2024, Retos, 59, 1071-1080

Sidhakarya state conditioning in improving shooting accuracy of petanque athletes in Bali

O condicionamento do estado de *Sidhakarya* na melhoria da precisão do remate dos atletas de petanca em Bali

Acondicionamiento del estado de Sidhakarya para mejorar la precisión de tiro de los atletas de petanca en Bali

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Abstract. Petanque is a growing Indonesian sport presently encountering the relatively low shooting accuracy of local athletes, compared to international standards. Therefore, this study aimed to analyze the role of *Sidhakarya* State Conditioning (SSC) in improving shooting accuracy of petanque athletes. An experimental design was subsequently implemented with a randomized pre-test and post-test process, through a control group approach consisting of 18 Bali athletes. In this context, the inclusion criteria prioritized athletes aged ≥ 18 years with good physical fitness measured through basal heart rate and residing in Bali Province. However, provincial competition winners and previous Psychological Skills Training (PST) players were excluded. Samples were also obtained through simple random sampling, with the Federation Internationale de Petanque & Jeu Provencal (FIPJP) instrument used to acquire data. From the description, statistical analysis was conducted using SPSS version 25 with a probability of $p < 0.05$. The results showed that shooting accuracy of petanque athletes significantly increased before and after SSC training with average elevation and probability of 7.72 times (95% CI 6.94 – 8.50) and $p < 0.001$ ($p < 0.05$), respectively. In this case, SSC training significantly enhanced shooting accuracy of Bali athletes with a 36.96% increase. These practices significantly influenced the physical and mental development of athletes. SSC approach also optimized physical, emotional, and mental balance by implementing six traditional practices, including *māpiuning*, *ngunda bayu*, *ngerēgep, ngelēkas*, *nyēraya*, and *nyīdhakarya*. SSC approach also strengthened cognitive abilities, biopsychological development, and heightened sensualization through the hormonal flow of DOSE into the body.
Keywords: *Sidhakarya* state conditioning; shooting accuracy; petanque; ethnomedicine; holistic therapy.

Resumo. A petanca é um desporto indonésio em crescimento que, atualmente, se depara com a precisão de tiro relativamente baixa dos atletas locais em comparação com os padrões internacionais. Por isso, este estudo teve como objetivo analisar o papel do condicionamento do estado de Sidhakarya (SSC) na melhoria da precisão de remate dos atletas de petanca. Posteriormente, foi implementado um desenho experimental com um processo aleatório de pré-teste e pós-teste através de uma abordagem de grupo de controlo constituído por 18 atletas de Bali. Neste contexto, os critérios de inclusão deram prioridade a atletas com idade ≥ 18 anos, com boa aptidão física medida através da frequência cardíaca basal e residentes na província de Bali. No entanto, foram excluídos os vencedores de competições provinciais e os jogadores anteriores do Psychological Skills Training (PST). As amostras foram também obtidas através de amostragem aleatória simples, tendo sido utilizado o instrumento da Federation Internationale de Petanque & Jeu Provencal (FIPJP) para a recolha de dados. De acordo com a descrição, a análise estatística foi efectuada com recurso ao SPSS versão 25 com uma probabilidade de $p < 0,05$. Os resultados mostraram que a precisão de tiro dos atletas de petanca aumentou significativamente antes e depois do treino de SSC, com uma elevação média e probabilidade de 7,72 vezes (IC 95% 6,94-8,50) e $p < 0,001$ ($p < 0,05$), respetivamente. Neste caso, o treino de SSC melhorou significativamente a precisão de tiro dos atletas de Bali, com um aumento de 36,96%. Estas práticas influenciam significativamente o desenvolvimento físico e mental dos atletas. A abordagem SSC também optimizou o equilíbrio físico, emocional e mental através da implementação de seis práticas tradicionais, incluindo māpiuning, ngunda bayu, ngerēgep, ngelēkas, nyēraya e nyīdhakarya. A abordagem SSC também fortaleceu as habilidades cognitivas, o desenvolvimento biopsicológico e aumentou a sensualização através do fluxo hormonal do DOSE no corpo.
Palavras-chave: Condicionamento do estado de Sidhakarya; precisão de tiro; petanca; etnomedicina; terapia holística.

Resumen. La petanca es un deporte en crecimiento en Indonesia que actualmente enfrenta una precisión de tiro relativamente baja de los atletas locales, en comparación con los estándares internacionales. Por lo tanto, este estudio tuvo como objetivo analizar el papel del Acondicionamiento del Estado de Sidhakarya (SSC) en la mejora de la precisión de tiro de los atletas de petanca. Posteriormente se implementó un diseño experimental con un proceso de prueba previa y posterior aleatorizado, mediante un enfoque de grupo de control compuesto por 18 atletas de Bali. En este contexto, los criterios de inclusión priorizaron a los atletas de ≥ 18 años con buena condición física medida a través de la frecuencia cardíaca basal y que residieran en la provincia de Bali. Sin embargo, se excluyeron los ganadores de competencias provinciales y los jugadores anteriores del Entrenamiento de Habilidades Psicológicas (PST). Las muestras también se obtuvieron mediante muestreo aleatorio simple, utilizándose el instrumento de la Federation Internationale de Petanque & Jeu Provencal (FIPJP) para adquirir los datos. A partir de la descripción, el análisis estadístico se realizó mediante el programa SPSS versión 25 con una probabilidad de $p < 0,05$. Los resultados mostraron que la precisión del tiro de los atletas de petanca aumentó significativamente antes y después del entrenamiento SSC con una elevación y probabilidad promedio de 7,72 veces (IC 95%: 6,94 – 8,50) y $p < 0,001$ ($p < 0,05$), respectivamente. En este caso, el entrenamiento SSC mejoró significativamente la precisión de tiro de los atletas de Bali con un aumento del 36,96%. Estas prácticas influyeron significativamente en el desarrollo físico y mental de los deportistas. El enfoque SSC también optimizó el equilibrio físico, emocional y mental mediante la implementación de seis prácticas tradicionales, incluidas māpiuning, ngunda bayu, ngerēgep, ngelēkas, nyēraya y nyīdhakarya. El enfoque SSC también fortaleció las capacidades cognitivas, el desarrollo biopsicológico y aumentó la sensualización a través del flujo hormonal de DOSE en el cuerpo.
Palabras clave: Condicionamiento del estado de Sidhakarya; precisión de tiro; petanca; etnomedicina; terapia holística.

Fecha recepción: 20-03-24. Fecha de aceptación: 31-07-24
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Introduction

The development of traditional sports is significantly increasing due to the national and international growing popularity (Hoven, 2022; Kim, Nauright, & Suveatwatanakul, 2020). This significant increase portrays a broader acceptance and appreciation for the values and cultural heritage contained in traditional sports practices (Kim et al., 2020; Summerley, 2020). According to Skinner & Smith (2021), the increasing global interest in understanding and appreciating cultural heritage and values

significantly impacted the worldwide preference for traditional sports. This impact was observed for petanque, a traditional sport originating from France, which was increasing in popularity and frequently contested at national and international events, specifically in Indonesia (Pelana et al., 2021; Phytanza et al., 2022). The sport also prioritized accuracy, as well as measured throwing approach, game strategy, and shooting skills mastery, specifically in pointing and firing categories (Carbonell Miralles, Guzmán Luján, & Dorochenko, 2022; Destriani et al., 2024; Feschet, 2016; Irawan et al., 2024). In addition, petanque was considered an inclusive and environmentally friendly sport portraying cultural values and promoting increased interest in Indonesia (Lubis, Permadi, & Isyani, 2023).

Shooting accuracy of Indonesian athletes remains below international standards irrespective of the significant increase in petanque popularity (Badaru, Rachmat Kasmad, Juhanis, & Anwar, 2021; Saputra, Kristiyanto, & Doewes, 2019). This observation was in line with the outcomes of the 2016 National Sports Week (PON) in West Java, where athletes only averaged 30 out of 100 points, proving that the average firing skill was below 50%. Phytanza et al. (2022) also stated that shooting category required simultaneous physical and mental engagement, high accuracy levels, effective attention, stress management, and emotional control, compared to the pointing group. The high frequency of throws subsequently led to frequent mental pressure, as well as muscle fatigue and tension during petanque matches, significantly impacting shooting accuracy (Irawan et al., 2024; Munir et al., 2024; Pelana et al., 2021). Therefore, a more in-depth study is needed to improve significant shooting accuracy in petanque, for the potential contribution to medals at several international events, such as the Sea and Asian Games, as well as other world championships (Purnomo & Yendrizal, 2020).

In Siekańska et al. (2021), the implementation of Psychological Skills Training (PST), including goal setting, progressive relaxation, meditation, self-talk, hypnosis, and imagery, impacted the mental development of athletes to achieve peak performance. Pettersen et al. (2022) also explained that the incorporation of PST into physical training positively and significantly affected the improvement of shooting accuracy, compared to the sole implementation of the strong exercise observed in football players. Moreover, PST highly facilitated athletes to achieve optimal focus and concentration levels during shooting, including visualization exercises, positive self-talk, and relaxation approaches designed to address mental disturbances (Ahmadzadeh, Badami, & Aghaei, 2019; Barker et al., 2020; Gross et al., 2018). These previous analyses confirmed that the combination of physical and mental training positively influenced athletes' performance, specifically in improving shooting accuracy.

Sidhakarya State Conditioning (SSC) is a training regimen integrating both physical and mental aspects, significantly enhancing athletes performance (Eka, 2023; Eka Santosa, 2022; Wirawan, 2021). Based on a previous study conducted on Bali athletes at the XX Papua PON, the implementation of SSC interventions positively influenced performance, as observed in increased medal achievements than other competitions (Eka Santosa, 2022). The application of SSC approach was also holistic, prioritizing physical, mental, and emotional aspects, as well as ensuring appropriate optimal training. In Wirawan (Wirawan, 2021), six traditional practices were subsequently integrated into the approach, namely *mā̄piuning* (progressive muscle relaxation), *ngunda bayu* (breathing relaxation), *ngerēgep* (rehearsal), *ngelēkas* (multi-sensory imagery), *nyēraya* (gratitude), and *nyīdhakarya* (mindfulness). These practices established a condition or "state" (*Sidhakarya*) combining relaxation, mental focus, and positive emotions, leading to positive effects on athletes performance. From the existing issues and information, the use of SSC approach is yet to be extensively reported regarding the impact on shooting accuracy of petanque athletes. Therefore, this study aims to analyze the role of SSC in improving shooting accuracy of petanque athletes, to contribute valuable insights to relevant stakeholders.

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From the existing issues and information, the use of SSC approach is yet to be extensively reported regarding the impact on shooting accuracy of petanque athletes. This study's significance lies in addressing the critical gap in petanque athletes' shooting accuracy, particularly in Indonesia, where performance remains below international standards despite the sport's growing popularity. By examining the potential of SSC, an innovative approach integrating physical and mental training, this research aims to contribute valuable insights into enhancing athletes' performance. The investigation is timely and relevant, as improving shooting accuracy could significantly impact Indonesia's medal prospects in international competitions. This study aims to analyze the role of SSC in improving shooting accuracy of petanque athletes, to contribute valuable insights to relevant stakeholders. Furthermore, this study extends the application of SSC beyond its initial success with Bali athletes, potentially offering a holistic training paradigm that could revolutionize petanque training methods and athlete development strategies.

Materials and methods

Study Design and Approach

A randomized pre-test and post-test approach was implemented with a control group design (Darwin et al., 2021), examining accuracy scores before and after intervention through SSC. This study was subsequently conducted for 6 weeks at the FOPI Gor Debes Field in Tabanan Regency (March-April 2022).

Ethical Approval

The study was approved and declared ethically feasible by the Health Research Ethics Commission Unit, Faculty of Medicine, Udayana University, with Protocol Number 2022.02.1.0237. Submission of the answered instruments provided consent to participate in the study. Privacy and confidentiality were also ensured. This study adhered to the Declaration of Helsinki. We confirm that we have obtained permission to use [images/data] from the participants/patients/individuals included in this presentation.

Samples and Subjects

The experimental subjects were selected using a simple random sampling approach, with the Bali petanque athletes participating in the end-year competition within Tabanan being the target (n=70). The sample size was also determined using the Pocock formula (2008) (Adnyana, 2021), leading to the selection of 18 athletes as subjects (n=18).

Inclusion and Exclusion Criteria

The selected subjects were required to meet the inclusion and exclusion criteria set, including being aged ≥ 18 years, possessing good physical fitness measured through basal pulse rate, and residing in Bali Province. Meanwhile, the exclusion criteria focused on the winners of championships at the Provincial Sports Week level and those presently undergoing other Psychological Skill Training (PST) programs.

Hypothesis

Shooting accuracy of petanque athletes was increased through the provision of SSC training in Bali Province.

Study Data

Data were obtained using test instruments containing information requirements related to the assessment of

petanque, according to the standard FIPJP (Federation Internationale de Petanque & Jeu Provencal).

Statistic Analysis

The data obtained were inputted and tabulated in Microsoft Excel software, accompanied by the processing approach using a partial significance test (t-test) and the SPSS (Statistical Package for the Social Sciences) version 25 for Windows. Decisions prioritizing the experimental outcomes were also accepted or rejected, considering a confidence level of 95% ($p<0.05$). In addition, the entire dataset was presented in tables and narratives regarding the appropriate outcomes.

Results

Characteristics of Subjects

Based on the identification of subjects by gender, male athletes were dominant at 55.6%, with the age distribution evenly spread between 18 to 21 years. The basal pulse analysis was also dominated by athletes with a rate of 71-90 beats per minute (77.8%). These analyses proved that the subjects were in good physical condition for measurements, as shown in Table 1.

Table 1.
Characteristics of study subjects

Characteristics	Frequency (N =18)	Percentage (%)	Mean ± SD
Gender			
Male	10	55.6	-
Female	8	44.4	
Age (years)			
18 - 19 years	9	50	19.56 ± 0.616
20 - 21 years	9	50	
Basal pulse (times/ minute)			
60 – 70	4	22.2	77.94 ± 6.121
71 - 90	14	77.8	

Remarks: Standard deviation

Measurement of Petanque Athletes Shooting Accuracy

According to the measurement of petanque athletes shooting accuracy, a significant difference was provided by the mean, median, mode, and standard deviation values before and after the test, with posttest scores higher than pretest coefficients. This showed that the implementation of SSC training positively influenced shooting accuracy of petanque athletes. Accuracy data and SSC training procedure are presented in Table 2.

Table 2.
Measurement of Petanque athletes shooting accuracy

Statistics	Pretest	Posttest
Number of samples	18	18
Mean	20.89	28.61
Median	21	29
Mode	18	25
Standard deviation	4.07	5.53

Classical Assumption Test and Hypothesis Confirmation

The classical assumption tests, including data normality and homogeneity, were performed before the hypothesis confirmation analysis. These tests showed that the mean scores of athletes shooting accuracy before and after SSC training were 20.89 and 28.61, respectively. The significance value for normality and homogeneity tests were also $p > 0.05$, proving that the data obtained were normally distributed and homogenous, as presented in Table 3. Based on the hypothesis confirmation, an increase was observed in shooting accuracy of petanque athletes before and after SSC training, at an average increase and probability of 7.72 times (95% CI 6.94-8.50) and $p = <0.001$ ($p < 0.05$), respectively. This showed that the provision of SSC training improved shooting accuracy of petanque athletes in Bali Province with an increase of 36.96%. Therefore, Ho and H1 were rejected and accepted, respectively, as presented in Table 3.

Table 3.
The results of normality and homogeneity tests

Data Group	Mean ± SD	Shapiro-Wilk	Levene's Test	95% Confidence Interval of the Difference		t	Sig. (2-tailed)
				Lower	Upper		
Pretest	20.89 ± 4.071	0.521	0.830	6.944	8.500	20.941	<0.001*
Posttest	28.61 ± 5.532	0.680	0.480				

Remarks: There is a significant difference ($p<0.05$).

Discussion

Sidhakarya State Conditioning (SSC)

"*Sidhakarya*" is obtained from the ancient Javanese words, "*siddha*" and "*karrya*", meaning success/already/surpassed and ceremony/dynamics, respectively. In this context, "*Sidhakarya*" is often used in the daily interactions of the Balinese community, interpreted as an achievement, success, and safety. This conditioning approach has permeated and become integrated into the habits of society, where many people are unaware about engaging in self-conditioning efforts. From the description, the efforts are commonly practiced by the community, specifically in Bali, to attract life hope such as health, well-being, or inner peace. Although self-conditioning is transferred through generations, relevant systematic coordinations are yet to be narrated.

SSC is an empirical approach commonly practiced by the Balinese community, with relevant information generationally transmitted through oral culture or palm leaves without written documentation (Wirawan, 2021). Based on the comprehensive analysis of related principles, SSC was not publicly presented as a good self-conditioning model for various purposes. Candra & Wardana (2019) also analyzed six SSC-based practices from biopsychological and traditional perspectives, including (a) *mā̄piuning* (progressive muscle relaxation), calming and relaxing all body muscles, (b) *ngunda bayu* (breathing relaxation), inhaling and exhaling deeply seven times, (c) *ngerē̄gep* (rehearsal), recalling and simulating the throwing of boules at the target, (d) *ngelē̄kas* (multi-sensory imagery), experiencing the sensation of perfectly throwing metal balls

through all senses, (e) *nyēraya* (gratitude), adopting an attitude of surrender and gratitude for the experience of throwing metal balls perfectly, (f) *nyīdhakarya* (mindfulness), throwing boules with a calm mind, heart, and unwavering conviction. These practices often establish a strong cognitive bridge, facilitating a deeper understanding and integration of the biopsychological and cultural aspects prioritizing athletes training and preparation (Swathy, Joni, & Suryawati, 2016). Figure 1. shows the flow diagram focusing on the six traditional practices.

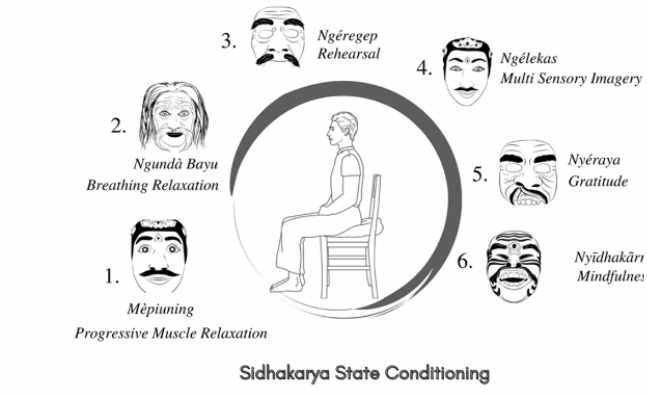

Figure 1. SSC Flow Diagram Based on Six Traditional Practices.

This empirical conditioning approach is a very close thread with steady psychotherapy, which is widely known as the ego state. This approach shows that the theory of ego state is in line with the philosophy of the *wali sidhakarya* mask dance known as the Pajegan Mask, where "JEG" is interpreted as single. The collaboration of the six sensory-motor approaches combines ego state therapy in the stages of the *tua* and *penasar* masks. This enables the initial burden in the body of the practitioner to flow out before being provided with a new program, causing the lighter capacity of the memory and mind (Sugiyama, 2018). The intervention also strengthens and forms a fabric between brain neurons, leading to the establishment of new membranes due to sensory stimulation. From the description, the new establishment is conducted by implementing the five senses in visualization or technical language sensualization. Furthermore, the provision of stimulation intensely contributes to the formation of new neuroplasticity (Aguirre Loaiza et al., 2020; Derouesné, 2021; Haavik et al., 2021; Rusmanto et al., 2023). This training conditions athletes to experience state of happiness before sensualization, stimulating the DOSE hormones (dopamine, oxytocin, serotonin, and endorphin) flowing into the body and causing more optimal training outcomes (Aridamayanti, Sari, & Romadhon, 2020).

SSC Approach in Improving Shooting Accuracy of Petanque Athletes

According to the results, shooting accuracy of petanque athletes was improved by implementing SSC approach. This prioritized relevant confirmatory assessment regarding SSC implementation in enhancing appropriate shooting accuracy. From the description, a difference was observed before and after training with SSC approach, significantly increasing accuracy due to the holistic nature prioritizing physical, mental, and emotional aspects. Optimal training was also ensured through the conditioned physical and mental aspects of athletes. Based on Pelana et al. (2021), petanque required the simultaneous use of physical and mental faculties, to enhance muscle strength, improve concentration, and increase relevant endurance levels (Melguizo-Ibáñez, Zurita-Ortega, Ubago-Jiménez, López-Gutiérrez, & González-Valero, 2023; Russell, Jenkins, Rynne, Halson, & Kelly, 2019).

In this case, SSC approach was highly significant in improving shooting accuracy of petanque athletes. The approach was subsequently obtained from traditional practices in Bali culture, due to relevant international excellence. These practices included (1) *mā piuning* (progressive muscle relaxation), (2) *ngunda bayu* (breathing relaxation), (3) *ngerēgep* (rehearsal) (4) *ngelēkas* (multi-sensory imagery), (5) *nyēraya* (gratitude), and (6) *nyīdhakarya* (mindfulness) (Eka Santosa, 2022; Wirawan, 2021). The practices were also observed in the six mask characters of the *Wali Sidhakarya* dance, with SSC approach possessing significant uniqueness and integrating cultural content elements. This caused the easy acceptance of the approach by people familiar with mask performance art, specifically athletes understanding the cultural heritage of the Javanese-Balinese and Nusantara societies (Candra & Wardana, 2019; Eka, 2023). In addition, SSC established a strong cognitive bridge, facilitating a deeper understanding and integration of the psychological and cultural aspects prioritizing athletes training and preparation.

The results showed that the improvement in petanque shooting accuracy was consistent with the integrated benefits at each stage of SSC approach implementation (Figure 2). Firstly, *mëpiuning* was related to the progressive muscle relaxation approach, causing physiological effects such as a decrease in heart rate and breathing frequency, as well as the stimulation of endorphins. These effects significantly and positively impacted muscle tension reduction and self-awareness (Battaglini et al., 2022; Thorenz, Berwinkel, & Weigelt, 2023; Usmani, Balcer, Galetta, & Minen, 2021). In biopsychological science, favorable responses commonly occurred at the biological, genetic, and physiological levels of the nervous system during the *mëpiuning* stage (Cooper, Kluding, & Wright, 2016; Hamsyah et al., 2024; Lozada-Medina, Santos-Quiroz, Cortina Nuñez, Hoyos-Espitia, & Pupo Sfeir, 2021; Sánchez Sánchez, Molinero, & Yagüe Cabezón, 2015). Secondly, *ngunda bayu* was similar to the respiratory relaxation approach, where breathing primarily calmed the nervous system and enhanced lung capacity in the Balinese dance (Laborde et al., 2022; Pelka et al., 2016; Yadav & Mutha, 2016). This proved that petanque athletes should achieve better control through physiological responses and breathing awareness development, contributing positively to relevant performance and mental well-being in training or competition (Harbour, Stöggl, Schwameder, & Finkenzeller, 2022).

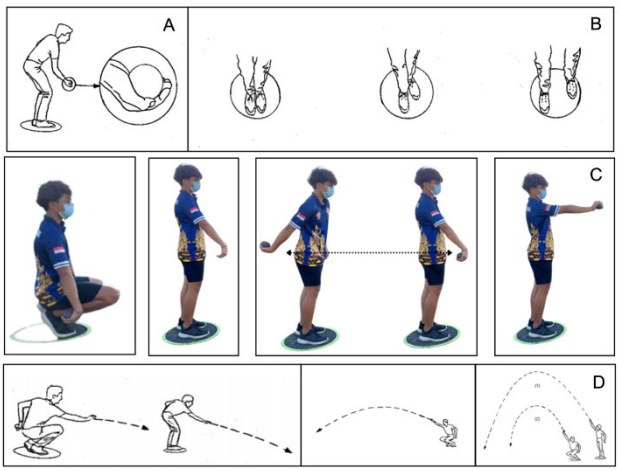

Figure 2. Resources for Improving Accuracy in Petanque Sport. Abbreviations: (a) hand position holding petanque ball, (b) foot position in petanque play, (c) body posture in performing shooting throw, and (d) three pointing approaches.

Thirdly, the *ngeregep* or rehearsal stage was codified from the character of the *penasar* mask, prioritizing the repetition of specific movements or actions (Hecker & Kaczor, 1988). This stage comprehensively detailed relevant movements, enhanced technical skills, and significantly strengthened athletes self-confidence in approaching and executing petanque tasks (Beaven, Kilduff, & Cook, 2023; Gontijo et al., 2023; Shaw et al., 2023). The rehearsal provided to elite Serbian athletes also improved performance by examining the increase in saliva testosterone levels, impacting stress endurance capability (De Muynck, Soenens, Delrue, Comoutos, & Vansteenkiste, 2020). In this case, *ngeregep* caused an adaptive response in the cardiovascular system, improved stress endurance abilities, and stimulated the biotransformation process associated with data processing (Beaven et al., 2023; Blázquez López, García Martínez, Ferriz Valero, & Olaya Cuartero, 2021; Gómez-Ferolla, Parodi-Feye, & Magallanes-Mira, 2024; Gonzalez Rodenas et al., 2019).

Fourthly, the *ngèlekas* or multi-sensory imagery stage was codified from the character of the *dalem* mask, prioritizing the imagination of realistically throwing a boule toward the target. This stage established a deep and detailed mental representation of the desired success, allowing athletes to develop a holistic understanding of petanque tasks. *Ngèlekas* was also a key instrument in shaping athletes perceptions of relevant success, building a solid mental foundation for appropriate performance in sports competitions. Based on Hidayat (2010), the provision of multi-sensory imagery training enhanced the ability to comprehensively understand new approaches. This proved that sensory training had physiological effects, forming new synaptic connections in neural networks and stimulating neuroplasticity processes (Cooper et al., 2016).

Fifthly, the *nyeraya* stage was codified from the character of *bondres* mask, focusing on relevant performance with an attitude of surrender and gratitude. This stage prioritized the guidance of athletes to intentionally consider positive elements, appreciate achievements, and produce an optimistic mental attitude. Based on Ahmadzadeh et al. (2019), gratitude training improved shooting skills for athletes under normal or pressure conditions. Ruser et al. (2021) also showed that gratitude was significantly related to reduced fatigue during exercise, improving the relationship quality between athletes and coaches. In this case, the *nyeraya* or gratitude stage significantly and positively impacted athletes and the surrounding environment.

Sixthly, the *nyidhakarya* stage was codified from the character of *sidhakarya* mask, as athletes having complete awareness transformed deep relaxation conditions to normal through a relaxed, comfortable, and calm body. This transformation allowed the mind to repeat the sublime and positive feelings presently experienced during training (Mindfulness) (Gross et al., 2018; Tebourski, Bernier, Ben Salha, Souissi, & Fournier, 2022). Strong self-confidence and sustained motivation also portrayed athletes mental resilience and significantly contributed to endurance, focus, and positive responses to competitive pressure (Brady, Mahoney, Lovich, & Scialabba, 2018). According to Alfonso Mantilla (2019), mindfulness was beneficial for helping coordinate breathing rhythms, focus, and awareness, continuously supporting the delivery of appropriate performance on every occasion. In this case, mental training stimulated people growth at the psychological level and significantly affected athlete's performance outcomes in sports.

Based on the results, SSC approach enhanced shooting accuracy of petanque athletes by holistically absorbing and integrating local cultural wisdom. This approach obtained uniqueness by incorporating cultural values and socio-spiritual dimensions into the training framework. SSC also focused on the development of physical abilities and accommodated improvements in psychological, emotional, and spiritual aspects. Furthermore, the training conditioned athletes to experience state of happiness before engaging in sensualization, stimulating the flow of DOSE hormones (dopamine, oxytocin, serotonin, and endorphins) into the body and optimizing relevant outcomes (Arias Estero, Argudo Iturriaga, & Alonso Roque, 2015; Aridamayanti et al., 2020; Hernández-Beltrán, Muñoz-Jiménez, Espada, Castelli Correia de Campos, & Gamonales, 2023). This experience enabled the formulation of a more comprehensive training framework and promoted people holistic well-being through SSC approach. The incorporation of cultural elements within the approach also potentially became a valuable component in the wellness tourism industry promoted by the central government. Therefore, SSC contributed to people development and stimulated cultural tourism growth through local values integration.

Mechanism of SSC

Based on the effectiveness test, a 36.96% shooting accuracy improvement was observed for athletes through the provision of SSC training, portraying the excellent potential for enhancing the six relevant practices. This approach was easily accepted by petanque athletes in Bali because the

terms and models provided were unnoticeably practiced daily during prayers or other activities. The six mask characters within the body were also easily understood by using the *wali sidhakarya* dance series metaphor, where all the masks were commonly placed in a bamboo woven suitcase (*katung*). From a biopsychological perspective, SSC approach included sensory and motor repetitions stimulating the formation of new connections between nerve fibers known as neuroplasticity in the central nervous system. In this case, the plasticity of nerves was distinguished into two types, namely functional and structural plasticities. Firstly, functional plasticity prioritized the changes in the physiological aspects of nerve cell function, such as impulse frequency or the possibility of releasing chemical signals capable of strengthening synaptic connections.

The changes in the synchronization level among groups of nerve cells were also a significant consideration. Secondly, structural plasticity focused on the transformation of nerve cell structures through the formation of new neural pathways. These pathways were commonly obtained from the establishment of new nerve fiber branches and synapses or the growth and addition of relevant cells (El-Sayes, Harasym, Turco, Locke, & Nelson, 2019). From the description, the exercises in SSC prioritized more senses, providing more stimuli and repetitions. This was consistent with a previous study, where repetition was a key factor in the mastery of various approaches, such as throwing (Burke & Mokadam, 2018). Furthermore, EEG measurements on mindfulness practitioners portrayed synchronicity between heart rate, pulse, emotions, and feelings more than the control group. This synchronized condition was considered the coherence between the body and mind, as only a few approaches initiated conventional training with self-conditioning and became a distinguishing feature of SSC (Cochrane, Loke, Leete, Campbell, & Ahmadpour, 2021).

According to the results, the performance of body organs became optimal during mind-body coherence, enabling petanque athletes to effectively perform shooting activities. In state of coherence, athletes also generally entered a flow state, the highest stage of mental concentration. This state often caused time-immersed feelings and was unable to perceive the duration of the exhausting match. The results were also supported by a study conducted on elite athletes, where mental training was considered an additional exercise in relevant routine programs (Kiens & Larsen, 2021). Furthermore, SSC approach provided training in several aspects, including progressive muscle relaxation, breathing relaxation, multi-sensory imagery, gratitude, mindfulness, local cultural, and socio-religious stages. This approach contained cultural and socio-spiritual aspects, enabling the subjects to improve physical, psychological, emotional, and spiritual abilities in one training session. SSC was also developed as content in the culture-based wellness tourism industry promoted by the central government.

Study Limitations and Novelty

Based on the limitations, the study was only conducted within the scope of petanque, leading to contextual outcomes and non-representation of other sports. The inclusion criteria also only prioritized health measurements through basal heart rate. This condition should be enhanced by conducting more comprehensive measurements, including respiratory, pulse, blood pressure, and body temperature rates before and after SSC interventions in each training session. Furthermore, the effectiveness of SSC approach was observed in improving shooting accuracy of petanque athletes, serving as a valuable reference for the development of more relevant and innovative reports in the future. In this case, future studies need to design better approaches and strategies to provide a deeper knowledge foundation for enhancing petanque athletes performance.

Conclusions

In conclusion, shooting accuracy of petanque athletes was significantly improved by implementing SSC approach. This was because the approach holistically prioritized the integration of physical, mental, and emotional aspects, ensuring the optimal training of athletes in relevant capacities. The use of the six traditional practices also significantly affected physical and mental development, including *mā̄piuning* (progressive muscle relaxation), *ngunda* bayu (breathing relaxation), *ngerēgep* (rehearsal), *ngelēkas* (multi-sensory imagery), *nyēraya* (gratitude), and *nyīdhakarya* (mindfulness). These practices established a strong cognitive bridge, facilitating a deeper understanding and integration of psychological and cultural aspects. Therefore, the strength, muscle endurance, and mental resilience of athletes were positively impacted by the facilitation activities. The results also proved that the training conditioned athletes to experience state of happiness before engaging in sensualization, stimulating the flow of DOSE hormones into the body and optimizing relevant outcomes. In this case, subsequent studies were required regarding the comparison of SSC with other PST approaches, to improve accuracy of athletes in the future.

Acknowledgments

We would like to thank all the participants who were willing to support this study.

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