

# The Lived Experience and Patient-reported Benefits of Yoga Participation in an Inpatient Brain Injury Rehabilitation Setting

## Abstract

**Context:** The multifactorial benefits of yoga have been well documented in the literature, with the integration of yoga therapy into healthcare being an emerging field. In general, yoga therapy programs are utilized in the community as an adjunct to other therapy. At present, limited rehabilitation units routinely incorporate integrative therapy options within a hospital environment. **Aims:** The aim of this study is to explore the lived experience and patient-reported benefits of yoga in an inpatient brain injury rehabilitation setting. **Settings and Design:** Thirty-one participants were recruited to the study after voluntarily participating in a yoga class within an inpatient brain injury rehabilitation unit of a major metropolitan hospital. Yoga sessions were held weekly for 60 min and consisted of a modified Hatha yoga style. This was a mixed-methods, quasi-experimental one-group pretest–posttest study. **Methodology:** Quantitative data were collected to measure perceptions of relaxation and well-being before and after yoga classes, along with the satisfaction of the class. Semi-structured interviews were utilized to collect qualitative data of experiences and perceptions associated with yoga participation. **Statistical Analysis Used:** Thematic analysis was completed for qualitative data. Quantitative data were analyzed using nonparametric statistical methods, and descriptive statistics were also provided. **Results:** The benefits described by participants are reported in this paper. These include improved relaxation, physical well-being, emotional well-being, being present, and self-awareness. **Conclusions:** This study describes the personal benefits experienced from regular yoga participation within an inpatient rehabilitation setting.

**Keywords:** Brain injury, hospital, rehabilitation, yoga

## Introduction

An acquired brain injury (ABI) is defined as any injury occurring in the brain after birth, including injuries sustained due to accidents, stroke, brain tumors, lack of oxygen, infection, poisoning, and degenerative conditions.<sup>[1]</sup> An ABI is one of the most common causes of disability in adults, with approximately one in every 45 Australians living with an ABI reporting restricted activity participation.<sup>[2]</sup> Rehabilitation is often required following an ABI due to physical, cognitive, behavioral, and emotional changes which result in limitations within meaningful life roles such as living independently, employment, social relationships, and leisure.<sup>[3,4]</sup> Rehabilitation stays may be longer due to the complexity of changes.<sup>[5]</sup>

Yoga practices are derived from an ancient system of philosophies, principles, and practices from the Vedic tradition of India and the Himalayas.

Yoga practice “cultivates health and well-being (physical, emotional, mental, and social) through the regular practice of a range of many different techniques, including postures and movement, breath awareness and breathing exercises, relaxation and concentration, self-inquiry, and meditation.”<sup>[6]</sup> In Western society, yoga is commonly practiced for exercise, relaxation, and therapeutic benefits. The style of practice is predominantly consistent with Hatha Yoga, involving physical body postures and movement (asanas), breathing techniques (pranayamas), and meditation.<sup>[7]</sup> Yoga participation rates in Australia are approximately between 3% and 12%.<sup>[8]</sup> The multifactorial benefits of yoga have been well documented in the literature. In various populations, yoga has improved sleep quality,<sup>[9]</sup> physiological and psychological outcomes related to stress,<sup>[10]</sup> pulmonary function,<sup>[11]</sup> and balance.<sup>[12]</sup>

The integration of yoga practices in therapeutic healthcare is emerging

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within the literature. The International Association of Yoga Therapists defines yoga therapy as “the process of empowering individuals to progress toward improved health and well-being through the application of the philosophy and practice of yoga.”<sup>[13]</sup> In general, yoga therapy programs are utilized in the community as an adjunct to other therapy. In a study exploring the therapeutic effects of yoga, Woodyard<sup>[7]</sup> found that yoga improved mental health, flexibility, proprioception, and balance, while lowering heart rate, respiratory rate, blood pressure, and cortisol levels. Similarly, another study explored the lived experience and perceived outcomes of a yoga program in a community-based stroke population. Participants had perceived physical improvements, an improved sense of calmness and the possibility for reconnecting and accepting a different body.<sup>[14]</sup>

At present, there is limited evidence to suggest that inpatient rehabilitation units routinely incorporate integrative therapy options within a hospital environment, particularly after ABI. Positive perceptions were reported by key staff following the implementation of yoga therapy within two general inpatient rehabilitation in the United States of America.<sup>[15]</sup> Participants with a traumatic brain injury (TBI) who completed the yoga program demonstrated improvements in balance, balance confidence, and endurance measures along with positive reported perceptions associated with participation.<sup>[16]</sup>

There is increasing recognition for the use of patient-reported experience measures and patient-reported outcome measures (PROMs) in measuring service delivery and improving quality within health care.<sup>[17]</sup> Emerging from the drive to make health services more patient-centered and positively valued by patients, the practice of capturing patient perspectives on their health outcomes through PROMs has substantial potential to transform health services.<sup>[18]</sup> In commencing an evaluation of a patient group, it was vital to understand the experience from their perspective. Therefore, the aim of this study is to explore the perceptions of yoga participation and the impact of the program on the lived experience of the inpatient brain injury rehabilitation setting.

## Methodology

### Participants

Participants were recruited through convenience sampling. The inclusion criteria were as follows: diagnosis of ABI, current inpatient of the brain injury rehabilitation unit, able to attend at least two yoga classes, and able to provide informed consent (as deemed by their treating occupational therapist). The exclusion criteria were participants who were physically, behaviorally, or cognitively unable to participate in yoga classes or provide consent, such as patients in posttraumatic amnesia or with cognitive deficits that would impair their ability to complete structured

interviews. Some participants had completed yoga before acquiring their brain injury; however, this was not considered relevant to the inclusion or exclusion criteria for this study. Ethics approval was received from the Metro South Human Research Ethics Committee. All participants provided informed written consent. Where possible, a significant other, family member, or personal contact was aware of their participation.

### Study design

This was a mixed-methods, quasi-experimental one-group pretestposttest study. The principles for meaningful and effective mixed methods studies as outlined by Green *et al.*<sup>[19]</sup> were utilized in the methodology design. A complementarity mixed methods approach uses qualitative data to elaborate and enhance the results of the quantitative data.<sup>[19]</sup> This increases the meaningfulness of the data by capitalizing each methodological strength while counteracting biases,<sup>[19]</sup> which was imperative in gathering a measurable understanding of the impact of the yoga program while also understanding the lived experience of participants while in rehabilitation.

### Procedure

Formal written consent was gained by a member of the research team. Ability to provide consent was checked with the treating therapists.

### Assessments

Given the limited research surrounding yoga participation after ABI, the research team designed pre- and post-questionnaires for the study in the format of a 100-point visual analog scale. They were modeled on the leisure satisfaction scale, which has been validated as an objective measure of leisure satisfaction.<sup>[20,21]</sup> The questionnaire was completed at the beginning and end of each yoga class, measuring pre/post levels of relaxation and well-being, and satisfaction with the class postcompletion.

After completing at least two yoga classes, participants were offered an audiotaped semi-structured interview, which is recognized as a powerful tool in health-care research to understand the thoughts, beliefs, and experiences of patient populations.<sup>[22]</sup> Interviews were completed over a single session in a quiet room with the participant and a member of the research team. Interviews took between 10 and 40 min. Before interviews, the research team underwent training in qualitative interviewing, with specific focus on engagement with participants who have an ABI. An interview guide, developed by the research team, was used to provide consistency between interviews. Interviews were then transcribed verbatim by the same researcher who completed the interview. Refer to Chart 1 for recruitment characteristics of the participants.

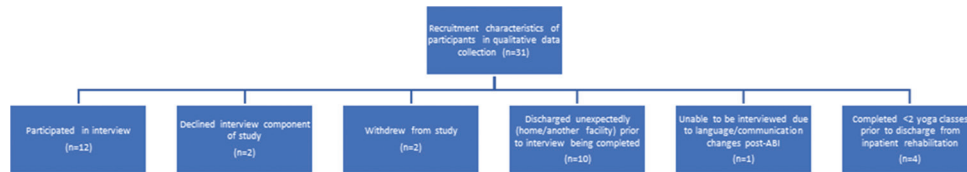


Chart 1: Recruitment characteristics of participants involved in qualitative data collection

**Table 1: Participant demographics and injury-related information**

Characteristic	Median (IQ range)
Age (years)	46 (18)
Gender	
Female	16
Male	10
Education (years)	11 (2)
Primary preinjury occupation (ANZSCO)	
Manager or professional	5
Technical/trade	6
Community/personal service	2
Sales or laborer	5
Student	2
Unemployed or retired	6
Diagnosis	
TBI	8
ABI	18
Stroke	3
Aneurysm	9
Tumor	1
Hypoxia	3
Encephalitis	2
Initial GCS score (n=21)	8 (9)
PTA duration in days (n=8)	29 (58)
TBI severity	
Moderate (PTA >1-7 days or GCS 9-12)	0
Severe (PTA >7 days or GCS 3-8)	8

TBI=Traumatic brain injury, ABI=Acquired brain injury, GCS=Glasgow Coma Score, PTA=Posttraumatic amnesia, IQ=Inter-quartile, ANZSCO= Australian and New Zealand standard classification of occupations

**Intervention**

Sixty-minute yoga classes were held once per week in a brain injury rehabilitation unit in a metropolitan hospital in Queensland, Australia. In the context of an inpatient rehabilitation setting, conflictual appointments or procedures occasionally affected participant availability. Specific content of the class was at the discretion of the instructor; however, all sessions followed a combination of Hatha yoga, breathing exercises, and meditation. This combination has been used to promote positive health for centuries in India<sup>[23]</sup> and is acknowledged as effective as a rehabilitative therapy in reducing stress, promoting healing, and enhancing the quality of life in people with ABI.<sup>[24]</sup> Classes commenced with body and breath awareness and concluded with guided meditation. The number of routines and

duration of each practice was determined by the instructor based on perceptions of how the individuals were appearing to be managing. Ease of participation in the postures and stretching was monitored by the yoga facilitator. Where indicated, these were modified to match participants’ abilities, which included tailoring an individualized program for participants seated on chairs or in wheelchairs.

**Data analysis**

Descriptive statistics were provided for all quantitative data using nonparametric statistical methods because of the small cohort size. Changes in well-being, relaxation, and satisfaction were analyzed and reported using the Wilcoxon signed-rank test. Averages for demographics and class satisfaction were reported using the median and interquartile range.

Interviews were recorded and transcribed verbatim. Qualitative data analysis commenced after the initial interviews, which assisted to refine subsequent interviews and enabled the process of constant comparative analysis.<sup>[25]</sup> The initial transcripts were read and reviewed to gain an overall insight into the interview content so that the researchers could familiarize themselves with initial data. The phases of thematic analysis outlined by Braun and Clarke<sup>[26]</sup> were used to guide the qualitative analysis process. One researcher familiarized herself with the verbatim transcripts of the first seven interviews and generated six initial themes or codes. These were discussed with the second member of the research team, from which three defined themes were identified. As further interviews were completed and transcribed, the ongoing analysis allowed the themes to be reviewed and sub-themes identified. A full review of the data was completed on finalization of data collection. This, combined with mixed-methodology study design, ensured rigor of the data.

**Results**

**Study profile**

Thirty-one participants initially consented to be involved in the study, with two subsequently withdrawing. Three further subjects were later excluded from the data analysis due to insufficient data. Demographic and injury data are summarized in Table 1.

There were improvements in self-reported levels of well-being, satisfaction, and relaxation pre–post yoga classes, which were statistically significant for well-being and relaxation, but not for satisfaction. Improvements were

greater post class one compared to class three. Percentage change and statistical change in well-being, satisfaction, and relaxation are outlined in Table 2.

Three themes emerged from the qualitative data analysis, including Person (the improved self-awareness of physical and emotional well-being), occupation (yoga as a meaningful occupation) and environment (getting more meaning from the rehabilitation environment). The personal effects are reported in this paper, with five sub-themes identified: relaxation, physical well-being, emotional well-being, being present, and self-awareness.

*Relaxation*

All participants described a key benefit of yoga to be the relaxing effects it induced, both to the mind and the body, along with feeling free from tension and anxiety. Participants identified a range of physical benefits, including improved balance, breathing, and flexibility that contributed to a sense of a relaxed body. Emotional benefits reported included improved mindset and alertness, and a chance to focus on themselves. Some participants described that they felt more relaxed both physically and emotionally, while others experienced more of one than the other:

*(After yoga)...."I feel relaxed in the mind and the body. Something I don't normally feel." (P5)*

*"I suffer from anxiety, so to be able to chill out, and not constantly be stressing about everyone around me, it was good. I just couldn't get over how relaxed I was afterwards."! (P18)*

*"I get agitated and become aggressive and get mad quickly. You know, something small, and I could really get angry. When I do that (yoga) class, it just...chills me out." (P19)*

Finally, the majority of participants discussed their experience of improved sleep following yoga class:

*"Yoga is Thursday afternoons.... it ended up usually turning Thursday night into a peaceful night which would usually mean a better sleep, and therefore a better Friday." (P13)*

*Physical wellbeing*

When describing their experiences of yoga, participants described well-being in physical or emotional contexts

or both. Physically, many described the opportunity for stretching, and participant eight extended this to feeling as though her movements were better afterward. Two participants went on to describe the impact on their flexibility:

*"I did notice the difference the next day – that I had more flexibility." (P23)*

Participants also discussed how awareness of different breathing strategies were helpful to their physical health:

*"The stretching part of things was good. After weeks of lying around in bed it doesn't hurt to stretch a few muscles and get a few bits working. The best bit.... for me was the mental side of it, just quietly sitting and just breathing quietly."(P24)*

*Emotional well-being*

Participants commonly reflected on improvements in their stress and anxiety when describing their emotional well-being:

*"It was able to relax your mind, take that stress away, any anxiety that was running through my system and causing my thinking to be off-putting. And that could affect my other therapies, so it was able to just relax it, ease it off and pretty much put it away."(P13)*

For some, this improved their alertness and level of arousal:

*"After the yoga, it seems I am awake.... and more alert to my surroundings. Before the yoga class, I am really, really tired and I don't feel like doing anything. After that, I think I could do more." (P1)*

*Being present*

Participants generally described the combined effects of emotional and physical activity in assisting to clear their mind and increase clarity or centering:

*"My way of thinking changes. Instead of focussing on my troubles at home it seems this exercise, while I am concentrating and doing it.... it relaxes me."(P1)*

*"It (yoga) has the effect of centring. I was able to quieten my mind, which is such a useful thing to be able to*

**Table 2: Change in self-reported wellbeing, relaxation and satisfaction after yoga participation**

	Median (IQ range)				Percentage improvement (%)	Wilcoxon signed rank test P
	Pre-Class 1	Post-Class 1	Pre-Class 3	Post-Class 3		
Wellbeing	65 (28.75)	80 (18.75)	79 (40) n=13	84 (40) n=13	15 (pre-post Class 1) 10 (pre-post Class 3)	0.001* (pre-post Class 1) 0.11 (pre-post Class 3) NS
Relaxation	70 (20)	90 (13.75)	70 (34) n=13	86 (28) n=13	20 (pre-post Class 1) 10 (pre-post Class 3)	0.001* (pre-post Class 1) 0.035* (pre-post Class 3)
Satisfaction		87.5 (28.5) n=26		98 (40) n=13		0.26 (change between pre-Class 1 and post-Class 3) NS

\*Significant improvement >P=0.05. NS=Not significant, IQ=Inter-quartile

*do – for anyone, not just for someone who has a brain injury.” (P23)*

### *Self-Awareness*

Participants described increased self-awareness of other situations they could apply the strategies practiced within the yoga class. They often described how this contributed to improved well-being at other times, particularly when faced with challenges:

*(If) “I’d wake up in the middle of the night, just quietly go into the breath....(it) steadies you down again” (P23).*

*“It probably helped me on the sleeping front. It did help just to keep myself calm and just relax, and not get upset about what was a fairly pointless thing” (P24).*

Many participants, regardless of whether they had previously done yoga, could identify the benefits in continuing the strategies they learnt from yoga following hospital discharge. Many reasons centered around the above themes:

*“It’s just that feeling I’m going to want again. Just that relaxed, being in your own mind, being your own breath, in the time that you are– the now” (P25).*

No side effects, other than the benefits of relaxation, well-being, feeling present, and self-awareness were reported. No injuries were sustained during any class and no physiological changes necessitating medical investigation occurred.

## **Discussion**

This study explored the experiences and perceptions of people with an ABI who participated in a yoga program while in an inpatient rehabilitation setting. It has provided new insight into the personal benefits experienced from yoga participation in this setting.

The benefits reported by participants in this study support previous research into the effects of yoga. A previous study has<sup>[27]</sup> discussed the health benefits of yoga; specifically, how yoga influences wellbeing through physical systems, psychological benefits, and spiritual mechanisms. Participants described benefits including musculoskeletal improvements, positive mood, acceptance, and mindful awareness. This is noted to be similar to the findings of this study, in which participants described many physical and emotional benefits.

The present study both supports and extends findings of previous research into yoga participation within an ABI population. Participants in Garrett *et al.* study<sup>[14]</sup> described feeling calmer, having improved sleep, improved emotional well-being, physical improvements and feeling connected, or more self-aware. However, despite similar findings that meaningful physical, psychological and social benefits can be experienced by ABI participants, the former study was completed in a community setting with patients who had

sustained a stroke at least 9 months earlier. Another 8-week community yoga program for a TBI population showed improved emotional regulation and health-related quality of life at conclusion.<sup>[28]</sup> The present study not only contributes new evidence to the benefits of yoga participation for people with an ABI; it also reports on the specific benefits of participating in yoga while in the sub-acute or acute rehabilitation phase following ABI.

Many studies have also reported on the association between yoga participation and improved sleep,<sup>[14,27,29,30]</sup> however, this has not been reported in an inpatient rehabilitation setting. Hospital environments can impact sleep hygiene, which has been previously reported in the literature.<sup>[31]</sup> However, participants in the current study identified a range of useful strategies from the yoga program that could assist them enhance quality and quantity of sleep.

Changes to self-awareness following an ABI, particularly a TBI, has been well documented in the literature.<sup>[32-34]</sup> Impairments in self-awareness may hinder participation in rehabilitation, precipitate need for increased supervision and impact motivation for treatment.<sup>[32]</sup> Although these results cannot be generalized to self-awareness of all deficits, in a patient population where most experience some degree of reduced awareness it is noted that a high proportion of participants identified ways that strategies learnt in yoga could be applied to other situations. This indicates a general understanding of the strategies and independent application to other situations encountered in rehabilitation.

In conducting yoga classes within an inpatient hospital rehabilitation setting, modifications were required to the typical Hatha yoga practices. The yoga sessions were led by a qualified yoga instructor who had a professional understanding of TBI. The Hatha practice was chosen by the instructor who considered it appropriate for this participant group. The practices implemented were chosen to reflect the reasoned levels of capability of the participant group yet remain general to appeal to the diversity of ability. As this was an exploratory study to evaluate the efficacy of a novel yoga program in an inpatient brain injury rehabilitation unit, alternate or extensive exploration of yoga practices was not undertaken. Future research to explore this is warranted.

A limitation of this study is its small sample size. However, this pilot project aimed to explore the perceptions of yoga participation within a cohort previously not explored and in inpatient rehabilitation, rather than traditional community yoga settings. Given patients volunteered to participate, it is possible their satisfaction may have been influenced by previous experiences with yoga. In turn, this may have influenced their engagement and enthusiasm in the program. Finally, it is difficult to quantify improvements in well-being given the subjective nature of the concept. There are many factors that may influence a person’s

perception of their well-being on any given day, which in turn may influence their self-ratings and make it difficult to determine the true impact of yoga on well-being.

## Conclusions

This study provides support for the personal benefits experienced from yoga participation and contributes new insight into these benefits within an inpatient rehabilitation setting. Given the small sample size and single site, further research exploring the benefits of yoga participation for inpatients with an ABI is required.

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## Conflicts of interest

There are no conflicts of interest.

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