Lyu, D., X. Lyu, Y. Zhang, Y. Ren, F. Yang, L. Zhou, Y. Zou & Z. Li. 2018. Tai Chi for stroke rehabilitation: a systematic review and meta-analysis of randomized controlled trials. *Frontiers in Physiology 9,* 983. doi:10.3389/fphys.2018.00983.

Nochi, M. 1997. Dealing with the 'void': traumatic brain injury as a story. *Disability & Society 12,* 533–55.

Paterson, B., & Scott-Findlay, S. (2002). Critical issues in interviewing people with traumatic brain injury. *Qualitative Health Research, 12(3),* 399 – 409.

Rogers, J. P., Chesney, E., Oliver, D., Pollak, T. A., Mcguire, P., Fusar-poli, P., ... Lewis, G. (2020). Psychiatric and neuropsychiatric presentations associated with severe coronavirus infections : a systematic review and meta-analysis with comparison to the COVID-19 pandemic. *The Lancet Psychiatry,* 1–17. https://doi.org/10.1016/S2215-0366(20)30203-0

Taylor-Piliae, R.E. & Coull, B.M. (2012). Community-based Yang-style Tai Chi is safe and feasible in chronic stroke: a pilot study. *Clinical Rehabilitation, 26(2)*, 121-131

Taylor-Piliae, R. E., T. M. Hoke, J. T. Hepworth, L. D. Latt, B. Najafi et al. 2014. Effect of Tai Chi on physical function, fall rates and quality of life among older stroke survivors. *Archives of Physical Medicine and Rehabilitation 9*,: 816–24.

Tyerman, A. (1999). Outcome measurement in a community head injury service. *Neuropsychological Rehabilitation, 9,* 481-491.

Von Steinbüchel, N., L. Wilson, H. Gibbons, G. Hawthorne, S. Höfer, S. Schmidt, J. Truelle et al. 2010. Quality of Life after Brain Injury (QOLIBRI): scale development and metric properties. Journal of Neurotrauma 27: 1167–85.

Winser, S.J., Kannan, P., Pang, M., Smith, C. & Tsang, W.W. (2018). Potential Benefits and Safety of T'ai Chi for Balance and Functional Independence in People with Cerebellar Ataxia. *The Journal of Alternative & Complimentary Medicine, 24(12)*, 1221-1223.

Yeates, G.N. (2015). Flow State Experiences as a Biopsychosocial Guide for Tai Ji Intervention and Research in Neuro-Rehabilitation. *Neuro-Disability & Psychotherapy, 3*(1): 22-41.

Yeates, G.N. (2019a). Eastern Spirituality, Mind-Body Practices and Neuro-rehabilitation. In A. Coles & J. Collicutt (eds). *The Neurology of Religion.* Cambridge, UK: Cambridge University Press, pp.191-213.

Yeates, G.N. (2019b). Mind-body interventions for neurological conditions. In: G.N. Yeates & F. Ashworth. *Psychological Therapies in Neuropsychological Rehabilitation*. Hove: Psychology Press.

Yeates, G.N. (2019c). The Potential Contribution of Mind-Body Interventions within Psychological Support following Aphasia: A conceptual review and case study. In K. Meredith & G.N. Yeates. (eds). *Neuro-Disability & Psychotherapy, Specialist Topics (vol II*). *Psychotherapy & Aphasia: Supporting Emotions & Relationships.* Oxford: Routledge.

Yeates, G. N., M. Murphy, J. Baldwin, J. Wilkes & M. Mahadevan. 2015. A pilot evaluation of a yoga group

Praxis Psy
Invierno 2022, Nº37, 1 - 94.
ISSN 2735-6957
32995/praxispsy.v23i37.176

for survivors of acquired brain injury in a community setting. *Clinical Psychology Forum 267*, 46–51.

Zheng, G., W. Zhou, R. Xia, J. Tao & L. Chen. 2016. Aerobic exercises for cognition rehabilitation following stroke: a systematic review. Journal of Stroke and Cerebrovascular Disease 25, 2780–9

Zigmond, A. S. & R. P. Snaith. 1983. The Hospital Anxiety and Depression Scale. *Acta Psychiatrica Scandinavica 67*, 361–70z