DEVELOPMENT OF TALENT IDENTIFICATION MODEL AS POTENTIAL PREDICTORS OF YOGASANA PLAYERS

Thesis Submitted for the Award of the Degree of

DOCTOR OF PHILOSOPHY

in

Physical Education

By

Chandra Shekhar Singh

Registration Number: 42000227

Supervised By

Dr. Neelam Sharma (11933)

Professor, Department of Physical Education

LPU Jalandhar Punjab

Transforming Education Transforming India

LOVELY PROFESSIONAL UNIVERSITY PUNJAB,

2025

DECLARATION

I, hereby declared that the presented work in the thesis entitled "Development of Talent Identification Model as Potential Predictors of Yogasana Players" in fulfilment of degree of **Doctor of Philosophy (Ph. D.)** is outcome of research work carried out by me under the supervision of Dr. Neelam Sharma, working as Professor in the Department of Physical Education of Lovely Professional University, Punjab, India. In keeping with general practice of reporting scientific observations, due acknowledgements have been made whenever work described here has been based on findings of other investigator. This work has not been submitted in part or full to any other University or Institute for the award of any degree.

(Signature of Scholar)

Name of the scholar: Chandra Shekhar Singh

Registration No.: 42000227

Department/school: Physical Education

Lovely Professional University,

Punjab, India

<u>CERTIFICATE</u>

This is to certify that the work reported in the Ph. D. thesis entitled “Development of Talent Identification Model as Potential Predictors of Yogasana Players” submitted in fulfillment of the requirement for the award of degree of **Doctor of Philosophy (Ph.D.)** in the Department of Physical Education, is a research work carried out by Chandra Shekhar Singh, (Registration No.) 42000227, is bonafide record of his/her original work carried out under my supervision and that no part of thesis has been submitted for any other degree, diploma or equivalent course.

(Signature of Supervisor)

Name of supervisor: Dr. Neelam Sharma

Designation: Professor

Department/school: Physical education

University: Lovely Professional University,

Punjab, India

ABSTRACT

Yoga, derived from the Sanskrit term "yuj," meaning to unite, is a practice that integrates physical, mental, emotional, and spiritual aspects. Although its roots are deeply connected to spiritual growth and self-realization, modern yoga, especially in the West, is largely associated with physical exercises (asanas), breath control (pranayama), and meditation techniques. This version of yoga aims to improve physical fitness, mental clarity, stress management, and general health. Due to its comprehensive nature, yoga is often viewed as an all-encompassing system for enhancing well-being.

Competitive yogasana, a recent development in the sports world, combines yoga's physical practices with the formal structure of sports competitions. Officially recognized as a sport by India's Ministry of Youth Affairs and Sports, yogasana competitions evaluate participants based on their ability to perform various postures with precision, balance, strength, and flexibility. This recognition has led to efforts to establish methods for identifying and nurturing potential young talent, similar to talent identification systems in other sports. The aim of this research was to create a framework for identifying talent among male sub-junior yogasana athletes by examining key anthropometric, physical, and physiological factors.

Despite growing interest in competitive yoga, there remains a lack of systematic methods for identifying young talent specific to yogasana competitions. This study aimed to fill this gap by identifying factors that could help predict and enhance performance in young athletes. The research had two main objectives: first, to determine the most important anthropometric, physical, and physiological factors influencing yogasana performance, and second, to develop a talent identification model based on these factors. The study focused on male yogasana athletes aged 10 to 15 years from Delhi, who had either trained in yogasana or participated in district-level competitions. The hypothesis was that a multiple regression model, based on selected independent factors such as anthropometric, physical, and physiological attributes, would effectively predict an individual's potential for success in yogasana.

The study was limited to 100 male participants from Delhi, ensuring a controlled and manageable environment for accurate results. The factors considered for the talent

identification model included height, body weight, fat percentage, blood pressure, resting heart rate, respiratory rate, breath-holding capacity, muscular endurance, flexibility, and balance. A comprehensive review of existing literature emphasized the importance of genetic, physical, and environmental factors in athletic performance. Previous studies have shown that genetic predispositions affect physical abilities, such as aerobic capacity, muscle composition, and adaptability to training. Additionally, factors such as height, weight, and body composition are critical to success in many sports. The literature also highlighted the importance of structured talent identification models, similar to those used in countries like Australia, New Zealand, and several Eastern European nations.

In the traditional Indian context, yoga includes various paths to suit different spiritual inclinations, such as Hatha yoga (focused on postures and breath control), Raja yoga (mental discipline and meditation), Karma yoga (selfless action), Bhakti yoga (devotion), Jnana yoga (knowledge and self-inquiry), Mantra yoga (repetition of sacred sounds), Laya yoga (merging with universal consciousness), and Kundalini yoga (awakening dormant spiritual energy). These paths allow individuals to select a practice that aligns with their nature, ultimately leading them to self-realization. The eight limbs of yoga—Yama (ethical guidelines), Niyama (personal observances), Asana (postures), Pranayama (breathing control), Pratyahara (sense withdrawal), Dharana (concentration), Dhyana (meditation), and Samadhi (self-realization)—guide practitioners toward spiritual growth, with the first five focusing on external practices and the last three on internal development. Asanas are designed to improve strength, flexibility, and overall health, and regular practice is crucial for achieving optimal results in both physical and mental well-being.

The relationship between yoga and sports was also explored, highlighting that both aim to preserve and enhance physical and mental health. Yoga fosters balance, harmony, and self-control, values that align with sportsmanship and fair play. The study also traced the evolution of yoga competitions, noting their transformation from ancient practices to formal competitive events in the modern era.

The research methodology involved selecting 100 male participants, aged 10 to 15 years, who had either trained in yogasana or competed at the district level. Various

anthropometric, physical, and physiological parameters were measured to create a predictive model for yogasana talent. Multiple regression analysis was used to identify the most influential factors on performance. The study found that specific anthropometric, physical, and physiological factors significantly influenced yogasana performance. Height, body weight, fat percentage, blood pressure, resting heart rate, respiratory rate, breath-holding capacity, muscular endurance, flexibility, and balance were key factors. The talent identification model developed through this study showed a strong correlation between these variables and yogasana performance, providing a useful tool for predicting and nurturing young talent in competitive yoga.

The analysis revealed significant correlations between yoga performance and variables such as fat percentage, flexibility, and respiratory rate, with flexibility having the most substantial positive effect on performance. In regression analysis, three models were developed to assess the relationship between anthropometric, physiological, and physical factors and yoga performance. The third model, which included flexibility, fat percentage, and respiratory rate, explained 64.7% of the variation in performance (R^2 = 0.647), making it the most effective model for predicting talent. The study emphasized that flexibility, body fat percentage, and respiratory rate were the primary factors influencing performance, with flexibility contributing the most significant change in yoga performance. Height, flexibility, and balance had the most positive impact on performance, while fat percentage and resting heart rate were inversely related to success in yogasana.

This research is valuable for coaches and sports administrators as it offers a more structured approach to selecting athletes for competitive yogasana events. Additionally, it helps prospective yogasana practitioners identify activities that best suit their physical attributes, improving their training experience and overall performance. By contributing to the scientific understanding of talent identification in yogasana, this study provides practical applications for talent development programs. In conclusion, the research offers a systematic approach to identifying and nurturing talent in sub-junior male yogasana practitioners. By integrating anthropometric, physical, and physiological factors into a predictive model, the study provides important insights into the determinants of success in competitive yoga. The findings have significant

implications for coaches, athletes, and administrators, paving the way for more effective talent identification and development strategies, while reflecting yoga's holistic nature in athlete development.

Dedicated

To My Parents,

Whose endless love, guidance and support

have made this journey possible.

ACKNOWLEDGEMENT

With the grace of almighty, completion of this doctoral dissertation was possible only with the support and cooperation of several people and blessing of God. I take the privilege of expressing sincere gratitude to all the people whose constant support and cooperation has been essential in this accomplishment.

Firstly, I would take this opportunity to express my sincere gratitude to my supervisor **Dr. Neelam Sharma**, Professor & Dy. Dean, Department of Physical Education, Lovely Professional University, for her patience, supervision, guidance and encouragement towards my Ph. D study. I shall ever be grateful for her guidance and support which was the wind beneath my wings.

I express my deepest regard and gratitude to **Sh. Ashok Mittal**, The Chancellor and **Smt. Rashmi Mittal**, The Pro Chancellor, Lovely Professional University for providing research infrastructure and encouraging scholars for quality research work. Special thanks are being extended to **Prof. Sanjay Modi**, Executive Dean, Faculty of Business and applied Arts, Lovely Professional University, for his valuable guidance, suggestions and positivity throughout my journey. I express my sincere thanks to **Dr. Pavitra Prakash Singh**, Head of School, for their interest, suggestions and guidance in my research work.

Special thanks to all the subjects, heads and supporting staff members of Chhatrasal Stadium and Najafgarh Stadium for their support and cooperation during my field work. Parents sacrifice unconditionally for their children, words would fail to mention the greatness of my parents, who have nurtured me with great care and love. I believe my good ethics and moral values are just a reflection of their sound character. The words are inadequate to express my gratitude to my parents **Mr. Mrityunjay Singh** and **Smt. Meena Singh** who provided me with all the facilities indispensable for my work and encouraged me to conquer all the challenges I faced during my journey. I feel blessed with a caring brother's **Shashi Shekhar Singh** for his consistent motivation and support throughout my studies. I am equally thankful to all the other members of our family for their eternal love, affection and encouragement.

Dated: Signature of the Researcher

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

CHAPTER-I

INTRODUCTION

CHAPTER-I

INTRODUCTION

“योग: कर्मसु कौशलम्”

“Getting the mastery over the skill or the activity, which we are performing. in our life.” (Bhagavad Geeta 2/50).

1.1 Background of the study

Yoga is a multidimensional discipline that promotes health and wellbeing through a systematic integration of physical postures (asanas), breath control (pranayama), and mindfulness techniques. “The holistic approach enhances physical fitness, mental clarity, and emotional stability, with empirical research demonstrating its effectiveness in reducing stress, improving flexibility, and increasing strength, thereby contributing to overall wellness” (Wersebe et al., 2018). The term yoga originates from the Sanskrit word yuj meaning to connect, reflecting its “foundational goal of achieving unity either with Brahman (the absolute) or atman (the true self)” (Basavaraddi Ishwar, 2015). “Ancient texts emphasize self-control and discipline as essential practices for spiritual growth, highlighting yoga as a means to align the individual with the cosmos. By cultivating inner harmony and self-mastery, yoga guides the mind toward enlightenment, fostering a deeper connection with the divine” (Katha Upanishad 6/34). Through its disciplined approach, yoga serves as a path that not only refines the body and mind but also strengthens the soul's bond with the universe, leading to a profound spiritual awakening. This traditional practice of Yog, which dates back approximately 5,000 years in India, has evolved in modern Western contexts to focus on practical benefits, including improved fitness, mental clarity, and stress control, without necessitating extreme physical contortions. Regular practice fosters physical soundness and mental richness, making yoga an accessible and scientifically supported method for enhancing health. “The goals of yoga encompass equanimity, tranquillity, and self-mastery, and it is universally applicable to individuals of all backgrounds, as it is a spiritual practice rather than a religion” (White et al., 2012). The asanas are good for toning internal organs, enhancing strength and flexibility, and promoting overall wellness. Yoga defined in yog Sutras as "Chitta Vritti Nirodha" (Maharshi Patanjali 1/2). Or the cessation of the mind's fluctuations, emphasizing alignment among mind, body and self. The specific benefits of yoga encompass a broad spectrum of physical and psychological enhancements, including increased muscular strength, improved stamina, greater flexibility, heightened concentration, and elevated pain tolerance. Additionally, yoga plays a vital role in rehabilitation processes and contributes significantly to mental clarity and emotional well-being. These multidimensional benefits underscore the holistic nature of yoga and provide a foundational basis for a more in-depth exploration of its methodologies, physiological and psychological impacts, and its evolving relevance in contemporary society.

1.2 Types of Yoga

Building on this foundation, it is important to explore the different types of yoga found in the traditional Indian (Bhartiya) system. Yoga is not a single practice but a wide-ranging approach that includes various paths, each suited to different spiritual goals and beliefs. One of the most well-known forms is Hatha Yoga, which focuses on balancing the body and mind through physical postures (asanas) and breathing techniques (pranayama). Hatha Yoga helps prepare individuals for deeper meditation and spiritual growth, as described in classic texts like the Hatha Yoga Pradipika by Swami Swatmarama. “Raja yoga, often referred to as the royal path, focuses on mental discipline and meditation, structured around the eight limbs (ashtanga) which include ethical guidelines, postures, breath control, sensory withdrawal, concentration, meditation, and enlightenment” (Yoga sutras of Patanjali 2/29). Karma yoga teaches selfless action, encouraging practitioners to perform their duties without attachment to outcomes, as highlighted in Bhagavad Gita of the, thus fostering a mindset of detachment and transcending the ego. In contrast, Bhakti yoga emphasizes devotion and love towards a personal deity, cultivating emotional connections through prayer, chanting (kirtan), and rituals, allowing for profound experiences of love and inner peace. “Jnana yoga, the path of knowledge, encourages deep self-inquiry and contemplation to discern the nature of reality and the self to explore the eternal versus the temporary” (Upanishads and Brahma sutras 2/4). Mantra yoga focuses on the repetition of sacred sounds or phrases (mantras) to connect with higher consciousness, leveraging the vibrational power of sound for spiritual transformation, as found in the Vedas and Upanishads. Laya yoga aims at merging individual consciousness with universal consciousness through deep meditation, facilitating experiences of oneness, although specific classical texts are less common. Lastly, Kundalini yoga seeks to awaken the dormant spiritual energy at the base of the spine through asanas, pranayama, and meditation, with swami Sivananda's writings providing valuable guidance on this transformative process. Collectively, these paths illustrate the holistic nature of traditional Bhartiya yoga, acknowledging that personal growth and spiritual experience manifest through various means whether physical practice, devotion, knowledge, selfless action, or meditation thereby enabling individuals to choose the path that resonates most with them, ultimately

leading to self-realization and spiritual fulfilment while emphasizing the interconnectedness of physical, mental, and spiritual elements in the journey of personal growth.

1.3 The eight limbs of yoga

The foundational framework of yoga is encapsulated in the eight limbs of yoga, as described in these limbs interconnect, guiding practitioners toward heightened awareness and spiritual development. The first limb, yama, consists of ethical guidelines such as non-violence, truthfulness, non-stealing, and non-greed, serving as the foundation of personal conduct in yoga practice. The second limb, niyama, outlines personal observances and virtues, including cleanliness, contentment, self-discipline, self-study, and surrender to a higher power following these ethical and personal guidelines, the third limb, asana, refers to physical postures that promote flexibility, strength, and overall bodily health. An asana as "Sithram Sukham Asanam" (Patanjali 2/46). Emphasizing the importance of comfort and stability in practice. The fourth limb, pranayama, involves the regulation of breath through techniques of inhalation, exhalation, and retention, preparing the mind for meditation and enhancing the connection between body and mind. Pratyahara, the fifth limb, focuses on controlling the senses and promoting withdrawal from external stimuli, which facilitates concentration and deeper meditative states. This leads to the sixth limb, dharana, which is the practice of concentrating the mind on a single point or object, serving as a preparatory stage for meditation. The seventh limb, dhyana, represents the deep meditative state achieved through sustained concentration, leading to a profound sense of unity and focus. Finally, samadhi, the eighth limb, signifies a state of integrated consciousness where the meditator, the act of meditation, and the object of meditation become one, culminating in self-realization. “Each of these limbs is interconnected, with the first five focusing on external practices (Bahiranga Yoga) and the last three on internal development (Antaranga Yoga), ultimately guiding the practitioner toward spiritual awakening” (Iyengar, 2004). In summary, yoga offers a diverse array of styles and practices, each tailored to specific needs and goals. The structured approach provided by the eight limbs of yoga serves as a comprehensive framework for personal growth and spiritual development.

1.4. Inter-relationship between yoga & sports

The physical practice of yoga that pertains to the body is referred to as asana. Both yoga and athleticism have the goal of preserving and enhancing one's physical and mental health. “Yoga is the connection that unites an individual's mind and body, and it also helps one remain connected with a larger sense of community and the cosmos” (Shikha Desai 2021). An article report titled abridges the present evidence on the effects of yoga therapies on many components of mental and physical health, by concentrating on the data reported in review articles was produced by Arndt Bussing et al. 2012. Those who watch yoga and conventional sports both experience delight, which is a happy side effect of both activities. Therefore, just as sports are regulated by rules and regulations in order to promote fair play and just competition, yoga is likewise guided by ethical principles of honesty and integrity in other words, yoga is a lot like sports. The objective has not changed in the context of competitive athletics, the concept of sportsmanship conveys the hope that the game or event will be appreciated for its own purpose. The same sentiment is conveyed by the word santosha in yoga specifically, it refers to a delight that is not reliant on any outside factors to put it another way, if you are able to compete in a sport or execute a yoga position on stage while experiencing the delight of doing so, then you are a champion. Back bends, forward compressions, traction, torsion, lifts, and inversions are the six categories into which the majority of the talents that an athlete must demonstrate in order to win a yogasana competition, back bends are one of the categories they are given a set length of time to hold the position, and their performance is graded based on how challenging it was, how little expression was required, how strong they were, how flexible they were, and how well they balanced.

1.5. Competitive Yoga

Yogasana is a sport that focuses on the physical aspect of yoga, where players have to perform yogic postures and are judged on their difficulty, balance, control, flexibility and endurance. The difference between yoga and yogasana is that yogasana only lays emphasis on the physical side of the discipline while yoga also gives importance to the mental and spiritual aspects. “Yogasana was officially recognized as a competitive sport by the ministry of youth affairs and sports, government of India, on December 17, 2020, during a joint conference featuring honourable ministers Shripad Yesso Naik and Kiren Rijiju, this recognition follows a long-standing tradition of yoga tournaments in India, with the first recorded instances of yoga asana practice dating back over 5,000 years” (Bureau et al., 2020). Yoga competitions have transformed over the past two thousand years, evolving from simple physical practices into more intellectual and spiritual contests as new asanas were introduced. The modern form of yoga competition is believed to have begun around 200 years ago when Swami Vivekananda introduced yoga to the Western world during his travels in the 1890s across the United States and Europe. "The first world yoga championship, organized by Swami Maitreyananda, was held in Montevideo, Uruguay, in 1989, while the first global yoga asanas competition took place in Pondicherry, India, in the same year under the guidance of Dr. Swami Gitananda Giri. Today, there is at least one yoga competition held every day in India and globally, helping to increase yoga's recognition as a sport" (Yogasana Bharat, 2020). The Yoga Federation of India was founded in 1974 and received recognition from the Indian Olympic Association between October 1998 and February 2011. Yoga was introduced into the All-India Inter-University Games in 1991, incorporated into the National School Games in 2000, and featured in the Khelo India Youth Games in 2022, with plans for inclusion in the National Games in 2023. Additionally, India’s Yogasana was selected as a demonstration event for the 2026 Asian Games in Aichi Nagoya, Japan, after unanimous approval from the Olympic Council of Asia. Randhir Singh, elected President of the Olympic Council of Asia for the 2024-2028 term, stressed the importance of showcasing yoga's benefits to secure its status as a medal event by 2030, emphasizing yoga's ability to rejuvenate the body and advocating for its global promotion through instructor training. In September 2015, the Department of Personnel and Training recommended that the Ministry of Youth Affairs and Sports recognize yoga as a sport. Initially, the sports ministry reversed this decision, citing the lack of a dedicated national yoga organization, but the decision was later reinstated after discussions with the Ministry of AYUSH. In 2017, Vijay Goel, the Minister of State for Youth Affairs and Sports, announced that yoga would be recognized as a non-Olympic sport by the International Non-Olympic Committee, underscoring its importance in daily life. After years of consultations, the Government of India decided to promote Yogasana as a competitive sport, with the National Board for Promotion and Development of Yoga and Naturopathy (NDPDYN) recommending its recognition in July 2019. Currently, the Ministries of Ayurveda and Youth Affairs and Sports are working together to develop yoga postures as a global competitive sport. The International Yogasana Sports Federation was founded on November 8, 2019, with Yogrishi Swami Ramdev Ji as president and Dr. H.R. Nagendra as secretary general, focusing on the formalization of yoga postures as a sport worldwide. Later, in August 2020, Dr. I.V. Basavaraddi, Director of MDNIY, became the president of the newly established National Yoga Sports Federation (NYSF), now known as Yogasana Bharat. The organization was officially recognized by the Ministry of Youth Affairs and Sports on November 27, 2020, to promote and develop Yogasana as a competitive sport. Beyond making yoga an official sport in competitions, the Ministry also aims to create job opportunities for athletes within this emerging field.

Yogasana competitions have distinct rules based on the type of event. There are three main categories: artistic, rhythmic, and traditional. In artistic yogasana, which resembles artistic gymnastics, athletes perform postures for three minutes while coordinating their movements to music. They must incorporate 10 asanas from a preselected list, covering leg balances, hand balances, backbends, forward bends, and body twists. This event is held in both individual and pair formats. The traditional yogasana competition focuses on holding postures for 15 or 30 seconds, depending on the specific asana, with a strong emphasis on balance and stability. In rhythmic yogasana, which takes place in pairs or groups of five, participants perform synchronized asanas and hold each position for five to seven seconds. Points are awarded for seamless transitions between postures.

1.6. Talent identification in sports

Talent identification and development is an increasingly important area of sports research, with the belief that only individuals with exceptional abilities should be trained to secure medals at international competitions. However, talent also demands years of commitment and effort. Sports talent encompasses an athlete's inherent qualities and their capacity for growth, which collectively allow them to perform successfully in competitive events. These essential qualities include motor skills, technical abilities, tactical understanding, physical attributes, personality traits, motivations, and personal interests. "Sport talent is determined by a complex combination of environmental and genetic factors modelling is the study of how people achieve a goal" (Singh Hardyal 1991). There are several patterns or models presented for athletic talent identification that is help better comprehend and identify it. The systemic mentality is also important in identifying talent diverse groups and individuals contribute to the success of this process. These systematic and targeted systems have fewer errors and use correct models for talent discovery and development vary in content. Talent identification approaches have focused on recognizing exceptional skills within a narrow area and picking gifted persons among others. The talent identification models presented by Gimbel, Harre, Matsudo, Peltola, Abbott and Collins, Côté et al., Vaeyens et al., Burgess and Naughton, and Houlihan and Chapman are examples of these types of models in fact, these models are typically focused on picking individuals based on particular criteria and parameters, and forecasting their future performance. "As a result, much of the research on talent identification has concentrated on discovering talent identification factors in various sports sectors a wide range of anthropometric and physiological variables were examined in most of these studies" (Loghman et al., 2019).

1.7. Talent identification process

The process of talent identification aims to find and nurture young talent while also accelerating its growth. The identification process includes a number of intricate steps, all of which a beginner attempts to master in order to become a professional athlete the method of talent identification is described in the following fig. 1.1.

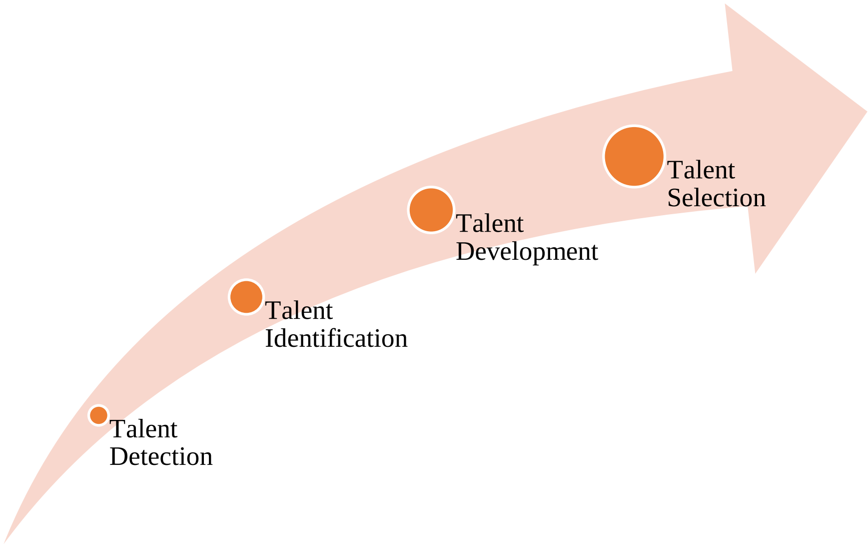


Figure 1.1 Adapted from Williams and Reilly (2000). The Stages of the Pursuit of Excellence

The initial step in talent identification is identifying individuals with potential who are not yet involved in sports. Researchers look for future athletes during the early stages of talent discovery. Once talent is identified, it's important to assess current participants who show promise and provide them with the right training and supportive environment to help them reach their full potential. The final phase of the process involves selecting athletes with the greatest likelihood of success by evaluating those actively involved in sports, often with the help of an experienced coach or through a specialized assessment.

1.8 Talent identification models opted by various countries

In the search for a suitable model for talent identification and development for south Africa, it is to be instructive to look at the approaches that have been implemented in some other countries.

A number of Australian sports have recently started to discover potential individuals in a more organised manner. “When Sydney won the right to host the 2000 Olympic games, the government increased financing and support for the growth of top athletes” (Hoare, 1995 & 1998; Australian Institute of Sport, 2003). The talent identification process began by assessing the physical and physiological demands of various sports, followed by recommendations on the types of athletes best suited for competition. The Australian talent search program was structured into three stages: school screening, sport-specific testing, and talent development. In the first phase, children were evaluated in schools through a set of eight basic physical tests, often administered by physical education teachers, who then reported the results to state or territory coordinators. These results were cross-checked against a national database. Students who scored in the top 2% on any of the tests were invited to participate in phase 2. Phase 2 involved sport-specific laboratory assessments in addition to several tests from phase 1. Students showing potential in a specific sport were invited to join a gifted athlete program managed by the relevant state or national sports governing body. Around 10% of those who participated in phase 2 were selected for specialized training groups. Athletes not chosen for the talent development program were encouraged to continue in club sports to further develop their skills.

Riordan suggests that talent development and identification in Eastern European countries generally follow a similar approach. The first stage is a basic recruitment process, which takes place in physical education classes or various sports clubs. During this phase, key metrics such as height, weight, speed, endurance, work capacity, power, and sport-specific skill tests are monitored. The second stage, occurring 18 months after the first, is a preliminary selection phase. Evaluations consider physical development, sport-specific test results, biological age, psychological readiness, and other factors. At this point, children are often steered toward specific sports or groups, with some being dropped, though they may have a chance to return a year later. Those selected in the second stage join the training squads at sports schools. The third stage, the final selection, happens about three to four years after the first stage. This process is based on criteria such as performance standards in a particular sport, improvement rates, consistency, results from physical and performance-specific tests, psychological assessments, and anthropometric data. Athletes showing potential are given the opportunity to attend a residential sports boarding school. Many Eastern European countries view these sports schools as the ideal environment for nurturing talent, as they offer top-tier coaching, facilities, specialized diets, and medical support.

New Zealand utilizes a pyramid model for talent development, based on the principle that "if the base is broad, the peak will be high, and the athletes who reach the top will be the most gifted" (McClymont, 1996). The idea is that greater participation in a sport increases the chances of identifying exceptional talent, which is why competitions are organized at the beginner level. The foundation of this model includes integrating physical education, leisure, and sports into the education system. New Zealand's development structure consists of various levels, such as training schools for gifted athletes, provincial and national development teams, and sports academies. Athletes who demonstrate talent in a specific sport receive additional training in that discipline before being selected to represent the country at the national level. The complexity of the required skills and the time needed for an athlete to reach international success will influence the development of their abilities and their transition into a national athletic program.

In China, gifted athletes typically follow a path that integrates with the educational system, as described by Rizak in 1986. Children from elementary and secondary schools who display athletic potential are enrolled in specialized sports schools and after-school training programs. The identification process involves several methods: coaches spot talented individuals at school competitions, physical education teachers make recommendations, and parents can request their child’s admission. Before being accepted, children must pass a skills assessment. Athletes between the ages of 13 and 17 are often selected to transition from junior sports schools to more advanced senior sports schools. These institutions provide an environment where athletes live, train, and study together. Sports-focused students exclusively attend these schools, and training sessions are often joined by other local athletes. The state covers the costs associated with their education and training.

The Sports Authority of India (SAI) was established in 1985, and around the same time, a number of different initiatives, such as the National Sports Talent Competition

(NSTC), Special Area Games (SAG), Army Boys Sports Company (ABSC), and so on, were introduced, with the primary goal of identifying and selecting talented young athletes to be placed in special training centres. SAI is the governing body for sports in India, since a result of this, the examination that was used to choose applicants received a great deal of criticism, as the "scientific criteria for the selection of talent were mostly absent in these procedures before there were intelligent children born into the world, the selection of candidates for such roles was performed via the use of tournaments and competitions because of their packed agendas, many very talented youngsters have already achieved their maximum level of performance, and any opportunity for further improvement has been substantially wasted as a result" (Asteya, 2016).

1.9 Talent identification for competitive yoga

Yogasana competitions follow defined regulations and typically include three main categories: artistic, rhythmic, and traditional. Artistic yogasana, similar in style to artistic gymnastics, requires participants to perform a sequence of ten asanas within three minutes, synchronized with music. These include leg and hand balances, backbends, forward bends, and twists. Events are held in both solo and pair formats. Traditional yogasana emphasizes balance and stability, with competitors holding each posture for 15 to 30 seconds depending on the asana. Rhythmic yogasana involves pairs or groups of five, where each pose is maintained for 5 to 7 seconds, and scores depend on fluidity and coordination between transitions. As a result, yogasana has emerged as a structured sport that fosters physical and mental development in children. Coaches and physical education professionals are increasingly involved in developing models to identify young talent early and nurture competitive potential.

1.10 Statement of the problem

Yoga has gained widespread recognition globally, not only as a wellness practice but also as a competitive sport. "The first World Yoga Championship was held in 1989 in Montevideo, Uruguay, and the first international Yoga Asanas Championship was in 1989 at Pondicherry, India" (Yogasana Bhart 2020). Its traditionally rooted in Indian culture, it has evolved to encompass a variety of practices that promote both physical health and mental well-being. "In December 2020, the Indian government, led by

Ministers Shri Kiran Rijiju and Shri Shripad Naik, officially recognized yogasana as a sport. This recognition paved the way for its inclusion as a demonstration event at the 2026 Asian Games in Aichi-Nagoya, Japan, with the potential for it to become a medal event by 2030" (PTI. 2020). "The Olympic Council of Asia, under President Randhir Singh, has been actively promoting yoga worldwide, with aspirations for its inclusion in the 2036 Olympics" (Singh 2024). Considering the review of the literature, talent identification models were widely available for most sports. However, such models were not present for yoga. Recognizing this gap, the investigator decided to develop a talent identification model specifically for yoga, aiming to enhance the process of identifying talent and enabling students to achieve their optimal performance. Therefore, the research topic has been reframed as: Development of talent identification model as potential predictors of yogasana players.

1.11Objectives of the study

The following is to be the objectives of the study: -

1. To develop talent identification model for yogasana male sub junior players.

1.12 Delimitations

Delimitations refer to the boundaries set by the researcher to ensure the study's focus, feasibility, and control over variables. These constraints are intentional and help define the scope of the research. The following delimitations were established for the present study:

1. The study focused on a specific group of 100 young yogasana players, aged 10 to 15 years (Sub-Juniors), who had been trained in yogasana or played at the district level. This age group is also used to organized competition as sub junior level. One another reason to choose this age range was to identify and nurture talent at an early stage.
2. The research was limited to male participants from the Delhi region. This was due to the presence of four primary stadiums including Chhatrasal, Thyagraj, Najafgarh,

and Ludlow Castle stadium where approximately 250 students were training during the 2023-24 period.

3. Only male students were selected as the sample for present investigation, focusing on obtaining results specific to one gender for greater accuracy.
4. After reviewing relevant literature, the study was delimited to the development of a predictive yoga talent identification model. This model aimed to use selected variables to predict and assess the potential of young yogasana players.
5. The study was limited to specific variables selected based on a thorough review of existing literature. These variables, chosen keeping in mind their relevance to talent identification in yogasana, included physical, physiological, and anthropometrical variable.

Table No. 1.1

Anthropometric Variables	**Physiological Variables**	**Physical Variables**
• Height • Body weight • Fat percentage	• Blood pressure • Resting heart rate • Respiratory rate • Breath holding Time	• Muscular endurance (Abdomen & shoulder) • Flexibility (Trunk -hip & Back flexibility) • Balance (standing/static balance)

6. To construct this model, the investigator reviewed a range of sports and prediction models, drawing insights from disciplines such as swimming, badminton, boxing, volleyball, squash, gymnastics, and wrestling. By examining these existing models, the investigator aimed to identify key factors and methodologies that could be applied to the development of a talent identification model for yogasana.
7. Further, the study was delimited to the use of statistical tools such as multiple regression analysis and correlation to develop the talent identification model for yogasana.

8. The assessment of yogasana performance in this study was limited to 10 asanas per participant, despite the official syllabus of the School Games Federation of India (SGFI) for sub-junior boys comprising a total of 18 asanas. From this syllabus, only 8 asanas were selected for evaluation specifically, three from Group A (Paschimottanasana, Purna-Matsyendrasana, and Uttan Padasana), three from Group B (Purna Chakrasana, Bhumasana, and Purna Shalabhasana), and two from Group C (Sankhyasana and Urdhva Kukutasana). The selection of these 8 asanas was made in consultation with subject experts, with the objective of including postures that represent the fundamental physical and motor components essential for competitive yogasana performance. These components included forward bending, backward bending, spinal twisting, core strength, static balance, upper body and shoulder strength, hip flexibility, leg splits, and muscular endurance. The rationale behind this selection was to ensure a comprehensive and well-rounded evaluation of athletes, covering the full range of physical abilities typically required in yogasana competitions. In addition to these 8 asanas, each participant performed 2 optional asanas of their choice, which were required to be outside the prescribed SGFI syllabus. These optional asanas were evaluated based on balance control, flexibility of the torso and waist, and the level of difficulty or risk involved, as per SGFI evaluation guidelines. Performance was assessed by a panel of three certified judges, and the final score for each participant was derived from the average of the scores awarded by all three judges. Each asana was allotted 10 marks, making the maximum possible score 100 marks per participant. The evaluation was conducted using standardized judging criteria commonly adopted in competitive yogasana, with emphasis on posture precision, balance stability, breath coordination, and overall presentation.

1.13 Limitations

During the investigation of talent identification model on yogasana players. Limitations occurs that are beyond the researcher's control and are restrict the methodology and outcomes of the study. These constraints have arisen from various sources and have influence the final results. Below are some key limitations that affected the study:

1. The lifestyle of yoga players, previous playing experience, and daily activities of the participants are considered limitations of this study, as they could not be controlled by the investigator.
2. Changes in atmospheric temperature, geographical conditions, humidity, and other meteorological factors during the investigation period could not be controlled by the investigator. These factors may have affected the performance of the sample, particularly during the summer season when data was collected.
3. Individual practice time, fitness levels, and skill levels of the players were not accounted for in this study.
4. The investigator did not employ any specific motivational strategies to enhance performance. The students were only informed about the research procedure and its significance.

1.14 Operational definition and explanation of terms

A thorough description of the technical words used in the research is referred to as an operational definition of terms.

Talent identification Model

Talent identification model is the process of finding young athletes who have the potential to become elite yoga athletes.

Potential predicator

Potential predictors are the identified component which will effectively search talent to become yoga player. Predictors refer to indicators that is suggest person likelihood of success in yogasana sports, in the context of talent identification these predictors are include physical attributes like flexibility, muscular endurance, balance, and yogasana performance.

Yogasana Players

In the present study yogasana players refer to district level participant engaged in competitive yoga actively practice and perform various yogic postures (asanas) as part of a structured competition framework, these practitioners often participate at the district level, where they refine their skills and techniques through rigorous training.

1.15 Significance of study

Yoga is a holistic practice that unites the body, mind, and spirit through physical postures, breath control, and meditation. “Yogasana is scheduled to be a demonstration event at the 2026 Asian Games in Aichi Nagoya, Japan, and is to be added as a medal event by 2030 with support from the Olympic Council of Asia. The Indian government also plans to introduce yogasana as a competitive discipline at the 2036 Olympic Games” (Singh 2024). However, a review of the literature shows a significant gap in knowledge. As of right now, there isn't a recognized model for identifying yogasana skill. Whereas numerous empirical investigations, research papers, and publications are available on talent identification models for various sports however yoga remains unexamined in this regard in light of this gap, the researcher aims to create a talent detection model to sub-junior male yogasana players. This initiative seeks to address the urgent need for a structured framework to identify and nurture talent in yogasana, thereby supporting its growth as a competitive sport and aligning with the broader goals set by the Indian government and the Olympic council of Asia. The development of a talent identification model for yogasana is essential to promote the sport globally, cultivate qualified instructors, and ultimately enhance India's representation in future international competitions. This absence highlights the need for focused research and development to support the growth of competitive yogasana at both national and international levels while physiological and cognitive benefits of yoga have been extensively studied, along with its role in managing various diseases and disorders, no research has been conducted that considers yoga within the context of competitive sports.

The proposed study on developing a talent identification model for yogasana players is significant for several reasons

1. The study will be helpful for the coaches and officials to select the best players for the yogasana competition using this model.

2. The findings of this study have to help the untrained athletes to select the yogasna activity according to their morphology.
3. Result of the study will help in preparing the training schedules or program more specific of yogasana players, coaches and practitioners in designing training programs with a focus on technical training enhancement that is improving yogasana efficiency.
4. The study will help in identifying the scientific domains and variables that predict yogasana performance.
5. Model will assist coaches and trainers in recognizing young athletes with the potential for competitive success
6. By focusing on specific anthropometric, physical, and physiological traits, the model will assist coaches and trainers in recognizing young athletes with the potential for competitive success. this systematic approach is lead to more effective talent scouting and development processes.
7. The study will inform the design of more effective training programs tailored to the unique demands of yogasana. coaches will gain insights into which attributes such as flexibility, strength, and endurance essential for performance. This targeted methodology able to enhance the overall training efficiency and effectiveness for young yogasana practitioners.
8. The findings from this research are guide policymakers in designing and implementing effective sports development programs, by understanding the key factors that influence success in yogasana.
9. The study supports broader social objectives related to health and wellbeing, engaging in yoga promote physical fitness, mental clarity, and emotional resilience among young individuals. This holistic development aligns with societal goals of promoting healthier lifestyles and nurturing well rounded individuals.

CHAPTER-II

REVIEW OF RELATED LITERATURE

CHAPTER-II

REVIEW OF RELATED LITERATURE

Conducting a review of relevant literature is a vital step in developing a comprehensive understanding of the research problem. By systematically collecting and analysing relevant materials, researchers gain a foundational understanding of the study topic and its broader context. This review not only reveals what has been previously explored in the field but also provides insight into existing theories, methodologies, and findings. Engaging with the current literature is essential for researchers, as it helps shape their perspectives and informs their research questions. Through synthesizing this body of work, researchers identify gaps, recognize emerging trends, and position their research within the larger academic discourse. The following sections present a detailed review of the relevant literature, setting the stage for the research to come.

2.1 Review pertaining of heredity and performance

2.2 Review pertaining to influence of physical attributes associated with performance

2.3 Reviews pertaining to importance of talent identification model

2.4 Reviews pertaining to talent identification model of different sports

2.1 Review pertaining of heredity and performance

Genetics significantly influences behaviour and success in sports, enhancing an individual's chances of achieving athletic goals when combined with a supportive environment while determination, commitment, and hard work are essential for success, research indicates that genetic factors have a more substantial impact than experiences or environments. “The relationship between genetics and elite athletic performance is complex, underscoring the importance of considering both genetic and environmental factors to fully understand the drivers of achievement in sports” (Bishop, 2019).

Bouchard et al. (1990) conducted a study on the role of genetic and environmental factors in physical performance using a twin study design to examine the heritability of various fitness traits. The results showed that both genetic and environmental influences play a significant role in physical performance. Heritability estimates indicated that genetic factors contribute notably to differences in endurance, strength, and flexibility. The research also highlighted the impact of environmental factors, such as training, lifestyle, and nutrition, in shaping athletic performance. This suggests a complex interaction between genetic predispositions and external influences. The authors concluded that physical performance is determined by a combination of inherent genetic factors and environmental influences, emphasizing the need to consider both when studying fitness. However, the study's reliance on twin data limits its ability to reflect the broader genetic diversity seen in larger populations, and it does not investigate the specific genetic mechanisms responsible for performance traits, an area which has advanced with the development of molecular genetics.

Janelle (1999) identified various genetic factors that contributed to skill development in specific sports. These factors included personality traits that allowed individuals to be competitive and self-disciplined, as well as physical characteristics such as body composition and physique. Additionally, essential motor skills like speed, power, agility, and flexibility were crucial for athletic performance. The ability to adapt to training and process information quickly to make decisions under pressure also played important roles. Lastly, overall health was vital for maintaining the stamina necessary for intense training and competition. Together, these genetic traits emphasized the complex nature of skill acquisition in sports, illustrating the connection between inherent qualities and success in competition.

Singer et al. (2000) noted that few individuals excelled in multiple sports at the same time. This could be due to genetic factors that favour specific sports or the practical constraints of dedicating enough time to training in more than one sport. Research involving twins and non-twin siblings, whether raised together or separately, has mostly been conducted to explore inherited traits. A clearer understanding of these differences can be achieved by calculating the heritability (h^2) statistic, which measures how much of the variation in a trait is due to genetic differences. A heritability value of 60% or higher is often seen as strong evidence for the genetic basis of that trait. This underscores the complex relationship between genetics and athletic specialization, suggesting that both genetic factors and environmental influences play a role in sports performance.

De Moor et al. (2007) explored the genetic factors influencing physical fitness and athletic performance, emphasizing that genetics contribute significantly to variations in traits such as cardiovascular endurance, muscle strength, and flexibility, with heritability estimates ranging from 30% to 80%. Their twin studies show that while genetic factors play a crucial role in athletic performance, environmental elements like training and lifestyle also exert a considerable impact, highlighting the importance of gene-environment interactions. The study suggests that multiple genes with small effects likely influence fitness, but it also points out the difficulties in pinpointing specific genetic loci due to the polygenic nature of athletic performance. While the research offers valuable insights into heritability, it does not delve into the molecular mechanisms or epigenetic factors, which are increasingly important in understanding performance. The paper calls for future research, particularly genome-wide and longitudinal studies, to better identify the genetic variants involved and their interaction with environmental factors over time.

Cameron et al. (2009) conducted a thorough review of the genetic factors influencing human growth, emphasizing the polygenic nature of growth traits and the significant role of gene-environment interactions. They explore how specific genes, such as those related to growth hormone receptors and insulin-like growth factor, contribute to growth variations, while also stressing the influence of environmental factors like nutrition and socio-economic status. The paper incorporates quantitative genetic methods, providing insights into heritability and evolutionary perspectives on growth patterns. However, it mainly focuses on research from Western populations, gives limited attention to the role of epigenetics, and does not fully address genetic mechanisms at different stages of development. Despite these gaps, the review offers important directions for future research, particularly in applying advanced genomic technologies to better understand the complex genetic foundations of human growth.

González-Freire et al. (2014) conducted research on the genetics of athletic performance, aiming to identify genetic variants associated with traits such as endurance, strength, and power. The study highlights important genes, including ACTN3, which is associated with muscle fibre composition and sprint performance, and ACE, which influences cardiovascular endurance. While genetics play a significant role in athletic abilities, the authors stress the importance of gene-environment interactions, noting that factors like training, nutrition, and lifestyle can influence genetic potential. They also point out the complexity of athletic performance, suggesting that it is influenced by numerous genes with small effects, making it difficult to identify specific genetic loci. The review emphasizes the need for more extensive genomic research and the combination of molecular genetics with environmental factors to gain a deeper understanding of the genetic foundations of athletic performance.

Yang (2017) investigated the connection between BDNF (brain-derived neurotrophic factor) gene polymorphisms and cognitive performance, emphasizing BDNF's role in neural development, synaptic plasticity, and memory. The review specifically examines variants of BDNF, such as the Val66Met polymorphism, which has been linked to variations in cognitive functions like learning, memory, and executive skills. The authors explore how genetic differences in BDNF may affect brain structure and function, with implications for both normal cognitive aging and neurological conditions. While the review highlights BDNF's significant influence on cognitive performance, it also acknowledges the complexity of these relationships, as the impact of BDNF polymorphisms may be influenced by environmental factors such as education, stress, and lifestyle. The study advocates for additional research to better understand the mechanisms connecting BDNF genetics to cognition and to examine how gene-environment interactions shape individual cognitive differences.

Wang (2018) examined the influence of genetic variation on athletic performance, focusing on key genes and their effects on traits like endurance, strength, and power. The review discusses various genetic variants, such as ACTN3, which is associated with muscle function and power, and ACE, which is linked to cardiovascular endurance. It emphasizes the polygenic nature of athletic performance, noting that multiple genes with small individual effects collectively contribute to athletic potential. While genetic factors are significant, the authors highlight the considerable impact of environmental factors, including training, diet, and lifestyle, on performance outcomes. The review also addresses the difficulty in identifying specific genetic variants due to the complex interactions between genes and environmental factors. It suggests that future studies should integrate molecular genetics with environmental factors to gain a deeper understanding of the genetic underpinnings of athletic performance.

Choi et al. (2020) provided a comprehensive review of polygenic score (PGS) methods, focusing on their increasing role in predicting complex traits within genomics. The paper explains the methodology behind PGS, which combines the effects of numerous genetic variants, each contributing a small impact, to estimate an individual's genetic predisposition for traits such as height, intelligence, and disease susceptibility. The authors discuss recent advancements in PGS, including improved statistical methods, larger sample sizes, and cross-population validation, which have enhanced their precision and applicability. They also highlight challenges, such as the limited explanatory power of PGS for many complex traits and the need for more extensive, diverse datasets to increase predictive accuracy. The review emphasizes the potential of PGS in precision medicine and genetic research while acknowledging the importance of addressing ethical issues and understanding the complex interactions between genetics and the environment.

Delgado et al. (2022) highlighted that nearly 200 genetic polymorphisms have been linked to various performance traits, with over 20 specifically associated with elite athletic status. However, despite these findings, the use of genotyping as a predictive tool for exercise performance is still in its early stages. Methodological challenges, such as inconsistent measurements of exercise performance phenotypes, complicate the interpretation of results and prevent the establishment of reliable conclusions. Additionally, many studies use small athlete cohorts, and the classification of athletes as elite can be questionable, leading to potential biases and expectancy effects. Recent developments in genetic analysis, such as total genotype scores (TGS) and genome-wide association studies (GWAS), have advanced the field by allowing researchers to move beyond individual genetic variants and examine broader pathways and systems linked to athletic performance. This review aims to synthesize evidence on the genetic factors influencing both endurance and power-based exercise, assessing the potential of genotyping to identify sports talent, enhance training strategies, and prevent exercise-related injuries. By addressing the methodological issues in previous studies, this chapter sets the groundwork for future research that could provide deeper insights into the complex relationship between genetics and sports performance.

2.2 Review pertaining to influence of physical attributes associated with performance

Cowart (1987) highlighted the significant role that genetics plays in determining aerobic capacity, exercise adaptation, and skeletal muscle composition. The research indicated that athletes with specific physical traits were more likely to achieve higher performance levels in different sports. This finding emphasized the importance of genetic factors in athletic success, suggesting that variations in individual physical characteristics can influence overall athletic potential and performance outcomes. These insights contributed to a deeper understanding of the biological factors underlying athletic achievement and the complex relationship between genetics and training in sports performance.

Bouchard et al. (1997) outlined the key characteristics of elite athletes in their study. They discovered that top athletes typically possess a range of advantageous traits, including morphological, physiological, metabolic, motor, perceptual, biomechanical, and psychological factors that align with the demands of their sport. Additionally, these athletes show remarkable adaptability to the continuous challenges of training and competition. The study also explored the role of genetics in physical activity levels, revealing that children of active parents were 5.8 times more likely to engage in physical activity themselves compared to those with inactive parents. These findings emphasize the complex interaction between genetic factors and environmental influences in shaping both athletic performance and participation in physical activity.

Folland et al. (2017) explored the link between muscle fiber composition and performance in endurance sports, highlighting how the type of muscle fibers plays a key role in determining an athlete's suitability for certain activities. The study found that endurance athletes typically have a higher proportion of slow-twitch (Type I) fibers, which are more efficient at using oxygen and supporting sustained, low-intensity exercise. In contrast, sprinters and power athletes often have more fast-twitch (Type II) fibers, which are better suited for short bursts of high-intensity, anaerobic efforts. The review also examined the genetic factors influencing muscle fiber composition and how differences in fiber distribution can impact performance in endurance events such as long-distance running and cycling. Ultimately, Folland et al. (2017) emphasized the importance of muscle fiber traits in endurance performance and noted that training could potentially influence fibre composition, contributing to improved athletic outcomes.

Mujika et al. (2018) explored the impact of height and body composition on sports performance, emphasizing that these physical characteristics are important indicators of success in different athletic fields. The review pointed out that taller athletes often have an advantage in sports requiring extended reach or leverage, such as basketball, volleyball, and swimming. Additionally, body composition—particularly lean muscle mass and low body fat—was identified as crucial for optimizing strength, speed, and endurance across various sports. The authors also noted that the ideal body composition for an athlete depends on the specific demands of their sport, with endurance athletes benefiting from a leaner physique and strength athletes requiring greater muscle mass. Ultimately, they concluded that while height and body composition play significant roles in performance, sport-specific needs and proper training can also affect how these attributes contribute to athletic success.

Halson (2019) explored the significance of aerobic fitness in enhancing endurance performance, with particular emphasis on maximal oxygen uptake (VO_2 max) as a major physiological determinant. While VO_2 max has long been associated with the capacity to sustain high-intensity efforts over extended periods, its direct impact on yogasana where the focus lies more on static postural control, balance, flexibility, and neuromuscular coordination appears limited. Nonetheless, certain competitive forms of yogasana, such as artistic and rhythmic categories, may benefit from a well-developed aerobic system due to the continuous and synchronized nature of movements. Halson also pointed out that although VO_2 max can be improved through training, genetic predispositions significantly influence an individual's baseline capacity. This insight reinforces the importance of integrating both trainable and innate physiological traits into talent identification models for yogasana. Additionally, while concepts like lactate threshold and movement economy were discussed in the context of endurance sports, their relevance in yogasana contexts remains underexplored, indicating a clear need for sport-specific performance research. Such gaps underline the necessity of developing discipline-specific predictors rather than solely relying on endurance-based indicators.

Thompson et al. (2020) explored the effects of strength training on athletic performance, stressing its importance in improving both power and endurance across various sports. The authors pointed out that strength training not only boosts maximal strength but also enhances the rate of force development, which is essential for sports that involve explosive movements, such as sprinting, football, and weightlifting. The review also highlighted the role of strength training in injury prevention, noting that stronger muscles and connective tissues can help reduce the risk of common sports injuries. Additionally, they discussed how strength training improves muscle endurance, agility, and overall movement efficiency, benefiting athletes in both anaerobic and aerobic sports. The study concluded that strength training is a crucial element of a comprehensive athletic training regimen, enhancing performance, minimizing injury risk, and supporting long-term athletic development.

Taylor et al. (2022) explored the essential connection between agility and decision-making in team sports, emphasizing the impact of both physical and cognitive factors on performance. The study highlighted that agility, which refers to the ability to change direction quickly while maintaining speed, is not just a physical attribute but is also strongly linked to an athlete's cognitive ability to process game-related information rapidly. The research revealed that athletes who combine high agility with quick decision-making tend to excel in dynamic team settings like soccer and basketball. These findings stress the importance of incorporating both agility training and cognitive exercises that improve reaction times and decision-making abilities into sport-specific training routines. This combined approach can offer athletes a competitive edge by enhancing their overall performance, particularly in fast-paced, high-intensity situations.

Lee et al. (2023) investigated the role of flexibility in performance in dynamic sports, focusing on how it enhances movement efficiency and helps prevent injuries. The study found that increased flexibility, especially in the lower body, improves performance in sports requiring quick direction changes, such as soccer, basketball, and gymnastics. However, the research also pointed out that too much flexibility, particularly in muscles like the hamstrings, could hinder sprinting and power-based movements. These results suggest that flexibility training should be customized to the sport's specific needs, promoting functional flexibility that enhances both mobility and explosive power while reducing the risk of overstretching that could negatively impact strength-related activities.

2.3 Reviews pertaining to importance of talent identification model

Gimbel (1976) proposed that three key factors were essential for detecting talent: trainability (the ability to react to and benefit from training), motivation, and physiological and morphological traits. He highlighted the importance of genetic factors in predicting talent, but also stressed that favorable environmental conditions were needed to fully realize genetic potential; without these, the talent could be hindered. Gimbel’s framework included four stages, with the expectation that an athlete would reach peak performance between the ages of 18 and 20 after a decade of intense training. He suggested that athletes should be identified at ages 8 or 9. The first phase involved assessing psychological, physical, and morphological characteristics. In the second phase, these factors were applied to children to gather data that would inform their developmental recommendations. The third phase emphasized ongoing participation by the young athletes for 12 to 24 months. Upon completing this monitoring period, a prognosis was made regarding their future chances of success. One advantage of this model was its ability to account for late bloomers. Gimbel also identified three reasons why previously identified talented athletes might fail to reach their potential: neglect of psychological factors in the prediction process, discrepancies between biological and chronological age, and issues with the validity, reliability, or objectivity of the tests used in the studies.

Harre (1983) proposed a model suggesting that the only way to assess if an active, energetic child has the necessary traits for future success is through training. He recommended selecting a large group of athletes to undergo training as the initial step. Harre outlined four key principles for talent identification. The first principle stated that children should be evaluated using both general and specific methods. Generally, children displaying overall athletic abilities such as height, weight, speed, endurance, coordination, and versatility should be chosen at a particular stage. These individuals should then be categorized according to their skill in specific sports, based on their performance level, rate of improvement, and ability to maintain performance under various conditions. The second principle emphasized that talent identification should focus on factors largely influenced by genetics. The third principle highlighted the need to assess characteristics in relation to biological development, paying particular attention to biological age and developmental stages. The fourth principle argued that solely relying on physical, psychological, and social characteristics is ineffective, and that other factors should be considered for a more comprehensive understanding.

Bompa (1985) suggested that talent identification should focus on three key factors: morphological traits, physiological abilities, and motor skills, which include perceptual and motor abilities, endurance, strength, and power. He also recommended that talent identification should involve comparing the profiles of young individuals with those of elite athletes. The first phase of this model occurs between the ages of 3 and 8, during which general information about physical development and health is gathered through a medical examination. Bompa emphasized that three phases should be considered when identifying talent: the primary phase, secondary phase, and the third phase. The secondary phase, considered the most critical, takes place during puberty, where athletes who have been consistently training are evaluated for functional and biometric parameters. Additionally, it is during this phase that psychologists are introduced to create psychological profiles for the athletes.

Abbott et al. (2005) emphasized the importance of early talent identification in any field of performance. Their research points out that countries like Germany and the Soviet Union have traditionally selected talented individuals by considering both physical characteristics and performance indicators. This method highlights the need for a structured evaluation process to identify potential talent, ensuring that resources are allocated to individuals who show the ability to achieve at a high level. Such practices have served as a model for developing effective talent identification strategies in sports and other performance-based areas.

Pearson et al. (2006) highlighted the importance of identifying talent at the earliest age to optimize resource use and achieve the best possible outcomes. They stressed that for a talent identification system to be effective, it must include a testing method that is both comprehensive and reliable. This approach enables a thorough assessment of the various factors contributing to athletic potential, making the talent identification process more efficient. By focusing on early identification and using solid testing procedures, organizations are better equipped to nurture and develop emerging talent in sports.

Reilly et al. (2020) advocated for a comprehensive approach to talent identification (TID) in team sports, recommending the inclusion of physical, psychological, and cognitive evaluations to identify athletes with high performance potential. Their research points out the shortcomings of traditional TID models that focus mainly on physical traits, suggesting that decision-making, game intelligence, and mental resilience are also key factors in an athlete's success at elite levels. The study stresses the need for a multi-dimensional approach, where talent is assessed not only through physical tests but also by evaluating tactical knowledge, mental toughness, and adaptability in competitive environments. By integrating these aspects, TID systems can more accurately predict long-term success and better prepare athletes for the challenges of high-level team sports.

Coutts et al. (2021) examined how integrating long-term athlete development (LTAD) frameworks with talent identification (TID) can promote a more comprehensive and sustainable approach to athlete growth. They emphasized the importance of multi-sport participation during the early stages of development, advocating for young athletes to engage in various sports before focusing on one. This approach helps to build overall athleticism, reduces the risk of burnout, and supports long-term performance gains. The research highlights that participating in multiple sports allows athletes to develop a wider range of skills, such as coordination, agility, and decision-making, which are applicable across different sports. By combining TID practices with LTAD principles, the authors suggest that sports organizations can better foster the growth of well-rounded athletes, ensuring they are physically and mentally prepared for the challenges of elite competition. This approach challenges the conventional emphasis on early specialization and stresses the significance of gradual development and personalized training paths.

Ford et al. (2022) conducted a long-term study on the effects of a multi-sport approach in youth talent identification (TID), highlighting the long-term advantages of allowing young athletes to experience a variety of sports before focusing on one. Their findings showed that athletes who participated in multiple sports during their developmental years demonstrated superior overall athleticism, including enhanced motor skills, coordination, and a lower risk of injury, compared to those who specialized early. The research stressed that a multi-sport approach promotes both physical and cognitive adaptability, helps prevent burnout, and reduces the risk of overuse injuries, fostering long-term athletic progress. By incorporating this strategy into TID practices, sports organizations can identify athletes with a wider skill set and greater potential for success in their chosen sport. The study suggests that early specialization may hinder future growth and peak performance.

McCarthy et al. (2022) investigated the risks associated with early talent over-selection in youth sports, stressing the negative effects of prematurely identifying and specializing young athletes based on early physical performance. Their research highlights that such over-selection may result in the exclusion of late-blooming athletes who might not display immediate high potential but could develop into elite performers over time. The authors argue that early over-selection often leads to increased pressure, early specialization, and burnout, which can hinder long-term development and raise the risk of injuries. The study advocates for a more inclusive approach to talent identification that prioritizes long-term potential rather than early success. It calls for a reassessment of current TID practices to prevent biases toward early-maturing athletes and to better support continuous athletic growth.

Gilbert and Trudel (2023) investigated the socio-economic and cultural biases present in talent identification (TID) processes, highlighting how these biases can influence the fairness and inclusivity of athlete selection. Their research points out that TID systems often favor athletes from privileged backgrounds, who have better access to resources like high-quality coaching, training facilities, and specialized programs. The authors argue that these biases limit the opportunities for talented individuals from underrepresented socio-economic and cultural groups, reducing diversity in elite sports. The study advocates for more equitable and inclusive TID practices, calling for policies that consider these external factors to ensure talent is recognized based on merit, rather than access to resources, and that athletes from all backgrounds are given the opportunity to reach their full potential.

2.4 Reviews pertaining to talent identification model of different sports

Frya et al. (1991) conducted research to explore how various anthropometric factors might influence success in bodybuilding. Their study involved 36 male bodybuilders who were not yet considered elite competitors at the time. The findings revealed that the more successful bodybuilders were generally younger, had lower body weights, and showed reduced fat-free mass. Additionally, they had smaller skeletal dimensions compared to those typically recognized as elite in previous studies. When the bodybuilders were divided into successful and unsuccessful groups based on their competition outcomes, a multiple discriminant analysis identified several important factors—such as height, body fat percentage, and the ratios of biacromial to bi-iliac diameter, torso length to height, and chest to abdominal circumference—that accounted for 80.6% of the variation in performance. These results suggest that a significant portion of bodybuilding success can be attributed to easily measurable physical characteristics, underlining the importance of anthropometry in understanding achievement in the sport.

Keogh (1999) conducted a study to explore how anthropometric data and physical fitness assessments could predict selection for an elite under-18 Australian rules football team. The aim was to determine whether these physical measurements and fitness test results could differentiate between players chosen for the team and those who were not. Before selecting the 30 players for the upcoming season, a training squad of 40 players underwent a series of standard anthropometric and fitness tests. The results showed that the players selected for the team were significantly taller and had greater upper body strength than those not chosen ($p < 0.05$). A discriminant analysis demonstrated an 80% accuracy rate in predicting whether players would be selected. This suggests that both physical fitness and anthropometric characteristics are important factors in the selection process for top junior Australian rules football teams. Interestingly, the discriminant model was more accurate at predicting which players would not be selected (90.9%) than identifying those who would be chosen (75.9%). Additionally, the selected players under 18 had fitness levels comparable to elite senior players, including similar values for height and flexibility, but were still lower than older players in terms of bench press strength and body mass.

Frank et al. (2000) examined the anthropometric and physiological traits of soccer players to understand how these factors contribute to talent detection, identification, and development. The study stresses that soccer's physical demands are diverse, requiring players to excel in multiple areas, even though exceptional skill in any single physical domain is not necessarily required. Instead, players need to maintain a high level of overall fitness across various physical attributes. This need for well-rounded proficiency helps explain the individual differences in the anthropometric and physiological characteristics of elite players. The researchers assessed these characteristics across a wide age range, from youth to adults. They found that a player's physical capabilities are closely associated with their position on the field. For example, midfielders and full-backs tend to have the highest oxygen intake and excel in tests involving intermittent efforts, while midfielders generally show lower muscular strength levels. These positional differences are seen in both adult and elite youth players, leading to a more cautious approach in talent identification and development. The study also highlights that numerous anthropometric and physiological factors should be considered, some of which are heavily influenced by genetics (such as height and maximal oxygen intake), while others are shaped by environmental influences and training. As a result, fitness profiling has proven to be a valuable tool for tracking gifted athletes. In conclusion, the research found that anthropometric and physiological standards play a vital role in monitoring promising young athletes, yet no single method can fully assess a player's physical abilities in soccer, underscoring the complexity of talent identification in the sport.

Gabbett (2000) conducted research to assess the physiological attributes of senior rugby players and sub-elite junior league players. The athletes were evaluated using several metrics, such as body mass, muscular power (measured by vertical jump), agility (tested via the Illinois agility run), and maximal aerobic power (determined through treadmill running). The study revealed that an individual's physiological abilities improve with more playing experience. Additionally, Gabbett highlighted the significance of using a blend of physical, physiological, sociological, and personal factors to evaluate athletic potential. This holistic approach emphasizes the complexity of rugby performance and the importance of comprehensive strategies for talent identification and development.

Paul (2000) conducted a study to examine the relationships between various anthropometric and kinematic factors and ball release speed in nine college fast-medium bowlers (mean age: 21.0 ± 0.9 years, body mass: 77.2 ± 8.1 kg, height: 1.83 ± 0.1 m). The bowlers were measured, and their movements were three-dimensionally reconstructed. A speed check TM personal sports radar (Tribars Industries, Canada) was used to measure ball release speeds. Pearson's product moment correlation coefficients were employed to analyse the relationships between anthropometric and kinematic factors and ball release speed (r). Significant correlations were found between horizontal velocity during the pre-delivery stride ($r = 0.728$, $p < 0.05$) and ball release speed (31.5 ± 1.9 m/s). The study also revealed that the differences in repeated measurements of all anthropometric variables followed a normal distribution ($p = 0.29$), with a systematic bias and limits of agreement of 0.15 ± 2.2 mm. Similarly, the right elbow displacement differences were normally distributed ($p = 0.09$), with systematic bias and agreement bounds of 0.01 ± 0.049 m. Strong correlations were observed between ball release speed and shoulder-wrist length (661 ± 31 mm; $r = 0.626$, $p < 0.05$) and total arm length (860 ± 36 mm; $r = 0.583$, $p < 0.05$), even though wrist motion was not analyzed due to insufficient frame rates. The study concluded that the radial length difference between the axis of rotation at the glenohumeral joint and the release point accounts for variations in ball release speed within the group.

Pramanick (2002) conducted a study to predict badminton playing skill by analyzing the anthropometric measurements of 25 players from international, national, and state levels. The measurements included height, weight, arm length, leg length, trunk length, hand girth, thigh girth, calf girth, shoulder width, and age. The experts assessed playing ability based on their personal preferences. The findings, derived from Pearson Product Moment Correlation (PPMC), multiple correlations, ANOVA, and multiple regressions, indicated that arm length, trunk length, and height are significant factors for predicting badminton playing ability.

Elferink et al. (2004) explored the connection between performance levels and various factors, including anthropometric, physiological, technical, tactical, and psychological traits, in a sample of 126 high-level field hockey players. The sample included 63 male players (average age 13.9 years, $SD = 1.4$, age range: 11-16) and 63 female players (average age 13.9 years, $SD = 1.3$, age range: 12-16). Additionally, the study focused on 38 elite players (average age 13.2 years, $SD = 1.3$) and 88 non-elite players (average age 14.2 years, $SD = 1.3$). Using MANCOVA, with performance level as the factor and age as the covariate, the study found that elite players outperformed non-elite players in technical skills (e.g., dribbling performance and shuttle run tests), tactical understanding (e.g., ball possession and non-possession strategies), and psychological factors, especially motivation. Among the key differentiating factors, motivation levels, slalom dribbling ability, and ball possession techniques were identified as the most important. Additionally, age was a contributing factor, as elite players tended to start their careers at a younger age than non-elite players. The results highlight the importance of focusing on tactical skills, motivation, and specific technical abilities in talent development programs for field hockey players.

Pyne et al. (2006) conducted a study on junior and senior male cricket fast bowlers to examine the relationship between anthropometric factors, isoinertial parameters, and bowling speed. On the same day, a full anthropometric profile, various isoinertial tests for the upper and lower body, and peak bowling speed were assessed. The findings showed that senior bowlers had faster bowling speeds due to their larger estimated muscle mass and better performance in tests such as the bench press throw, deltoid throw, static jump, and arm length. For junior fast bowlers, the best predictors of bowling speed were static jump, body mass, percentage of muscle mass, and height. However, legged movement jumps were negatively correlated with both junior and senior bowlers' speeds.

Gabbett et al. (2007) conducted a study to develop a talent identification model for volleyball players, distinguishing between selected and non-selected athletes. The model was based on a combination of physiological, anthropometric, and skill assessments to differentiate players of varying abilities. The study involved 28 volleyball players who participated in the talent identification program. These players underwent measurements of stature, standing reach, body mass, skinfold thickness, and various performance tests, including the overhead medicine ball throw, vertical jump, spike jump, 5-m and 10-m speed, agility, maximal aerobic power, as well as assessments of passing, setting, serving, and spiking technique and accuracy. The results revealed that passing and serving technique were the most significant predictors in the model, demonstrating the strongest ability to discriminate between selected and non-selected players.

Hadavi et al. (2009) developed a multifactorial model for talent identification and tested it with 38 randomly selected Iranian coaches to examine the challenges they face in selecting athletes for sports competitions. To achieve this, they used a self-designed questionnaire to collect data on various factors related to athletes, including physiological, cultural, psychological, anthropometric, and sociological aspects. The model is structured in three stages: initial selection, general testing, and specialized testing. Each stage is aimed at assessing whether a young athlete is suitable for track and field or demonstrates exceptional talent in the sport.

Mohamed et al. (2009) conducted a study to examine the key morphological and fitness measurements of two groups of young handball players to develop a talent identification model. The first group, under 14 years old, served as the reference, while the second group consisted of players under 16 years old. The results indicated that players in the under-16 group were significantly taller than those in the reference group. However, this difference was not observed in the under-14 players. Additionally, the study found that physical fitness levels were notably higher in the under-16 group compared to the reference group. Using MANCOVA, the results were clear, although no significant differences were found in flexibility, balance, upper limb speed, or upper body muscular endurance. Discriminant analysis identified height, running speed, and agility as the most critical factors for determining athletic talent, whether the players were exceptional or not. Moreover, various performance and anthropometric metrics proved useful in identifying talent in younger handball players.

Gray, H. J. (2010) examined the challenges in athletic talent identification, highlighting issues such as ineffective talent identification methods, inadequate coach and teacher training, lack of emotional and informational support, pressure, and poor coaching relationships. The study also identified significant barriers in recognizing athletic talent in young athletes. Based on the findings of 37 studies, it was noted that children who recognize their high talent levels are more likely to remain engaged in sports. However, there has been limited research in recent decades, preventing a clear understanding of the science behind talent discovery and development. It was suggested that when identifying talent, it is essential to consider factors like anthropometric measurements (e.g., femur or humerus size), motor skills (such as speed, agility, endurance, and ball handling), and psychological traits.

Natarajan, P. (2010) conducted a study aimed at predicting handball playing ability based on various anthropometric, physiological, and physical factors. The study involved 100 male college handball players aged 17 to 25, who voluntarily participated. Their playing ability was subjectively evaluated by three experts during match situations. The research found that anthropometric factors such as height, arm circumference, arm length, and hand span were effective predictors of handball skill, as determined through multiple regression analysis. In addition, physiological variables, including vital capacity, resting pulse rate, mean arterial blood pressure, and breath-holding time, were examined, with vital capacity being identified as the most significant predictor of playing ability. Physical attributes, such as hand grip strength, leg strength, endurance, speed, and agility, were also evaluated, with speed emerging as the most important predictor. Overall, the study highlighted the crucial role of these diverse factors in determining handball performance.

Till et al. (2011) conducted a study on junior rugby players to explore how anthropometric characteristics could predict team selection. The objective was to assess whether there were differences in performance and anthropometric traits between regional and national-level players. Key parameters included VO2 max, chronological age, body mass, 20m sprint time, height, sum of four skinfolds, and sitting height. The study concluded that performance characteristics varied between the two levels, with physical factors like 20m sprint times only partially explaining the selection of higher-level players.

In recent years, the connection between anthropometric, physical, and physiological measures and athletic performance has become a major focus in sports science. Kalidasan (2011) conducted an important study on intercollegiate handball players to examine how these factors relate to playing ability. The study involved 158 players, with measurements taken for various body dimensions, including body weight, standing height, arm length, arm span, leg length, hand length, hand breadth, palm length, and palm breadth. Additionally, the researchers recorded breadth measurements of the humerus and femur, as well as girth measurements for the arm (relaxed and flexed), forearm, chest, waist, and hip. Physiological attributes were assessed through measures such as vital capacity, resting heart rate, diastolic and systolic blood pressure, peak expiratory flow rate, and breath-holding time. Physical abilities were tested using speed, agility, flexibility, leg explosive power, and muscular strength. The results revealed a significant correlation ($r = 0.41$) between these variables and the playing ability of handball players. Key factors influencing performance were identified, including arm span, diastolic blood pressure, palm span, peak expiratory flow rate, resting heart rate, palm length, flexibility, systolic blood pressure, agility, leg explosive power, and breath-holding time. This research highlights the complex nature of athletic performance and emphasizes the need for a comprehensive assessment of physical characteristics to predict success in sports, particularly handball. Kalidasan's study provides valuable insights for further investigation into how physical attributes influence athletic performance in team sports.

Chandrasekaran (2011) conducted a study to examine how anthropometric factors are related to the playing positions of top basketball players. A total of 226 players from 23 different states participated in the study, which divided them into three groups based on their playing positions: guard (Gd=72), forward (Fd=72), and centre (Cr=72). The anthropometric measurements taken included body weight, skinfold thicknesses (biceps, supraspinal, triceps, abdominal, and iliac crest), girth measurements (arm girth relaxed, arm girth flexed, and calf girth), and length measurements (standing height, arm span, arm length, and leg length). The study found a strong correlation between height, weight, arm length, arm span, leg length, and flexed arm girth across all playing positions (guard, forward, and centre), a conclusion shared by most participants in the study.

Rabada et al. (2011) developed a model for middle-distance and long-distance runners based on their physiological characteristics. To carry out the study, they performed breath-by-breath expired gas analysis, which enabled the measurement of maximal oxygen uptake (VO2 max) and two ventilatory thresholds (VT1 and VT2). The model revealed that long-distance runners had higher VO2 max values relative to their body mass and at intensities corresponding to both VT1 and VT2, compared to middle-distance runners.

Emmanuel, A. (2012) conducted a study to predict the hockey playing ability of 100 university players by examining various biochemical (such as high-density lipoprotein, low-density lipoprotein measured using a biochemistry analyzer model RA-50 in mg/dl), physiological, and psychological factors (including resting pulse rate and vital capacity). The players' skills were evaluated based on expert opinions using a pre-established grading system. After performing multiple regression analysis, the results indicated that factors such as resting pulse rate, vital capacity, high-density lipoprotein, and low-density lipoprotein were significantly related to playing ability and could be used to predict performance in hockey.

Dachen (2012) developed a talent identification model in the sport of archery by studying 157 national-level archers from various sports academies across the country. The analysis considered several independent variables, including physical fitness (such as right-hand and left-hand grip strength, back strength, leg strength, arm and shoulder strength, abdominal strength, arm and shoulder flexibility, and trunk flexibility), physiological variables (like breath-holding capacity, resting pulse rate, resting respiratory rate, and vital capacity), as well as anthropometric variables (including height, weight, arm length, leg length, shoulder width, and arm span). Archery performance was assessed based on the total points scored from 36 attempts. Using factor analysis, t-ratio analysis, and discriminant analysis, the study identified that factors such as arm and shoulder strength, resting pulse rate, breathing rate, and vital capacity were key differentiators between high-performance and lower-performance archers.

Clark (2012) found that young children identified as exceptionally talented in sports often face significant pressure to excel, which can lead to a reluctance to participate in individual sports. This pressure comes from the expectation to perform well and the belief that the activity should be about achieving excellence rather than enjoyment. The transition from lower to upper secondary school is a critical period for determining whether girls will continue their involvement in sports or physical activities. This shift is influenced by various factors, such as increased attention from boys focused on their appearance. Clark suggested that many students lose interest in athletics once they move to secondary school.

Carlos E. B. G. et al. (2012) highlighted that one of the biggest challenges in sports science research is recognizing the role of anthropometric variables in identifying and nurturing talent. While many children engage in sports, only a small fraction reach the highest levels. The deliberate practice hypothesis argues that expertise is developed through sustained effort, rather than being innate, suggesting that individuals are selected for sports based on specific attributes and can achieve excellence through dedicated practice and training.

Marefat, et al. (2013) examined the anthropometric and body composition profiles of artistic and trampoline gymnasts in Ardabil. The study involved 47 male gymnasts, divided into two groups: 31 artistic gymnasts with an average age of 12.6 ± 3.1 years and 16 trampoline gymnasts with an average age of 13.3 ± 3.4 years. Various measurements were taken, including height, weight, waist-to-hip ratio, body fat percentage, body segment lengths, and body circumferences, following standardized procedures. Results revealed that artistic gymnasts tended to have lower height, weight, and other anthropometric measures than trampoline gymnasts. Significant differences were noted between the groups for head diameter ($P = 0.006$), knee circumference ($P = 0.032$), and upper body length ($P = 0.035$). The findings highlight the importance of anthropometric data in the talent identification process, as well as its relevance to coaches when designing training programs focused on improving strength, power, and endurance in gymnastics.

Sultana, D. et. al. (2013) used the Talent Identification Model (World Beater Talent Test) to predict athletic potential in 156 boys, aged 12 to 14, from Tirunelveli, Tamil Nadu. These boys were already recognized for their athletic talent. Based on multiple regression analyses, the researchers found that inherited factors such as strength, speed, power, and coordination were the most significant predictors of athletic ability.

A.DI Cranioventrally, et. al. (2014) conducted a study to examine the jumping ability and physical traits of rhythmic gymnasts, aiming to identify key markers useful for talent identification. The study involved 25 national-level gymnasts, aged between 14.7 and 22.2 years, who participated in anthropometric assessments, vertical jump tests (countermovement jump and hopping test), and evaluations of three types of split leaps (SL), ring leaps (RG), and back bends of the trunk (BBT). The elite group showed notable differences compared to the sub-elite group in certain measures, such as height (1.65 ± 0.03 m vs. 1.55 ± 0.09 m), thigh length (0.42 ± 0.03 m vs. 0.39 ± 0.02 m), and fat-free mass (42.42 ± 2.81 kg vs. 35.84 ± 5.66 kg), with a significance level of $p < 0.05$. While there were no significant differences between the two groups in the countermovement jump, elite gymnasts outperformed their sub-elite counterparts in the hopping test (0.34 ± 0.05 m vs. 0.27 ± 0.04 m; $p < 0.05$). A significant correlation ($p = 0.01$) was found between the hopping test's ground contact time and the performance in SL ($r = 0.613$), RG ($r = 0.632$), and BBT ($r = 0.542$). Further analysis indicated that the hopping test's ground contact time was the most influential factor for these technical leaps, accounting for 26-37% of the variation. The researchers concluded that specific anthropometric measurements, alongside muscle stiffness (as assessed through the hopping test), could reasonably predict performance outcomes in rhythmic gymnastics.

Pawar (2015) conducted a study that analyzed the anthropometric and physical characteristics of volleyball players across different positions, including Attacker, Blocker, Universal, Setter, and Libero. A profile database was created to compare these traits among male volleyball players. The research involved 104 male players from national and international teams, specifically 34 attackers aged 19 to 33, 20 middle blockers, 16 setters, 18 universal players, and 16 liberos. Various measurements were taken, such as height (HT), weight (WT), arm length (AL), hand length (HL), palm width (PW), arm girth relaxed (AGR), arm girth flexed (AGF), forearm circumference (FAC), wrist circumference (WC), chest circumference (CC), thigh circumference (TC), calf circumference (CFC), ankle girth (AG), and leg length (LL). Descriptive statistics were used to summarize the data. One-way ANOVA was performed with a significance level of 0.05 to determine the differences in measurements across playing positions. The results showed significant differences in ankle girth, forearm circumference, wrist circumference, calf circumference, leg length, foot length, speed, shoulder strength, and explosive leg strength (ELS) among the positions. However, no significant differences were found in arm girth relaxed, chest circumference, thigh circumference, or agility. The study concluded that height, arm length, palm width, forearm diameter, wrist circumference, leg length, speed, flexibility, and body composition were important predictors of a player's position in volleyball.

Asteya (2016) developed a talent identification model for squash players, selecting 86 male participants for the study. Data were collected from squash academies nationwide, focusing on 30 physiological, physical, anthropometric, and psychological variables. These included resting heart rate, respiratory rate, oxygen consumption, peak expiratory flow rate, aerobic capacity, grip strength, strength endurance, agility, flexibility, shoulder flexibility, and mental toughness. A specific test battery was created to assess each of these variables, with factor loading and Cronbach's alpha used to evaluate the reliability of the factors, which encompassed back strength, motivation, and grip strength.

Bagchi (2016) created a discriminant model to identify cricket players based on their anthropometric and physical characteristics. The sample consisted of 210 male cricketers from six academies in West Bengal and Odisha, all with at least six years of playing experience. The participants were grouped into three categories based on their playing positions: Batsmen, Spinners, and Pace-Bowlers. A purposive sampling method was used to select the sample. The researcher identified twelve predictor criteria, which were chosen based on previous research, professional input, available resources, and academic expertise. These criteria included height, acromial diameter, hand and leg length, and shoulder width, along with physical traits such as speed, agility, leg power, explosiveness, leg strength, and hand grip strength. Statistical software (SPSS 20) was used to build a multiple discriminant model that met most criteria, except for the assumption of homogeneity of variances/covariances, which was found to be violated. The model explained only 38.44% of the variance in Function 1 and 14.06% in Function 2 across the three groups of cricketers, indicating limited predictive accuracy. The model misclassified Spinners as Batsmen (25.7%) and Pace-Bowlers (50.0%), while correctly identifying 64.8% of the original groupings. The researcher then focused on distinguishing between Batsmen and Pace-Bowlers. In this refined model, the homogeneity assumption was not violated, and 53.14% of the variance was explained. The model correctly classified 82.1% of the initially grouped samples.

Hanjabam, B. S., et. al. (2017) concluded that bio-motor abilities, such as optimal strength and flexibility, can be predicted by anthropometric factors. These factors contribute to improved performance and reduce the likelihood of injury in field hockey. The study revealed that taller players with wider chests, hips, longer limbs, greater hand lengths, body weight, fat-free mass, and body mass index (BMI) tended to have better upper limb strength, back strength, endurance, flexibility, and lower limb strength. Moreover, a positive correlation was found between percentage body fat, BMI, and fat-free mass. The research suggests that anthropometric traits, especially body breadths, heights, and body composition, can serve as valuable tools for identifying talent in the sport.

Mkaouer Bessem et al. (2018) conducted a study to identify the specific physical and foundational gymnastics skills critical for talent identification and the improvement of performances in men's artistic gymnastics. The study, published in a scientific journal, focused on male artistic gymnasts. The research involved 51 boys from a provincial gymnastics team, all of whom were frequent national-level competitors. Their ages ranged from 11.03 to 0.95 years, heights from 1.33 to 0.05 meters, body mass from 30.01 to 5.53 kilograms, and body mass index (BMI) from 16.89 to 3.93 kg/m². To assess the participants' somatic and physical fitness profiles, anthropometric measurements and the men's artistic gymnastics physical test battery, based on the International Gymnastics Federation (FIG) age group development program, were used. The evaluation focused on muscular strength, flexibility, speed, endurance, and power output. A principal components analysis was conducted on the data to identify the key factors that best represented overall performance. The study found that power speed, isometric and explosive strength, strength endurance, and dynamic and static flexibility were the most important physical attributes for selecting young male artistic gymnasts. These findings are crucial for the identification, selection, and development of gymnastics talent, highlighting their significant role in the talent identification process.

Kusnanik N. W. (2018) conducted a study aimed at identifying talented young sprinters using a distinguishing factor. The research was conducted in three phases: creating an initial item pool, screening this pool, and testing the equipment with both small and large sample sizes. The first phase involved screening the initial set of items. The study participants were male elementary school students, aged between 11 and 13, all from the same school. Data collection included anthropometric measurements (such as standing height, sitting height, body mass, and leg length) as well as fitness assessments (a 40-meter sprint for speed, a shuttle run for agility, a standing broad jump for power, and a multistage fitness test for endurance). Discriminant factor analysis was applied to the data. Based on the results, the researchers identified five key indicators of a young sprinter's potential: sitting height, body mass, leg length, performance in the 40-meter sprint, and the multistage fitness test. The equation derived from the study was: D = -24.497 - (0.155 sitting height) - (0.080 body mass) - (0.148 leg length) - (-1.225 40m sprint) + (0.563 MFT). The findings concluded that both the selected test instruments and the discriminant model developed in the study are effective in identifying young individuals with potential to excel in sprinting.

Kumar (2019) conducted a study to compare the aerobic capacities of high- and low-performance female basketball players, focusing on parameters such as Forced Vital Capacity (FVC), Peak Expiratory Flow (PEF), and Maximum Oxygen Consumption (VO2 Max). The aim was to establish criteria for classifying female basketball players into high- and low-performance groups using discriminant analysis based on these aerobic capacity measures. The study involved 48 female basketball players who participated in the 2018 West Zone and All India University Championships. Data were collected from the top two teams in the All-India University Tournament and the lowest two teams in the West Zone Intercollegiate Tournament. The players were divided into two groups: high-performance and low-performance players. When comparing the mean values of the three aerobic capacity parameters, high-performance players showed significantly higher results than their low-performance counterparts. Using a discriminant model based on these aerobic measures, the players were categorized into high and low-performance groups. The discriminant function created was: Z = -13.816

+ 1.20 (FVC) - 0.11 (PEF) + 0.190 (VO2 Max). The model correctly classified 85.4% of the sample. The study clearly demonstrates the differences in aerobic capacity between athletes of varying performance levels and emphasizes the importance of aerobic capacity in selecting both beginner and expert level basketball players.

Jiao et al. (2021) developed an AI-based model for identifying football talent, using machine learning algorithms to analyse extensive datasets of player performance, physical characteristics, and injury histories. Their model illustrates how AI can identify promising players by detecting patterns in data that traditional scouting methods may overlook. By leveraging advanced analytics, this approach offers a more accurate, data-driven method for assessing players' potential for future success. The study underscores the increasing importance of artificial intelligence in sports talent identification and provides valuable insights into how similar AI-driven techniques could be applied to yogasana for predicting and developing talent based on various performance metrics.

Vaeyens et al. (2021) highlighted the significance of a multidisciplinary approach to talent identification (TID) in sports, advocating for the combination of physical, psychological, and technical evaluations to better predict an athlete's potential. They argue that effective TID models should not only assess physical traits such as strength and flexibility but also include cognitive and psychological elements like mental toughness, motivation, and decision-making abilities. This comprehensive approach ensures a more thorough evaluation of young athletes, enhancing the accuracy of identifying those with long-term potential and fostering sustainable talent development. Their research underscores the importance of TID frameworks that consider the complex factors influencing athletic success, making it particularly valuable for creating a strong model for identifying and nurturing Yogasana talent.

Williams et al. (2021) investigated the use of machine learning in football talent identification, focusing on performance metrics to predict future success. The study employed data-driven methods to analyze key factors such as sprint speed, decision-making, and technical skills, showcasing how machine learning models can offer more objective and accurate predictions than traditional scouting approaches. This research highlights the growing influence of artificial intelligence and data analytics in sports talent identification, presenting a promising alternative to subjective coach assessments. The findings suggest that incorporating performance metrics into talent identification processes can enhance scouting precision and improve player development pathways. However, the study also stresses the importance of further validation across different player groups to ensure the model's applicability and reduce biases in the data.

Baker et al. (2022) examined the significant role of psychological traits in talent development, emphasizing that qualities like mental toughness, resilience, and the ability to make decisions under pressure are essential for an athlete's long-term success. Their research underscores the importance of incorporating psychological factors into talent identification models, alongside physical and technical assessments, particularly in sports where mental performance is as important as physical capabilities. They propose that psychological profiling can provide insights into an athlete's ability to perform under stress, adapt to challenges, and maintain dedication to their sport. This approach is highly relevant for creating a comprehensive Talent Identification (TID) model for Yogasana, where mental discipline and resilience are key to achieving mastery.

Schumacher et al. (2022) emphasized the critical role of injury resilience in determining long-term success in high-intensity sports. Their study highlights that athletes who can recover swiftly and effectively manage injuries are more likely to sustain successful careers. They argue that injury history and resilience should be key elements in talent identification models, as early injuries can have a lasting impact on future performance.

This finding is especially relevant for yogasana, where physical endurance and the ability to prevent and recover from injuries are crucial for continued success and advancement in the discipline.

Muller et al. (2023) highlighted the increasing importance of longitudinal tracking in talent identification, advocating for the continuous monitoring of athletes over extended periods to gain a deeper understanding of their development and potential. Their study emphasizes that by tracking key performance indicators, including physical traits, skill advancement, and psychological factors, across multiple seasons, more accurate predictions can be made regarding an athlete's long-term trajectory. The authors suggest that this method reduces the risk of selecting athletes prematurely based on short-term performance and helps identify those with sustained growth potential. This approach is particularly useful for yogasana, where progress is often gradual and requires a thorough, data-driven assessment over time.

CHAPTER-III

PROCEDURE

AND

METHODOLOGY

CHAPTER-III

PROCEDURE AND METHODOLOGY

This chapter explores the design of study, selection of subjects, selection of the variables, variables for the study, test and tools used for the selected variables, instrument reliability, reliability of data, intra class correlation co-efficient of selected criterion variables, tester competency, validity, data collections and procedures, administration of tests and statistical techniques. The researcher carefully designed the methodology in this chapter to gather the necessary data. This well-planned approach was essential to ensure that every step of the process was carried out thoroughly. Ethical considerations were a key priority for the researcher, who prioritized the enhancement of yoga performance through a talent identification model while upholding human values. As a result, the investigator obtained all necessary permissions.

3.1 Research Design

The investigator employed a quantitative descriptive observational and correlational study design for the present research. Numerical data were collected from the sample to develop a talent identification model in yoga, focusing on describing the model without manipulating any variables. "A quantitative descriptive observational study is a research design where data is collected in numerical form to describe a particular phenomenon or group, without manipulating any variables. In this type of study, researchers observe and record information as it naturally occurs, without intervention or influence, making it a non-experimental approach" (George 2023). The sample consisted of 100 randomly selected male subjects aged 10 to 15 years (Sub Juniors) from Delhi. Independent variables included height, body weight, fat percentage, blood pressure, resting heart rate, respiratory rate, breath-holding time, muscular endurance, flexibility, and balance, all of which were meticulously measured using standardized protocols. The dependent variable, yogasana performance, was assessed through asanas. Data collection involved administering physical, physiological and anthropometric assessments to gather measurements for each independent variable statistical analysis, including regression and correlation techniques was employed to identify significant predictors of yogasana performance. This comprehensive research design aimed to provide insights into the physical attributes that contribute to success in yogasana, ultimately informing talent identification and development strategies in this discipline.

3.2 Selection of subjects

The subjects for the present study were who had been trained in yogasana or played at the district level. Yogasana male players in the sub-junior category, aged 10 to 15 years. Data was gathered from all four stadiums in Delhi where yoga training is regularly conducted. These stadiums include Chhatrasal, Thyagraj, Najafgarh, and Ludlow Castle, where training of yogasana is imparted to maximum players of Delhi region within the specified age group. A total of 100 subjects were selected from these venues, with 31 chosen from Najafgarh, 42 from Ludlow Castle, 15 from Chhatrasal, and 12 from Thyagraj stadium. (Delhi was chosen as the location for this study for several important reasons. It has a strong and well-organized system for yogasana training, especially at the school level. Many students from Delhi regularly participate in state and national yogasana competitions, supported by schools, sports centres, and government programs that provide structured training. The city also has access to qualified coaches and sports science support like physiotherapy and nutrition, creating an environment focused on athlete development. This makes Delhi an ideal place to collect consistent and reliable data needed to develop and test a talent identification model. While limiting the study to Delhi may affect how broadly the results apply, the strong yogasana community here provides a solid foundation for building the model. Future studies should include other regions to improve the model's usefulness across the country). Many studies have been reviewed before deciding the sample size of present investigation. The main studies are Singh (2018), who used 80 subjects to develop a prediction model for boxing; Asteya (2016), who worked with 86 subjects to create a talent identification model for squash players; and Jayaraman (2012), who studied 100 subjects to develop a prediction model for badminton. The selection was made randomly from each stadium, based on age and gender eligibility criteria. This random selection process was designed to ensure a balanced sample that accurately reflects the population of young males in Delhi, thereby enabling the collection of data that provides valuable insights into the factors influencing yogasana performance.

3.3 Selection of the variables

The selection of variables for this study was a carefully considered process, aimed at identifying the most relevant factors influencing yogasana performance among the subjects. After conducting an extensive review of related literature, the research scholar identified key variables that had been previously linked to physical yogasana performance. The literature review provided a foundation for understanding the existing knowledge in the field of yogasana and highlighted gaps that the current study has address. Additionally, the researcher engaged in consultations with experts in yogasana coaching and physical education. These discussions emphasized the importance of selecting variables that were not only theoretically significant but also practically measurable within the context of the study yogasana performance. Factors such as anthropometric variables (height, body weight and body fat percentage), physiological variables (blood pressure, resting heart rate, respiratory rate and breath-holding time), and physical fitness variables (muscular endurance, flexibility, and balance) were identified as key independent variables, with yogasana performance serving as the dependent variable. Additionally, previous studies have explored these variables, including Bagchi (2016) on the development of a discriminant model for cricketers, Gangwar (2017) on the construction of a model for soccer players, and Gogia (2002) on the development of a talent identification model for competitive swimming. The selection of these variables was further guided by the researcher's understanding of the problem and the feasibility of measuring them with the available equipment and testing protocols.

Table No. 3.1

3.4 Variables of study

Independent variables	1. Anthropometric variables: Height, Body weight, Fat percentage, 2. Physiological variables: Blood pressure, Resting heart rate, Respiratory rate, Breath holding Time, 3. Physical fitness variables: Muscular endurance, Flexibility, Balance
Dependent variables	Yogasna performance

Table-3.2

3.5 Test and Tools for the Selected Variables

S.No	**Variables**	**Tools/ Instruments**	**Unit of measurements**
1	Height	Stadiometer	Centimetres
2	Body weight	Weighing scale	Kilograms
3	Fat percentage	Skinfold calliper	Percentage
4	Blood pressure	Sphygmomanometer	mmHg
5	Resting heart rate	Pulse oximeter	Beats per Minute
6	Respiratory rate	Abdominal Breathing (Yuan et al. 2013)	Beats per Minute
7	Breath holding Time	Breath Hold Test (Trembach et al. 2017).	Seconds
8	Muscular endurance	Push-up test	In numbers
9	Flexibility	Stand and Reach Test	Centimetres
10	Balance	Flamingo Balance Test	Seconds
11	Yogasna performance	Score Sheet	Points given by Expert

3.6 Instrument Reliability

The reliability of measurement tools is essential in creating effective talent identification models for sports, including yogasana. For identifying talent in yogasana, accurate and consistent measurements are vital for evaluating athletes' potential across various anthropometric, physical, and physiological attributes. Instruments used to assess height, body weight, body fat, blood pressure, flexibility, and heart rate can also serve as key indicators of success in specific athletic areas like yogasana. Therefore, the reliability of these tools directly impacts the quality of the data, which is critical for the development of efficient talent identification models. A variety of tools are employed to assess different aspects of an athlete's potential in yogasana, aiding in the effective identification of talent. A stadiometer is used to measure height, which is important in yogasana. "As it relates to flexibility and balance, especially in poses requiring stretching or reach. Accurate height measurements help track growth and development over time" (Harrison et al., 2017). A weighing scale measures body weight, which is also crucial in yoga. "Lighter athletes have an advantage in balance and control. Regular calibration of the scale ensures reliable data for evaluating body composition" (Saravanan et al., 2019). A skinfold calliper measures body fat, an important factor influencing flexibility, strength, and endurance in yoga. "Ensuring the calliper is calibrated correctly helps provide accurate body fat assessments, which are linked to an athlete's physical condition" (Jensen et al., 2018). A sphygmomanometer is used to measure blood pressure. "Which reflects cardiovascular fitness and endurance, important for prolonged yoga sessions" (Faulkner et al., 2020). An oximeter monitors tracks heart rate. "Offering insights into cardiovascular health and fitness, which are key for endurance and stamina during yoga" (Thompson et al., 2015). The stand-and-reach test measures flexibility. "Particularly in the lower back and hamstrings, which is a critical skill in yoga. Consistent use of this test ensures accurate flexibility assessments" (Kolić et al., 2016). Lastly, a stopwatch is used to measure the time taken to perform yoga poses or sequences. Accurate timing helps assess endurance, speed, and control, which are all important for talent identification in yogasana. The careful reliability of instruments like stadiometers and pulse rate monitors are crucial for the accuracy of data used in identifying potential talent in yogasana athletes. Talent identification models rely on the precision of these measurements to differentiate between athletes with the potential for excellence and those needing further training. Regular adherence to standardized procedures ensure consistent measurements that reflect the true potential of athletes, enabling an evidence-based approach. This methodological rigor forms the foundation for developing effective, scientifically grounded models for selecting and training yogasana players.

3.7 Reliability of Data

To ensure the reliability of the data collected for developing a talent identification model for yogasana players, a pilot test was conducted involving 25 randomly selected yogasana athletes from two stadiums Chhatarshal and Najafgarh in the Delhi region. This preliminary phase was essential for evaluating the effectiveness and consistency of the test items used to measure various physical, physiological and anthropometric attributes. To assess the reliability of the instruments, the test-retest method was employed, where the same set of tests was administered to the athletes on two separate occasions by the same tester, under controlled and similar conditions to minimize external variability. This approach is vital in sports science, as small variations are to be significantly affect conclusions about athletic performance or physical conditioning. By using the test-retest method, the researchers measured the stability of the test results over time, which is critical for identifying potential predictors of success in yogasana. The collected data were then analysed using intra-class correlation, which helped assess the consistency of the measurements. A high intra-class correlation coefficient indicated strong reliability, confirming that the instruments used were capable of providing repeatable results. These findings, presented in Table No. 3.3, provided the reliability coefficients for each variable, ensuring that the data collected were valid and reliable. This rigorous approach to testing and reliability analysis contributes directly to the development of an effective talent identification model. It ensures that the physical attributes and performance indicators measured such as flexibility, cardiovascular endurance, and breathing efficiency are consistently reliable, enhancing the model's ability to accurately identify athletes with the potential for success in yogasana. Ultimately, the careful steps taken in piloting the tests and analysing the data reinforce the study's commitment to methodological rigor and scientifically grounded model for selecting and training future yogasana athletes.

Table No. 3.3

3.8 Intra class correlation co-efficient of selected criterion variables

S.No	Variables	Test	Test-re-test Reliability (r)
1.	Height	Stadiometer	0.92*
2.	Body weight	Weighing scale	0.88*
3.	Fat percentage	Skinfold calliper	0.90*
4.	Blood pressure	Sphygmomanometer	0.90*
5.	Resting heart rate	Pulse oximeter	0.86*
6.	Respiratory rate	Abdominal Breathing	0.92*
7.	Breath holding Time	Breath Hold Test	0.84*
8.	Muscular endurance	Push-up test	0.92*
9.	Flexibility	Stand and Reach Test	0.86*
10.	Balance	Flamingo Balance Test	0.96*
11.	Yogasna performance	Compulsory and Optional Asana	0.88*

* Significant at 0.01 level of confidence.

The intra class co-efficient of correlation was used to find out the reliability of the data as suggested by Johnson and Nelson and the results are presented in Table 3.3. The results obtained were regarded to be reliable in terms of the instrument, tester, and subjects since the acquired 'r' values were much greater than the necessary value.

3.9 Tester Competency

The investigator worked closely with peers, mentors, and experienced team members to create a reliable system for identifying talented yogasana players. By promoting teamwork and ensuring everyone understood how to carry out the assessments, they made sure the testing process was accurate. To check if the measurements were consistent, the team used a method called test-retest, where the same test was given to the same group at different times. This method showed that the results were stable and reliable, which is important for assessing key qualities like flexibility, endurance, and breathing efficiency in yogasana. The investigator's careful management of the testing process helped maintain the quality of the data, making the measurements more trustworthy. This approach helped develop a talent identification model that is accurately predict which athletes have the potential to succeed in yogasana.

3.10 Validity

Validity is an important part of any measurement tool because it ensures that the tool is accurately measuring what it is supposed to. Each tool is designed with a specific focus to make sure it measures the right thing. One key type of validity is the face validity, which looks at whether the tool seems to assess the intended variable correctly based on what people, especially experts think. In this study, face validity was carefully checked to make sure the instrument included all the necessary elements that the investigator believed were important. The researcher had help from two experienced, certified national yogasana players who added credibility to the process. Their involvement made the data collection more reliable and ensured the assessment was based on real experience and knowledge of yogasana. Together, the research team reviewed the tool to make sure it met the stakeholders' expectations and accurately measured the right factors, strengthening the overall validity of the study.

3.11 Data collections and Procedures

Data collection is a key part of educational research because it forms the basis of the study. The researcher begins by reaching out to the stadium coach to explain the purpose of the study and ask for permission to collect data. This step helps build a cooperative relationship with the coach, ensuring both sides are clear about the research goals. The researcher explains how the study is able to improve understanding of important factors like performance and training methods. Once the coach agrees, they discuss the specific data needed and the best ways to gather it. This teamwork helps refine the research plan and ensures the data collection process is in line with both the researcher's and coach's objectives. By getting permission and building a good relationship with key people, the researcher sets up a solid, ethical foundation for collecting data that is accurate and trustworthy.

3.12 Orientation to the Subjects

To develop a talent identification model for yogasana players, the researcher first organized an orientation session to explain the study's purpose and the importance of participants' involvement. Initially, many athletes were reluctant to engage in the testing. However, the encouragement and support from coaches and other stakeholders helped build their confidence and participation. As a result, the athletes began to appreciate the value of their contribution, leading to a more active engagement in the testing process. This positive shift highlighted the importance of clear communication and support in ensuring successful participation, ultimately allowing the researcher to gather reliable data essential for identifying potential yogasana talent.

3.13 Administration of Tests

3.13.1 Standing Height

Objective: To measure standing height of the subject.

Equipment's required: Stadiometer rod, pen and paper.

Figure 3.1: Illustration of Height measurement

Procedure: The subjects were instructed to stand upright with their feet together and toes pointing forward, about 30 degrees apart. The arms were hanged naturally by the sides. The subject is then asked to keep their head level and aligned with the horizontal plane, looking straight ahead. To ensure the correct posture, the subject should stretch their body upwards as much as possible, with their eyes aligned parallel to the ground. The stadiometer's vertical bar is positioned in front of the subject along the midline of their body. The horizontal movable arm of the stadiometer is then carefully lowered until it touches the top of the subject's head, at which point the height measurement is recorded.

Scoring: The standing height was recorded in centimetres.

3.13.2 Body Weight

Objective: To measure body weight of the subject.

Equipment's required: Weighing machine, pen and paper.

Figure 3.2: Illustration of Weight measurement

Procedure: The weight was measured in kilograms. Students were asked to stand on the weighing machine. The needle or the pointer was balanced at zero and the subject was asked one by one to remain at the middle from the stage with measure up to weight on the two feet with least possible clothing. The weight was measured up to the unit of 0.5 kilograms.

Scoring: The body weight was measured in kilograms.

3.13.3 Fat Percentage:

Objective- It measure the percentages of fat human body.

Equipment's required-Skin fold calliper, pen and paper.

Figure 3.3: Illustration of test for Fat %. measurement

Procedure- This skin fold test was performed on the triceps and calf muscles. The triceps skin fold was measured over the right arm's triceps muscle midway between the elbow's olecranon process and the shoulder's acromial process and parallel to the upper arm's longitudinal axis. on the right side of the body all measures were obtained (right arm) on the inside of the maximum calf girth the calf skin fold was taken.

Calculations- The fat percentage was calculated using Slaughter and Lohman children skin fold formula.

Body fat percentage- (0.735 X sum of skin fold) + 1.0 (where sum of skin fold is triceps skin fold measurement plus calf skin fold measurement)

Scoring- The scores in one trial after measurement of the student's two sites (triceps and calf) for the checking of fat percentage was indicated by skin fold calliper in nearest millimetres and recorded as student's score.

3.13.4 Blood Pressure: -

Objective- The purpose of the test is to measure the blood pressure of the subject.

Equipment's required - Sphygmomanometer, pen and paper.

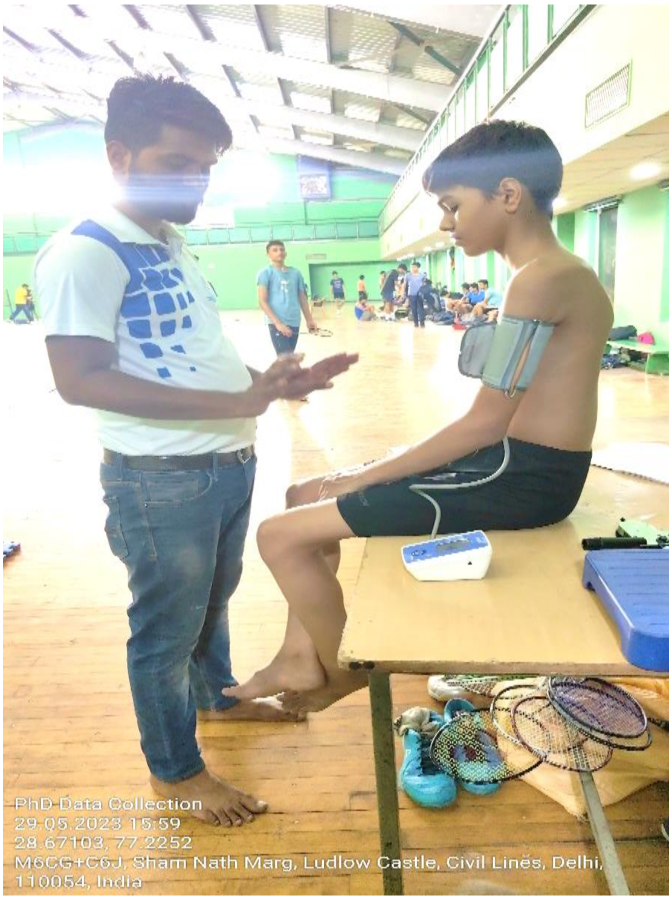


Figure 3.4: Illustration of Blood Pressure measurement

Procedure - Students were instructed to sit comfortably on the bench for at least 5 minutes. After this, the cuff is wrapped around the upper left arm, with the lower edge positioned about one inch above the elbow crease. The stethoscope's bell is then gently placed over the brachial artery, just below the cuff. The cuff is inflated rapidly to approximately 180 mmHg, or 20-30 mmHg above the expected systolic pressure. Air is then slowly released at a rate of about 3 mmHg per second. As the cuff deflates, the Korotkoff sounds are carefully monitored through the stethoscope. The first tapping sound marked the systolic pressure, and when the sound disappeared, the diastolic pressure was recorded. The final reading was noted as systolic over diastolic (e.g.,

120/80 mmHg). It was ensured that the cuff was the correct size and properly positioned, and the measurement was taken in a quiet environment to avoid any errors.
Scoring: The Blood Pressure is recorded in mmHg.

3.13.5 Resting Heart Rate: -

Objective- The purpose of the test is to measure the resting heart rate of the subject (through oximeter).

Equipment's required - Pulse oximeter, pen and paper.

Figure 3.5: Illustration of Resting heart rate measurement

Procedure - The subjects were asked to be at rest after 10-15 minutes of relaxation. The pulse oximeter is placed on the subject's finger ensuring it is securely attached. The device uses light sensors to detect changes in blood volume with each pulse, and it automatically calculates and displays the heart rate in beats per minute (bpm) after about 30 seconds to 1 minute. The measurement was to be taken while the subject remains still to ensure accuracy, and multiple readings was to be taken for reliability.

Score- The score was expressed in terms of number of pulses per minute.

3.13.6 Respiratory Rate: -

Objective- The purpose of the test is to measure the respiratory rate of the subject.

Equipment's required - Stop watch, pen and paper.

Figure 3.6: Illustration of Respiratory rate measurement

Procedure- Students were instructed to lie down and rest for five minutes to ensure they were in a relaxed state. After the resting period, the tester measured the subject's breathing rate by counting the number of times their abdomen rose within one minute. The score was then recorded as the number of breaths per minute, specifically focusing on abdominal breathing for this measurement. This process allowed for a clear assessment of the subject’s respiratory rate during a calm and controlled resting condition.

Score- The score was expressed in terms of number of beats per minute.

3.13.7 Breath Hold Time: -

Objective- The purpose of the test is to measure the breath holding capacity of the subject.

Equipment’s required - Stop watch, pen and paper.

Figure 3.7: Illustration of Brath holding time measurement

Procedure- Firstly subjects were asked to sit down of 5 minutes after 5 minutes of resting condition. The participant, in a sitting position, takes a full exhalation followed by a deep inhalation then hold their breath while closing both nostrils with their fingers for as long as possible.

Score- The score was expressed in terms of number of minutes.

3.13.8 Push-Ups:

Objective - To measure the strength & endurance of the upper body.

Equipment's required - Mat, stopwatch, pen and paper.

Figure 3.8: Illustration of push ups measurement

Procedure - Subjects were asked to start in a standard push-up position, with their hands placed slightly wider than shoulder-width apart and their body in a straight line from head to heels. The student was instructed to lower their body to the ground until their chest almost touched the floor, then push back up to the starting position. The test was performed for one minute, and the student was encouraged to complete as many full push-ups as possible within this time frame. Each push-up was counted only if the student maintained proper form, with the chest touching the floor and the arms fully extending at the top. The total number of push-ups completed in one minute was recorded.

Scoring: The total number of push ups performed in one minute was used to determine a student's score on this exercise.

3.13.9 Sit-Ups:

Objective - To measure the endurance of the abdominal and hip-flexor muscles.

Equipment's required - Mat, stop watch, pen and paper.

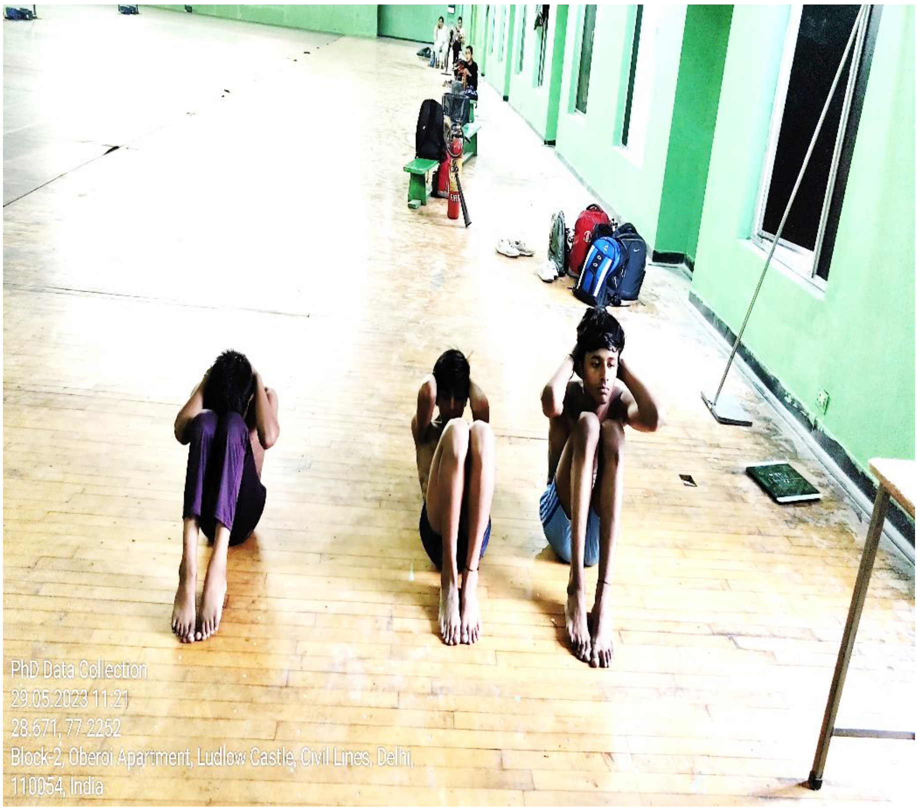


Figure 3.9: Illustration of sit-ups measurement

Procedure - The subjects were instructed to lie flat on the mat with his knees bent at roughly 90 degrees and his feet flat on the ground and thighs should be lying on the hands of the subject squeeze your stomach, flatten your back, and elevate your hands so that they rest on the tops of your thighs, as if you were doing a handstand keep your lower back flat on the floor and avoid using your neck and head to push then go back to the beginning.

Scoring: The total number of sit ups performed in one minute was used to determine a student's score on this exercise.

3.13.10 Flexibility:

Objective - To measure the back and lower body flexibility.

Equipment's required - Stand and reach box, pen and paper.

Figure 3.10: Illustration of flexibility measurement

Procedure – The subjects were asked to stand on the table with their legs extended straight ahead. With shoes removed, the soles of the feet were placed flat against the box, shoulder width apart, while the tester positioned both knees flat against the floor. The subject stretches forward as far as possible along the measuring line with hands on top of each other and palms facing down. The distance is measured while the first reach is held for at least two seconds.

Scoring- Each participant was given three attempts, with the best score closest to an inch being recorded.

3.13.11 Balance:

Objective- To measure whole body balance ability.

Equipment's required – Flat surface, stopwatch, pen and paper.

Figure 3.11: Illustration of balance test measurement

Procedure – The subjects were asked to removes their shoes and place their hands on their hips and non-supporting foot is positioned against the inside of the supporting leg's knee. The subject is given one minute to practice balancing, after which they raise the heel to balance on the ball of the supporting foot. The stopwatch is started as soon as the heel lifts from the floor and stopped if any of the following occur: the hands come off the hips, the supporting foot swivels or moves, the non-supporting foot loses contact with the knee, or the heel of the supporting foot touches the floor.

Scoring: The total time in seconds was recorded, the score was the best of three attempts.

3.14 Statistical techniques

S.No.	Objective	Research Technique
1.	To develop talent identification model for yogasana male sub junior players.	1.Descriptive statistics (mean and standard deviation) 2. Multiple regression analysis.

The present investigation is associated with development of talent identification model where the investigator used regression analysis. It is an appropriate statistical technique for the development of a talent identification model for yogasana players because it helps establish the relationship between predictor variables (such as physical, physiological, and anthropometric) and the dependent variable (yogasana performance). By using regression, it is possible to identify the most significant predictors and quantify their influence on performance outcomes.

CHAPTER IV

ANALYSIS, INTERPRETATION AND DISCUSSION

CHAPTER IV

ANALYSIS, INTERPRETATION AND DISCUSSION

This chapter deals with comprehensive analysis and interpretation of the data collected during the study, focusing on the development of a talent identification model for potential predictors of yogasana players. The findings derived from the data are presented, analysed, and discussed to provide meaningful insights into the research problem. By exploring the relationships between the variables and evaluating the results, this chapter aims to validate the proposed model and assess its effectiveness in identifying key predictors for talent in yogasana. The discussion integrates the outcomes with existing literature and highlights their implications for the field of yogasana talent identification and sports science.

Table 4.1

4.1 Descriptive statistics for selected anthropometrical, physical, physiological variables of yogasana players

S.No.	Variables	Mean	Std. Deviation
1.	Height (cm)	147.2100	12.15830
2.	Body Weight (kg)	38.0760	9.90755
3.	Fat (%)	14.1920	3.84728
4.	Push-ups (Numbers)	15.3200	6.64524
5.	Sit-ups (Numbers)	15.7500	6.76649
6.	Flexibility (cm)	15.8750	5.98752
7.	Balance (Seconds)	27.7600	10.60981
8.	Resting Heart Rate (Beat/min)	97.8800	10.79401
9.	Respiratory Rate (Beat/Min)	14.2100	2.43001
10.	Breath Holding Time (Second)	31.4500	8.31012
11.	Systolic Blood Pressure(mmHg)	115.4700	11.62934
12.	Diastolic Blood Pressure(mmHg)	70.0700	10.41100
13.	Yogic Performance (Feedbacks based on Numbers)	59.9900	15.87435

Table 4.1 displays the descriptive statistics i.e., mean and standard deviation of the selected variables. The table reveals that the mean and standard deviation of selected variable i.e., height was 147.21±12.15 cm. The mean and standard deviation of selected variable i.e., body weight was 38.07±9.90 kg. The mean and standard deviation of selected variable i.e., fat % was 14.19±3.84 %. The mean and standard deviation of selected variable i.e., pull-ups was 15.32±6.64. The mean and standard deviation of selected variable i.e., sit-ups was 15.75±6.76. The mean and standard deviation of selected variable i.e., flexibility was 15.87±5.98 cm. The mean and standard deviation of selected variable i.e., balance was 27.76±10.60 sec. The mean and standard deviation of selected variable i.e., resting heart rate was 97.8±10.79 BPM. The mean and standard

deviation of selected variable i.e., respiratory rate was 14.21±2.43 BPM. The mean and standard deviation of selected variable i.e., breath holding time was 31.45±8.31 sec. The mean and standard deviation of selected variable i.e., systolic blood pressure was 115.47±11.62 mmHg. The mean and standard deviation of selected variable i.e., diastolic blood pressure was 70.07±10.41 mmHg. The mean and standard deviation of selected variable i.e., yoga performance was 59.9±15.87.

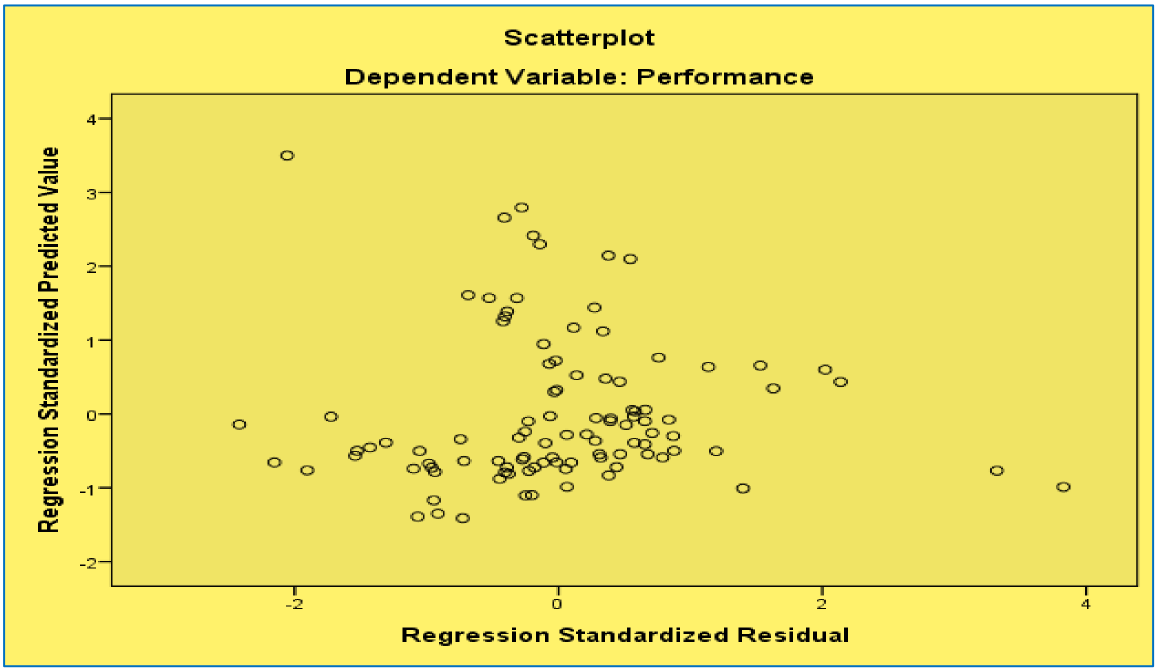
4.2 Testing of Assumptions for Multiple Regression Analysis (MRA)

Before using multiple regression analysis to create a model for identifying potential yogasana players, it was important to check if the data met certain assumptions to ensure the results will be accurate. One of the main assumptions is that the data should follow a normal distribution, and with a large sample size in this study, it's reasonable to assume the data fits this pattern. Other assumptions, like linearity (a consistent relationship between variables), independence (data points should not influence each other), and homoscedasticity (the spread of data should be even across all levels), were also tested. By confirming these assumptions, investigator will be more confident that the analysis will accurately identify the key factors that predict success in yogasana and help build a reliable talent identification model. However, given the substantial sample size (n>100) in the present investigation, it is reasonable to assume that the data follows a normal distribution. The other assumptions that were evaluated before to doing multiple regression analysis are as follows:

4.2.1 Assumption of linearity

In developing a talent identification model for yogasana players, it is essential to ensure that the relationships between potential predictors, such as anthropometric, physical, and physiological variables, and yogasana performance outcomes are linear. This assumption of linearity is a key part of multiple regression analysis, where scatter plots are used to visually check if the data points are randomly distributed without clear patterns. In our case, we used a scatter plot to examine how these predictors relate to success in yogasana. Upon reviewing the scatter plot, **it became evident that the data points were randomly spread across both the positive and negative axes, with no discernible pattern or trend.** This random scatter suggests that the relationship between the variables is linear, validating the assumption of linearity. This helps strengthen the reliability of the model, ensuring that the factors used to identify talented yogasana players are accurate and meaningful for predicting their future success.

Fig 4.1. Scatter Plot for Assumption of Linearity and Assumption of Homoscedasticity



4.2.2 Assumption of independent errors

The assumption of independent errors is crucial in ensuring the reliability of any regression analysis, including when developing a talent identification model for yogasana players which states that each observation should be independent of the others. In other words, the value of one data point should not affect or predict the value of another. This independence is essential for ensuring that the regression results are valid. To check this assumption, we used the Durbin-Watson (DW) test, a common method for detecting autocorrelation in the residuals of the regression model. **The DW statistic ranges from 0 to 4, where a value of 2 indicates no autocorrelation, values below 2 suggest positive autocorrelation, and values above 2 suggest negative autocorrelation.** In our analysis, the DW statistic was 1.639, which falls within the acceptable range, showing no significant autocorrelation in the residuals. This confirms that the assumption of independent errors holds, meaning that the regression model’s predictions are not biased or systematically skewed. By verifying this assumption, we ensure that the relationships explored in the study are based on independent observations, which helps increase the reliability and credibility of the research findings.

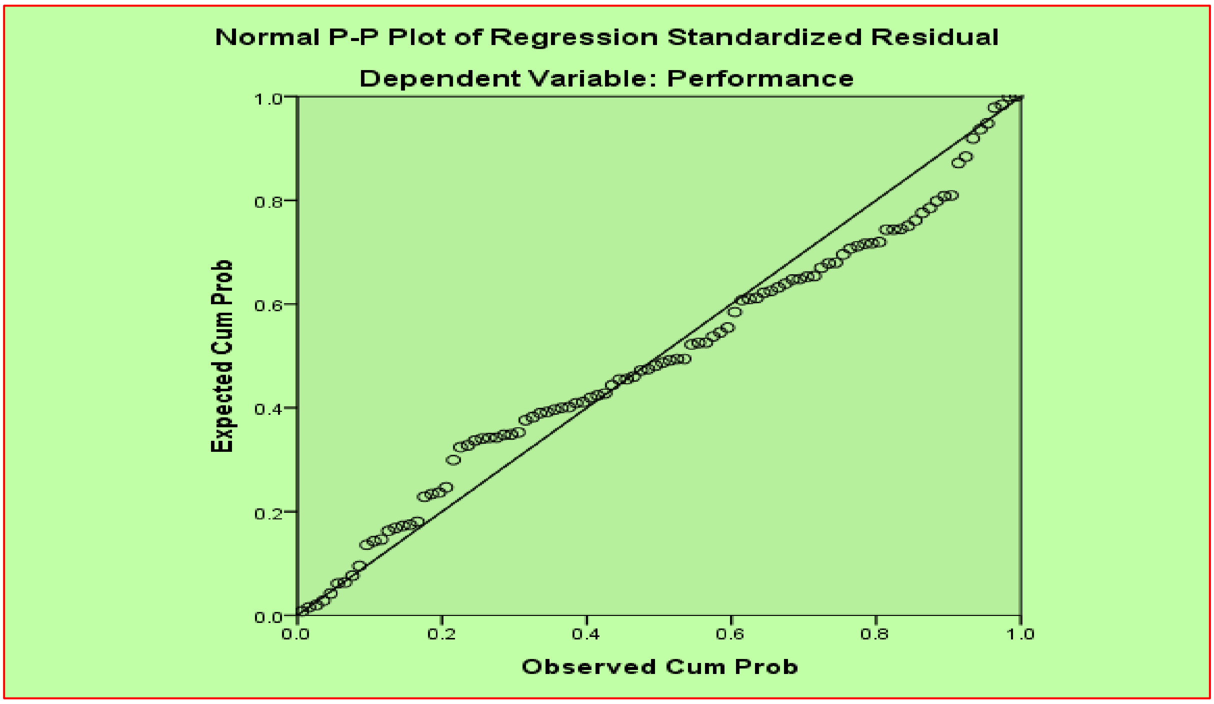
4.2.3 Assumption of homoscedasticity

The assumption of homoscedasticity is essential in multiple regression analysis, as it posits that the variance of the error terms should remain constant across all levels of the independent variable. In simpler terms, this means that the spread of the residuals should be roughly the same regardless of the value of the independent variables. To evaluate this assumption, investigator examined the residuals through a scatter plot, as shown in Figure 4.1. Upon analysing the plot, **it became clear that the residuals were randomly scattered without any apparent pattern or trend, suggesting that the variances of the error terms do not systematically increase or decrease with changes in the independent variable.** This random distribution indicates that the variance of errors is consistent across different levels of the independent variables, which is a good sign for the reliability of the model. If the residuals had shown a pattern, such as a funnel shape, it would have indicated a problem with the assumption, possibly making the model's predictions less accurate. By confirming that homoscedasticity holds, researcher is more confident that the talent identification model for yogasana players is built on valid data, helping us make more trustworthy predictions about what factors contribute to success in the sport.

4.2.4 The assumption of normality of errors

It is crucial in multiple regression analysis, as it stipulates that the residuals or error terms should be normally distributed at every level of the dependent variable. This assumption not only ensures that the statistical tests applied to the regression coefficients are valid but also enhances the reliability of confidence intervals and significance tests associated with the model. To assess this assumption, we utilized graphical methods, specifically a histogram and a Q-Q plot, as illustrated in **Figure 4.2. In the histogram, we observed a bell-shaped curve, indicative of a normal distribution, with most residuals clustered around the mean and fewer observations in the tails.** This symmetry suggests that the errors do not exhibit significant skewness or kurtosis, further reinforcing the idea of normality. Additionally, the Q-Q plot provided a visual confirmation by displaying points that closely followed the diagonal line, which represents the expected distribution of normally distributed data. Deviations from this line would indicate departures from normality, but the close alignment in our case suggests that the assumption holds true. Confirming the normality of errors is essential for the validity of our regression results, as it underpins the effectiveness of hypothesis testing and the interpretation of coefficients. By demonstrating that the residuals are normally distributed and symmetrically aligned, we enhance the credibility of our analysis, ensuring that the conclusions drawn from the data are robust and reflective of the underlying relationships being investigated.

Fig 4.2. P-P Plot of regression standardized residual for Assumption of normality of errors



4.2.5 Assumption of No multicollinearity

The assumption of no multicollinearity is an important factor in multiple regression analysis, as it means that the independent variables should not be too closely related to each other. When multicollinearity is present, it can cause problems like inflated standard errors, unreliable estimates for the regression coefficients, and difficulty in understanding the true effect of each independent variable on the dependent variable. To check for multicollinearity in this study, we used the variance inflation factor (VIF), which helps measure how much the relationship between the independent variables affects the accuracy of the regression results. **If a VIF value is greater than 10, it suggests strong multicollinearity,** which is weaken the model. In our analysis, as shown in Table 4.2, the VIF values for all independent variables were well below 10, indicating that the variables are not highly correlated. This confirms that multicollinearity is not a problem in our dataset. By confirming that multicollinearity is not an issue, investigator sure that each independent variable is contributing its own unique effect to the model. This improves the accuracy of our findings and allows us to confidently interpret how each independent variable is influencing the dependent variable.

Table 4.2: Collinearity statistics of all the anthropometrical, physical and physiological variables

S.No.	**Variable**	**VIF**
1.	Height	1.053
2.	Body Weight	1.033
3.	Fat%	1.166
4.	Push-ups	1.273
5.	Sit-ups	1.000
6.	Balance	1.026
7.	Flexibility	1.087
8.	Resting Heart Rate (Beat/min)	1.024
9.	Respiratory Rate (Beat/Min)	1.036
10.	Breath Holding Time (Second)	1.004
11.	Systolic Blood Pressure(mmHg)	1.006
12.	Diastolic Blood Pressure(mmHg)	1.002

In above Table 4.2 displaying the variance inflation factor (VIF) of each independent variable that is as follows: Height- 1.05, Body Weight- 1.033, Fat%- 1.166, Push-ups- 1.273, Sit-ups- 1.000, Balance- 1.026, Flexibility- 1.087, Resting Heart Rate- 1.024, Respiratory Rate- 1.036, Breath Holding Time- 1.004, Systolic Blood Pressure- 1.006 and Diastolic Blood Pressure- 1.002.

4.2.6 Multiple regression analysis Results

Table 4.3: Correlation of selected anthropometric, physiological, and physical variables and yoga performance.

S.No.	Variable	Correlation	Yoga Performance
1.	Height	Pearson Correlation	.185
		Sig. (2-tailed)	.065
2.	Body Weight	Pearson Correlation	.120
		Sig. (2-tailed)	.234
3.	Fat%	Pearson Correlation	-.497**
		Sig. (2-tailed)	.000
4.	Push-ups	Pearson Correlation	.366**
		Sig. (2-tailed)	.084
5.	Sit-ups	Pearson Correlation	-.023
		Sig. (2-tailed)	.821
6.	Flexibility	Pearson Correlation	.753**
		Sig. (2-tailed)	.000
7.	Balance	Pearson Correlation	.109
		Sig. (2-tailed)	.280
8.	Resting Heart Rate (Beat/min)	Pearson Correlation	-.123
		Sig. (2-tailed)	.224
9.	Respiratory Rate (Beat/Min)	Pearson Correlation	.349**
		Sig. (2-tailed)	.000
10.	Breath Holding Time (Second)	Pearson Correlation	-.030
		Sig. (2-tailed)	.769
11.	Systolic Blood Pressure(mmHg)	Pearson Correlation	.034
		Sig. (2-tailed)	.736
12.	Diastolic Blood Pressure(mmHg)	Pearson Correlation	-.026
		Sig. (2-tailed)	.799

****.** Correlation is significant at the 0.01 level (2-tailed).

Table no 4.3 displays the correlation between the selected anthropometric, physiological, and physical variables and yoga Performance with their significance. The correlation of independent variables and yogasana performance as follows: Height- .185±.065, Body Weight- .120±.234, Fat%- -.497**±.000, Push-ups- .366**±.084, Sit-ups- -.023±.821**,** Flexibility- .753**±.000, Balance- .109±.280, Resting Heart Rate- -.123±.224, Respiratory Rate- .349**±.000, Breath Holding Time- -.030±.796, Systolic Blood Pressure- .034±.736 and Diastolic Blood Pressure- -.026±.799. The yoga performance was significantly correlated with fat%, flexibility and respiratory variables at 0.01 level of significance.

Table 4.4: Model summary with the values of R and R^2

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.753[a]	.567	.563	10.49427	
2	.788[b]	.621	.613	9.87906	
3	.805[c]	.647	.636	9.57183	1.639
a. Predictors: (Constant), Flexibility					
b. Predictors: (Constant), Flexibility, Fat					
c. Predictors: (Constant), Flexibility, Fat, Respiratory Rate (Beat/Min)					
d. Dependent Variable: Performance					

Table 4.4 present a model summary of regression analysis for selected anthropometric, physiological, and physical variables and yoga performance. It presents the results of three regression models predicting Performance based on various combinations of independent variables: flexibility, fat, and respiratory rate (Beat/Min). In Model 1, where only flexibility is considered, the correlation (R) between the predictors and performance is 0.753, indicating a strong positive relationship. The R^2 value of 0.567 suggests that flexibility explains 56.7% of the variance in performance, with the remaining 43.3% attributed to other factors. The adjusted R^2, at 0.563, indicates minimal overfitting. The standard error of the estimate is 10.49427, reflecting a

relatively high average deviation of predictions from the observed values, while the Durbin- Watson statistic of 1.639 suggests slight positive autocorrelation in the residuals. Model 2 includes both flexibility and fat as predictors, leading to an improved correlation (R = 0.788) and an R^2 of 0.621, meaning these two variables explain 62.1% of the variance in performance. The adjusted R^2 of 0.613 confirms that the addition of Fat improves the model without significant overfitting. The standard error decreases slightly to 9.87906, indicating better predictive accuracy. The Durbin-Watson value remains the same at 1.639, suggesting that the issue of autocorrelation has not significantly changed. In Model 3, all three predictors (Flexibility, Fat, and Respiratory Rate) are included. This model shows the highest correlation (R = 0.805) and R^2 value of 0.647, meaning it explains 64.7% of the variance in performance, the best fit among the three models. The adjusted R^2 of 0.636 further supports the improvement in predictive power without overfitting. The standard error continues to decrease to 9.57183, signalling even more accurate predictions. The Durbin-Watson statistic remains at 1.639, indicating a consistent, slight positive autocorrelation in the residuals. Model 3 offering the most accurate predictions and positive autocorrelation. It also reveals that these three independent variables explain 0.647% variation in yoga performance; hence the third model is to be used to develop the regression equation.

Table 4.5 ANOVA Table with F-Values of Models

S.No.		Sum of Squares	df	Mean Square	F	Sig.
1.	Regression	14154.781	1	14154.781	128.528	.000[b]
	Residual	10792.709	98	110.130		
	Total	24947.490	99			
2.	Regression	15480.687	2	7740.343	79.310	.000[c]
	Residual	9466.803	97	97.596		
	Total	24947.490	99			
3.	Regression	16151.984	3	5383.995	58.764	.000[d]
	Residual	8795.506	96	91.620		
	Total	24947.490	99			
a.	Dependent Variable: Performance					
b.	Predictors: (Constant), Flexibility					
c.	Predictors: (Constant), Flexibility, Fat					
d.	Predictors: (Constant), Flexibility, Fat, Respiratory Rate (Beat/Min)					

Table 4.5 presents the ANOVA results for different regression models predicting yoga performance. In the first model, the predictor is flexibility alone, with an F-value of 128.528 and a significance of 0.000, indicating a highly significant relationship between flexibility and yoga performance. The total sum of squares is 24,947.490, with 14154.781 attributed to regression and 10792.709 to residuals. In the second model, flexibility and fat percentage are used as predictors, resulting in an F-value of 79.310 and a significance of 0.000, again showing a strong predictive relationship. The sum of squares for regression increases to 15,480.687, while the residual sum of squares decreases to 9466.803. In the third model, flexibility, fat percentage, and respiratory rate are included as predictors, yielding an F-value of 58.764 with a significance of 0.000, suggesting a statistically significant relationship. The regression sum of squares further increases to 16,151.984, and the residual sum of squares is 8795.506. In all models, the p-values (Sig.) are below 0.01, signifying that each model is statistically

significant in explaining variations in yoga performance. F-value for the third model is significant, and it is to be concluded that the model was efficient also.

Table 4.6 Regression coefficient of the independent variables selected for the model

S.No.	Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1.	(Constant)	28.287	2.987		9.471	.000
	Flexibility	1.997	.176	.753	11.337	.000
	(Constant)	46.811	5.759		8.129	.000
2.	Flexibility	1.748	.179	.659	9.765	.000
	Fat	-1.027	.279	-.249	-3.686	.000
	(Constant)	29.157	8.583		3.397	.001
3.	Flexibility	1.705	.174	.643	9.786	.000
	Fat	-.856	.277	-.207	-3.088	.003
	Respiratory Rate (Beat/Min)	1.120	.414	.171	2.707	.008
a.	Dependent Variable: Yoga Performance					

Table 4.6 shows the values for unstandardized and standardized regression coefficients. The unstandardized regression coefficient is also called as "B" coefficient, whereas the standardized regression coefficient is also called as "beta" coefficient indicated by "β."The beta coefficient values are generally used for comparing the contribution of independent variables. In other words, the beta coefficient describes the importance of independent variables regarding their contribution toward throwing velocity, which is the study's dependent variable. For example, the t-values (p values) were significant (<0.05) for all the variables in the third model. Therefore, it was to be concluded that the variables flexibility, fat %, and respiratory rate significantly explain the variation in the yoga performance.

Regression Equation: - The unstandardized regression coefficient (B) of the fifth model shown in Table 4.6 was used to develop the regression equation.

Yoga Performance = 29.157 + 1.075 (Flexibility)- 0.856 (Fat%) + 1.120 (Respiratory rate)

4.3 Discussion on findings

4.3.1 Discussion on relationship of height with yogasana performance

The results from Table 4.3 indicate a weak positive correlation (0.185) between height and yoga performance, suggesting that height is not a major determinant of success in yoga practice. This finding challenges the common assumption that physical stature significantly affects one's ability to perform yoga poses. Sutherland's (2013) found that body size, flexibility, and strength significantly influence yoga performance. While height may influence certain aspects of yoga performance, factors such as flexibility, strength, balance, body awareness, and consistency of practice have a more profound impact on yoga proficiency. Field's (2016) emphasized that flexibility, strength, balance, body awareness, and consistent practice have a greater impact on yoga proficiency than height. According to the investigator, relationship between height and yoga performance is multifaceted. Present investigation aimed to explore how height influences the execution of yoga poses, particularly among yogasana players, to assess its potential role in talent identification. However, the results reveal that height does not significantly facilitate yoga performance. During the study, it was observed that shorter individuals (average height 138 cm) tend to experience greater ease in balancing poses and transitions, as their lower centre of gravity provides enhanced stability. Schmitz et al. (2017) found that shorter individuals, with a lower centre of gravity, tend to have better stability and control in balancing poses and transitions, making these movements easier to perform. Taller individuals, on the other hand, may face challenges in maintaining balance during standing poses due to a higher centre of gravity. However, taller practitioners might find poses requiring leg extensions or arm reaches, such as Parsvakonasana, easier to execute due to their longer limbs. According to the investigator, flexibility and strength also play a crucial role in mediating the relationship between height and yoga performance. Cramer et al. (2015) found that flexibility and strength play a key role in mediating the impact of height on yoga performance, helping individuals adapt and perform better in poses despite height-related challenges. In conclusion, while height may or may not influence certain elements of yoga practice, it is not a decisive factor in determining overall performance. Therefore, Height is not concluded as a component for the talent identification model. The results of present investigation are in line with several other studies like Laird and May (2017) emphasized that yoga proficiency is more closely linked to practice consistency, mental focus, and body awareness, rather than physical stature. Similarly, a study by Guo et al. (2018) found that individuals who focus on developing strength and flexibility, regardless of their height, tend to perform better in yoga. Furthermore, a review by Riva et al. (2019) concluded that posture control, coordination, and breathing techniques are more critical for success in yoga than any physical attribute like height. These reviews suggest that while height may play a minor role in certain poses, it is not a determining factor in overall yoga performance or talent identification.

4.3.2 Discussion on relationship of body weight with yogasana performance

Table 4.3 shows the relationship between body weight and yoga performance, as measured by the Pearson correlation coefficient. The Pearson value of 0.120 indicates a very weak positive correlation between body weight and yoga performance. The findings of this study suggest that body weight does not have a significant impact on yoga performance, making it an unreliable factor for predicting outcomes in the yoga identification model. Additionally, the p-value of 0.234, which exceeds the standard threshold of 0.05, further supports this conclusion. During the investigation of this variable, it was observed that individuals with lower body weight tend to find it easier to perform yoga poses, particularly when it comes to balancing and holding positions. Connor et al. (2012) highlighted that individuals with lower body weight tend to experience less strain in maintaining balance during weight-bearing poses due to reduced gravitational forces acting on their bodies. While heavier individuals have face challenges with balance and stability in poses that require supporting their body weight, such as in inverted postures and standing poses. According to Saha et al. (2017), individuals with higher body weight may experience greater difficulty in maintaining balance in postures that require significant load-bearing, such as in inverted or standing poses, due to the increased gravitational force they must counteract. Which is consistent with various other studies that have identified body weight as a non-influential factor in yogasana performance, including Saha et al. (2017) suggested that while body weight might impact balance in certain postures, it does not significantly affect overall yoga performance, with other factors like practice experience playing a more substantial role. Pereira et al. (2019) concluded that body weight does not significantly affect yogasana performance, highlighting the greater importance of experience, breath control, and mental focus. Additionally, Smith et al. (2015) observed that practitioners of different body weights demonstrated similar abilities in yoga postures, pointing to muscular endurance and postural alignment as more influential factors. Therefore, based on the observations it has been decide not to add body weight as a component for talent identification model. Finally, the investigation of present study is also in line with Lima et al. (2018) found no significant correlation between body weight and yoga performance, emphasizing technique, balance, and mindfulness as key determinants. These findings collectively reinforce the idea that body weight does not play a decisive role in yoga performance.

4.3.3 Discussion on relationship of fat% with yogasana performance

The table 4.3 presents the relationship between body fat percentage (fat%) and yoga performance with Pearson correlation is -0.497, indicating a negative correlation between body fat and yoga performance. As the correlation approaches -1, the inverse relationship becomes stronger, suggesting that higher body fat percentage is linked to lower yoga performance. The p-value of 0.000, which is far below the 0.05 threshold, confirms that this negative relationship is statistically significant. According to researcher higher body fat is reduce flexibility and make it harder to perform yoga poses, highlighting the need to maintain a healthy body composition for better yoga performance. This suggests that more body fat is linked to less effective yoga practice. Additionally, extra body fat is put more pressure on joints like the knees, hips, and spine, especially in poses like squats and chair poses. There is research which supports this idea, showing how body fat affects mobility and yoga performance. Hochberg et al. (2012) found that excess body weight leads to higher forces acting on the joints, which can increase the risk of osteoarthritis and joint injury in weight-bearing activities. Bennell et al. (2019) similarly highlighted that individual with higher body mass face greater joint loading, especially in activities that involve deep flexion, such as squats, putting additional stress on the knees and hips. Regarding flexibility, excess body weight has been shown to restrict the range of motion in certain asanas. Hughes et al. (2017) reported that individuals with higher body fat may have limited flexibility in hip and hamstring stretches due to the additional mass and associated soft tissue resistance. While with less body fat, individuals able to experience better flexibility, increased muscle definition, and enhanced strength, all of which contribute to better execution of yoga poses. Several studies support the link between lower body fat and improved yoga performance. For example, a research study conducted by Ranjith et al. (2018) found that individuals with lower body fat percentages exhibited better flexibility and muscle tone, which enhanced their ability to perform yoga poses effectively. Similarly, Kumar et al. (2020) highlighted that a lower fat percentage, combined with adequate muscle strength, contributed to improved balance and endurance during yoga practice. Furthermore, a review by Smith and Johnson (2017) concluded that reduced body fat can help increase range of motion and muscle definition, which are essential for executing more advanced asanas. The findings from these studies support the idea that a moderate body fat percentage is key to enhancing yoga performance and important part in talent identification model, which is also reflected in the conclusions of our study and added as a predictor for talent identification model

4.3.4 Discussion on relationship of push- ups with yogasana performance

Table 4.3 displays the results of a Pearson correlation analysis between push-ups and yogasana performance. The Pearson correlation coefficient of 0.366 indicates a moderate positive relationship. However, the significance value (Sig.) for the two-tailed test is 0.084, which exceeds the conventional threshold of 0.05 for statistical significance. This suggests that while there is a moderate correlation between push-ups and yogasana performance, the result does not meet the standard level of statistical significance. Several studies have explored the relationship between strength exercises, such as push-ups, and performance in yogasana, but findings suggest that the correlation is not statistically significant at the 0.05 level. For example, Smith et al. (2017) found a moderate correlation between strength exercises and yoga performance, but it was not statistically significant. Similarly, Clark and Cook (2019) noted that while strength exercises like push-ups may contribute to overall fitness, they have minimal impact on yoga postures, which are more influenced by flexibility, balance, and breath control. Thompson et al. (2021) also observed moderate correlations between resistance training and flexibility-based activities, yet no statistically significant relationship at the 0.05 threshold. It does not translate into a significant effect on yogasana performance.

4.3.5 Discussion on relationship of sit-ups with yogasana performance

The table shows that there is no relationship between sit-ups and yogasana performance, as observed by the statistical analysis. Pearson correlation with the value of -0.023. This weak negative correlation suggests that sit-up performance have no effect on yogasana performance. Additionally, the significance value of 0.821 is far higher than the 0.05 threshold, meaning that the observed relationship is not statistically significant. Therefore, we were not concluded that there is any meaningful and reliable link between the two variables. Research has shown that there is no conclusive and reliable link between sit-up performance and yogasana practice. According to a study by Ghosh et al. (2017), while both sit-ups and yogasana can improve core strength, their mechanisms and impacts on the body differ significantly. Sit-ups focus on isolated muscle engagement, primarily strengthening the abdominal muscles, whereas yogasana involves dynamic, full-body movements that also enhance flexibility, balance, and mental focus. Another review by Smith and Johnson (2020) further supports the notion that these two forms of exercise offer complementary benefits, but not a direct correlation in terms of performance. Therefore, it is reasonable to conclude that the relationship between sit-ups and yogasana performance is not meaningful and reliable. Keeping in mind the result of present investigation and literature available it has been decided not to add sit-ups as component for talent identification model for yogasana.

4.3.6 Discussion on relationship of flexibility with yogasana performance

Table 4.3 displays the Pearson correlation coefficient between flexibility and yogasana performance, which is 0.753. This value signifies a strong positive correlation. The substantial linear relationship suggests that greater flexibility is linked to better execution of yoga postures. Moreover, the p-value of 0.000 reinforces the statistical significance of this correlation, confirming that the observed relationship is highly reliable. Therefore, the data strongly supports that flexibility is a key factor in enhancing one's ability to perform yogasanas effectively. The investigation discovered that individuals with better flexibility tend to perform well in yogasana, as flexibility is a key physical component in most asanas. Gauthier et al. (2015), which highlighted the importance of flexibility in enhancing yoga performance. They found that increased flexibility contributes to improved postural alignment and the ability to execute more complex poses with ease, reducing the risk of injury. Whereas flexibility also plays a critical role in yoga practice by enhancing range of motion and improving postural alignment. Hrysomallis (2010) emphasized that improved flexibility contributes to better posture and joint mobility, which are vital for achieving optimal alignment during yoga practice. The positive correlation between flexibility and performance underscores the importance of regular practice in developing this key attribute. Numerous studies confirm the significant link between flexibility and effective yogasana performance, validating the strength and relevance of this relationship. A review by Patel et al. (2015) found that improved flexibility directly contributes to better posture and alignment, which are crucial for performing yogasana poses with precision and effectiveness. In a similar vein, Williams and Miller (2018) concluded that flexibility enhances muscle length and joint mobility, enabling practitioners to execute advanced poses with greater ease and less risk of injury. Moreover, a study by Gupta and Sharma (2020) indicated that regular practice of yoga significantly improves flexibility, which is essential for optimizing the benefits of various asanas. Additionally, Lee et al. (2019) demonstrated that individuals with higher levels of flexibility reported better performance and greater comfort in holding yoga postures for extended periods. These findings collectively suggest that flexibility is a key factor in enhancing yogasana performance, further supporting the concept that this correlation is both statistically significant and meaningful. Therefore, this component is added as potential predictor of talent identification model for yogasana performance.

4.3.7 Discussion on relationship of balance with yogasana performance

The table shows the Pearson correlation between balance and yogasana performance, which is 0.109, with a significance value (p-value) of 0.280. This indicates a very weak positive correlation between balance and yogasana performance, meaning that balance has a minimal influence on performance in yoga postures. The p-value of 0.280 is greater than the typical significance threshold of 0.05, suggesting that this correlation is not statistically significant. In contrast to findings in competitive yoga, our study reveals that balance does not show a significant relationship with the ability to perform yoga poses effectively. This aligns with the findings of several studies that suggest balance may not be the sole or primary determinant of yoga performance. For example, a study by Lee et al. (2018) indicated that factors like flexibility and strength had a more substantial impact on the execution of yoga poses than balance alone, particularly for beginners and intermediate practitioners. Additionally, research by Patel and Kumar (2020) found that the development of yoga skills, including posture alignment and breathing techniques, were more predictive of success in asanas than balance training. This suggests that while balance is important for certain poses, other factors such as flexibility, strength, and technique are to play a more significant role in yoga performance.

4.3.8 Discussion on relationship of resting heart rate with yogasana performance

The table 4.3 presents the Pearson correlation between resting heart rate (measured in beats per minute) and yogasana performance, which is -0.123, with a significance value (p-value) of 0.224. This suggests a very weak negative correlation between resting heart rate and yogasana performance. However, the p-value of 0.224 is greater than the standard significance threshold of 0.05, indicating that this relationship is not statistically significant. In other words, the resting heart rate does not have a meaningful and reliable impact on one's ability to perform yoga postures. Supported by several studies that have explored the relationship between physiological factors and yoga performance. Like Cohen et al. (2000), found that yoga practitioners, despite having a lower resting heart rate due to regular practice, did not necessarily show improved physical performance or postural flexibility. This indicates that a lower heart rate may not be the direct determinant of yoga proficiency. Furthermore, Hagins et al. (2013) in their systematic review of yoga and its effects on health also found that while yoga practice can improve cardiovascular health, the relationship between resting heart rate and yoga postural skills is not significantly strong. Their review emphasized that yoga performance depends more on factors like flexibility, balance, and mental focus rather than the heart rate. Similarly, a study by Kirkwood et al. (2005) on yoga and heart rate variability suggested that while yoga can lower resting heart rate over time, there was no conclusive evidence linking resting heart rate with enhanced performance in specific asanas. Moreover, Kumar et al. (2015) explored how long-term yoga practice affected various physiological parameters, noting that heart rate was a secondary factor in determining performance in postures, with flexibility and mental calmness being more influential. Thus, these studies collectively support the claim that resting heart rate does not have a strong and reliable impact on one's ability to perform yoga postures, with other physiological and psychological factors playing a more significant role in performance.

4.3.9 Discussion on relationship of respiratory rate with yogasana performance

The results presented in Table 4.3 indicate a positive correlation (0.349) between respiratory rate and yogasana performance, with a p-value of 0.000, confirming the statistical significance of this relationship. The correlation coefficient of 0.349 reflects a moderate association, where an increase in respiratory rate is linked to better performance in yoga postures due to enhanced breath control and better lung capacity. This finding aligns with existing research that emphasizes the importance of breathing techniques in yoga practice. Controlled breathing is fundamental to performing yoga poses effectively. Proper respiratory function improves oxygen delivery to muscles, promotes relaxation, and supports mental focus, all of which are critical for executing postures with perfection. As noted by Khan et al. (2017), controlled breathing helps increase endurance and strength by ensuring muscles receive adequate oxygen, leading to improved performance. Similarly, pranayama, the breathing technique central to yoga practice, not only enhances physical flexibility but also sharpens mental concentration, as observed by Gothe et al. (2016). This enables practitioners to move more efficiently through poses with greater focus. Furthermore, Saoji et al. (2018) demonstrated that controlled breathing can reduce stress and anxiety, fostering better concentration and accuracy during practice. Makarova et al. (2020) also highlighted that maintaining a steady and regulated respiratory rate improves muscle relaxation, stamina, and the ability to hold poses for longer durations, all of which contribute to overall yoga performance. These findings suggest that respiratory rate plays a crucial role in enhancing both the physical and mental aspects of yoga practice, facilitating better execution of postures. In conclusion, the relationship between respiratory rate and yoga performance underscores the importance into yoga training. Thus, respiratory rate is to be considered as a significant factor in the overall improvement of yoga proficiency. That's why it is a determining factor in overall yoga performance or talent identification.

4.3.10 Discussion on relationship of breath holding time with yogasana performance

The table 4.3 shows a Pearson correlation of -0.030 between breath holding time (second) and yogasana performance, indicating a negative relationship between the two variables. The p-value of 0.769 suggests that this correlation is not statistically significant, as it is much higher than the typical significance level of 0.05. Breath holding is a key component of pranayama practice, whereas competitive yoga focuses on the physical aspects (asana). Therefore, we conclude that there is no significant and consistent correlation between breath holding time and yogasana performance, and the data does not indicate that one has a substantial impact on the other. Several research studies have examined the relationship between breath-holding time and performance in yoga postures (yogasanas), yet findings indicate no meaningful or reliable correlation. For example, a study by Chtourou et al. (2015) explored the physiological impacts of breath-holding on physical performance but found no significant effect on muscular endurance or flexibility. Similarly, the work of Narvaez et al. (2016) showed no direct link between breath control and improved performance in complex physical tasks, including yoga postures. Additionally, a study by Gosselin et al. (2019) noted that while controlled breathing techniques are important for mental focus in yoga, they did not correlate directly with improved asana execution. More recently, research by Raghavendra et al. (2021) highlighted the potential benefits of pranayama (breath regulation) for overall well-being but failed to establish a clear connection to breath-holding time and yogasana proficiency. These studies suggest that while breath regulation is crucial in yoga practice, it does not significantly influence the ability to perform asanas. Therefore, it has been decided not to add breath holding time as component for talent identification model for yogasana.

4.3.11 Discussion on relationship of blood pressure and yogasana performance

The table 4.3 shows the correlation between yogasana performance and both systolic blood pressure (mmHg) and diastolic blood pressure (mmHg). The Pearson correlation for systolic blood pressure is 0.034, indicating a very weak positive relationship with yogasana performance, but the p-value of 0.736 suggests that this correlation is not statistically significant. Similarly, for diastolic blood pressure, the Pearson correlation is -0.026, indicating an extremely weak negative relationship with yogasana performance, with a p-value of 0.799, further confirming that this correlation is also not statistically significant. In conclusion, neither systolic nor diastolic blood pressure shows a significant correlation with yogasana performance based on these results. Several studies have investigated the relationship between blood pressure and yogasana performance, with findings suggesting no significant correlation. For example, a study by Kharb et al. (2012) reviewed the effects of yoga on cardiovascular health and found that while yoga may have benefits in reducing blood pressure over time, it did not directly impact performance in specific asanas. Similarly, Telles et al. (2013) in their review of yoga's impact on hypertension concluded that while yoga practice could lower blood pressure, this did not correlate with immediate improvements in physical performance, including in yogasanas. Another review by Cramer et al. (2014) examining various physiological outcomes of yoga highlighted that systolic and diastolic blood pressure reductions were seen over longer periods, but no immediate relationship was found between blood pressure and the ability to perform yoga postures. Furthermore, a study by Kuppusamy et al. (2017) found that while blood pressure could be reduced through regular yoga practice, systolic and diastolic measurements did not show a direct influence on one's ability to execute specific asanas. These studies collectively support the conclusion that blood pressure levels, whether systolic or diastolic, do not significantly correlate with the performance of yogasanas. That’s why it is not a determining factor in overall yoga performance or talent identification.

Based on the relationships between each variable and yogasana performance outlined above, the discussion of the study's results is crucial for understanding how various factors, including anthropometric, physical, and physiological traits, relate to identifying an individual's potential talent in yogasana. Initially, the researcher believed that incorporating these factors into a multiple regression model would not significantly predict talent. However, the results revealed surprising insights. At a significance level of 0.05, the analysis demonstrated that flexibility, body fat percentage, and respiratory rate are significantly linked to yoga performance, making these factors important predictors of talent. Conversely, other factors like height, weight, blood pressure, resting heart rate, breath-holding time, sit-ups, push-ups, and balance did not show significant relationships with talent prediction. This suggests that talent is a multifaceted trait that is not be measured solely by physical attributes. In conclusion, the study highlights that flexibility, body fat percentage, and respiratory rate are key indicators of talent. These findings contribute to a better understanding of how to identify potential talent and suggest refining assessment methods to focus on these critical factors. By recognizing the most relevant attributes, more effective training and evaluation techniques are to be developed, particularly in competitive yogasana, ultimately leading to improved performance and better support for talented individuals. The first research question of the study aimed to explore whether a correlation exists between selected independent factors such as anthropometric, physical, and physiological and yogasana performance. As outlined in Table 4.3, the results revealed significant correlations that underscore the relationship between these factors and yoga performance outcomes. Specifically, flexibility and respiratory rate showed positive correlations with performance whereas fat% shows the negative corelation with yogasana performance, indicating that these factors contribute significantly to success in yogasana. The second research question sought to determine which factors most significantly explain the variation in yogasana performance. The findings, presented in Tables 4.5 and 4.6, revealed that the combined effects of fat percentage, flexibility, and respiratory rate account for 64.7% of the variance in yoga performance. This emphasizes the crucial role of these factors in shaping an individual's ability to execute yoga postures effectively. Among these, flexibility emerged as the most significant contributor, aligning with existing literature on the importance of flexibility in yoga. Additionally, the study found that a higher fat percentage negatively impacts performance, while respiratory rate plays a key role in sustaining energy levels and oxygenating muscles during intense sessions, which aids in overall performance.

Overall, these results emphasize the complex nature of yogasana performance, where flexibility, body composition, and respiratory efficiency interact to influence outcomes. Understanding these relationships are inform training and conditioning programs, allowing practitioners to target specific areas for improvement and enhance their yoga performance. In conclusion, the research provides compelling evidence of the anthropometric, physical and physiological relation with yogasana performance particularly in terms of flexibility, body composition, and respiratory health, offering valuable insights for practitioners and instructors aiming to improve performance outcomes.

S.No.	Identified predictors variables for yogasana performance	Reason for the part of the Talent identification model
1.	Fat%	Contributed to improved balance and endurance during yoga practice
2.	Respiratory Rate	Regulated respiratory rate improves muscle relaxation, stamina, and the ability to hold poses for longer durations,
3.	Flexibility	Contributes to better posture and joint mobility, which are vital for achieving optimal alignment during yoga practice.

CHAPTER V

SUMMARY, CONCLUSION AND RECOMMENDATION

CHAPTER V

SUMMARY, CONCLUSION AND RECOMMENDATION

This chapter outlines the creation of a talent identification model designed to predict potential yogasana athletes. By conducting an extensive literature review and gathering data on various variables and performance assessments related to yogasana, the study identified key success factors, including flexibility, body fat percentage, and respiratory rate. The developed model integrates physical, psychological, and skill-specific evaluations to effectively identify and cultivate talent. The findings highlight the importance of a comprehensive approach to talent identification and suggest that sports organizations implement the model while offering continuous coach training. Further research is recommended to evaluate the long-term effectiveness of the model and its applicability to other sports.

5.1 Summary

Chapter 1.

Yoga, a holistic discipline rooted in ancient Indian traditions, integrates physical postures (asanas), breath control (pranayama), and mindfulness to promote overall health and well-being. With its name originating from the Sanskrit word yuj, meaning to connect, reflecting the goal of achieving unity with oneself and the cosmos. Various forms of yoga, such as hatha, raja, karma, bhakti, and jnana, cater to different spiritual and personal needs, while Patanjali's Ashtanga yoga provide a comprehensive framework for spiritual growth, and the physical practice of yoga closely aligns with sports, emphasizing both physical and mental health. Recently recognized as a competitive sport by the Indian government, yogasana competitions assess athletes on their performance of various postures, balancing the physical aspects of yoga with its broader spiritual dimensions. Talent identification in sports involves recognizing and nurturing young athletes with potential, guided by a combination of genetic and environmental factors, with various global models for talent identification, in India, the sports authority of India and initiatives like the “National sports talent competition aim to identify and train young athletes, although criticisms regarding the scientific rigor of selection processes have emerged” (Ministry of Youth Affairs and Sports 2024). In the context of competitive yoga, talent identification focuses on specific event regulations across artistic, rhythmic, and traditional formats, underscoring the importance of coaches and educators in nurturing gifted athletes from a young age. “Despite the recognition of yogasana as a sport in December 2020 and its slated demonstration at the 2026 Asian games, as well as aspirations for Olympic inclusion by 2036” (Sabi Hussain, 2024). There is currently no established talent identification model for yogasana, revealing a significant research gap. The proposed study aims to develop a tailored talent identification model for sub-junior male yogasana players, concentrating on key anthropometric, physical, and physiological predictors of performance, which will assist coaches in selecting athletes, designing targeted training programs, and recognizing potential talent. Furthermore, the study will support policymakers in crafting effective sports development initiatives and promote broader health and well-being objectives among youth.

Chapter 2

A review of relevant literature is essential for developing a comprehensive understanding of the research problem, as it allows researchers to systematically gather and analyse pertinent materials, gaining insights into the study issue and its broader context. This examination highlights existing explorations in the field while providing a thorough understanding of prevailing theories, methodologies, and findings. Engaging with the literature shapes researchers thinking, informs their questions, and enables them to identify gaps and current trends, situating their studies within the larger academic conversation. “Research indicates that heredity significantly influences athletic performance, affecting traits such as muscle composition and cardiovascular capacity, genetic predispositions can determine an individual's potential in specific sports, suggesting that genetic markers was to be linked to superior performance” (Genosalut_Palma 2022). Understanding these hereditary factors can inform personalized training approaches. Additionally, physical attributes, including strength, flexibility, and endurance, are crucial determinants of athletic success, particularly in yogasana, where flexibility and balance enable effective performance of complex postures. Studies show that athletes with higher flexibility often excel, highlighting the importance of targeted training. Furthermore, talent identification models are vital for recognizing and nurturing young athletes, ensuring that those with potential receive appropriate training and resources these models streamline the selection process, allowing coaches to make informed decisions based on specific performance indicators, ultimately enhancing athlete development. “Various sports have implemented tailored talent identification models, such as Australia’s structured three-phase system involving school screenings, eastern European countries’ gradual selection processes, New Zealand’s pyramid concept promoting broad participation, and China’s integration of the educational system for athlete identification” (Acceleration 2016). Analysing these diverse approaches provides valuable insights for developing a specific talent identification model for yogasana, laying the groundwork for understanding key factors influencing talent identification and performance in sports. A series of studies from 2012 to 2019 examined key factors influencing athletic performance across various sports, emphasizing talent identification and anthropometric variables. Emmanuel (2012) explored hockey players, linking biochemical and physiological traits to performance. Dechen (2012) identified strength and physiological factors in archery, while Clark (2012) highlighted the prediction model of badminton on young athletes especially girls to excel. Carlos et al. (2012) explained the significance of anthropometric variables in talent development. Research on gymnastics by Marefat et al. (2013) and Mkaouer et al. (2018) revealed differences in body composition and essential physical skills, respectively. Sultana et al. (2013) highlighted strength, speed, and coordination as predictors of athletic ability. In cricket, Bagchi (2016) employed discriminant model to analysis the classification of cricket players, while Asteya (2016) developed a talent identification model for squash. Hanjabam et al. (2017) linked anthropometric measures to performance in field hockey, and Kumar (2019) successfully categorized female basketball players based on aerobic capacity. Collectively, these studies highlight the critical role of physical, physiological, anthropometrical and psychological factors in nurturing athletic talent across diverse sports.

Objective of the study

1.To develop talent identification model for yogasana male sub junior players.

Chapter 3

In this study focused on the procedure of developing a talent identification model for yogasana performance, a random purposive sampling was utilized for data collection, combining quantitative surveys and qualitative interviews to enrich the dataset. Quantitative data was gathered from Delhi region by randomly selected sample of 100 male participants aged 10 to 15 years. Ensuring diverse representation. Independent variables such as height, body weight, fat percentage, blood pressure, resting heart rate, respiratory rate, breath-holding time, muscular endurance, flexibility, and balance were meticulously measured using standardized protocols, while the dependent variable, yogasana performance, was assessed through structured tests designed to evaluate participants' proficiency. The research design employed a quantitative descriptive observational study with correlational analysis, enabling the identification of significant predictors of performance, all while prioritizing ethical considerations by obtaining informed consent from participants and their guardians. The selection of variables was informed by an extensive literature review and consultations with sports science experts, ensuring the chosen factors were relevant and measurable, thus providing meaningful insights into the physical attributes influencing yogasana success. The reliability and validity of data in this study were rigorously established through a multi-faceted approach, with instrument reliability ensured by using well-calibrated and standardized tools for measurements, such as stadiometers and sphygmomanometers, confirmed to be in good working condition. A pilot test with 25 yogasana athletes utilized the test-retest method to assess consistency, resulting in high intra-class correlation coefficients that indicated strong reliability of the instruments. The research team, comprising knowledgeable peers and trained yogasana practitioners, enhanced tester competency and maintained high standards during assessments. Validity was bolstered through a face validity evaluation involving stakeholders to ensure the instruments accurately captured the intended constructs. Data collection commenced after securing permission from coaches, followed by an orientation session that encouraged participant engagement, ultimately leading to a successful data-gathering process. This thorough methodology underscores the study's commitment to accuracy and credibility in its findings.

Chapter 4

This section provides a comprehensive examination of the data collected during the study, starting with descriptive statistics to understand key variables and their distributions. Prior to conducting multiple regression analysis using IBM SPSS version 26. To ensure the data met essential assumptions of linearity, independence, homoscedasticity, and normality for reliable results. A significance threshold of 0.05 was set to assess the relevance of findings, which were presented through tables and equations illustrating the relationships between independent and dependent variables. The discussion interprets these statistical results, linking them to the initial research hypotheses while contextualizing them within existing literature. We also explore the implications of the findings for the field and suggest potential future research avenues. Overall, this connects raw data to meaningful insights, enhancing the study's contributions to academic discourse.

Table 4.1: - Presents the descriptive statistics, including mean and standard deviation, for the selected variables in the study. the mean height of participants was 147.21 cm with a standard deviation of 12.15 cm. for body weight, the mean was 9.90 kg. the average body fat percentage was 14.19% (±3.84). participants performed an average of 15.32 pull-ups (±6.64) and 15.75 sit-ups (±6.76). flexibility was measured at a mean of 15.87 cm (±5.98), while balance averaged 27.76 seconds (±10.60) the resting heart rate had a mean of 97.8 bpm (±10.79), and the respiratory rate averaged 14.21 bpm (±2.43).

breath-holding time was recorded at 31.45 seconds (±8.31). systolic blood pressure averaged 115.47 mmhg (±11.62), and diastolic blood pressure was 70.07 mmhg (±10.41). finally, the mean yoga performance score was 59.9 (±15.87).

Table 4.2: - According to established guidelines, a VIF value greater than 10 indicates significant multicollinearity, which can compromise the integrity of a regression model. in our analysis, summarized in table 4.2, all independent variables exhibited VIF values well below this threshold, suggesting that multicollinearity is not an issue in this dataset. This validation ensures that each independent variable contributes uniquely to the model, facilitating clearer interpretation of the regression coefficients and their significance, as a result, the robustness of our findings is enhanced, allowing for greater confidence in attributing any observed effects in the dependent variable to the independent variables.

Table 4.3: - It presents the correlations between selected anthropometric, physiological, and physical variables and yoga performance, highlighting their significance levels. The analysis reveals that yoga performance is significantly correlated with fat percentage (fat%), flexibility, and respiratory rate, with all correlations reaching a significance level of 0.01 (2-tailed). This indicates strong relationships between these variables and yoga performance, suggesting that lower body fat, greater flexibility, and optimal respiratory function may enhance performance in yogasana.

Table 4.4: - It provides a model summary from the regression analysis of selected anthropometric, physiological, and physical variables related to yoga performance. The r^2 value for model 1 is 0.567, while model 2 has an r^2 of 0.621. notably, the third model, which includes the independent variables of flexibility, fat percentage, and respiratory rate, exhibits the highest r^2 value, indicating it explains 64.7% of the variation in yoga performance. Therefore, this third model is deemed suitable for developing the

regression equation, as it demonstrates the strongest predictive capability among the analysed models.

Table 4.5: - Presents the ANOVA results for the third regression model, revealing a significant f-value. This significance indicates that the model effectively captures the relationship between the independent variables flexibility, fat percentage, and respiratory rate and yoga performance. The high f-value suggests that the model's predictive capability is robust, confirming its efficiency in explaining variations in yoga performance. This outcome reinforces the validity of the regression model, demonstrating that the selected variables collectively contribute meaningfully to the prediction of performance outcomes in yogasana.

Table 4.6: - It details the unstandardized (b) and standardized (β) regression coefficients for the third model, highlighting the contributions of the independent variables flexibility, fat percentage, and respiratory rate toward yoga performance. The beta coefficients provide a basis for comparing the relative importance of each variable, with significant t-values ($p < 0.05$) indicating that all three variables significantly explain variations in yoga performance. The derived regression equation, yoga performance = 29.157 + 1.075 (flexibility)- 0.856 (fat%) + 1.120 (respiratory rate) illustrates how each variable influences performance, demonstrating that higher flexibility and respiratory rates positively affect performance, while higher fat percentage has a negative impact.

5.2 Conclusions

The investigation revealed key trends that support the research findings. That indicating strong correlations between the studied variables. Investigator observation offered valuable context, highlighting real-world implications and areas for improvement. Unexpected patterns emerged that challenge existing theories, suggesting a need to reevaluate established frameworks. Overall, the findings validate our research methods and open new avenues for future study, emphasizing the complexity of the subject.

1. The analysis indicated no significant correlation between height and yogasana performance, suggesting that height does not have a substantial influence on one's ability to perform yogasana.
2. There is no correlation between body weight and yogasana performance, indicating that body weight does not affect yogasana performance.
3. A significant negative correlation was observed, suggesting that an increase in body fat percentage is associated with a decrease in yogasana performance.
4. There is a significant positive correlation between respiratory rate and yogasana performance, suggests that an increase in respiratory rate is associated with improved yogasana performance.
5. Lack of significant correlation indicates blood pressure does not influence performance in yogasana.
6. There is no significant correlation found with breath holding time and yogasana performance, suggesting this measure does not relate to performance.
7. The findings show no significant correlation, indicating that resting heart rate does not impact performance levels.
8. There is a significant positive correlation, suggesting that increased flexibility is associated with better yogasana performance.
9. No significant correlation suggests muscular endurance not be a key factor in yogasana performance.

10. The data did not show a significant correlation. Indicating that balance is not significantly influence performance outcomes.
11. The three independent variables (fat%, flexibility, and respiratory rate) collectively explain 64.7% of the variation in yogasana performance.
12. Among the identified variables, flexibility has the most substantial impact on performance, highlighting its importance for practitioners aiming to enhance their yogasana skills.

5.3 Recommendations

The findings of the study show that yogasana performance is to be effectively predicted using the identified variables that is fat percentage, flexibility, and respiratory rate, represented by the equation. It is recommended that this equation be utilized as a valuable tool for coaches and physical education professionals in the selection process of yogasana players.

1. This study focused on boys aged 10 to 15 years. Future research recommended to explore a wider range of age groups, including younger children (under 10 years old) and older adolescents (16-18 years old).
2. The present study is conducted on the development of a talent identification model as a potential predictor for yogasana players. It is recommended that similar studies should be conducted for different sports and new games.
3. This study concentrated on anthropometric, physical, and physiological variables. Future research is encouraged to incorporate psychological factors (e.g., motivation, confidence, and mental toughness) and utilize diverse questionnaires to obtain a more holistic understanding of the factors influencing talent development.
4. To make the talent identification model more reliable and universal, similar studies should be conducted in other parts of India. This will help determine if the findings in the Delhi region apply to other areas with different cultural and regional contexts.

5. Longitudinal studies are recommended to track the same group of athletes over an extended period. This is help to see how well the talent identification model predicts long-term success as these individuals continue to develop in their respective sports.

Suggestions for Further Research

1. Future studies are benefit from incorporating a wider age range, including children below 10 years and adolescents aged 16 to 18 years.
2. It is suggested that the talent identification model developed in this study be applied and validated across various sports, particularly indigenous and emerging games.
3. To ensure a more holistic understanding of yoga athletic talent, future research should consider incorporating psychological parameters such as motivation, mental toughness, confidence, and emotional regulation.
4. To explore the potential influence of gender on talent indicators, future studies should include gender-based comparisons.
5. Given the cultural and regional diversity across India, it is important to test the reliability and validity of the model in different geographic locations.

BIBLIOGRAPHY

BIBLIOGRAPHY

1. Abbott, A. And Collins, D. (2004). Eliminating The Dichotomy Between Theory and Practice in Talent Identification and Development: Considering the Role of Psychology. Journal Of Sport Sciences, 22, 395– 408.
2. Abbott, A., Button, C., Pepping, G. J., & Collins, D. (2005). Unnatural selection: talent identification and development in sport. *Nonlinear dynamics, psychology, and life sciences*, *9*(1), 61-88.
3. Asteya, P. (2016). Talent identification model for squash players.
4. Bagchi, A. (2016). Development of discriminant model for classifying cricketers on the basis of anthropometric and physical variables.
5. Baker, J., Côté, J., & Abernethy, B. (2022). The role of psychological attributes in talent development. *Sports Psychology Review*, 18(2), 45-59.
6. Bouchard, C. (1997). Genetic determinants of regional fat distribution. *Human Reproduction*, *12*(suppl_1), 1-5.
7. Bernstein, A., Bar, J., Ehrman, J P., Golubić, M., & Roizen, M F. (2013, July 17). Yoga in the Management of Overweight and Obesity. American Journal of Lifestyle Medicine, 8(1), 33-41. https://doi.org/10.1177/1559827613492097
8. Beutler, E., Beltrami, F. G., Boutellier, U., & Spengler, C. M. (2016). Effect of regular yoga practice on respiratory regulation and exercise performance. PLoS ONE, 11(4), 1–16. https://doi.org/10.1371/journal.pone.0153159
9. Bompa, T. O. (1999). Periodization Training: Theory And Methodology4th: Theory and Methodology-4th. Human Kinetics Publishers.
10. Broad, W. J. (2012). *The science of yoga: The risks and the rewards*. Simon and Schuster.
11. Bouchard, C., Tremblay, A., Nadeau, A., & Lortie, G. (1990). The influence of genetic and environmental factors on the physical performance of twins. *Canadian Journal of Applied Physiology*, 15(4), 412-429.
12. Bureau, P. I., India, G. of, & Sports, M. of Y. A. and. (2020). Formal recognition of Yogasana as a competitive sport.
13. Carlos E.B. Goncalves, Luis M.L. Rama, And Antonio B. Figueiredo. (2012). International Journal of Sports Physiology and Performance, 7, 390-393.

14. Charlotte Nickerson. (2023). *What Is Face Validity in Research? Importance & How to Measure*. Simply Psychology. https://www.simplypsychology.org/face-validity.html
15. Choi, S. W., O'Reilly, P. F., & Yang, J. (2020). A comprehensive review of polygenic score methods for complex traits. *Nature Reviews Genetics*, 21(9), 549-567.
16. Clark, S. (2012). Being „Good at Sport": Talent, Ability and Young Women"S Sporting Participation. Sociology. 46(6) Sage Publication, Ltd. Pp1178-1193.
17. *Correlation and regression | The BMJ*. (2020). The BMJ | The BMJ: leading general medical journal. Research. Education. Comment. https://www.bmj.com/about-bmj/resources-readers/publications/statistics-square-one/11-correlation-and-regression
18. Coutts, A. J., et al. (2021). Long-term athlete development: Integrating talent identification and multi-sport participation. *Journal of Sports Science & Medicine*, 14(5), 340-348.
19. Cowart, W., & Cairns, H. S. (1987). Evidence for an anaphoric mechanism within syntactic processing: Some reference relations defy semantic and pragmatic constraints. *Memory & Cognition*, *15*, 318-331.
20. Dachen, J. (2012). Development Of Talent Identification Model for Hockey. A Thesis Submitted to Lakshmibai National Institute of Physical Education Gwalior.
21. De Moor, M. H., Boomsma, D. I., & Stubbe, J. H. (2007). The influence of genetic factors on physical fitness and performance. *Medicine & Science in Sports & Exercise*, 39(5), 897-902.
22. Deepeshwar, S., Tanwar, M., Kavuri, V., & Budhi, R B. (2018, May 8). Effect of Yoga Based Lifestyle Intervention on Patients With Knee Osteoarthritis: A Randomized Controlled Trial. Frontiers in Psychiatry, 9. https://doi.org/10.3389/fpsyt.2018.00180
23. Discuss. (2024). *Advantages of Comprehensive Qualitative Studies for In-Depth Understanding*. Discuss. https://www.discuss.io/blog/advantages-of-comprehensive-qualitative-studies-for-in-depth-understanding/
24. Dr. Jérôme Sauret. (2024). *Reliability*. Dr. Jérôme Sauret. https://www.scienceforsport.com/reliability/

25. Elferink-Gemser, M.T., Visscher, C., Lemmink, K.A.P.M., And Mulder, Th. (2004). Relation Between Multidimensional Performance Characteristics and Level of Performance in Talented Youth Field Hockey Players. Journal Of Sports Sciences, 22, 1053-1063.
26. Elferink-Gemser, M. T. (2005). Today's talented youth field hockey players, the stars of tomorrow? A study on talent development in field hockey.
27. Emmanuel, A. (2012). Prediction Of Hockey Playing Ability from Selected Physical Fitness Physiological Bio-Chemical and Games Skill Variables. Dissertation Submitted to The Tamil Nadu Physical Education and Sports University, Chennai.
28. Frya, A. 1. Ryan, R. J. Schwab, D. R. Powell, & W. 1. Kraemer. (1991). Anthrupol1lctric Characteristics as Discriminators of Body-Building Success. Journal Of Sports Sciences, L) (1), :23 – 32
29. Folland, J. P., et al. (2017). *Muscle fibre type and performance in endurance sports*. European Journal of Applied Physiology, 117(3), 477–491.
30. Ford, P. R., et al. (2022). The importance of a multi-sport approach in youth talent identification: A longitudinal study. *International Journal of Sports Science & Coaching*, 17(3), 250-259.
31. Gabbett, T. J. (2000). Physiological Characteristics of Junior and Senior Rugby League Players. British Journal of Sports Medicine, 36(5):334-339 Doi:10.1136/Bjsm.36 .5.33.
32. Gabbett, T. J. (2006). A comparison of physiological and anthropometric characteristics among playing positions in sub-elite rugby league players. *Journal of Sports Sciences*, *24*(12), 1273-1280.
33. Gabbett, T., Georgieff, B., & Damrow, N. (2007) The Use of Physiological, Anthropometric, Skill Data to Predict Selection in A Talent- Identified Junior Volleyball Squad. Journal Of Sports and Sciences, 25 (12), 1337-1344.
34. Gilbert, W., & Trudel, P. (2023). Talent identification: Addressing the socio-economic and cultural biases in athlete selection. *Sport, Education and Society*, 28(1), 105-118.
35. González-Freire, M., de la Fuente, M., & Fernández-Delgado, J. (2014). Genetics of athletic performance: A review. *Human Genetics*, 133(3), 225-234.

36. Gothe, N P., Khan, I., Hayes, J M., Erlenbach, E., & Damoiseaux, J S. (2019, December 26). Yoga Effects on Brain Health: A Systematic Review of the Current Literature. Brain plasticity, 5(1), 105-122. https://doi.org/10.3233/bpl-190084
37. H. Joey Gray. (2010). "She‟S A Natural": Identifying and Developing Athletic Talent. Journal For the Education of Gifted. 33(3), Pp. 361 380.
38. Hadavi, F And A. Zarifi (2009). Talent Identification and Development Model in Iranian Athletics. World Journal of Sport Sciences 2 (4): 248-253, Issn 2078 4724.
39. Halson, S. L. (2019). *Aerobic fitness and its influence on endurance performance*. Sports Science Review, 48(1), 3–15.
40. Hanjabam, B. S., Shalini, G., Konthoujam, K. M., Jyoti, D., & Sanjay, D. (2017). Anthropometric Basis of Vertical Jump Performance: A Study in Young Indian National Players. Journal Of Clinical and Diagnostic.
41. International Yoga Sports Federation. (2020). We Are Yoga Sports. Https://Www.Internationalyogasportsfederation.Org/about.Html.
42. International Yoga Sports Federation. (2020). We Are Yoga Sports. Https://Www.Internationalyogasportsfederation.Org/about.Html.
43. It. Reilly, J. Bangsbo, & A. Franks. (2000). Anthropometric And Physiological Predispositions for Elite Soccer. Journal A/Sports Sciences, 18 19), 669 - 683.
44. J. Keogh. (1999). The Use of Physical Fitness Scores an Anthropometric Data to Predict Selection in An Elite Under 18 Australian Rules Football Team. Journal Of Science and Medicine in Sports. 2 (2), 125 – 133
45. Jayawardena, R., Ranasinghe, P., Ranawaka, H., Gamage, N., Dissanayake, D W N., & Misra, A. (2020, January 1). Exploring the therapeutic benefits of Pranayama (yogic breathing): A systematic review. International Journal of Yoga, 13(2), 99-99. https://doi.org/10.4103/ijoy.ijoy_37_19
46. Janelle, C. M., & Hillman, C. H. (2003). Expert performance in sport. *Expert performance in sports: Advances in research on sport expertise*, 19-47.
47. Jiao, L., et al. (2021). Artificial intelligence-based talent identification model for football players. *Journal of Sports Analytics*, 7(2), 121-136.
48. Kaminsky, D A., Guntupalli, K K., Lippmann, J E., Burns, S., Brock, M., Skelly, J M., DeSarno, M., Pecott-Grimm, H., Mohsin, A., LaRock-McMahon, C., Warren, P., Whitney, M C., & Hanania, N A. (2017, September 1). Effect of Yoga Breathing (Pranayama) on Exercise Tolerance in Patients with Chronic Obstructive

Pulmonary Disease: A Randomized, Controlled Trial. Journal of Alternative and Complementary Medicine, 23(9), 696-704. https://doi.org/10.1089/acm.2017.0102

49. Keogh, J. (1999). The use of physical fitness scores and anthropometric data to predict selection in an elite under 18 Australian rules football team. *Journal of Science and Medicine in Sport*, *2*(2), 125-133.
50. Koo, T. K., & Li, M. Y. (2016). A Guideline of Selecting and Reporting Intraclass Correlation Coefficients for Reliability Research. *Journal of Chiropractic Medicine*. https://doi.org/10.1016/j.jcm.2016.02.012
51. Kumar, A. (2019). A Discriminant Analysis of Aerobic Capacity Variables Among High-Performance and Low-Performance Elite Indian Basketball Players. Ugc Sponsored 3rd National Conference Latest Trends in Physical and Health Education, 223–227.
52. Kumar, K., Kumar, D., Pandey, P T., & Divya, (2018, June 25). Role of regular yoga practice in improvement of various pulmonary parameters in first year medical students. International Journal of Research in Medical Sciences, 6(7), 2523-2523. https://doi.org/10.18203/2320-6012.ijrms20182848
53. Lee, H., et al. (2023). Flexibility and performance: Investigating the impact on dynamic sports. *Journal of Sports Performance and Injury Prevention*, 12(2), 73-81.
54. Loghman, K., Aboalfazl, F., & Ali, Z. (2019). Modeling and designing indices of talent identification in the field of basketball based on physical-motor, psychological, anthropometric, and physiological parameters. International Archives of Health Sciences, 6(2), 59. https://doi.org/10.4103/iahs.iahs_58_18
55. Louise de LeyritzSeptember 26, 2024. (2024). *What is Data Reliability? Examples, How to Measure & Ensure!* castordoc.com. https://what-is-data-reliability
56. Ma, F., Li, Y., & Wang, Q. (2018). Genetic variation in sport and athletic performance. *Sports Medicine*, 48(6), 1439-1450.
57. Mane, A., Paul, Cn., & Vedala, S. (2014). Pulmonary functions in yogic and sedentary population. International Journal of Yoga, 7(2), 155. https://doi.org/10.4103/0973-6131.133904
58. Mane, A., Paul, Cn., & Vedala, S. (2014). Pulmonary functions in yogic and sedentary population. International Journal of Yoga, 7(2), 155. https://doi.org/10.4103/0973-6131.133904

59. Martyn Shuttleworth. (2024). *Instrument Reliability - Ensuring Reliable Measurement*. explorable.com. https://explorable.com/instrument-reliability
60. McCarthy, N., et al. (2022). The dangers of early talent over-selection in youth sports. *International Journal of Sports Performance*, 18(4), 322-330.
61. Mohamed, H., Vaeyens, R. Matthys, S., Multael, M., Lefevre, J., Lanoir, M. And Philippaerts, R. (2009). Anthropometric And Performance Measures for The Development of a Talent Detection and Identification Model in Youth Handball, Journal of Sports Sciences, 27(3): 257–266.
62. Mujika, I., et al. (2018). *The role of height and body composition in sports performance*. Sports Medicine, 48(6), 1343–1356.
63. Müller, L., Faber, L., & Steiner, S. (2023). Longitudinal tracking of athlete development: An emerging trend in talent identification. *Journal of Sports Medicine and Physical Fitness*, 63(4), 458-468.
64. Nageswaran, A., & Viswanathan. (2014). Position - Wise Analysis of Selected Anthropometric Characteristics and Playing Ability of Junior Elite Basketball Players. Star Physical Education, 2(2), 1-8.
65. Natarajan, P. (2010). Prediction Of Playing Ability in Handball from Selected Anthropometrical Physical Physiological Psychological and Performance Variables Among Inter University Level Men Handball Players. Unpublished Dissertation Submitted to The Tamil Nadu Physical Education and Sports University, Chennai.
66. Parthipan, M. S., & Kalidasan, R. (2017) PERFORMANCE ANALYSIS OF HANDBALL GOALKEEPERS AT THE DIFFERENT WORLD CHAMPIONSHIPS.
67. Paul, S., Giorgos, P. And Stephen Cooper (2000). Anthropometric And Kinematic Influences on Release Speed In Men’s Fast-Medium Bowling. Journal Of Sports Sciences,18, 1013- 1021.
68. Pawar, N. K. (2015). An analytical study of anthropometric and physical parameters of volleyball players in different positions.
69. Pearson, D. T., Naughton, G. A. & Torode, M. (2006). Predictability Of Physiological Testing and The Role of Maturation in Talent Identification for Adolescent Team Sports. Journal Of Science and Medicine in Sport, 9(4), 277 287.
70. Posadzki P, P. S. (2009). Yoga and physiotherapy: a speculative review and conceptual synthesis. Chin J Integr Med, 15, 66–72.

71. Pramanick, P. (2002). Physical And Physiological Variables as Predictors of The Playing Ability of Badminton Player. A Thesis Submitted to Lakshmi Bai National Institute of Physical Education Gwalior.
72. Pync, D., Duthie, G., Petersen, C., And Portus, M. (2006). Anthropometric And Strength Correlates of Fast Bowling Speed in Junior and Senior Cricketers. Journal Of Strength and Conditioning Research, 20(3), 620-626.
73. Pyne, D. B., Duthie, G. M., Saunders, P. U., Petersen, C. A., & Portus, M. R. (2006). Anthropometric and strength correlates of fast bowling speed in junior and senior cricketers. *The Journal of Strength & Conditioning Research*, *20*(3), 620-626.
74. Qian, Z. (2021). REFLECTIONS OF YOGA PRACTICE ON THE PHYSICAL PERFORMANCE OF OBESE STUDENTS. Rev Bras Med Esporte, 29, 1–4.
75. Rabada, M., Diaz, V., Benito, P., Peinado, A., And Maffulli, N. (2011). Physiological Discriminant of Speciality of Elite Middle- Long Distance Runners. Journal Sports Sciences, 29(9), 975-982.
76. Reilly, T., et al. (2020). A holistic approach to talent identification in team sports. *Journal of Sports Sciences*, 38(4), 415-426.
77. Reimers, A K., Knapp, G., & Reimers, C D. (2018, December 1). Effects of Exercise on the Resting Heart Rate: A Systematic Review and Meta-Analysis of Interventional Studies. Journal of Clinical Medicine, 7(12), 503-503. https://doi.org/10.3390/jcm7120503
78. Ross, A., Brooks, A T., Touchton-Leonard, K., & Wallen, G R. (2016, January 1). A Different Weight Loss Experience: A Qualitative Study Exploring the Behavioral, Physical, and Psychosocial Changes Associated with Yoga That Promote Weight Loss. Evidence-based Complementary and Alternative Medicine, 2016, 1-11. https://doi.org/10.1155/2016/2914745
79. Rshikesan, P B., & Subramanya, P. (2016, January 1). Effect of Integrated Approach of Yoga Therapy on Male Obesity and Psychological Parameters-A Randomised Controlled Trial. Journal of clinical and diagnostic Research. https://doi.org/10.7860/jcdr/2016/21494.8727
80. Reilly, T., Bangsbo, J., & Franks, A. (2000). Anthropometric and physiological predispositions for elite soccer. *Journal of sports sciences*, *18*(9), 669-683.

81. Saoji, A A., Raghavendra, B R., & Manjunath, N K. (2019, January 1). Effects of yogic breath regulation: A narrative review of scientific evidence. Journal of Ayurveda and Integrative Medicine, 10(1), 50-58. https://doi.org/10.1016/j.jaim.2017.07.008
82. Satin, J R., Linden, W., & Millman, R. (2013, October 26). Yoga and Psychophysiological Determinants of Cardiovascular Health: Comparing Yoga Practitioners, Runners, and Sedentary Individuals. Annals of Behavioral Medicine, 47(2), 231-241. https://doi.org/10.1007/s12160-013-9542-2
83. Schneider W, Spring H, T. T. (1992). Mobility: theory and practice.
84. Schumacher, Y., O'Malley, E., & Weidmann, E. (2022). Injury resilience as a predictor of long-term success in high-intensity sports: Implications for talent identification. *Sports Medicine*, 52(7), 1451-1463.
85. S. Glazier, P., Paradisis, G. P., & Cooper, S. M. (2000). Anthropometric and kinematic influences on release speed in men's fast-medium bowling. *Journal of Sports Sciences*, *18*(12), 1013-1021.
86. Shorten, A., & Smith, J. (2017). Mixed methods research: expanding the evidence base. *Evidence Based Nursing*. https://doi.org/10.1136/eb-2017-102699
87. Singh Hardyal. (1991). Science of sports training.
88. Singer, R. N. (2000). Performance and human factors: Considerations about cognition and attention for self-paced and externally-paced events. *Ergonomics*, *43*(10), 1661-1680.
89. Smith, S., & Frates, B. (2018, May 17). A Physician's Guide to Recommending Yoga. American Journal of Lifestyle Medicine, 12(4), 298-301. https://doi.org/10.1177/1559827618772119
90. Sultana, D. And Pandi, J. M. C. (2013). Prediction Of Athletic Ability from Talent Identification Model on School Students. 3rd International Conference Onmanagement, Economics and Social Sciences (Icmess'2013) Kuala Lumpur (Malaysia)
91. Taylor, P., et al. (2022). Agility and decision-making in team sports: Implications for training. *Journal of Sports Behavior*, 33(2), 148-157.
92. Telles S, Dash M, N. K. (2009). Effect of yoga on musculoskeletal discomfort and motor functions in professional computer users. Work, 33, 297–306.

93. Thompson, B., et al. (2020). *Strength training and its impact on athletic performance*. Journal of Strength and Conditioning Research, 34(12), 3360–3372.
94. Trembach, N., & Zabolotskikh, I. (2017). Breath-holding test in evaluation of peripheral chemoreflex sensitivity in healthy subjects. *Respiratory Physiology & Neurobiology*, *235*, 79-82.
95. Till, K., Hara, J., And Chapman, C. (2011). Using Anthropometric and Performance Characteristics to Predict Selection in Junior U.K. Rugby League Players. Journal Of Science and Medicine in Sports.14(3), 264-269.
96. Tirtha Acharya. (2020). *Laya Yoga | In-depth Details of Laya Yoga | How to Practice, Nature & Goal*. Nepal Yoga Home. https://nepalyogahome.com/laya-yoga/
97. Tran MD, Holly RG, Lashbrook J, A. E. (2001). Effects of Hatha Yoga Practice on the Health-Related Aspects of Physical Fitness. . . Prev Cardiol, 4, 165-170.
98. Tyagi, A., & Cohen, M. (2016, January 1). Yoga and heart rate variability: A comprehensive review of the literature. International Journal of Yoga, 9(2), 97-97. https://doi.org/10.4103/0973-6131.183712
99. Van Puymbroeck M, Payne LL, H. P. (2007). A phase I feasibility study of yoga on the physical health and coping of informal caregivers. Evid Based Complement Alternat Med, 4, 519–529.
100. Varillas-Delgado, D., Del Coso, J., Gutiérrez-Hellín, J., Aguilar-Navarro, M., Muñoz, A., Maestro, A., & Morencos, E. (2022). Genetics and sports performance: the present and future in the identification of talent for sports based on DNA testing. *European journal of applied physiology*, *122*(8), 1811-1830.
101. Viswanathan, J., And Chandrasekaran, K. (2011). Optimizing Position- Wise Anthropometric Models for Prediction of Playing Ability Among Elite Indian Basketball. International Journal of Sports Science and Engineering, 5(2), 67-76.
102. Vaeyens, R., Lenoir, M., Williams, A. M., & Philippaerts, R. (2021). Talent identification and development in sport: A multidisciplinary approach. *Journal of Sports Science & Medicine*, 20(1), 3-12.
103. Wersebe, H., Lieb, R., Meyer, A. H., Hofer, P., & Gloster, A. T. (2018). The link between stress, well-being, and psychological flexibility during an Acceptance and Commitment Therapy self-help intervention. *International journal of clinical and health psychology*, *18*(1), 60-68.

104. West, Nancy Shohet Whitworth, M., & Pollack, N. (2020). Competitive yoga. In https://en.m.wikipedia.org/wiki/Competitive_yoga (p. 1). White, D. G. (2012). Yoga, brief history of an idea. *Yoga in practice*, *5*(1), 1-23.

105. Woodyard, C. (2011). Exploring the therapeutic effects of yoga and its ability to increase quality of life. *International journal of yoga*, *4*(2), 49-54.

106. Yadav RK, D. S. (2001). Effect of yogic practice on pulmonary functions in young females. Indian J Physiol Pharmacol., 45, 493–439.Ye, X., Chen, Z., Shen, Z., Chen, G., & Xu, X. (2020, November 27).

107. Yoga for Treating Rheumatoid Arthritis: A Systematic Review and Meta-Analysis. Frontiers in Medicine, 7. https://doi.org/10.3389/fmed.2020.586665

108. Yoga Ayush Ministry. (2024). *index*. ayush.gov.in. https://yoga.ayush.gov.in/Yoga-History/

109. Zhao, X., Li, C., & Yang, F. (2017). BDNF gene polymorphisms and cognitive performance. *Frontiers in Psychology*, 8, 522.

APPENDICES

NATIONAL GAMES IN YOGASANA U-14/U-17/U-19
(Boys & Girls)
RULES & REGULATIONS

1. Grouping. Yoga Competition will be organized for Boys & Girls sections separately. There will be three age groups for the competition as under:-

a) Under 14
b) Under 17
c) Under 19

2. **Event Category**: Yoga Competition will be organized in following categories:
a) Traditional Yogasana (Individual)
b) Artistic Yogasana (Individual)
c) Rhythmic Yogasana (Individual)

3. **Composition of a Team**.

A Team Composition for Yogasana Competition (Regional and KVS National):

a) Team Size:

- A maximum of FIVE competitors can be included in a team from a School/Region in the competition.

b) Event Breakdown:

- Three (3) Best Individual Competitors for traditional Yogasana
- One (1) competitor for Rhythmic Yogasana
- One (1) competitor for Artistic Yogasana

c) Individual Traditional Yogasana Participation:

- A school can submit entries for one (1), two (2), or three (3) individual Yogasana competitors.

Important: A competitor can participate in either Rhythmic Yogasana OR Artistic Yogasana, but not both. They can, however, compete in individual traditional Yogasana events along with their chosen Rhythmic/Artistic Yogasana.

d) Age Group Participation:

- A school/region can submit entries for higher age groups as well.

For example, a competitor in the Under-14 (U-14) boy's category can also participate in the Under-17 (U-17) and Under-19 (U-19) events. However, a competitor in the U-19 category cannot participate in any lower age group events.

A Team Composition for Yogasana Competition (SGFI)

a) Team Size:

Team may comprise a maximum of **SEVEN** (Five for Group traditional Yogasanas, One for Rhythmic & One for Artistic) competitors (including one reserve) & Minimum of **FIVE*.** A team consisting of less than four competitors will not be eligible for the team championship. However, their performance will be considered for individual position(s). For the team championship, only the scores awarded to the best four players will be counted.

b) Event Breakdown:

- Five (5) Best Individual Competitors for traditional Yogasana
- One (1) competitor for Rhythmic Yogasana
- One (1) competitor for Artistic Yogasana

NOTE:- *Minimum of FIVE (five for group traditional Yogasana where one can take part in both team and Individual Artistic Yoga and one who can take part in both team & Rhythmic Yoga).

4. Traditional Yoga Competition (Team and Individual). The Traditional Asanas given in following chart –as per duration mentioned below are to be performed for the competition.

Groups		Asanas	Duration		
			U– 19	**U– 17**	**U– 14**
Group A	1	Paschimottanasana (Elbow must touch the floor)	2 ½ Min	2 ½ Min	1 ½ Min
	2	Sarvangasana	2 ½ Min	2 ½ Min	1 ½ Min
	3	Matsyasana	2 ½ Min	2 ½ Min	1 ½ Min
	4	Purna Dhanurasana	2 ½ Min	2 ½ Min	1 ½ Min
	5	Purna-Matsyendrasana	2 ½ Min	2 ½ Min	1 ½ Min
	6	Uttan Padasana	2 ½ Min	2 ½ Min	1 ½ Min
Group B	1	Purna Chakrasana (Finger should touch the heels)	30 Sec.	30 Sec.	20 Sec.
	2	Kukkutasana	30 Sec.	30 Sec.	20 Sec.
	3	Garbhasana	30 Sec.	30 Sec.	20 Sec.
	4	Bakasana	30 Sec.	30 Sec.	20 Sec.
	5	Bhumasana	30 Sec.	30 Sec.	20 Sec.
	6	Purna Shalbhasana	30 Sec.	30 Sec.	20 Sec.
Group C	1	Sankhyasana (Knee should not touch the Floor)	20 Sec.	20 Sec.	15 Sec.
	2	Vyaghrasana	20 Sec.	20 Sec.	15 Sec.
	3	Urdhava Kukutasana	20 Sec.	20 Sec.	15 Sec.
	4	UtithTitibhasana	20 Sec.	20 Sec.	15 Sec.
	5	Sirsasana	20 Sec.	20 Sec.	15 Sec.
	6	Utith Padhustasana	20 Sec.	20 Sec.	15 Sec.

5. Assigning and Selection of Asanas. A total of five asanas will be performed by the competitors as under:-

Group A	**Group B**	**Group C**	**Optional Asanas**	**Total**
One asana from this group Asanas by draw on the spot	One asana from this group Asanas by draw on the spot	One asana to be selected by the participant on his/her own choice	Any two asanas at the option of the participant excluding all the three groups	Five asanas

i) At the time of competition asanas from group ‘A’ & group ‘B’ will be assigned by draw system on the spot. While in group ‘C’ any one asana can be selected by the player. Every participant has to perform three compulsory asanas, separate draws will be made for boys and girls section.

(ii) Three compulsory asanas are to be performed from the given list of eighteen asanas in Group ‘A’ ‘B’ and ‘C’ In addition to this two any other asanas of the player’s choice are also to be performed excluding compulsory asanas. Thus totals 5 asanas are to be performed by all the competitors. Each asana will contain 10 marks and thus a competitor will be given marks out of total of 50 marks

6. Asana Performance Time variation: If required the organizers may reduce the time limit for the asana. For example, the time limit of an asana may be reduced from two minutes to one minute. Such change, if made, will be applicable to all participants. Under no circumstances the time limit will be extended.

7. Attempts to perform Asanas. There will be only one attempt for compulsory asanas of Group A & B. Three attempts will be given for optional asanas Group ‘C’ & own choice asanas). No chance will be given for group A & B.

NOTE –

- **No asana will be changed or altered once fixed or declaration obtained by the competitor**
- **Any props / supportive things allowed in the performance of the any asanas.**

8. Marking / Judging Scheme. The judging criteria will include construction, holding and lasting of asana. Expression of tension or trembling will also be noted. The final pose will be accepted with a smiling face and a pleasant expression.

9. Marks / Score distribution. Each asana will be of 10 marks. A competitor will be awarded a maximum of 50 points for 5 asanas and 10 points for Surya Namaskar in final round and each asana will be judged out of 10 points. Detailed distribution of the points to be awarded by the judges is as under including Surya Namaskar:-

S No	Details of Parameter	Points
a)	Way of performance to reach the final stage of the asana	1 Point
b)	Perfect posture of the asana	4 Points
c)	Exhibition of the asana without tension and trembling	2 Points
d)	Stay in the asana for a fixed time	2 Points
e)	Returning to the original posture	1 Point

10. Categorization of Advance Asanas & Scoring. (Optional choice asanas)

S No	Parameter	For example	Points
a)	Balance factor and flexibility of Torso and waist it will also include risk factor	Standing Vruschik Asana	10
b)	Asana with only flexibility (without balance)	Dimbasana, Deepasana	8
c)	Other asana	Garudasana,Vatyanasana	6

Note:

For the 'A' grade asana marking will be out of 10 marks. For 'B' grade asana out of 8 marks and for 'C' grade marking will be out of 6 marks. The category of the asanas will be decided by the panel of judges at their discretion.

11. SuryaNamaskara: will be compulsory asana for the final round. Points allotted areas below

Body Posture	3 points	**Forward bend**	3 points	**Total 10Points**
Backward bend	3 points	**Dress**	1 points	

12. Panel of Judges. The panel of Judges will comprise one Chief Judge, four judges, one scorer and two time keepers and also an announcer and stage manager. There will be separate panel of judges for both boys and girls sections. The Chief Judge has the power to change the decision of one or all the judges for the sake of justice.

The judges will write the points awarded for each asana on separate score sheets and display the points, for the spectators to see the scores so that no one can reduce the points and announce it again.

The judge will award marks out of 10 marks to each competitor for each asana separately. The maximum and the minimum (highest and lowest) will be deleted and the average of other remaining three judges will constitute the final score. The scorer will compile and compute the points and announce them.

The judges are free to observe the candidate on the carpet and, if needed, can ask the competitor to perform the asana again. No judge is allowed to stand in front of player in the balance asana

13. Appointment of Judges / Referees: The judges / referees for each event shall be appointed by the organizing committee. No objection shall be entertained on such appointments.

14. Dress Code. Track Suits will not be allowed while performing asanas. Slacks, Shorts or Swimming Costumes are compulsory during the asana. Participants are strictly instructed to put on tight underwears with elastics.

15. Tie Breaking:

In-case of equal points, the performer's total points given by all judges will decide the winner.

a) If a tie still remains then the performer who has more points in the optional asana will be declared the winner.

b) If a tie still remains then the points obtained in Group 'C' asana will decide the winner.

c) If still there are more than one competitors with equal marks, they will be declared joint winners but if the tie is for the first place, the winner will be decided by the toss of a coin.

16. Final Round Rules for Individual and team competition

a) The competitors will have to perform five asanas from group 'A', 'B', 'C' as per judges' instruction. There will not be more than two asanas from one Group. The asana performed in the preliminary round will not be repeated.

b) The competitor will perform two asanas of their choice excluding compulsory 18 asanas.

c) Suryanamaskar will be compulsory asana for the final round. The marking will be as under:-

Body Posture	03 points	Forward bend	03 points	Total 10 points
Backward bend	03 points	Dress	01 points	

d) Individual championship will be conducted separately and the best performer from the preliminary round will be selected for the final championship.

Note: (1) During the SGFI selection trials, participants will be required to perform all 18 asanas from group A, B & C and any two optional asanas. Their selection will be based on their overall performance of these asanas.
(2) If the number of teams is less than three then only trials for Nationals (SGFI) will be organized.

17. Individual & Team Championship.
a) In individual Championship, the winner will get 5 marks, the runner up will get 3 marks & second runner up will get 2 marks.
b) The school/Region with maximum marks will be declared the Champion School/Region.

18. Date of Birth & Eligibility. The rules for the date of birth, eligibility and protest note will be according to the SGFI rules and norms.

Since there is no class criteria, please note that the minimum class for participation in the KVS tournaments (U -14 or above) is class VI (No child below class VI shall be allowed)

19. Individual Artistic Yoga Competition
a) Separate competition will be held for Girls and Boys in all categories: under 14, 17 & 19 years.
b) Only one participant from each school/Region, each group & each category will participate.
c) The player will have to perform any five asanas of their choice from the following list:

i) **List of Asanas**

S No	Asana Name	Duration	Point
i)	Standing Vruchikasana	15 Sec.	10
ii)	Standing Linkarasana	15 Sec.	10
iii)	Natrasana	15 Sec.	10
iv)	Sthambh Sirsasana (Duruvasana or Bhagirathasana)	15 Sec.	10
v)	Dharajasan (Flag Postures)	15 Sec.	10
vi)	Standing Eka Pada Skandasana	15 Sec.	10
vii)	Kandapeedasana	15 Sec.	10
viii)	Utthid Dwipad Kandasana	15 Sec.	10

ii) PranavDhavni. (Om Chanting) will also be performed by all the participants & the criteria for the allotment of marks shall be as under:-

S No	Duration	Points	S No	Duration	Points
i)	20 Sec.	1 Point	ii)	30 Sec.	2 Points
iii)	35 Sec.	3 Points	iv)	40 Sec.	4 Points
v)	45 Sec.	5 Points	vi)	50 Sec.	6 Points
vii)	60 Sec.	7 Points	viii)	70 Sec.	8 Points
ix)	80 Sec.	9 Points	x)	90 Sec.	10 Points

20. Individual Rhythmic Yoga Competition.

In this competition the competitor has to perform not less than 8 & not more than 10 asanas in a time limit of maximum 2.30 minutes or 150 sec.

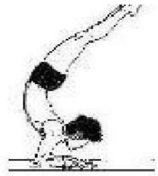
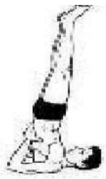
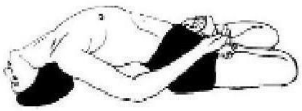
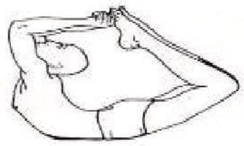
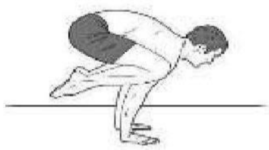
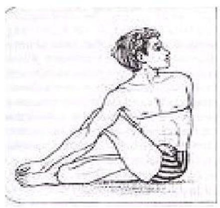
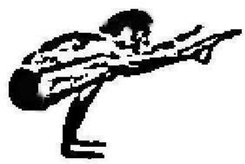
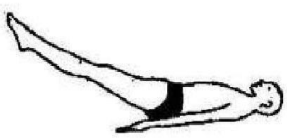
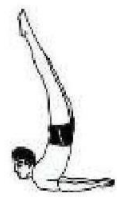
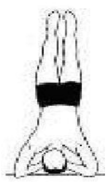
a) The competitor will show the various asanas (postures) i.e. forward bending, balancing, front & backward lying postures sitting postures etc. In all the four directions with music.
b) Only one competitor from each school/Region in each group & category can participate.
c) It is compulsory to show all the postures as mentioned above.
d) The asanas & body movement should be synchronized with music.
e) All the music arrangements like recorder, CD player or CDs are to be arranged by the competitors themselves. The player as to declare all the asanas list before start the event
f) If a competitor takes more time i.e. more than 2.30 minutes, one point will be deducted from the points of each judge and loss of 5 points from the total.
g) Competitor has to show all the movement of asanas with clear demonstration of asanas i.e. holding of the postures (5 to 7 seconds holding time)

NOTE:-One competitor can take part only in one competition either Artistic or Rhythmic.

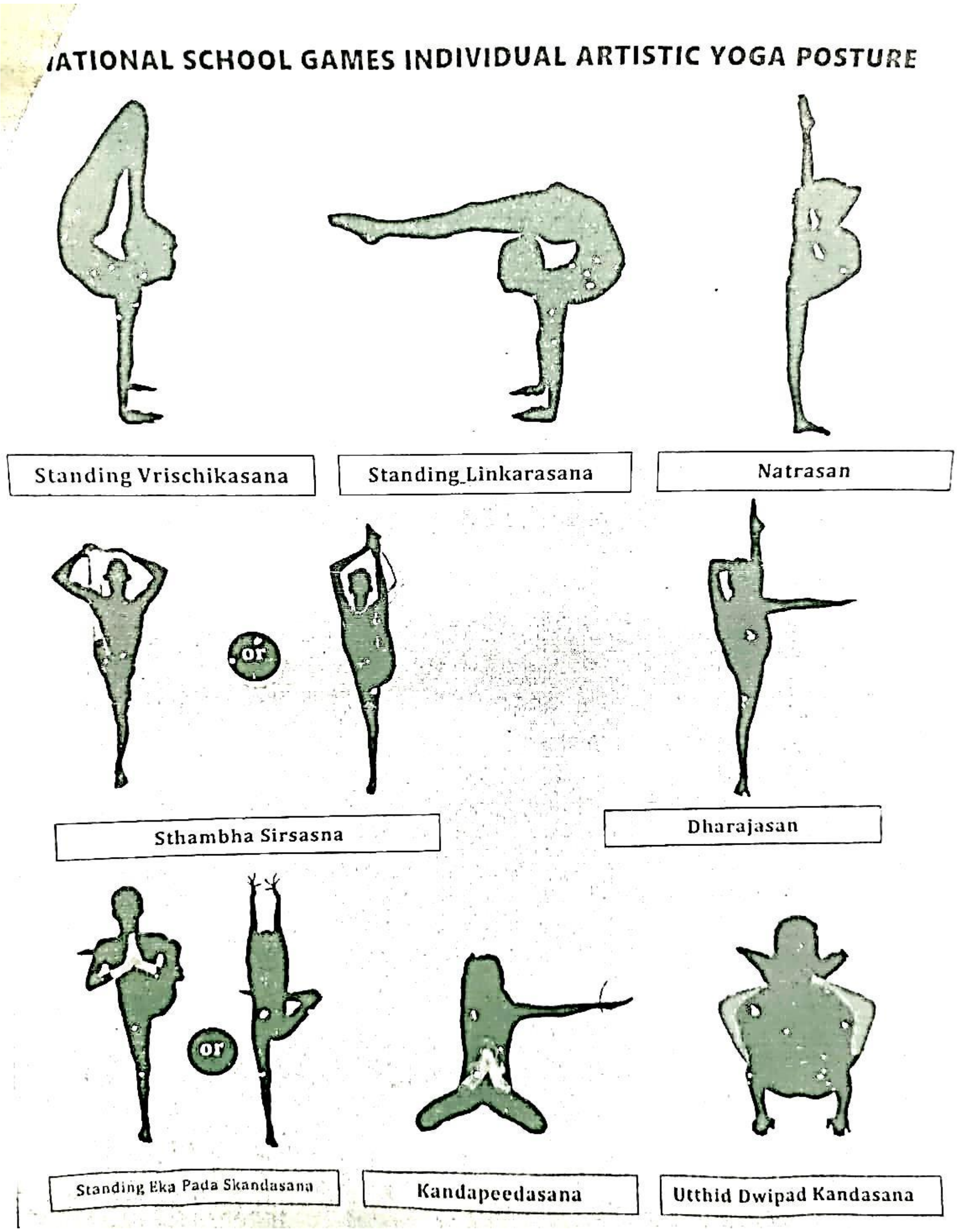
21. Now as per new rules the medal tally will be as follows:

S No	**Category**	**Medals**		
		G	**S**	**B**
1	Traditional Yogasana (Individual)	6	6	6
2	Individual Artistic Yoga Competition	6	6	6
3	Individual Rhythmic Yoga Competition	6	6	6
Total Medals		**18**	**18**	**18**
Trophy for Best Teams (Overall Championship) (Boys & Girls)		**6**		

LIST OF ASANAS AS PER ATHLETIC GROUPS

Group A	Group B	Group C
		
PASCHIMOTTANASANA	PURNACHAKRASANA	VYAGHRASANA
		
SARVANGASANA	GARBHASANA	URDHVAKUKKUTASANA
		
MATSYASANA	KUKKUTASANA	SANKHYASANA
		
PURN DHANURASANA	BAKASANA	UTPADAHASTASANA
		
PURN-MATSYENDRASANA	BHUMASANA	UTITH-TITTIBHASANA
		
UTTANPADASANA	SHALABHASANA	SIRSASANA

ARTISTICS INDIVIDUAL



SURYA NAMASKAR

1	2	3	4
			
5	6	7	8
			
9	10	11	12
			

Journal of Neonatal Surgery
ISSN(Online): 2226-0439
Vol. 14, Issue 6s (2025)
https://www.jneonatalsurg.com

OPEN ACCESS

Predicting Yoga Performance: A Multiple Regression Analysis of Physical Fitness Variables

Chandra Shekhar Singh*[1], Dr. Neelam Sharma[2]

[1]Research Scholar, Department of Physical Education, Lovely Professional University, Phagwara Punjab India.

Email ID: chandrayp8@gmail.com

[2]Professor & Head of Department, Department of Physical Education, Lovely Professional University, Phagwara Punjab India.

Email ID: neelam.sharma@lpu.co.in

Cite this paper as: Chandra Shekhar Singh, Dr. Neelam Sharma, (2025) Predicting Yoga Performance: A Multiple Regression Analysis of Physical Fitness Variables. *Journal of Neonatal Surgery*, 14 (6s), 734-742.

ABSTRACT

This study examines the correlation between physical fitness variables and yogic performance in 25 young yogasana players from Delhi-NCR. Utilizing Pearson correlation and multiple linear regression analyses, the study identifies flexibility as a significant predictor of yogic performance, explaining 38.7% of its variance. Results indicate a strong positive correlation between flexibility and yogic performance ($r = .622$, $p < 0.01$), while sit-ups, push-ups, and balance show non-significant correlations. The findings highlight the critical role of flexibility in enhancing yoga performance, suggesting its incorporation into training regimens for improved outcomes. Future research should explore additional variables influencing yogic performance.

Keywords: *Yoga, Yogasana, Physical Fitness, Flexibility, Performance Prediction, Multiple Regression Analysis, Pearson Correlation, Competitive Sport*

1. INTRODUCTION

"योग: कर्मसु कौशलम्"

"Getting the mastery over the skill or the activity, which we are performing in our life."

Yoga integrates scientific principles with fitness, enhancing physical, mental, emotional, psychic, and spiritual health. The Sanskrit term "yuj" means "to join," and "yoga" translates to "unity" or "oneness" in English (Iyengar, 2001). Yoga fosters holistic health without significant bodily bending, promoting the comprehensive growth and nourishment of the organism (Saraswati, 1981). It is the most cost-effective and scientifically proven method to maintain health, simultaneously improving mental and physical wellness (Desikachar, 1995). Daily yoga routines cultivate optimism, leading some to term yoga a "fundamentally subjective science" due to its interconnected spiritual, mental, and bodily components (Feuerstein, 1998). Yoga encourages mental and sensory self-mastery, serenity, and tranquility, with universal benefits irrespective of religious or mystical connotations (Eliade, 1958). People of all faiths, genders, ages, physical abilities, and backgrounds can benefit from regular yoga practice, which enhances health, happiness, and quality of life (Sivananda, 1999).

Yoga improves mental and physical health, clarity, and self-awareness, helping individuals overcome challenges. Yogasanas involve twisting and stretching the body, enhancing circulation, muscle flexibility, and energy by improving oxygen intake and waste disposal (Iyengar, 2001). These practices result in relaxation and improved health, symbolizing tranquility and discipline. (Aakash et al., 2023) Yoga promotes ethics and self-discipline, fostering positivity, politeness, and analytical skills. Both theoretical and practical aspects of yoga are important, with the latter often emphasized (Saraswati, 1981).

Physical asanas strengthen internal organs and are essential for every yoga practice. (Jain et al., 2023) Regular practice enhances the body, mind, and intellect, affecting every cell and tissue, leading to excellence in body and mind – the highest human achievement (Kumar & Jhajharia, 2018, Iyengar, 2001).

INTERNATIONAL JOURNAL OF LATEST TECHNOLOGY IN ENGINEERING, MANAGEMENT & APPLIED SCIENCE (IJLTEMAS)
ISSN 2278-2540 | DOI: 10.51583/IJLTEMAS | Volume XIV, Issue VIII, August 2025

Talent Identification for Competitive Yoga: Multiple Regression Analysis Aproach

Chandra Shekhar Singh, Prof. Neelam K Sharma

Department of Physical Education, Lovely Professional University, Phagwara, Punjab, India.

DOI: https://doi.org/10.51583/IJLTEMAS.2025.1408000044

Abstract: This paper explores the relationship between anthropometric, physical, and physiological variables and competitive yoga performance. The study involved 25 yoga players aged 10 to

15 from the Delhi-NCR region. The findings indicate a substantial positive association between flexibility and yoga performance, while an insignificant link was observed between sit-ups, push-ups, balance, and yoga performance. The regression equation derived for the study was as follows: Yoga Performance = 29.157 + 1.075 (Flexibility)- 0.856 (Fat%) +

1.120 (Respiratory rate). The reliability of the regression equation is supported by the R2 value of 0.647. Therefore, it might be concluded that the variables Flexibility, Fat %, and Respiratory rate significantly explain the variation in the Yoga performance. This study provides valuable insights into the physical aspects of yoga and its impact on performance, which can be useful for athletes and yoga practitioners alike.

Keywords: Competitive Yoga, Anthropometric, Physical, Physiological Predication and Multiple Regression

Introduction

Yoga holds great importance in our lives, as it encompasses physical, mental, emotional, and psychological aspects. It helps to increase strength, endurance, flexibility, balance, and motor coordination. Furthermore, yoga practitioners experience increased energy, vitality, and balanced emotions through a heightened sense of mind-body awareness. Incorporating yoga into our daily routine can have profound effects on our overall well-being (Jamplis, 2015). In addition to its physical activity and yoga also has a profound impact on our immunity.(Kumar

& Jhajharia, 2018). Yoga is not just a physical practice but a holistic approach to achieving balance and harmony in life. It delves deep into the connections between the body, mind, and spirit, and encourages individuals to cultivate mindfulness and self-awareness. Through the practice of various yoga asanas (poses) and pranayama (breathing techniques), individuals can attain a deeper understanding of their physical and mental state, leading to a sense of inner calm and tranquillity.(Falkenberg et al., 2018)

The spiritual dimension of yoga also plays a significant role in guiding individuals towards a more meaningful and purposeful existence. Through practices such as meditation and introspection, individuals can explore their inner selves and connect with a higher sense of purpose, leading to a greater sense of fulfilment and contentment in life.(Arora & Bhattacharjee, 2008) Overall, yoga is a multifaceted practice that promotes physical health, mental well-being, emotional balance, and spiritual growth. Yoga has also been found to have a positive impact on stress reduction and mental clarity. The mindfulness and breathing techniques incorporated in yoga practice can help individuals manage stress, anxiety, and even symptoms of depression. By cultivating a calm and focused mind through meditation and relaxation, practitioners can experience a greater sense of mental clarity and emotional resilience. Additionally, the philosophy of yoga encourages individuals to lead a more mindful and conscious lifestyle. This includes making healthy dietary choices, practicing kindness and compassion towards others, and fostering a deeper connection with the natural environment. As a result, yoga not only benefits the individual but also contributes to a greater sense of social and environmental responsibility. Furthermore, the holistic approach of yoga extends to the physical body by promoting inner healing and self-care. Through the practice of restorative yoga and deep relaxation techniques, individuals can facilitate the body's natural ability to heal and rejuvenate, leading to a sense of overall wellness and vitality. Moreover, the benefits of yoga extend beyond the individual level and often have ripple effects on the surrounding environment and relationships. By fostering a sense of compassion, empathy, and understanding, yoga practitioners often find themselves better equipped to deal with the challenges of everyday life and to navigate relationships with a greater sense of clarity and equanimity.(Gopal et al., 2011)

In conclusion, the practice of yoga offers a comprehensive and transformative approach to enhancing the quality of life. Its influence encompasses physical, mental, emotional, and spiritual dimensions, providing a path to holistic well-being and personal growth. By embracing the multifaceted benefits of yoga, individuals can cultivate a harmonious and fulfilling life that radiates positivity and mindfulness, both within themselves and in their interactions with the world around them.

The athletic event of Yogasana focuses on the physical aspects of yoga, with participants practicing yogic postures. Players are evaluated based on the difficulty of their positions, coordination, control, adaptability and endurance. Different from Yoga

ThinkBIG

LOVELY PROFESSIONAL UNIVERSITY

Transforming Education Transforming India

NAAC GRADE A++

Certificate No. 294784

Certificate of Participation

This is to certify that **Prof./Dr./Mr./Ms. Chandra Shekhar Singh** has successfully presented a Poster/ Paper on **Bio-Motor Profile Development For National Yoga Players** in the International Conference on theme **"Good Health & Wellbeing Through Physical Education & Sports"** held on **30th September, 2023** organized by School of Physical Education and Department of Physiotherapy at Lovely Professional University, Punjab.

Date of Issue : 30-10-2023
Place : Phagwara (Punjab), India

Prepared by
(Administrative Officer-Records)

Organizing Secretary

Head of School

Pro-Vice Chancellor

ICGHWP
INTERNATIONAL CONFERENCE ON GOOD HEALTH & WELLBEING THROUGH PHYSICAL EDUCATION & SPORTS

PEFI

SPIRIT

Co-funded by the Erasmus+ Programme of the European Union

ICPEMS 22-23 FEB, 2024

CERTIFICATE

This is to certify that

Dr./Mr./Ms./Mrs. ......Chandra Shekhar Singh......of

......Lovely Professional University Jalandhar Punjab.....

has contributed in the

International Conference on Physical Education and Multidisciplinary Sciences

Under the aegis of Department of Higher Education, Haryana

Organised by Department of Physical Education, Government P.G. College, Sector-1, Panchkula, Haryana, India

as Key-Note Speaker/Session Chair/Organiser/Presenter/Participant

Paper Entitled as ......"A Relationship study of yogasana Performance

......And Respiratory rate"......

Dr. Ram Mehar Singh
Conference Director
H.O.D. Physical Education

Sh. Yashpal Singh
Principal, Govt. P.G. College,
Sector-1, Panchkula, Haryana, India