

The Impact of Socioeconomic Background on Taekwondo Participation among Adolescents in Mumbai: A Comparative Study Across School Types

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ABSTRACT

Taekwondo has become one of India's most widely practised martial arts. Yet the chance to train and compete in it is not shared equally. This paper examines the extent to which socioeconomic background influences access to Taekwondo training and competitive participation among adolescents aged between 13 and 18 in Mumbai, India. Respondents were drawn from four school types: government, BMC, private and international. The study with a sample size of $n = 75$ draws on existing literature and primary research to argue that private school students demonstrate higher training frequency and competitive participation in Taekwondo than students who study in government schools. Income correlates strongly with training frequency ($r = +0.68$). A multiple regression shows that this relationship is not direct. Once financial struggle, parental priority and travel barriers are held constant, income is no longer a significant predictor of training days ($\beta = 0.195$, $p = 0.276$). Parental priority is the only significant predictor ($\beta = 0.317$, $p = 0.008$). Income appears to act on participation through parental attitudes and household financial pressure rather than on its own. In addition, the research paper has identified financial barriers, lack of school infrastructure and family attitudes towards sports participation as the primary factors driving the disparity in Taekwondo training and competitive participation between government and private school students.

Keywords: Taekwondo; Competitive Sport; Socioeconomic Status; Mumbai; India; Primary Data

INTRODUCTION

This study examines how socioeconomic background influences access to taekwondo training and competitive participation among adolescents in Mumbai's private and government schools. The question is significant because it highlights potential inequalities in access to this structured sport within one of India's most socioeconomically diverse urban centres. Respondents were selected from four types of schools: government, BMC, private, and international. The study uses a mixed-methods approach, wherein it combines a review of existing literature with primary data obtained from a survey, from which

75 responses were selected and analysed. The analysis finds that the gap between private and government school students is real and large, but that household income does not drive it directly. Parental priority and household financial pressure carry the effect.

Understanding the Factors that Affect Participation in Organised Sports

Existing research establishes that socioeconomic status and the type of school affect participation in organised sports among Indian adolescents (Singh, 2024; Singh & Singh, 2022; Kumar, 2024). Higher household income enables families to absorb the recurring costs of coaching, equipment and competition. Better-resourced private schools provide the facilities, trained staff and structured pathways that government schools typically lack. However, there is no study that applies these dynamics specifically to participation in Taekwondo in an urban Indian context. This study addresses that gap by examining how socioeconomic background shapes access to Taekwondo training and competitive participation among adolescents in Mumbai. By doing so, it aims to contribute sport-specific, city-level evidence to the existing literature.

The Connection Between Sports Participation and Socioeconomic Status

Sports participation in India is connected to students' socioeconomic status. It follows a clear gradient where participation can rise steadily as the students' household income increases. According to studies, high-income households have reported 80% participation in organised sports whereas low-income households have reported approximately 40% (S. Singh, 2024; Owen et al., 2022). This 40% gap in participation represents a substantial inequality that directly justifies the need for targeted research into how socioeconomic background shapes access to specific sports, such as Taekwondo.

Socioeconomic Status (SES)

Socioeconomic status (SES) is defined as an individual's social and economic standing as indicated by their income, parental education and occupation. This is central to the analysis, which is discussed in this paper. The type of school serves as a practical proxy for SES, given that private schools in India predominantly serve higher-income families. This means households earning more than ₹9 lakh annually ($\approx$ 9,700 USD). On the other hand, government schools serve lower-income communities, which can include households earning less than ₹3 lakh annually ($\approx$ 3,200 USD) (Government of India, 2024).

The sport in focus is Taekwondo - a Korean martial art and Olympic discipline that requires ongoing expenditure on uniforms, training, grading examinations and entries for competition. The population under study includes adolescents in Mumbai aged between 13 and 18. This age bracket is a critical window for participation in competitive sports in one of India's most socioeconomically stratified urban centres. This is because students in this age group are directly engaged in school-level sports and competition.

The Significance of the Study

Taekwondo is among the most widely practised modern martial arts in India, with the Indian Taekwondo Union alone reporting over 50,000 active students across 25 states (Indian Taekwondo Union, n.d.). It also happens to be one of 24 major sports disciplines identified under the Government of India's Khelo India scheme for conducting national competitions (Press Information Bureau, 2019). The sport's popularity among adolescents is reinforced by its Olympic status and dual identity as both a competitive discipline and a practical form of self-defence (Kim et al., 2021). This appeal is visible in Indian schools, where Korean Cultural Centre India programmes engaged over 9,000 students across 116 schools between 2021 and 2024, with a further 3,287 students enrolling across 47 schools in 2025 (ACN Correspondent, 2025). Understanding how SES shapes access to Taekwondo is significant for aspiring athletes, coaches, educational institutions, and policymakers. For aspiring athletes, it highlights barriers that may limit their access to training and competition. For coaches, it offers insights into the socioeconomic factors that affect student participation in Taekwondo. Educational institutions can better understand how differences in resources and infrastructure can influence access. Policymakers can rely on the evidence offered by this study to bridge the gap in Taekwondo training and participation between private and government school students.

If competitive participation in Taekwondo is concentrated among private school students, it could highlight a systemic inequality that limits access to the sport, particularly to adolescents from lower-income backgrounds.

Identification of the Gap in Existing Research

Taken together, these studies establish that socioeconomic status and the type of school could significantly influence participation in organised sports among Indian adolescents. However, there is no existing study which applies these dynamics to Taekwondo participation in Mumbai or in any other urban city in India. This gap has already been explicitly acknowledged within existing literature on Taekwondo research. A peer-reviewed meta-analysis conducted by Kim et al. (2021) of the psychosocial effects of Taekwondo training highlighted that this dimension remains entirely unstudied. It directly calls for future research to examine whether the effects of this martial art on social development can differ depending on socioeconomic factors (Kim et al., 2021).

Aims and Goals of the Paper

Responding to the limitations in current literature, this study examines whether socioeconomic background shapes access to Taekwondo training and competitive participation among adolescents in Mumbai. The Literature Review section will build the foundation by analysing how income, school infrastructure and family attitudes can influence sports participation. The private and government school comparison is the primary contrast reported. Data for international and BMC school students is reported alongside it, where the sub-sample size allows. The Methodology section will explain how the data was

collected. The Findings and Discussion section will evaluate what the primary data reveals about training frequency, tournament participation, belt progression and perceived equality among respondents.

Socioeconomic Background, Type of School and Sports Participation in India

Research in India has consistently identified financial barriers, school infrastructure and family attitudes as the key factors that determine whether adolescents begin and sustain participation in competitive sports. It is important to know that no existing study focuses specifically on adolescents participating in Taekwondo in the Indian context. This limits the understanding of sport-specific barriers, participation patterns and inequalities in access to Taekwondo training and competition and justifies the need for research in this area. However, the studies reviewed below establish the socioeconomic foundation on which this paper's inquiry rests.

Income and Financial Barriers as Determinants of Access to Sports

Household income is among the most decisive factors that shape sports participation among young people, especially in India. Families with higher incomes can readily afford the ongoing costs of aspects, such as coaching, equipment, travel and tournament fees. In contrast, lower-income households prioritise essential expenditure, such as education, food and healthcare, which leaves little funds for sport. Research into sports participation among youth has found that high-income households reported participation rates of nearly 80% in organised sports, compared to approximately 40% among low-income households (Singh, 2024; Owen et al., 2022).

In addition, income levels shape which sport a young person pursues. Expensive and equipment-intensive activities can attract participants from wealthier backgrounds. On the other hand, lower-income groups can attempt sports with minimal financial requirements, such as wrestling, kho-kho, athletics, football, kabaddi and hockey (Singh & Singh, 2022). Taekwondo demands consistent expenditure in terms of purchasing uniforms, grading fees to progress to the next level, and competition registration costs. This is evident from real-world accounts in Mumbai and Nashville alike. This is where practitioners and organisations have stressed sport's financial barriers as a primary obstacle to participation among lower-income communities (Balaji, 2019; McDonald, 2022).

A Comparison of Sports Infrastructure in Private and Government Schools

Schools are the primary environments where Indian children participate in organised physical activities. Yet the quality of these environments varies substantially based on the type of school. Research into the Indian education system has found that when compared with rural and government schools, urban private schools usually fared better in terms of the availability and the quality of sports facilities, including sports equipment, playgrounds, extracurricular sports programmes and coaching and training facilities (Kumar, 2024).

Additionally, students in well-resourced private schools benefit from well-maintained grounds, indoor tracks and spaces, and modern facilities such as gymnasiums, pools and recovery centres. In contrast, students from government schools, which predominantly serve lower-income communities, lack access to most of these infrastructural advantages. Beyond physical infrastructure, the presence of trained coaching staff and easier pathways into competitive sports are far more common in private educational settings. The lack of such institutional support can further disadvantage students from local and government schools (Singh, 2024).

Parental Education, Family Attitudes and Engagement in Sports

Beyond income and infrastructure, family attitudes can play a significant role in shaping sports participation among adolescents. A study of 211 female college-level athletes across universities in Kerala found that socioeconomic status and emotional intelligence together significantly determine the level of engagement in sports among young Indian athletes (Rajesh et al., 2020). Socioeconomic status can broadly encompass factors, such as family income, parental occupation and parental education levels. Parents who are better educated tend to be better informed about the developmental and career benefits of sports, and are more likely to support and fund their children's involvement. Conversely, students from families with a lower socioeconomic status can often face discouragement, which is rooted in the cultural perception that academics must take priority over sports (Singh, 2024).

In the context of this paper, the tri-factor advantage of private school attendance, higher household income, and higher parental education creates a compounding effect that allows private school students to access structured competitive sports, such as Taekwondo, with fewer barriers. Taekwondo is examined in particular because participation in the sport at a competitive level can depend on access to formal training environments, professional coaching and competition pathways. In turn, this means that participation can depend on socioeconomic factors (Horvat et al., 2023).

General Physical Activity Versus Structured Competitive Sports

Research conducted by Clarke & Mondal (2022) can complicate this paper's argument. It underlined that students attending private schools were paradoxically less physically active overall than their peers in government schools (Clarke & Mondal, 2022). However, this is not a contradiction. The measure that was used was general physical activity - encompassing unstructured movement and informal recreation. When the scope is narrowed to structured, fee-based and competitive organised sports, which is precisely the category into which taekwondo falls, the advantages of students attending private schools become more pronounced. This paper focuses specifically on training frequency and competitive participation in Taekwondo, and not physical activity in the broader sense.

METHODOLOGY

Research Methodology

This study employed a mixed-methods approach, beginning with an extensive review of the existing literature that is available on the core subject of this paper - the influence of socioeconomic background on access to Taekwondo training and competitive participation among adolescents in Mumbai. Thereafter, qualitative and quantitative research was undertaken to better analyse the relationship between socioeconomic background and Taekwondo participation among adolescents in Mumbai.

Details about Where Research Papers were Chosen From

To identify relevant literature for this study, a systematic search was conducted across several academic databases, including Google Scholar, PubMed, ResearchGate, JSTOR and Scopus. These platforms were selected for their broad and academic coverage of peer-reviewed articles and journals, which include various disciplines, such as education, public health, sports and social sciences.

Inclusion and Exclusion Criteria

Studies were included if they examined socioeconomic factors in relation to sports participation, school-based physical activity and/or sports training among adolescents in India or comparable international contexts (Table 1.). Papers that focused on elite-level athletic performance without any reference to participation barriers were excluded. A total of eight studies were selected for detailed review and analysis.

Study	Focus and design	Key findings	Strengths	Limitations
Singh, S. (2024)	Socioeconomic determinants of sports participation in India. Secondary data design based on national surveys and government reports.	High-income households report participation roughly twice that of low-income households. Spans income, parental education, gender norms, urban-rural divides, school infrastructure, caste and regional variation.	Broad coverage of determinants.	Relies solely on secondary data.
Singh, K. and Singh, M. (2022)	Demographic factors (age, caste, gender,	Income shapes which sports a person pursues;	Wide range of demographic variables.	Does not examine any single sport.

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Study	Focus and design	Key findings	Strengths	Limitations
	religion, income, marital status) and sports participation in India.	lower-income groups are restricted to low-cost options.		
Kumar, R. (2024)	White paper on structural barriers to sport within the Indian education system.	Academic pressure, weak infrastructure and the dominance of cricket disadvantage lower-SES students.	Wide-ranging scope.	Editorial in nature. No empirical data or primary research.
Rajesh et al., (2020)	Cross-sectional study of 200+ female college athletes in Kerala using standardised questionnaires and statistical analysis.	Socioeconomic status and emotional intelligence both significantly affect athletic achievement.	Multiple statistical methods (correlation, ANOVA, chi-square).	Only studied female athletes in Kerala, so it doesn't generalise to adolescents.
Clarke, J. and Mondal, S. (2022)	Analysis of India's sporting ecosystem (policy, funding, participation barriers) from independence to the present.	Private school students are paradoxically less physically active overall than government school students.	Wide temporal scope and covers policy, funding, governance and elite sport.	Only a policy-level analysis, so it offers no individual participation data.
Kim et al. (2021)	Meta-analysis of 28 studies on the psychosocial effects of Taekwondo training.	Significant positive effects on sociality, character, etiquette and school adjustment. Flags the absence of research on how effects vary by socioeconomic background.	Identifies the socioeconomic research gap this paper addresses.	Not India-specific.
Singh, J. (2018)	Effect of socioeconomic status on the sport performance of 60 intercollegiate shooters in Punjab.	Socioeconomic status had a positive effect on sport performance at the inter-college level.	Primary research with a validated questionnaire and access to a state-level tournament.	Relatively old and focuses on shooting-based sports.
Owen et al. (2022)	Systematic review and socioeconomic	Young people from higher SES households were	Very large evidence base with a rigorous	

Study	Focus and design	Key findings	Strengths	Limitations
	disparities in physical activity and organised sport participation among children and adolescents.	nearly twice as likely to participate in organised sport.	meta-analytic design. Separates organised sport from overall physical activity.	

Table 1. Summary of studies selected for review

1. Singh, S. (2024). *Socio-Economic Factors Influencing Sports Participation in India: An Analysis*. International Journal of English Literature and Social Sciences, 9(6), 439–447.

This paper has examined the socioeconomic determinants of sports participation in India using a secondary data-based design. Drawing on national surveys and government reports, it found that high-income households report participation rates nearly twice that of low-income households. The study has covered a wide range of determinants, such as income, parental education, gender norms, urban-rural disparities, school infrastructure, caste and regional variations and this breadth a key strength. However, it exclusively relies on secondary data and lacks sport-specific analysis. This means the findings cannot capture the lived experiences of athletes or the nuances of participation in any single sport

2. Singh, K., & Singh, M. (2022). *Demographic Factors Impact on Sports Participation*. International Journal of Physical Education, Sports and Health, 9(4), 148–152.

This paper has identified how factors, such as age, caste, gender, religion, income and marital status, can influence sports participation in India. The key findings include the observation that income determines which types of sports individuals pursue, with lower-income groups restricted to low-cost options. Whilst the paper covers a broad range of demographic variables, it does not examine participation in a specific sport.

3. Kumar, R. (2024). *Building a Healthy Nation: A White Paper on Olympic Sports and the Indian Education System*. Journal of Family Medicine and Primary Care, 13(8), 2805–2818.

This white paper¹ examines the structural barriers which are limiting sports participation within the Indian education system. It argues that academic pressure, poor infrastructure and the dominance of cricket collectively place students from lower socioeconomic backgrounds at a disproportionate disadvantage. Selected for its wide-ranging scope, the paper is nevertheless editorial in nature, because of which it lacks empirical data and primary research.

¹ A white paper is an in-depth report on a particular issue, typically produced by an expert, an institution or a government body. It is intended to inform readers about a complex topic and, in most cases, advance a position or set of recommendations. Unlike empirical research, white papers are largely analytical and editorial in nature.

4. Rajesh et al., (2020). Role of Socio-Economic Status and Emotional Intelligence on Sports Attainments. Materials Today: Proceedings.

This cross-sectional study of 211 female college-level athletes in Kerala used standardised questionnaires and statistical methods to analyse how socioeconomic status and emotional intelligence can influence athletic achievement. It found that both factors can significantly impact achievement. The study's key advantages lie in its use of multiple statistical methods, such as correlation analysis, ANOVA and chi-square tests. These tools and factors aided in regards to the empirical credibility of its findings.

5. Clarke, J., & Mondal, S. (2022). Sport Policy in India. International Journal of Sport Policy and Politics, 14(4), 729–741.

The article has recognised India's sporting ecosystem by analysing elements, such as policies, funding trends and participation barriers from the time that India attained independence to the present day. Its findings stress that students in private schools are paradoxically less physically active overall than those in government schools. The paper's key strength lies in its wide temporal scope. Furthermore, it has comprehensively covered aspects, such as policy, funding, governance and elite-level sport.

6. Kim, Y.J., et al. (2021). The Psychosocial Effects of Taekwondo Training: A Meta-Analysis. International Journal of Environmental Research and Public Health, 18(21), 11427.

This meta-analysis of 28 studies has explored the effects of Taekwondo training on the development of sociality, a trait that prompts the need to associate with social groups, character building, etiquette, and adjustment to school life. It found significant positive psychosocial effects across all four domains. Furthermore, it identifies the absence of research into how these effects vary across socioeconomic backgrounds as a gap requiring future investigation.

7. Singh, J. (2018). Socioeconomic status effect on sport performance of non-achiever and achiever shooters. International Journal of Physiology, Nutrition and Physical Education, 3(1): 1047-1050.

This paper examined how socioeconomic status affects the performance of 60 intercollegiate shooters in Punjab, comparing those who placed in the top eight of their competition with those who did not. Using a validated socioeconomic status questionnaire and comparisons of group means, it found that socioeconomic status had a positive effect on shooting performance, with significant differences observed across high, mediocre and low status groups. Whilst the paper offers rare evidence from a single sport in the Indian context, its small sample of collegiate athletes from one state means the findings cannot be generalised to adolescents or to the barriers that shape access and participation itself.

8. Owen, K. B., et al. (2022). Fair Play? Participation Equity in Organised Sport and Physical Activity Among Children and Adolescents in High Income Countries: A Systematic Review and Meta-Analysis. International Journal of Behavioral Nutrition and Physical Activity, 19(1), 27.

This systematic review and meta-analysis has synthesised 104 studies, covering 163 effect sizes, on socioeconomic disparities in physical activity and organised sport participation among children and adolescents in high-income countries. It found that young people from higher socioeconomic status households were nearly twice as likely to participate in organised sport as their lower status peers, and that the socioeconomic gap was wider in structured sport than in general physical activity. The scale of its evidence base and its separation of organised sport from overall physical activity are its key strengths. However, its scope is restricted to high-income countries, which means its findings cannot be applied directly to the Indian context.

Together, the studies reviewed collectively establish a relationship between socioeconomic status and sports participation in India. However, none of them have directly explored Taekwondo participation in the context of urban India or focused specifically on the role of the type of school as a proxy for socioeconomic background in shaping access to this martial art. To address this gap in the existing literature, the following qualitative and quantitative primary research was undertaken as a part of this study.

Qualitative Research

Primary qualitative data was gathered through conducting interviews with two senior Taekwondo coaches from established academies in Mumbai. Both participants chose to remain anonymous. Their interviews explored their observations on how Taekwondo has evolved, how socioeconomic status can shape access to training and the barriers that they have observed firsthand amongst their students. These qualitative insights proved to be central to our quantitative study and fundamental to the refinement of our survey.

Quantitative Research

Primary quantitative data was gathered through a structured online survey, which was distributed between 28th March and 2nd April 2026. The target population of this study was established as adolescent Taekwondo practitioners in the Mumbai Metropolitan Region. The Indian Taekwondo Union alone reports over 50,000 active students across 25 states (Indian Taekwondo Union, n.d.), of which Mumbai, as one of the sport's largest urban centres, accounts for a substantial share. At a 90% confidence level and a margin of error of $\pm 10\%$, the minimum required sample size was determined to be 68. A total of 75 valid responses were collected. Two respondents did not answer every item used in the regression model. So, the regression is therefore based on 73 cases.

Taekwondo coaches, school sports coordinators and academies distributed the survey to the participants through channels, such as email and WhatsApp. To ensure balanced socioeconomic representation, a

stratified random sampling approach was employed, whereby respondents were segmented according to their residential area and the type of school. All participation was voluntary, and all information was collected anonymously. The sample size was $n = 75$. Respondents were drawn from the 13 to 18 age group.

Data and Variables

The questionnaire consisted of 13 questions, which were grouped into three sections: demographics (5), experience (3) and access and challenges (5). It included nominal variables, such as school type and residential area, ordinal variables, such as household income and belt level, and 5-point Likert scale items (1 = strongly disagree to 5 = strongly agree) to measure perceived barriers to participation (included in Annexure A).

The occupation-related question was the only open-ended and free-text question in the questionnaire. Since people's responses were unstructured (yielding around 40 unique entries), they were manually grouped into broader occupational categories for further analysis and evaluation. Group-level scores reported throughout, whether weekly training days, financial struggle scores or perceived equality scores, were calculated as the arithmetic mean/average of the coded values within each respondent subgroup, such as the six monthly income bands or the four school types. This produced the per-group values plotted in the figures. Three families of tests were applied depending on the variable types involved. Independent-samples t-tests were used to compare a continuous outcome with a categorical grouping variable. Chi-square tests of independence were used to assess associations between two categorical variables, such as tournament participation by school type. Pearson correlations were calculated at the individual respondent level. Two-tailed p-values are reported for each.

FINDINGS

This section presents and discusses the findings from the primary survey of 75 adolescents across Mumbai, and examines how socioeconomic factors impact participation in Taekwondo.

Profile of Respondents

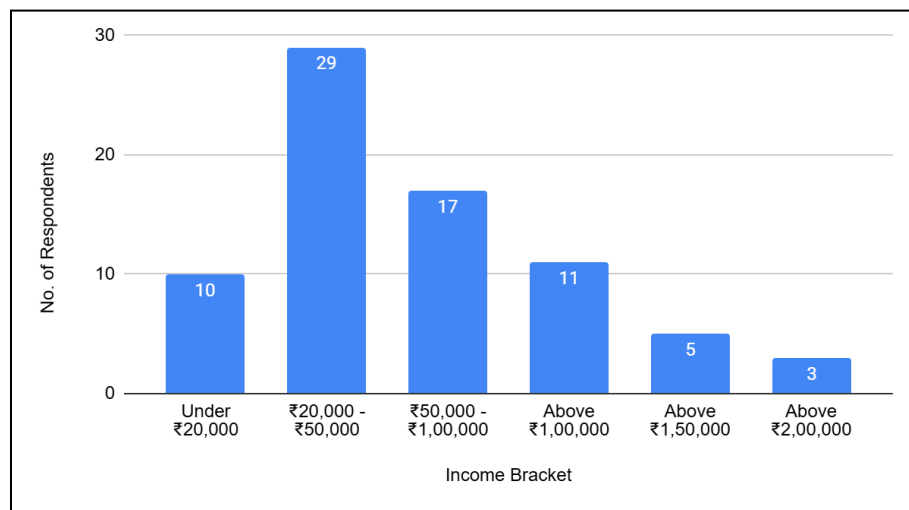


Figure 1. Distribution of Respondents by Household Monthly Income Level

Respondents were selected from the 13 to 18-year-old age group. Gender was not recorded, as the survey was anonymous. This dataset indicates that the research had a strong outreach to lower-income communities, with the majority of respondents (54.7%) drawn from government and BMC schools, and the largest income cohort falling within the ₹20,000 to ₹50,000 monthly bracket (Figure 1.). Geographically, areas such as Thane and Navi Mumbai account for the largest share of respondents. This is because the survey was primarily circulated via coaches and academies. The distribution of these academies are concentrated in this region.

The Impact of the Type of School and Income Level on Training Frequency

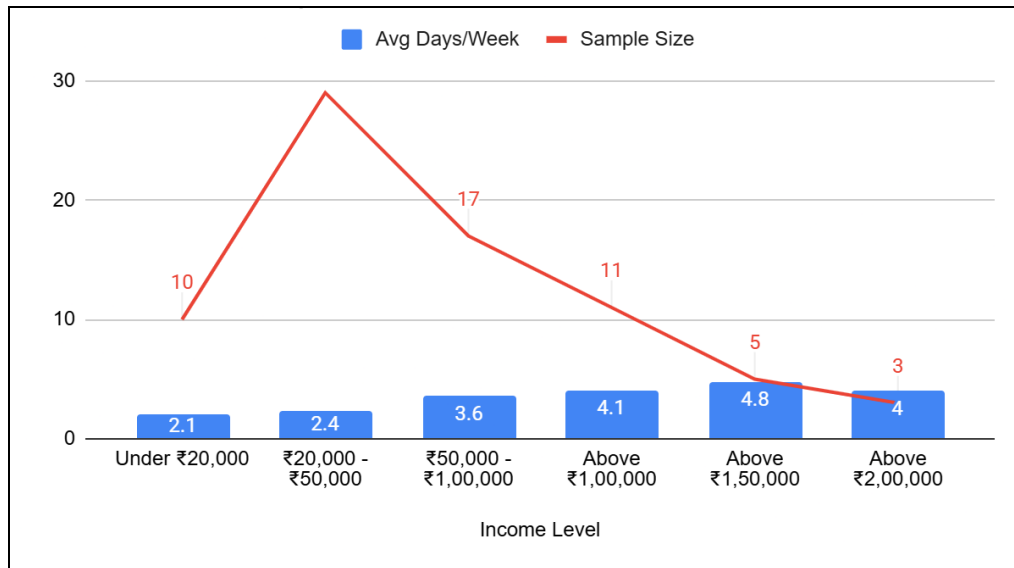


Figure 2. Average Training Days per Week and Sample Size Across Income Levels

The primary data reveal a stark disparity in training frequency between private and government school students. On average, private school students train for 4.2 days per week compared to 2.5 days for their government school counterparts. This gap of 68% is statistically significant ($t = 8.67$, $p < 0.001$). The disparity is further reinforced by a difference in income levels, with a strong positive correlation between household income and weekly training frequency ($r = +0.68$, $n = 73$, $p < 0.001$) (Figure 2.). These findings indicate that financial capacity is associated with how consistently an adolescent can train. The regression in Table 3 separates the direct and indirect parts of that association.

Tournament Participation

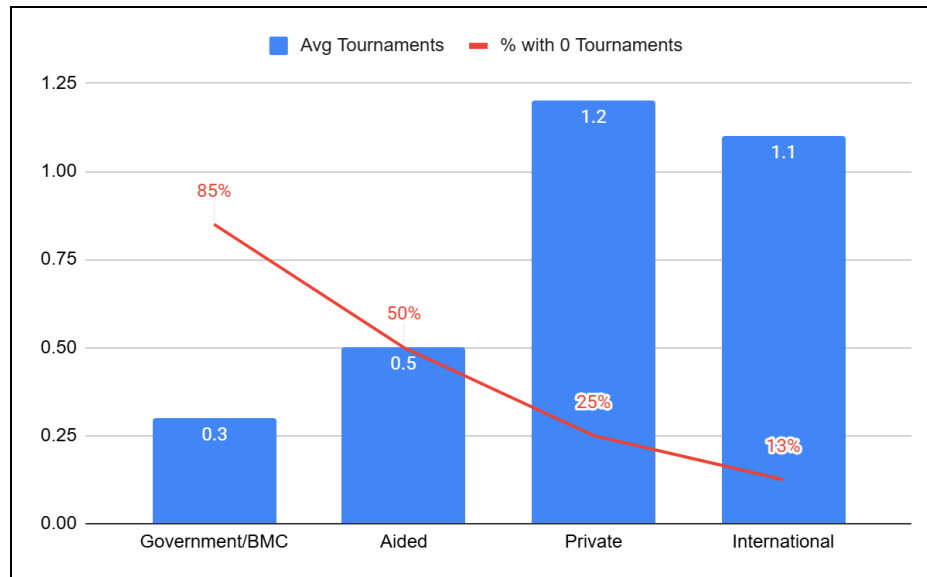


Figure 3. Distribution of Tournament Participation by the Type of School

Tournament participation revealed a sharp divide: 85% of government school students competed in zero tournaments over the preceding twelve months, compared to 25% of private school students and 12.5% of students from international schools. 92% of students from households earning below ₹50,000 had no tournament experience whatsoever. This is compared to just 21% of students from households with an income of over ₹1 lakh (Figure 3.). The strong positive correlation between income and tournament participation ($r = +0.62$, $n = 73$, $p < 0.001$) indicates that competitive access is tied to financial means.

The questionnaire collected income and tournament participation as labelled brackets (ordinal variables) rather than numeric values. These were assigned ordinal numeric values for quantitative analysis through correlation, regression and statistical analysis.

Financial and Geographic Barriers to Access

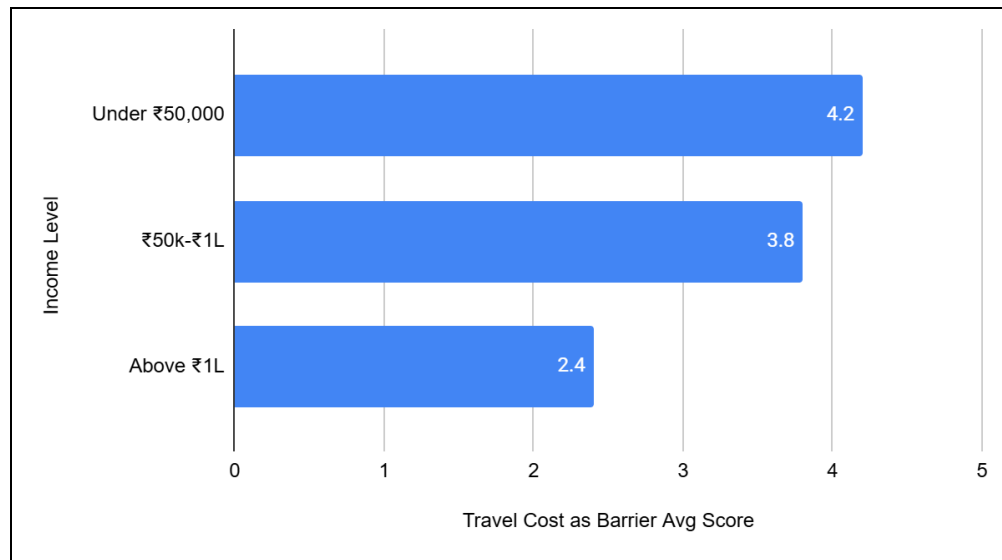


Figure 4. Average Travel Cost Barrier Score Across Income Levels

Each respondent was asked whether paying the monthly fees and high-quality gear was a financial struggle for their family, and whether the cost or distance of travelling to the training hall was a major hurdle for them. They rated their agreement with a statement on a 5-point Likert scale (1 = strongly disagree to 5 = strongly agree). Then, the average financial struggle scores and travel barrier scores were calculated across income levels and school types. The data analysis revealed that the average financial struggle scores decline sharply as household income rises, with the strongest correlation in the dataset ($r = -0.82$, $n = 73$, $p < 0.001$) (Figure 4.), which shows that lower-income students face greater financial barriers to participation in Taekwondo. Students with monthly household income levels below ₹50,000 also report the highest travel barrier scores.

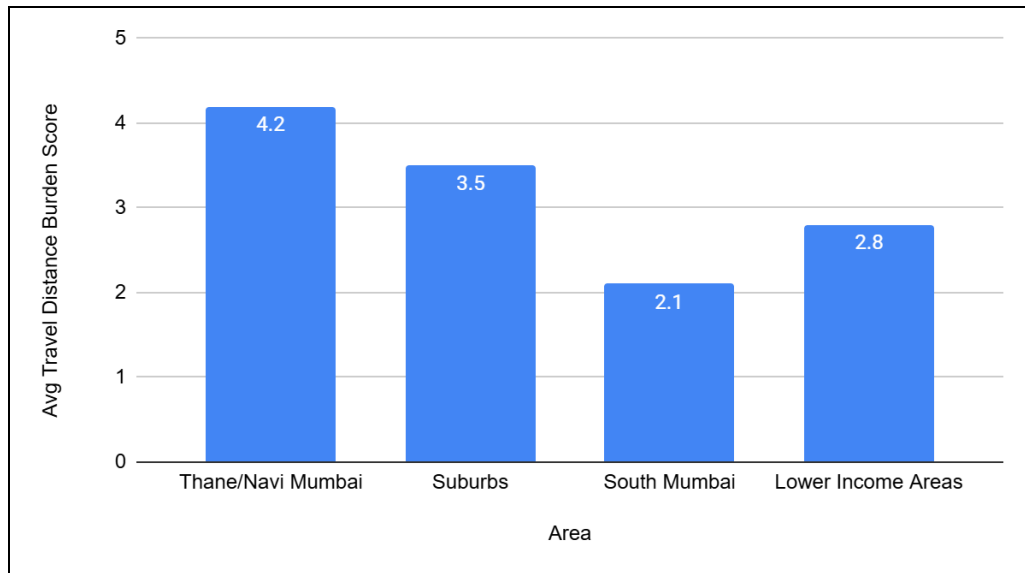


Figure 5. Average Travel Barrier Score Across Geographic Areas

Geographically, students from Thane and Navi Mumbai reported the highest travel barrier scores and correspondingly reported low training frequency and tournament participation. This is because of the concentration of quality training facilities in central Mumbai, which forces students from these outer areas into longer and costlier commutes. By contrast, South Mumbai students reported the lowest travel barrier scores along with the highest training frequency and tournament participation (Figure 5.). Together, these findings indicate that financial and geographic barriers compound one another, and may jointly account for the lower training frequency and tournament participation which is observed among government school and lower-income students.

Family Structure, Parental Occupation and Support

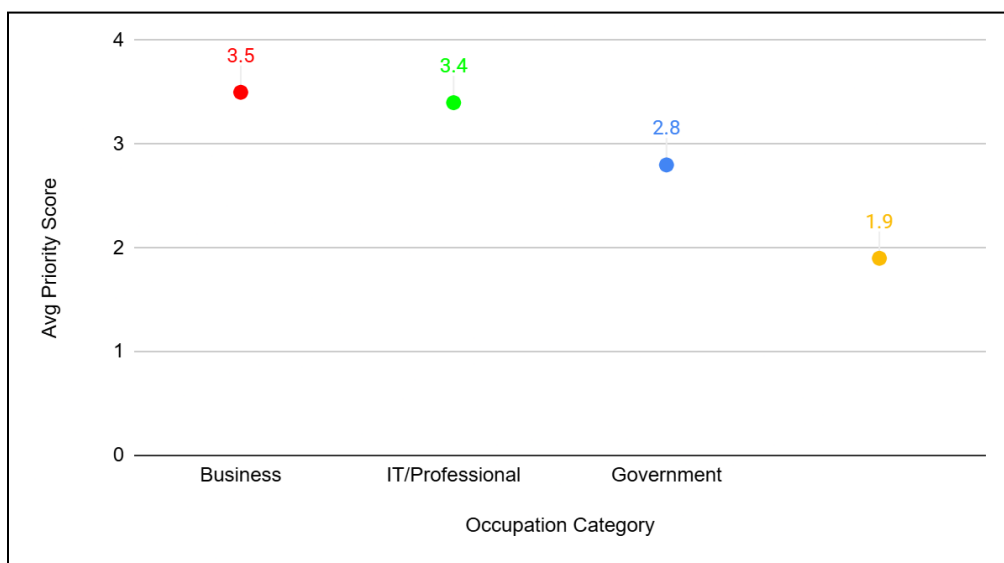


Figure 6. Parental Priority for Taekwondo Based on Parental Occupation

Prioritisation of participation in Taekwondo among parents rises steadily with household income. This pattern is closely mirrored by parental occupation. For instance, children of business people and IT professionals reported the highest parental priority scores (Figure 6.), whereas children of blue-collar workers reported the lowest. These patterns show that a student's likelihood of receiving active parental support for participation & competition is tied to their family's socioeconomic standing.

Academic Pressure and Participation in Sports

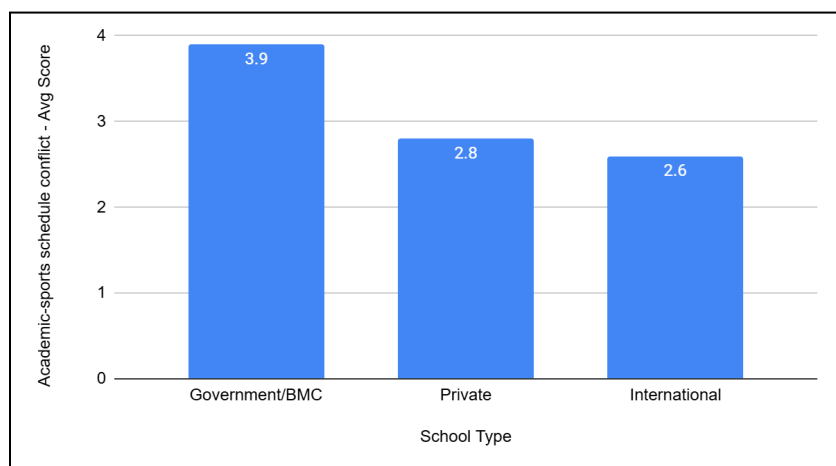


Figure 7. Average Score to Measure Training Missed Due to Academic Pressure by School Type

Each respondent was asked whether they often miss training because of school coaching classes or exam pressure. They rated their agreement with these statements on a 5-point Likert scale (1 = strongly disagree to 5 = strongly agree). Then, average scores were calculated across school types and income levels.

This data revealed that academic pressure emerges as an additional barrier to consistent participation in Taekwondo, with government school and lower-income students reporting the highest levels of conflict between academics and training (Figure 7.). This pattern reflects the perception, which can be more prevalent in lower-income households, that academic achievement is the primary route to economic mobility, which makes sport appear to compete with academic work rather than complement it.

Socioeconomic Status and Belt Level Progression

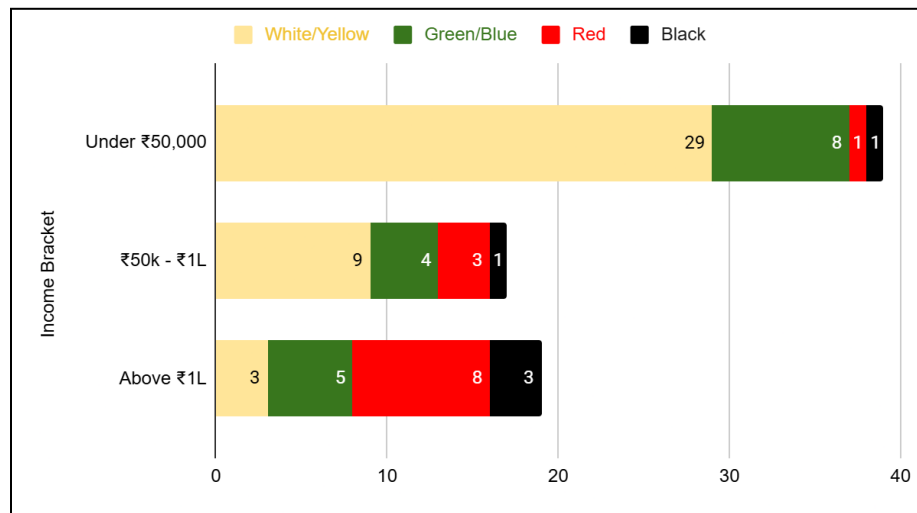


Figure 8. Variation in Belt Levels Across Income Groups

Belt-level progression reveals a clear socioeconomic gradient: lower-income students are concentrated at beginner levels, whilst higher-income students advance further (Figure 8.). For instance, among students earning under ₹50,000, 29 are at white/yellow level compared to just 1 at black belt. On the other hand, in the above ₹1L group, only 3 are at white/yellow, whereas 3 have reached black belt and 8 are at red belt.

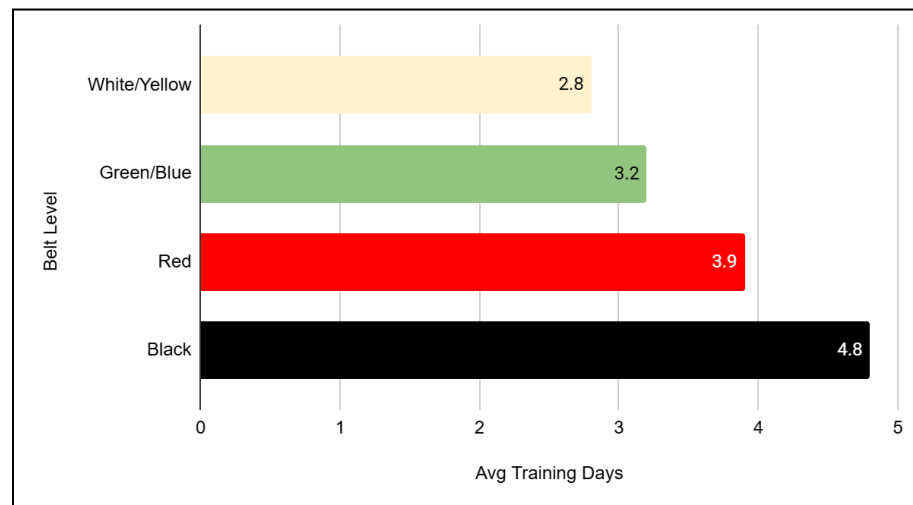


Figure 9. Average Training Days per Week Across Belt Levels

This is largely mediated by training frequency, which carries a strong positive correlation with belt level ($r = +0.71$, $n = 73$, $p < 0.001$) (Figure 9.). Average training days increase from 2.8 at white/yellow to 3.2

at green/blue, 3.9 at red, and 4.8 at black belt level. This illustrates that the financial barriers limit training frequency among lower-income adolescents. It directly constrains their progression within the sport.

Perception of Equality Among Participants

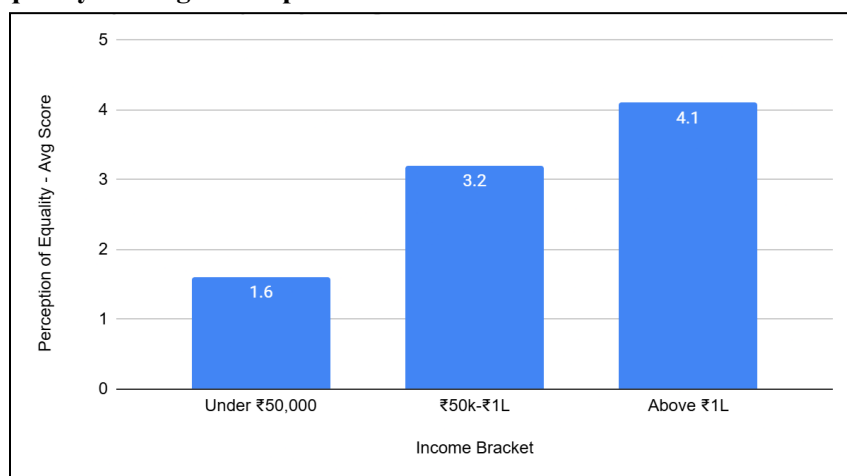


Figure 10. Perception of Equality Across Income Levels

The questions on access and challenges were designed to capture respondents' subjective views on the barriers that they face and their sense of getting opportunities within the sport. Rather than measuring observable outcomes, these questions explored how participants themselves experience and perceive their participation in Taekwondo, which adds an attitudinal dimension to the factual responses collected elsewhere in the questionnaire.

Students are acutely aware of their opportunities or lack of opportunities. Students from low-income households rate their access to equal opportunities at just 1.6/5, whilst students from high-income households rate it at 4.1/5 (Figure 10.). This 2.5-point gap mirrors the participation gap. Furthermore, the very strong positive correlation between income and perceived equality ($r = +0.79$, $n = 73$, $p < 0.001$) highlights that disadvantaged students recognise the systemic barriers they face. Students from government and aided schools also report significantly lower perceived equality scores than those in private and international schools.

Correlation and Regression Analysis of Socioeconomic Factors and Participation Outcomes

This chart maps the Pearson correlation coefficients² between the key socioeconomic variables and outcomes with regard to participation in Taekwondo.

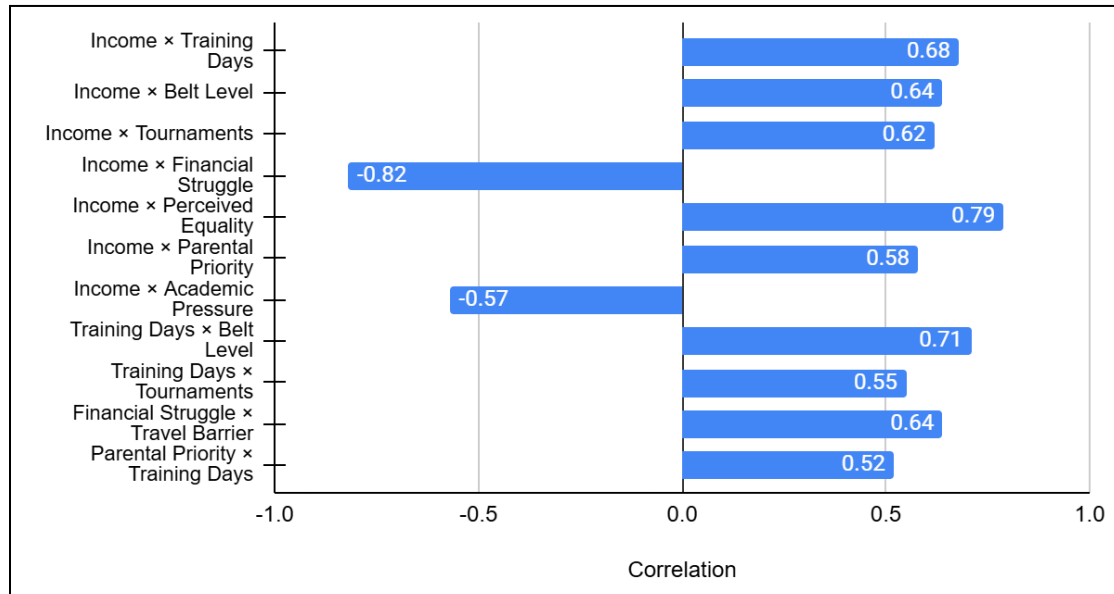


Figure 11. Correlation Analysis of Socioeconomic and Participation Variables

The primary data has confirmed that socioeconomic factors are consistent predictors of participation in Taekwondo patterns among adolescents in Mumbai. Income, as the primary indicator of socioeconomic standing, correlates strongly with training frequency, belt level and tournament participation (Figure 11.). Financial struggle, which manifests most acutely among lower-income households, has displayed the strongest correlation with income (-0.82). This reinforces that the barriers identified in this paper are not isolated. They are systematically rooted in financial disadvantage. Notably, training frequency emerges as the strongest predictor of belt-level progression (+0.71) which indicates that once financial barriers are cleared, consistent access to sport is the primary factor influencing advancement.

ANOVA Table

² The Pearson correlation coefficient (r) measures the strength and direction of the linear relationship between two variables. It ranges from -1 to +1, where +1 indicates a perfect positive relationship, -1 a perfect negative relationship, and 0 no linear relationship at all. Values close to ±1 reflect stronger associations.

Source	SS	df	MS	F	p
Regression	49.0959	4	12.274	10.9504	< 0.001
Residual	76.2192	68	1.1209	–	–
Total	125.3151	72	–	–	–

Table 2. ANOVA Results for Multiple Regression Predicting Weekly Training Days

Two cases were excluded for missing data on one or more predictors. The results (Table 2.) pinpoint that the regression model is statistically significant ($F = 10.95$, $p < 0.001$). This means that the set of independent variables, such as income, financial struggle, parental priority and travel barriers, collectively explain a significant portion of the variation in weekly training days.

Coefficients							
Predictor	B	Std β	SE	t	p	95% CI Low	95% CI High
Intercept	2.4314	–	1.1099	2.191	0.032	0.217	4.646
Income	0.1752	0.195	0.1596	1.098	0.276	–0.143	0.494
Financial Struggle	–0.3435	–0.315	0.1814	–1.894	0.062	–0.705	0.018
Parental Priority	0.3543	0.317	0.1305	2.715	0.008	0.094	0.615
Travel Barrier	0.1443	0.131	0.1519	0.95	0.346	–0.159	0.447

Table 3. Regression Coefficients for Predictors of Weekly Training Days

Two cases were excluded for missing data on one or more predictors. A multiple regression predicting weekly training days (Table 3.) shows that the four socioeconomic factors together explain a significant share of the variation ($F = 10.95$, $p < 0.001$). Parental priority is the strongest predictor and the only one to reach significance ($\beta = 0.317$, $p = 0.008$). Financial struggle also stands out as a strong secondary predictor and approaches significance ($\beta = -0.315$, $p = 0.062$). Income ($\beta = 0.195$, $p = 0.276$) and travel barrier ($\beta = 0.131$, $p = 0.346$) are not significant once the other factors are held constant. The strong correlation between income and training days ($r = +0.68$) indicates that income affects participation mainly through parental priority and financial capacity rather than acting directly or explicitly. The gap between private and government school students reflects several socioeconomic forces working together rather than any single cause.

DISCUSSION

Policy Implications

The most urgent intervention required is the creation of a subsidised tournament fund. 85% of government school students have no competitive experience, and without direct financial support for entry fees and travel, this gap is unlikely to be bridged on its own. Geographic expansion of training facilities is equally critical. Thane and Navi Mumbai are significantly underserved, and students in these areas report the highest travel barrier scores in the dataset. Additional facilities in these regions would meaningfully reduce a barrier that compounds financial disadvantage. Flexible, weekend-intensive scheduling and targeted financial aid can positively contribute towards addressing the unique constraints that are faced by low-income families .

Additionally, beyond just sports, government support for Taekwondo can be interpreted through the lens of having a public-safety investment. At its very core, Taekwondo is a self-defence discipline, which is particularly significant for adolescent girls. Similar initiatives can already be seen across India, such as the Central Board of Secondary Education's directive, which was introduced in the year 2008, which encouraged schools to offer self-defence training. In addition, UP's Mission Shakti which was founded by Chief Minister Yogi Adityanath in the year 2020, equips girls from rural sectors with practical self-defence skills by practising Taekwondo.

A gear subsidy programme would directly address one of the most immediate financial obstacles. This is because equipment costs place Taekwondo out of reach for many lower-income students, before training has even begun. Finally, schools must be brought into the solution. Recognising Taekwondo as a legitimate extracurricular activity would reduce the academic-sports conflict that disproportionately affects lower-income students. This is because they perceive academic achievement as the only viable path to economic mobility.

Research Limitations

The limitations of this study should be noted. The data is cross-sectional, so individual progression cannot be tracked over time. Responses are self-reported. This can introduce potential bias - particularly in questions that rely on the respondent's perception. Key contextual variables, including age, years of training, and specific costs, have not been captured. Finally, the geographic spread of respondents does not fully capture the diversity of Mumbai, as certain areas of the city are underrepresented in the dataset.

The Compounding Effect of Barriers

The findings have underpinned the idea that qualitative patterns can deepen our understanding of how socioeconomic factors shape participation in Taekwondo. Socioeconomic disadvantages do not operate as

single and isolated forces. For many adolescents who participated in this study, the barriers they face occur in various combinations. Together, they have a far greater impact.

A student facing any one barrier, whether it is low household income or a lack of institutional support, still has a reasonable chance of progressing. Roughly 50% of such students progress to the green belt level or higher. However, when a second barrier is added, this figure drops to 20%. For students navigating three or more simultaneous barriers, the odds of progressing to the green belt level or higher become significantly lower. Only 7% of such adolescents manage to achieve this milestone. These findings reveal that barriers to participation in Taekwondo multiply rather than add up linearly.

An Analysis of Outliers and the Protective Factors Behind Them

The findings identify several outliers worth examining. Rather than undermining this paper's central argument, these cases actually bolster it by revealing how socioeconomic factors influence participation in Taekwondo beyond the broad patterns already established above.

One of these unexpected patterns emerged among students from lower-income households in other settlements. Despite reporting high financial struggle scores, some of these students recorded surprisingly low travel barrier scores. This could indicate the presence of hyperlocal training facilities or community programmes operating within these settlements. For instance, Mumbai's dense public transport network, particularly the local trains and BEST buses, makes short-distance travel relatively affordable. This may further explain the low travel barrier scores which were reported by these respondents.

In saying that, transportation costs are only a part of the larger picture. For lower-income families, the opportunity cost of training matters just as much. Time spent elsewhere competes with time which is usually devoted to schoolwork and/or other familiar responsibilities. As a result, this can affect sustained participation even when fares are affordable. Furthermore, the primary data reveals outliers among participants with more resources. Several respondents from private and international schools remain at the white belt level despite having the financial means to train more consistently. In these cases, low training frequency is the deciding factor, which shows that socioeconomic advantage creates the conditions for progression but does not guarantee it.

It is important to note that outliers emerge at the other end of the socioeconomic scale too. This dataset includes those students who have progressed to advanced belt levels despite the severe socioeconomic constraints. For instance, one student of a government school, from a household earning under ₹20,000 per month, has earned a black belt. Another student was from a single-parent household, with an income in the range of ₹20,000 to ₹50,000. He has competed in 3 to 5 tournaments, despite training only twice a week. These cases demonstrate that talent, determination and perseverance exist amongst adolescents of all socioeconomic backgrounds. However, they also expose the limitations of individual effort in the absence of familial and/or institutional support.

CONCLUSION

This study has found that income correlates strongly and consistently with participation in Taekwondo, with correlations from 0.6 to 0.8 across key metrics. The regression shows that income works through parental priority and household financial pressure rather than acting directly on training frequency. The regression shows that income works through parental priority and household financial pressure rather than acting directly on training frequency. Financial, geographic, familial and institutional barriers do not operate independently. They can combine with each other. Every additional disadvantage can multiply rather than simply adding to the last. Tournament participation access emerges as noticeable evidence of this inequality. For instance, 92% of lower-income students have no competitive experience. This creates a developmental gap that training alone may not succeed in bridging. Independent income and family structure can further shape the outcomes of competitive participation.

The data highlights what drives progression once access is secured. Training frequency is the strongest predictor of belt advancement, with a correlation of +0.71, which underscores the value of consistent access to the sport. Disadvantaged adolescents are acutely aware of the barriers which they face. This is evident as they have reported perceived equality scores of just 1.6 out of 5, compared to 4.1 out of 5 amongst their wealthiest peers.

FUTURE RESEARCH DIRECTIONS

Future research should prioritise a longitudinal study tracking the same cohort over two to three years in order to measure dropout rates and progression patterns. A detailed cost analysis of tournament participation, gear and travel expenses would strengthen the argument around financial barriers. Qualitative interviews with high-achieving outliers and dropouts would add depth, as it would reveal the particular factors that enable some disadvantaged students to progress or excel against the odds. Furthermore, a comparative study that is conducted across Indian cities or in an international context would better pinpoint these findings within broader datasets. Gender classified data is a useful direction for future work, since access barriers in Indian sport often differ for girls and boys. Lastly, an intervention trial that tests the impact of a subsidised tournament programme would be a particularly valuable next step. The trial would move beyond the correlational findings to establish whether removing the financial barrier directly increases participation. This type of trial would benefit lower-income and government school students at a rapid rate. Simultaneously, it would provide policymakers and funders with the evidence that is needed to justify a subsidised tournament fund at scale.

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