

The effects of judo therapy in patients with mental disorders

Authors' Contribution:

- A Study Design
- B Data Collection
- C Statistical Analysis
- D Manuscript Preparation
- E Funds Collection

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Abstract

Background and Study Aims:

As a sport that requires technical and physical skills training, judo develops logical thinking and mental strength, as well as contributes to psychosocial development. Judo has been introduced in therapy aimed at patients with mental disorders and intellectual disability. However, the usefulness and effects of judo therapy have not been scientifically evaluated enough. The aim of this study is to provide knowledge about the effects of judo therapy in the rehabilitation of patients with mental disorders, focusing on the psychosocial domains of subjective well-being and quality of life.

Material and Methods:

Of the 34 participants, 20 underwent judo therapy (12 times over a six-month period), and 14 were followed up as controls. We measured changes in subjective psychosocial domains using the Subjective Well-being Inventory (SUBI) and Japanese version of the Questionnaire about the Process of Recovery.

Results:

Two-way ANOVA revealed a statistically significant effect of group (i.e. control vs. judo) as well as of the group × period interaction in SUBI sub-items of self-confidence and sense of accomplishment. Post-hoc tests showed significantly higher scores for these SUBI sub-items after 6 and/or 12 times of judo therapy. We found a significant effect of the group only in the sub-item 'acceptance of the illness'.

Conclusions:

Judo therapy enabled considerably fast improvement in the self-confidence and sense of accomplishment of patients. Our results contribute to the development of the quantitative evaluation of judo therapy. Multi-centre, long-term follow-up studies are required to formulate the structure of effective judo therapy that is applicable to a wide variety of clinical settings.

Keywords:

ADHD • depression • dissociative disorder • epilepsy • psychiatric rehabilitation • mental health • subjective well-being • schizophrenia

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Judo therapy – refers to judo as part of psychiatric therapeutic treatment, conducted at the medical institution (psychiatric hospital) for more than 20 years [18, 19].

Social skills training – is a type of cognitive-behavioural therapy, aiming to improve patient's social skills through role plays, simulating real life situations [18].

Treatment strategy – early stages of therapy for patients in the acute state is based on medication treatment. Cognitive-behavioural therapy and judo therapy are considered subsidiary therapy methods, assisting medication treatment.

Intellectual disability – is an intellectual development disability affecting mental functions in general, including logical thinking, problem solving, planning, abstract thinking, judgement, academic and experience-based learning. Intellectual disability is defined as following: 1. Deficits in intellectual function diagnosed by standardized tests and clinical assessment. 2. Obvious deficits in adaptive behaviours. 3. Appeared until puberty (around the age of 18).

Depression – is a mood disorder characterized by persistent feelings of sadness leaving patients unable to enjoy their daily activities. Depression is accompanied by various physical symptoms like sleeping disorders, loss of appetite and fatigue. In cases where daily life is heavily affected, a clinical depression may be suspected.

Schizophrenia – mental disorder affecting several brain functions, resulting in symptoms like hallucinations, and delusions.

Sense of accomplishment – refers to the subjective feeling of achieving the goals one was aiming for. Mental satisfaction requires setting up goals step by step and the process of achieving these goals. In other words, a lacking sense of accomplishment is linked to a loss of vitality.

Self-confidence – is the confidence in one's powers and abilities when faced with important or unexpected situations. Self-confidence enables the individual to react in a calm manner when faced with challenges and adversities.

INTRODUCTION

Judo, founded by Kano Jigoro in 1882, is a modern Japanese martial arts discipline, referred to as budo. Currently, 204 countries and regions are affiliated with the International Judo Federation [1]. Judo successfully spread as a competition sport after being accepted as a sport in the Olympic Games in 1960. Kano Jigoro described the ultimate purpose of judo as follows: 'Judo is the way of using one's mental and physical power in the most efficient way. The practice of judo develops body and mind through training in attack and defence. Developing and forging one's body and mind is the essence of the art of judo, and the final goal of judo training lies in striving for self-perfection and contributing to society' [2]. Therefore, competition judo is only one element constituting the art of judo, which was originally a form of mental training that included supporting the mental and social development of the individual, providing a learning environment, and enabling the practitioner to contribute to society.

Shishida [3] defined budo as 'a system of character training within the framework of etiquette and rules based on technical practice through competition and formal training' [3]. Meanwhile, Todo [4] described the specific characteristics of judo as follows: 'Judo is practiced while gripping sleeve and collar, using the long sleeve to break the balance'. The techniques of judo are based on the principles of 'breaking the opponent's balance', 'moving oneself into a stable position, where the technique can be executed', and 'focusing the power to specific points and executing the technique' [4]. Therefore, the characteristic of judo lies in resolving the self to a certain extent through using the judo uniform as a medium to connect with the partner within a common space (referred to as *ma*). In encouraging practitioners to feel the other person's intention, unite with the other, and attain mental resilience and reason, judo may support social awareness.

Several studies have shown the positive effects of practicing judo in patients with mental disorders and intellectual disabilities [5]. Sasaki [15] analysed relevant materials to clarify the historic development and mechanism of judo therapy. Sasaki's attempt at an overall approach based on social function is representative of the work that aims to shed light on the concept of judo therapy. Sasaki [15, 16, 17] identified the following trends within the research related to judo therapy:

1) the shift in the recognition of judo from a combat sport to a therapeutic tool for psychiatric rehabilitation, 2) the specific value of judo as a tool of psychiatric therapy, 3) the consideration of judo as part of a therapeutic program.

In Europe, for example, judo gained popularity as a competitive sport while also developing as a leisure activity. Therefore, the European view of judo has not focused on the competitive aspect alone but also embraced the aspect of judo as a martial art offering character building and access to a distinctive culture. In the 1970s, judo developed into an educational sport for children and even included in school education as an elective subject [11]. Developments in Europe illustrate that the positive impact of judo on mental functions is widely recognized. However, there are no studies showing the application of judo as a tool for psychiatric rehabilitation. Further, no systematic control study has scientifically evaluated the effects of judo on mental disorders.

Nakamura et al. [18, 19] proposed a form of judo therapy that is consistent with the structure of social skills training (SST) and serves as a novel approach in psychiatric rehabilitation. Using a brief questionnaire, they also suggested that subjective well-being and feelings related to quality of life (QOL) may represent the psychosocial domain where judo therapy affects psychiatric rehabilitation.

The aim of this study is to gain knowledge about the effects of judo therapy in the rehabilitation of patients with mental disorders, focusing on the psychosocial domains of subjective well-being and quality of life.

MATERIAL AND METHODS

Participants

Group 0 (n = 14) consisted of participants aged 26 to 64 years with an average age of 45.7 years. Group 1 (n = 20) ranged from 20 to 62 years, with an average age of 37.7 years. Our study did not impose medical exclusion criteria for judo therapy (Table 1).

We analysed data from out-patients with mental disorders or intellectual disabilities who 1) used the psychiatric day-care or vocational rehabilitation unit of Nishikawa Hospital, 2) provided informed consent and agreed to participate

Table 1. General characteristics of the surveyed people.

Variable	Group 0 (n = 14)	Group 1 (n = 20)
Sex (male/female)	8/6	17/3
Age (years)	45.7 ±9.8	37.7 ±13.6

Therapeutic effects – refers to potential therapeutic effects of the judo therapy provided by Nishikawa hospital in patients diagnosed with mental disorders like depression and schizophrenia. (This study assumes several positive effects for patients and focusses on the investigation of mental effects of judo therapy).

in this study, 3) completed the six-month program, and 4) were not diagnosed of any severe internal diseases or physical disabilities by their physicians.

To ensure randomized comparative verification, we opened a sports club to recruit participants and then interviewed all participants. Surveys were conducted to collect basic background information including age, sex, and main diagnosis. We received 34 applicants, all of whom agreed to participate in the sports club and provided informed consent, which included the right to discontinue in written form.

This research was approved by the Academic Research Ethical Review Committee of Fukuyama University (Approval Number H-168) and Nishikawa Hospital Research Ethics Committee (Approval Number 30-07). Nishikawa Hospital served as the facility where the research was conducted. Physical fitness measurements and psycho-

logical tests were performed on 5 December 2018, 27 February 2019, and 22 May 2019 for all participants. Twenty participants received judo therapy twice a month during the study period (Group 1). The remaining 14 participants were included in the control group (Group 0) (diagnosis of mental disorders see Table 2).

Judo therapy

Judo therapy was administered twice a month in sessions lasting one hour. The sessions were led by hospital staff who are approved to hold the black belt by the Kodokan Judo Institute. The details of the schedule and structure of judo therapy have been described previously [18, 19]. Judo therapy incorporates the elements of SST where the participants form a circle, and then the instructor and one participant perform judo for about one to two minutes in the centre of the circle. The participants were encouraged to applaud the good performance of their peers.

Randori – sparring in judo in which both participants practice attacking and defending [26].

Table 2. The characteristics of the mental disorders of the investigated persons (ordinal variable: from the most numerous representations of cases of mental disorders in Group 1).

Mental disorders	Group 0 (n = 14)	Group 1 (n = 20)
intellectual disability	1	8
schizophrenia	3	5
Depression	5	3
ADHD	1	2
alcohol dependence	0	1
dissociative disorder	2	1
Epilepsy	2	0
Total	14	20

ADHD attention-deficit hyperactive disorder.

Data collection

The survey (physical fitness measurements and psychological tests) was conducted by seven professionals, including two authors, three occupational therapists, and two nurses. They helped the participants understand questions that challenged the latter's decoding ability. In addition, all 12 judo therapies were recorded on video. The first author participated in 11 of the 12 sessions of judo therapy and interviewed the participants. Based on the hypothesis that judo therapy reduces anxiety and tension, increases confidence in dealing with unexpected events, and provides the effect of fostering awareness of accepting everyday life, as suggested by Nakamura et al. [18, 19], we adopted the Subjective Well-being Inventory (SUBI; 40 items) [20] and the Japanese version of the Questionnaire about the Process of Recovery (QPR-J; 22 items) [21] for the evaluation of psychosocial domains. Subjective well-being is a broad concept that includes emotional states, satisfaction with a specific area, such as family and work, and satisfaction with life in general [22]. Recovery, as assessed by QPR-J, is the

process by which a person with a mental illness finds new meaning or purpose in life and lives a fulfilling life, even if symptoms and disorders continue [23, 24].

Data analyses

All data are presented as means (M), standard deviation (\pm or SD). Two-way repeated-measures ANOVA were used to compare the data. When significant differences were detected by ANOVA, Holm-Sidak post hoc analysis was performed. Data analysis was conducted based on the statistical free software HAD developed by Shimizu [25]. The acceptable level of significance was set at $p < 0.05$, further considering the adjusted p-values (Padj); not significant (ns).

RESULTS

Apart from sense of accomplishment and self-confidence, all other factors of SUBI (out of 11) and the five factors included in QPR-J did not show any significant changes. However, significant

Table 3. Results of analysis of variance Subjective Well-being Inventory (SUBI) and the Japanese version of the Questionnaire about the Process of Recovery QPR-J.

Research tools and subfactors		Group 0 (n = 14)		Group 1 (n = 20)		Main effect		
		M	SD	M	SD	group	period	interaction
WHO SUBI	positive feeling for life	5.78	1.74	6.29	1.69			
	sense of accomplishment	4.59	1.05	5.90	1.69	*	*	^
	self confidence	4.96	1.36	6.25	1.53	*	*	**
	a filing of bliss	5.70	1.64	6.19	1.53			
	support from relatives	6.63	1.54	6.75	1.94			^
	social support	5.56	1.60	6.54	1.91			^
	relationship with family	6.85	1.09	6.27	1.24			
	mental control	15.78	3.79	14.33	3.65			
	feeling of physical unhealthiness	14.00	2.35	13.88	2.96			
	poor social connection	7.04	1.39	6.29	1.71			
	disappointment of life	6.48	1.59	6.42	1.54			
QPR-J	meaning of life	27.74	3.11	29.44	5.16			
	understanding of treatment	6.74	1.31	7.25	1.49			^
	illness acceptance	20.70	2.62	23.13	3.29	*		
	support from others	15.52	2.54	16.04	2.41			
	self-management	7.37	1.46	7.44	1.59			

* $p < 0.05$; ** $p < 0.01$; ^ $p < 0.10$

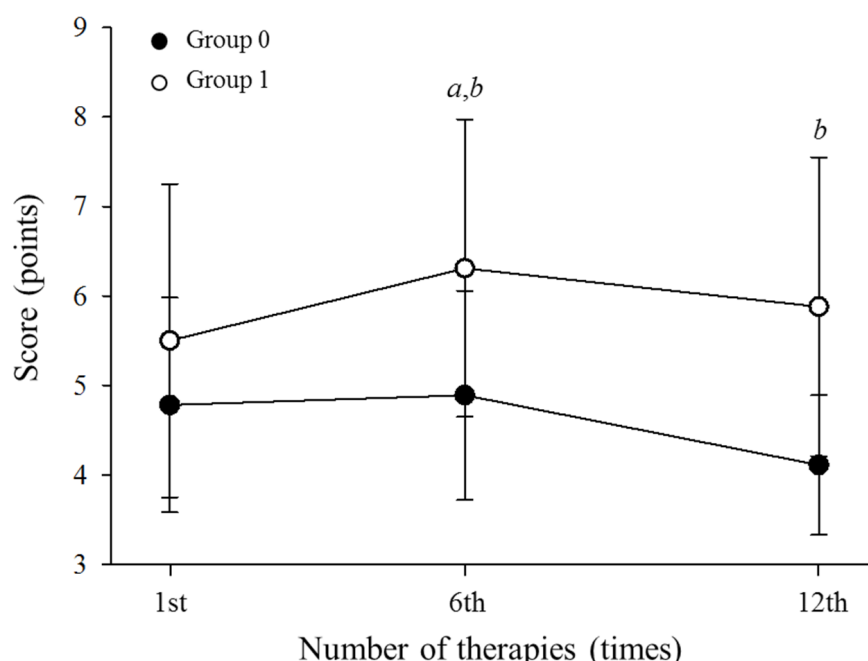


Figure 1. Judo therapy-induced changes in sense of accomplishment (psychological tests were conducted before the 1st and 6th therapy and after the last therapy /12th; ^a $p < 0.05$ vs 1st within group; ^b $p < 0.05$ vs Group 0 at the same period; two-way repeated-measures ANOVA); values are means and SD.

main results were observed for changes in sense of accomplishment. The main effects measured within group ($F(1,23) = 5.07, p = 0.034$) and the period ($F(2,46) = 4.53, p = 0.016$) were significant. The interaction effect between period and group was also significant ($F(2,46) = 3.17, p = 0.051$). For self-confidence, the main effects of group ($F(1,23) = 5.64, p = 0.026$) and period ($F(2,46) = 4.74, p = 0.013$) were also significant. We also found a significant trend in the interaction effect between period and group ($F(2,46) = 5.16, p = 0.009$) (Table 3).

Sense of accomplishment

Group 0 showed a significant trend of change in terms of simple main effects ($F(2,46) = 3.11, p = 0.054$). Group 1 likewise showed a significant change ($F(2,46) = 5.17, p = 0.009$). We conducted a comparative analysis (Holm-Sidak method) of the results of Group 1 and found the measured change between sessions 1 ($M = 5.50 \pm 1.75$) and 6 ($M = 6.31 \pm 1.66$) to be significant (1st to 6th session: $t(23) = -3.09, \text{Padj} = 0.015$). The measured changes between sessions 1 and 12 ($M = 5.87 \pm 1.67$) and between sessions 6 and 12 were also significant (1st to 12th: $t(23) = -1.47, \text{Padj} = \text{ns}$; sessions 6 to 12: $t(23) = 1.81, \text{Padj} = \text{ns}$). The results of the sub-examination

concerning the study period showed no significant main results ($F(1,69) = 1.32, p = 0.254$). Meanwhile, the comparison of sessions 6 and 12 showed noticeable changes in both Groups (session 6: $F(1,69) = 5.15, p = 0.026$; 12th session: $F(1,69) = 7.90, p = 0.006$) (Figure 1).

According to the comparison results of session 6 and 12 using the multiple comparison procedure (Holm-Sidak method), Group 1 showed more significant changes ($M = 6.31 \pm 1.66$) than Group 0 ($M = 4.89 \pm 1.17$) (Group 0 · 1: $t(69) = 2.26, \text{Padj} = 0.026$). Session 12 showed more significant results for Group 1 ($M = 5.87 \pm 1.69$) than Group 0 ($M = 4.11 \pm 0.78$) (Group 0 · 1: $t(69) = -2.81, \text{Padj} = 0.006$).

Self-confidence

Group 0 obtained significant results ($F(2,46) = 5.46, p = 0.007$), as did Group 1 ($F(2,46) = 4.03, p = 0.024$). We then compared the results of Groups 0 and 1 using the multiple comparison procedure (Holm method). We noted a significant change between sessions 6 ($M = 5.56 \pm 1.24$) and 12 ($M = 4.22 \pm 1.39$) in Group 0 (sessions 6 to 12: $t(23) = 3.20, \text{Padj} = 0.012$). The changes from sessions 1 ($M = 5.11 \pm 1.45$) to 6 and from sessions 1 to 12 were not significant (sessions 1 to 6: $t(23) = 1.08, \text{Padj} = \text{ns}$; sessions 1 to 12:

t (23) = 2.18, Padj = ns). As for group 1, the results showed a significant change from sessions 1 (M = 5.75 ±1.73) to 6 (M = 6.56 ±1.59) (sessions 1 to 6: t (23) = -2.65, Padj = .043). However, no significant changes were found between sessions 1 and 12 (M = 6.44 ±1.26) and sessions 6 and 12 (sessions 1 to 12: t (23) = 2.25, Padj = ns; sessions 6 to 12: t (23) = 0.40, Padj = ns). The sub-examination of the period showed significant effects after session 12 (session 12: F (1,69) = 12.87, p = 0.001). There were no significant effects after sessions 1 and 6 (session 1: F (1,69) = 1.07, p = 0.304; session 6: F (1,69) = 2.66, p = 0.108). The multiple comparison procedure measuring the effects after 12 sessions using the Holm-Sidak method showed more significant results in Group 1 (M = 6.44 ±1.26) than group 0 (M = 4.22 ±1.39) (group 0 · 1: t (69) = 3.58, Padj = 0.001) (Figure 2).

DISCUSSION

We provided judo therapy at a medical institution specialized in psychiatry. Compared with previous research, this new study included a larger number of probands with mental

disorders. In addition, by establishing a control group that underwent psychological evaluation within the same setting and period as the intervention group, our study established a stable research environment. In addition to the high number of participating probands and the provided environment, the application of an appropriate scale also improved the objectivity of this study.

Our study focused on analysing the main and interaction effects between the two indicators that showed the most significant changes or trends, namely, sense of accomplishment and self-confidence. Among the 11 factors constituting SUBI and the five factors evaluated within QPR-J, the two factors of sense of accomplishment and self-confidence showed a significant improvement between sessions 1 and 6 in group 1, which underwent judo therapy. Compared with group 0, which did not undergo judo therapy until session 6, group 1 showed a significant improvement in sense of accomplishment. These results support the positive influence of judo therapy on improving mental health, as found in previous studies.

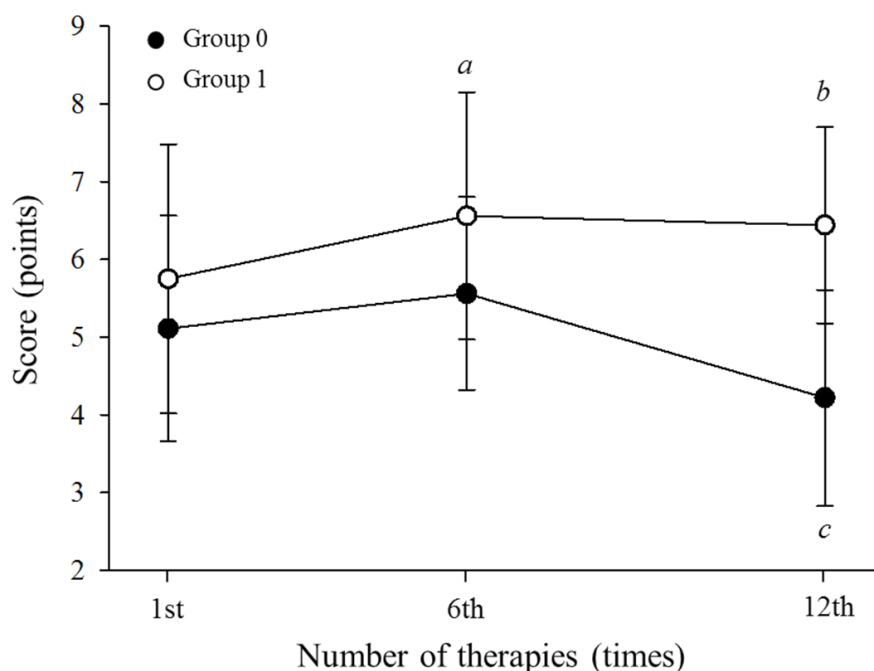


Figure 2. Judo therapy-induced changes in self-confidence (psychological tests were conducted before the 1st and 6th therapy and after the last therapy /12th; ^ap<0.05 vs 1st within group; ^bp<0.05 vs Group 0 at the same period; ^cp<0.05 vs 6th within group: two-way repeated-measures ANOVA); values are means and SD.

We assumed that the potential for mental health improvement through judo therapy would be related to judo-specific elements, such as reasonable thinking and fighting spirit, which are activated through practice. In judo, practitioners have to directly engage with a partner through gripping; it is difficult to move the partner without adapting to the partner. Therefore, anticipating the movement of a partner and adapting one's own movement is a key element of judo. Our study evaluated the participants using videos from the first to the twelfth session. Improvement in etiquette, break-falling, and basic techniques, such as throws, were evaluated.

During the first three sessions, many participants were tense and tended to raise their shoulders, using movements that focused on themselves. They could not break the balance of the partner, and as a result, could not properly execute the techniques. However, when they started to feel and understand the gap between their body image and the executed movement, as well as the support and feedback of the instructors and fellow group members, the participants started to improve gradually in the latter half of the study. Judo has a practical training method for fostering perseverance. Free practice, referred to as randori, requires practitioners to take responsibility for their own actions through engaging in free sparring. We also included a randori in judo therapy. Participants who usually did not express their feelings expressed themselves verbally. This trend continued until the end of the study period. Finally, most of the participants engaged actively. These results showed that judo-specific factors fostered through practical training, such as learning techniques, insight, and cooperation with others, and stress relief through perseverance could contribute to improving the sense of accomplishment and self-confidence.

The significant trends in the factors related to the level of mental fatigue using SUBI and QPR-J, as shown in previous research [18, 19], could not be clarified. One possible reason for this is the difference in research conditions. Nakamura et al. [18, 19] included a wider range of conditions and more participants, and their study was conducted over a longer period than the actual study. In addition, previous experience of judo therapy may have been reflected in the survey. For this reason, the evaluation of judo therapy possibly changed between the actual time of therapy and the time of evaluation. Outcomes

between patients with the same condition may differ owing to their life environments, such as outpatients living in the area and inpatients at the hospital. Patients living in the area may show more improvement in skills related to mental control and social independence. In this way, the effects of judo therapy may differ. Our study confirmed a positive trend in social skills improvement, including sense of accomplishment and self-confidence, between the first and sixth sessions, delivered over a period of three months. However, further investigation is needed to clarify whether the lack of significant change between sessions 6 and 12 may be attributed to rapid therapy effects or the loss of effects of the therapy after a certain period.

We found that judo therapy has significant positive effects on the mental well-being of patients with various mental health conditions. Significant changes in sense of accomplishment and self-confidence, as part of subjective well-being, were measured at a relatively early stage. Access to instructors who understand the use of judo and its potential danger could contribute to the applicability of judo as part of SST. We conclude that judo can be considered an applicable therapeutic tool for training social skills at psychiatric institutions.

LIMITATIONS

Conducted in cooperation with a medical institution, this study provided a large-scale analysis, unseen in previous research. Instead of an experience-based evaluation, this study presented quantitative results based on the methodology of the social sciences. As such, this study could offer a framework for further research on judo therapy. However, because we formed a group out of probands who wanted to participate in judo therapy and we did not execute a random double-blind trial, the possibility remains that the two groups were not evenly separated. The relatively short period of six months and the fact that the study was not conducted between several institutions may also have influenced the results; these issues related to trial design should be improved in future studies. Moreover, it is not clear how long the effects remain. This study did not include the field of exercise physiology. The effects on exercise physiology and how these potential effects may influence the mental state remain important questions.

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