ASSESSING THE IMPACT OF LOCAL SPORTS INFRASTRUCTURE ON YOUTH DEVELOPMENT IN PAKISTAN: A CROSS-SECTIONAL STUDY

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ABSTRACT

This study examines the role of sports infrastructure in shaping youth wellbeing, academic performance, and resilience in Sindh, Pakistan, through a mixed methods design combining a systematic review, a cross-sectional survey of 1,032 youth aged 18–24 years, and focus group discussions with youth, parents, teachers, coaches, and policymakers. Eight Union Councils in Karachi and Hyderabad were selected to represent variation in population density and facility availability.

Quantitative analyses revealed significant differences across psychological distress, physical health, and academic resilience, with youth in Union Councils without facilities reporting poorer outcomes. Regression models confirmed that sports facility availability predicted better health, lower distress, and higher academic performance, even after adjusting for age, gender, household income, and population density. Distance showed mixed effects, while utilization varied: low use linked to better health and lower distress, but moderate use predicted higher substance use. Covariates highlighted inequities, with females performing better academically and higher income protective.

Qualitative findings reinforced these results, revealing strong demand for affordable, safe, and inclusive sports spaces, particularly for female youth and those with disabilities. Parents emphasized academic priorities and safety concerns, coaches stressed family encouragement, and policymakers acknowledged systemic barriers of underfunding, poor governance, and weak institutional coordination. The systematic review confirmed Pakistan's lag behind global standards of accessibility, safety, and inclusion.

Findings underscore that infrastructure availability provides a foundational advantage, but outcomes are moderated by utilization, gender equity, and socioeconomic context. Policy implications call for inclusive design, stronger governance, public–private partnerships, and sustained community engagement.

PREFACE

This study investigates the role of sports participation and access to sports spaces in shaping youth development outcomes in Pakistan. While numerous studies have highlighted the benefits of sports for academic performance, physical health, and social skills, there remains a notable gap in research on how the presence and accessibility of sports infrastructure within communities influence these outcomes in the local context. This gap is particularly significant given the uneven distribution of sports facilities across regions and the implications this has for youth development. By examining this underexplored dimension, the research seeks to provide insights into how access to safe and structured sports environments can impact physical health, academic achievement, psychological well-being, and risks such as substance misuse.

The purpose of this study is to contribute valuable knowledge that can inform more targeted and effective policies for improving sports access, ultimately promoting better health and holistic development among young people in Pakistan. In doing so, it aims to fill an important literature gap and offer new perspectives on the broader implications of sports infrastructure for youth well-being.

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ABBREVIATIONS

PILL	Pakistan Institute of Living and Learning
REDCap	Research Electronic Data Capture (secure, web-based app) UC(s) – Union Council(s)
ToC	Theory of Change
PICO	Population, Intervention, Comparator, Outcome (systematic review framework)
ID	Identification number
FGD	Focus Group Discussion
IRB	Institutional Review Board
KHI	Karachi (used as code for IDs)
HYD	Hyderabad (used as code for IDs)

INTRODUCTION

Sports and physical activity are widely recognized as powerful tools for fostering positive youth development. Beyond their role in enhancing physical fitness, sports contribute to social interaction, communication, competition, conflict resolution, decision-making, and moral and psychosocial growth (Yang et al., 2022). They provide safe, structured, and supervised environments that attract and retain children, making them ideal spaces for interventions and personal growth (Bhimavarapu, 2025). Participation in sports has consistently been linked to improved academic performance, better mental health, and stronger social cohesion (Bailey et al., 2013; Biddle & Asare, 2011). Moreover, regular physical activity improves cardiovascular health, lowers obesity risk, and boosts overall fitness (Tremblay et al., 2014). Psychologically, sports reduce symptoms of anxiety and depression, build resilience, and strengthen self-esteem (Biddle & Asare, 2011).

Importantly, engaging in sports has also been associated with a reduced risk of substance misuse among youth (Zenic et al., 2020). By offering a structured environment that encourages discipline, focus, and purpose, sports diminish the likelihood of risky behaviors such as drug and alcohol use (Khan & Khan, 2018).

LITERATURE REVIEW

Engagement in sports has been consistently linked to a reduced risk of substance misuse among youth, as structured environments foster discipline, focus, and a sense of purpose that diminish the likelihood of risky behaviors such as drug and alcohol use (Zenic et al., 2020; Khan & Khan, 2018). Beyond individual benefits, sports contribute to broader economic outcomes: healthier youth are more likely to succeed academically, secure better employment, and achieve higher lifetime earnings, while reduced healthcare costs associated with lower rates of obesity, mental health issues, and substance misuse further enhance productivity (Kari et al., 2016).

Despite these well-documented advantages, the availability and quality of sports spaces are often neglected in urban planning. Youth without access to safe and well-maintained facilities face barriers to participation, which can negatively affect health and psychosocial development (Tremblay et al., 2014). Importantly, youth development cannot be understood solely through neighborhood boundaries; it requires attention to broader ecological networks and activity spaces. Browning & Soller (2014) argue that these extended environments shape developmental outcomes by mediating access to resources, peer networks, and community support. Yet, such networks depend on intentional design and accessibility. Ismail (2025) highlights that spaces designed with socio-spatial communal values foster belonging and cohesion, while Bagnall et al. (2023) demonstrate that inclusive community infrastructure strengthens social relations and wellbeing. Together, these perspectives suggest that sports facilities should be viewed not merely as recreational amenities but as ecological nodes that expand or constrain youth networks. In Pakistan, where urban development is uneven and infrastructure inadequate, disparities in sports access raise pressing equity concerns (UNICEF, 2019). Neglecting sports spaces risks reproducing social exclusion and limiting psychosocial development, indicating the need for evidence-based interventions that integrate ecological, architectural, and wellbeing perspectives.

Government initiatives that prioritize the development and maintenance of sports facilities are therefore critical. Safe and accessible spaces encourage regular physical activity, which is linked to improved psychological health and reduced risks of substance misuse, while also generating wider social and economic gains. Against this backdrop, the present cross-sectional study investigates the impact of access to sports spaces on youth outcomes in Pakistan. It compares emotional, behavioral, and academic outcomes of youth residing in localities with structured sports facilities to those without, exploring dimensions such as physical health, academic performance, psychological wellbeing, and risk for substance misuse. The study also examines types of sports engaged in and characteristics of available spaces, with qualitative interviews and focus groups involving youth, parents, sports ministries, and policymakers.

By focusing on this underexplored dimension, the study aims to contribute valuable knowledge on the broader implications of sports infrastructure for youth development. Findings will inform targeted policies to improve access, ultimately promoting better health, resilience, and holistic

development among young people in Pakistan, while filling a critical literature gap on the role of sports facilities in shaping long-term societal progress.

2.1. Study Objectives

1. To assess the relationship between availability and access to sports spaces, their utilization, and impacts on youth outcomes such as academic performance, physical health, psychological wellbeing, and risk for substance misuse.

2. To propose evidence-based policies for expanding sports spaces in underserved areas, drawing on qualitative insights from youth, parents, sports authorities, and policymakers.

3. To determine the optimal level of sports infrastructure needed by comparing national and global standards with current availability in Pakistan.

RESEARCH METHODOLOGY

3.1. Theory of Change

As part of the RASTA project, a two-hour Theory of Change (ToC) workshop was conducted on 8th July 2025 to engage stakeholders and to co-develop a shared framework for understanding how sports participation can influence youth outcomes. Two groups were formed, one in Karachi and one in Hyderabad, consisting of sports players, their parents, coaches, physical training teachers, and other key stakeholders. The Karachi group gathered at the PILL Karachi office, facilitated by Dr. Sehrish Irshad (Co-Investigator), while the Hyderabad group met at the Indus Hotel Hyderabad, facilitated by Ms. Faster Gill (Hyderabad Site Lead). Both groups were connected through Zoom, and the overall session was led by Ms. Sameen Ali (Facilitator).

Before the session began, all participants provided informed consent for audio and video recording of the discussions. The session was also documented through photographs. A total of 32 participants attended the event, with 16 participants from Karachi and 16 participants from Hyderabad. Over the course of three hours, participants engaged in structured discussions, shared their perspectives, and collectively mapped out the pathways of change. Their responses were systematically recorded and later organized into a Theory of Change diagram (see Figure 2) that captures the assumptions, inputs, activities, outcomes, and long-term impacts identified by the groups.

At the conclusion of the session, participants were thanked for their contributions, provided with tokens of appreciation, and asked for their consent to be contacted for future research studies.

3.2. Quantitative Methods

3.2.1. Study Design

This was a cross-sectional study with a mixed-methods approach, combining both quantitative and qualitative data collection methods to explore the relationship between access to sports spaces and sports participation with youth outcomes such as academic performance, physical and psychological well-being, and risk for substance use.

3.2.2. Study Population

The target population for this study included youth aged 18-24 from four districts of Sindh. Participants were divided into two groups:

Group 1: Youth residing in localities where structured sports spaces or playgrounds were available within 5 miles radius.

Group 2: Youth residing in localities where structured sports spaces or playgrounds were not available within 5 miles radius.

3.2.3. Inclusion Criteria

- Aged between 18 and 24 years old.

- Must reside in one of the selected urban or rural sites in Sindh or Punjab, Pakistan. Must be currently enrolled in school or college or university.
- Able to understand and respond to the survey and interview questions

3.2.4. Exclusion Criteria

- Individuals with a known history of severe mental illness.
- Individuals who are unable to provide informed consent.

3.2.5. Sampling

For the RASTA project, we followed a two-stage cluster stratified random sampling approach to ensure representativeness and balance in our sample (see Appendix A). In the first stage, we selected two divisions from Sindh province: Karachi and Hyderabad. From each division, we further chose two districts—one with the highest population density and one with the lowest population density—to capture variation across urban and semi-urban. In Karachi division, we selected Karachi East (most populated) and Karachi Kemari (least populated), while in Hyderabad division we selected Hyderabad district (most populated) and Tando Muhammad Khan (least populated). This process gave us a total of four districts.

In the second stage, we treated Union Councils (UCs) as clusters. We compiled complete UC lists for each district from published source of Pakistan Bureau of Statistics (PBS) and, with the support of the Ministry of Sports, Government of Sindh, classified them into two categories: UCs with sports facilities and UCs without sports facilities. From each district, we then randomly selected one UC from the "with sports" category and one UC from the "without sports" category, which resulted in a total of eight UCs across the four districts.

Within each selected UC, we applied a random household selection method to avoid bias and ensure every household had an equal chance of being included. A computer-generated random list of households was prepared, and field researchers were instructed to visit each of these households and mark the pre-allocated participant IDs. For the Karachi division, participant IDs range from KHI-001 to KHI-516, whereas for the Hyderabad division, participant IDs range from HYD-001 to HYD-516. From each selected household, one eligible participant (based on the project's inclusion criteria, such as age and consent) was approached, primarily on the basis of availability at the time of visit. This ensured that sampling remained consistent while avoiding over-representation from larger households.

Through this process, we collected data from 129 participants in each UC, resulting in a final sample size of 1,032 participants across all districts. To ensure the required number of participants, a total of 150 households were allocated from each UC instead of 129. In cases where participants were not approachable, refused to give consent, or did not meet the inclusion criteria, additional households were approached until the desired sample size of 129 participants was achieved from each UC.

This approach allowed us to capture variation across geography, population density, and access to sports facilities, while still maintaining randomness and representativeness. By following this structured sampling method, the RASTA project ensured that the findings would reflect the broader population of Sindh in a reliable and unbiased manner.

The sampling framework is provided in Appendix 2: Sampling Framework, List of UCs and List of Selected Households.

3.2.6. Questionnaires and Tools

The final survey package included the following documents, surveys and tools. All documents, survey and assessment tools were translated from English to Urdu as well as in Sindhi and then back translated in English to compare and confirm that conceptual meaning was maintained in the translated versions. They were also culturally adapted to the local context for better comprehension and validity.

Participant Information Sheet: The Participant Information Sheet (PIS) described the purpose of the study in simple language.

Informed Consent Form: It explained what participants had to do in the study, the potential benefits they could receive, their rights as participants, and when they could withdraw from the study.

Demographic Survey: It was developed to collect background data including age, gender, marital status, educational level, current enrollment status, field of study, and household socioeconomic indicators such as parental education, occupation, income, and access to basic facilities.

Academic Performance: This was assessed in two ways: (a) participants' most recent cumulative grade, verified through official transcripts or semester reports, and (b) the Academic Resilience Scale (ARS-6).

The Academic Resilience Scale–6 (ARS-6) is a brief, validated six-item measure (Cui et al., 2023) derived from the longer ARS-30 (Cassidy, 2016). It assesses students' ability to cope with academic challenges, rated on a 5-point Likert scale (1 = strongly disagree to 5 = strongly agree), producing scores from 6 to 30. Higher scores indicate stronger resilience, such as persistence and adaptive coping. The Urdu version demonstrated good internal consistency (Cronbach's $\alpha = 0.843$; Fatima et al., 2022).

Sports Participation: Participants were asked to respond to questions regarding availability of sports facilities in their neighborhood, the condition of the facility, type of facility, and the extent to which they utilized the facility.

Psychological Well-being: Psychological distress was measured using the Kessler Psychological Distress Scale (K10), a 10-item screening tool assessing non-specific anxiety and depression symptoms through self-reported emotional states (Andrews & Slade, 2001). Items are rated on a 5-point Likert scale from "none of the time" to "all of the time," yielding scores between 10 and 50.

Higher scores reflect greater distress. The K10 shows strong reliability and validity across diverse populations (Andrews & Slade, 2001).

General Health and Activities of Daily Living (GHA): Overall health and functional ability were measured using a validated self-report scale assessing general health perceptions and independence in daily living (McManus et al., 2016). Respondents first rated overall health as Excellent, Very Good, Good, Fair, or Poor, followed by items on physical functioning and independence. Responses were converted into numerical values and summed to yield a composite score, with higher totals reflecting better health and independence, and lower scores indicating poorer status. Scores provide a composite view of wellbeing, with higher ratings reflecting better health and independence, and lower ratings indicating poorer status.

Drug Abuse Screening Test (DAST-10): The Drug Abuse Screening Test (DAST-10) is a brief, 10-item screening tool designed to identify potential problems related to drug use. It can be administered by a clinician or completed as a self-report, with each item requiring a simple yes/no response. The tool is typically completed in under eight minutes and yields a score ranging from 0 to 10, with higher scores indicating greater severity of drug-related issues. A score of 0 reflects no reported problems, 1–2 suggests a low level of concern, 3–5 indicates moderate problems warranting further assessment, 6–8 reflects substantial difficulties requiring more intensive evaluation, and 9–10 denotes severe problems necessitating comprehensive intervention (Skinner, 1982).

3.2.7. Data Management and Governance

For the RASTA project, a comprehensive data management and governance framework was established to ensure accuracy, security, and reliability. All instruments were uploaded to REDCap, a secure web-based data capture system (Harris et al., 2009, 2019), under a dedicated "RASTA" project. Forms were pilot-tested, refined, and finalized for field use. Four tablets with REDCap installed were deployed—two for Karachi and two for Hyderabad—each configured with restricted access to safeguard data. Field teams entered interview responses directly into REDCap, minimizing duplication, error, and loss. Participant tracking was managed through hard copy ID lists, consent forms, and information sheets, with IDs crossed out after completion. Follow-up visits or telephone interviews were arranged when surveys could not be completed in one sitting. Data was synchronized with REDCap whenever internet was available, ensuring centralized backup. Governance protocols included unique participant IDs, confidentiality safeguards, and restricted access. Supervisors monitored quality, while co-investigators oversaw fieldwork. As district-level data accumulated, it was merged, cleaned, validated, and analyzed. Initial analysis generated descriptive statistics, followed by ongoing preliminary analyses and comprehensive statistical evaluation at study completion. This dynamic process ensured methodological rigor, ethical integrity, and reliable outcomes aligned with the project's research objectives.

3.3. Qualitative Methods

3.3.1. Study Design

The study employed three Focus Group Discussions (FGDs) to explore access to sports infrastructure for children and youth from multiple stakeholder perspectives. Separate FGDs were conducted in Karachi and Hyderabad, each targeting distinct groups to capture context-specific insights. Participants were selected using purposive sampling to ensure diversity in gender, age, and roles relevant to the objectives. Each FGD comprised 15–20 participants. Semi-structured topic guides were developed to reflect the unique perspectives of parents, teachers, and coaches; youth; and policymakers and stakeholders. Discussions focused on household, school, community, and governance-level experiences, covering barriers, motivations, and policy challenges related to sports access and participation.

3.3.2. Data Collection

A qualitative component of Focus Group Discussions (FGDs) was designed to capture in-depth perspectives on the intersection of sports and mental health. (See Appendix B for Topic Guide). The first FGD took place on 2nd September 2025 at the PILL Karachi Office, facilitated by Ms. Sana Farooq with support from Dr. Sehrish Irshad and Dr. Mohsin Hassan Alvi. Twenty youth (12 from Karachi, 8 from Hyderabad) from diverse backgrounds, aged 18–24 years, shared experiences, challenges, and expectations regarding sports participation and its impact on well-being. A topic guide and activity pack structured the discussion to ensure alignment with study objectives.

The second FGD, held on 25th September 2025, was facilitated by Ms. Zaib Un Nisa, supported by the same co-investigator. Participants included 19 parents and coaches of children aged 12–22 from Hyderabad and Karachi who provided insights based on practical field experience.

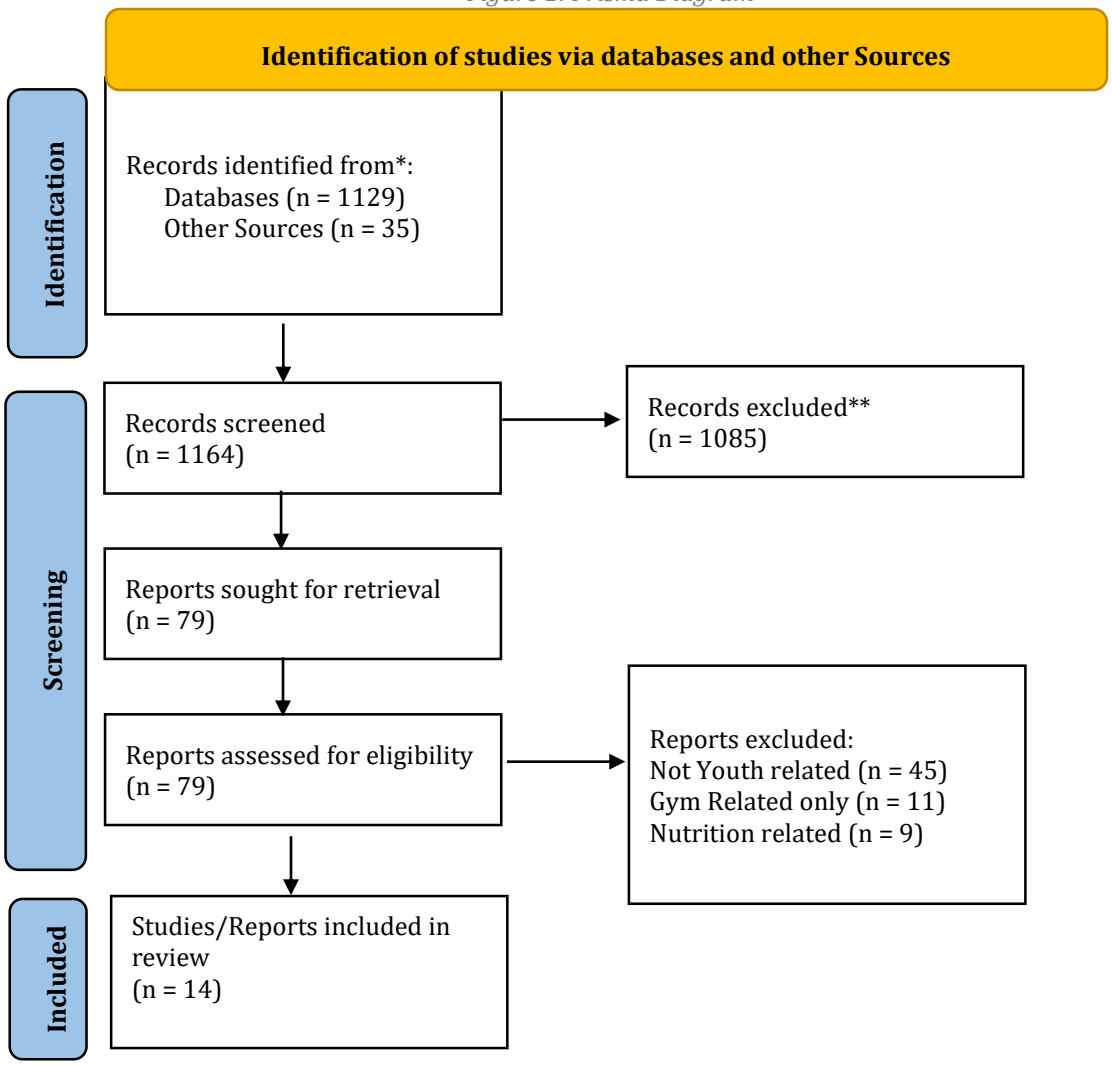
The third FGD, conducted on 6th Dec 2025, engaged 15 policymakers and stakeholders such as ministry officials, council chairmen, advisors, legal experts, and academics, all based in Hyderabad, Sindh. The FGD was facilitated by Ms. Sana Farooque and co-investigators, including Dr. Mohammed Arif and Dr. Rubeena Kidwai. Data collection employed participatory methods, with notes, quotes, and verbatim transcripts analysed inductively to identify themes. Ethical protocols were strictly followed, with informed consent obtained and confidentiality assured. Supplementary materials, including the Topic Guide, are provided in Appendix 3.

3.4. Evidence Synthesis Methods

This systematic review followed established scoping review methodology to map existing literature on youth sports facilities, accessibility standards, and Pakistan's infrastructure context. The search strategy included academic databases, grey literature, policy documents, and international guideline repositories. Search terms included combinations of: "youth sports facilities," "accessibility standards," "safety guidelines," "sports infrastructure Pakistan," "inclusive sports design," and "disability access sports."

Inclusion criteria encompassed: (1) studies examining youth sports facility types and standards; (2) international guidelines on accessibility and safety; (3) research on Pakistan's sports infrastructure and policy; (4) studies identifying barriers and enablers to sports facility implementation. Both peer-reviewed research and authoritative policy documents were included to ensure comprehensive coverage of academic evidence and practical implementation frameworks.

Figure 1: Prisma Diagram



Source: Authors' compilations.

The database searches identified 1,129 records, and an additional 35 records were identified through other sources, resulting in a total of 1,164 records. After title and abstract screening, 1,085 records were excluded. Seventy-nine reports were sought for retrieval and assessed for eligibility. Following full-text assessment, 65 reports were excluded with reasons, including not youth-related (n = 45), gym-related only (n = 11), and nutrition-related (n = 9).

A total of 14 key sources were identified and analyzed, representing international guidelines (n=3), Pakistan-specific studies (n=4), global research and best practices (n=4), and regional guidelines (n=3). Data extraction focused on facility types, accessibility standards, safety requirements, policy frameworks, and identified barriers and enablers.

3.5. Ethical Approval

The study proposal was submitted for and received ethical approval from the Institutional Review Board at the Institute of Clinical Psychology, University of Karachi.

FINDINGS AND DISCUSSION

4.1. Results from the Theory of Change

4.1.1. Vision of Success

Across both sites, participants articulated a unified vision: every community should have accessible and sustainable sports facilities that nurture healthier, more confident, and resilient youth. These facilities were seen as not just recreational spaces but hubs for fostering discipline, teamwork, and opportunities for growth.

4.1.2. Barriers and Challenges

In Karachi, participants highlighted limited numbers of safe and well-maintained facilities, overcrowding in available spaces, and financial barriers to accessing private sports clubs. In Hyderabad, the main challenges included poor infrastructure in semi-urban and rural settings, cultural resistance to female participation, and a lack of trained coaches. Common barriers identified across both sites included safety concerns, gender restrictions, insufficient equipment, and weak government investment.

4.1.3. Stakeholders

Participants identified youth, parents, coaches, teachers, and local government as primary stakeholders. Community leaders, NGOs, and private sector partners were seen as vital for sustaining facilities. Policymakers and media were considered crucial in raising awareness, shaping narratives, and driving reforms to improve equitable access to youth sports infrastructure.

4.1.4. Key Outcomes/Goals

Short- and Medium-Term Goals

- Establishment and improvement of safe, inclusive, and affordable sports facilities in local communities.
- Increased youth participation in sports, with particular emphasis on including girls and marginalized groups.
- Development of healthier habits, greater academic resilience, and improved peer networks.
- Enhanced community engagement and ownership of local facilities.

Long-Term Goals

- Sustained presence of well-maintained sports infrastructure across urban and rural areas.
- Improved physical health and psychological well-being among youth populations.
- Reduction in substance misuse and other risk behaviors.
- Expanded career and leadership opportunities for youth through structured

participation in sports.

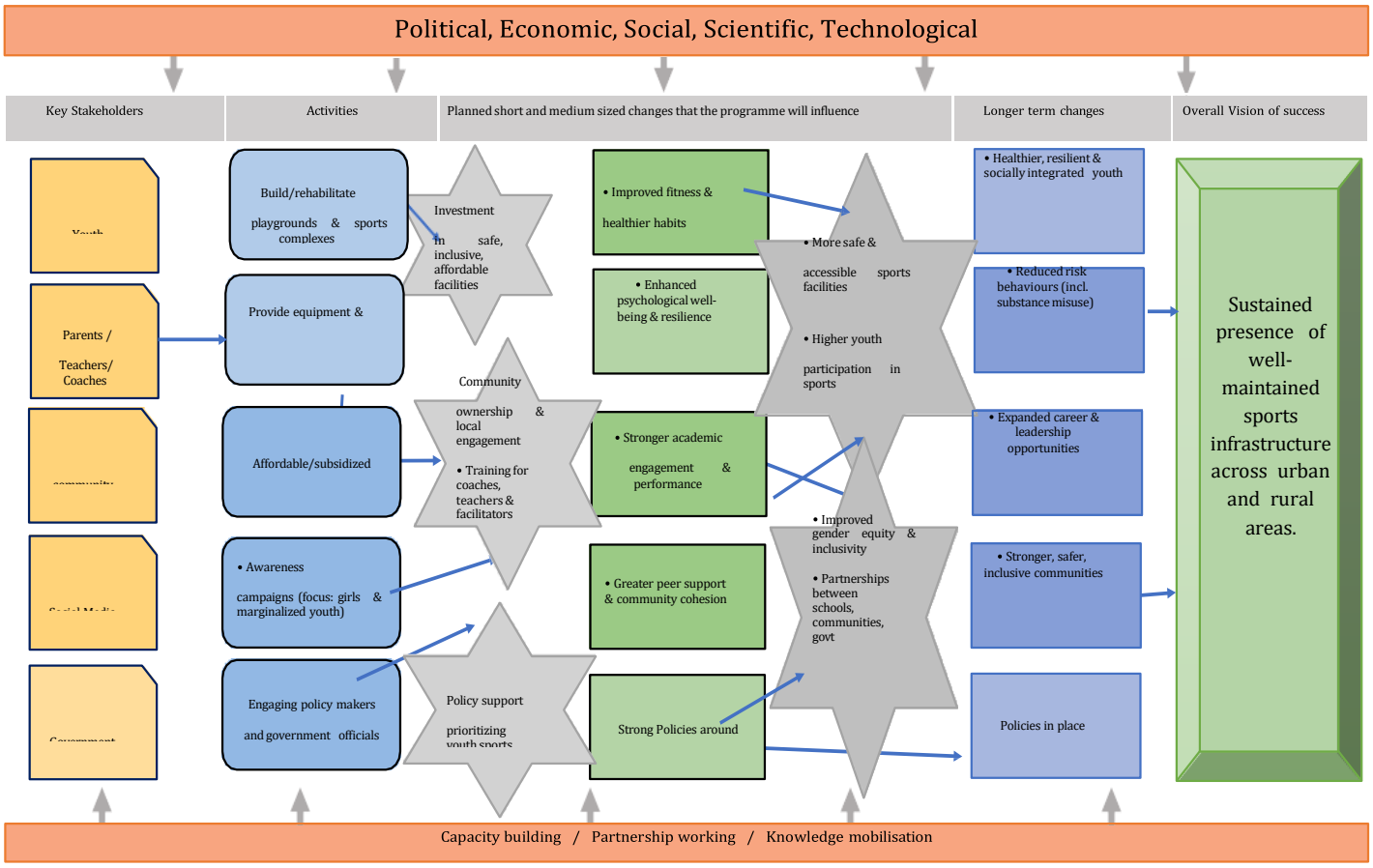
4.1.5. Tasks and Assumptions

Participants assumed that policymakers and local governments would prioritize youth sports in planning and budgeting. They also assumed that cultural norms would gradually shift to support gender equality in sports and that trained facilitators or coaches would be available to guide young people. Continued political support and community ownership were considered critical for sustaining progress.

4.1.6. Final Impact: Theory of Change for Youth Sports Access and Wellbeing in Sindh

The anticipated long-term impact was the creation of healthier, more resilient, and socially integrated youth populations, supported by equitable access to quality sports infrastructure. Such investments are expected not only to strengthen individual well-being but also to foster stronger communities and contribute to national development.

Figure 2: Causal Pathway - Theory of Change for Youth Sports Access and Wellbeing



Source: Authors' compilations.

This diagram illustrates the hypothesized pathways linking access to sports infrastructure with physical, psychological, and academic outcomes among youth. Arrows indicate directional influence. The supplementary materials related to the ToC workshops are provided in Appendix 1: photographs taken during the sessions, attendance records, the activity pack for Karachi, and the activity pack for Hyderabad. (See Appendix C for additional ToC tables with results).

4.2. Results from Evidence Synthesis

This systematic review looked at the types of sports facilities available for young people around the world, the rules that make these facilities safe and accessible, and how Pakistan compares with international standards. The review used evidence from 14 key sources, including international guidelines, regional frameworks, and studies from Pakistan. Overall, the findings show a large gap between global best practices and the current situation in Pakistan.

Globally, sports participation is known to improve physical health, mental well-being, and social skills among young people (Bailey et al., 2013; Biddle & Asare, 2011). However, access to safe and inclusive sports facilities is not equal, especially in low- and middle-income countries like Pakistan (Fitri et al., 2022). With about 64 percent of its population under the age of 30, Pakistan faces serious challenges in providing enough quality sports facilities for youth (GOP, 2024b). International agreements such as the UN Convention on the Rights of Persons with Disabilities clearly state that access to sports and recreation is a basic right, including for persons with disabilities (UN, 2006).

International youth sports standards also stress the importance of safety, proper equipment, and emergency preparedness (International Association for Youth Sports, 2024a, 2024b). Despite these commitments, many parts of Pakistan, especially rural areas, lack safe, well-maintained, and accessible sports facilities (Punjab Sports Board, 2023; Migration Letters, 2024).

Internationally, youth sports facilities include a wide range of spaces such as community playgrounds, school grounds, multi-purpose sports complexes, gymnasiums, swimming pools, athletics tracks, and specialized facilities like tennis courts and skate parks (Abu Dhabi Sports Council, 2023; Sports Facilities Advisory, 2027; BuiltX, 2025). Best practice design focuses on safety, flexible use, age-appropriate equipment, and universal access so that girls, boys, and persons with disabilities can all participate (Sport England, 2024; Disability Sport Northern Ireland, 2016, 2022). Global guidelines, including those from UNCRPD and Sport England, emphasize features such as ramps, accessible changing rooms, safe playing surfaces, emergency plans, and trained staff (UN, 2006; Disability Sport Northern Ireland, 2016; Sports Medicine Australia, 2017). These standards also highlight that access to information about facilities is important so users can understand what support is available (Wibowo et al., 2025).

In comparison, Pakistan's sports infrastructure shows major weaknesses. Although national and provincial sports policies exist, implementation is weak and uneven (Ali, et al., 2023; Punjab Sports Board, 2023; Kanwal, 2019). Quality facilities are mostly concentrated in large cities, while rural and smaller towns often lack even basic grounds (Aslam et al., 2023; Migration Letters, 2024; Laghari et

al., 2024). Many existing facilities are poorly maintained because most sports budgets are spent on administration rather than upkeep and development (Mehmood & Tayyab, 2023). Facilities are rarely designed to support girls or persons with disabilities, and school and college sports infrastructure is often inadequate (Arshad, 2020; Laar et al., 2019; Mahmood et al., 2021). Limited funding, poor planning, and weak coordination between government bodies further worsen the situation (Khan, 2025; Migration Letters, 2024).

When compared with international standards, Pakistan falls short in areas such as accessible routes, parking, toilets, safety inspections, emergency planning, and inclusive changing facilities (GOP, 2024a). These gaps persist despite Pakistan being legally committed to accessibility under international agreements.

The review identifies several key barriers to improvement. These include insufficient funding, unequal distribution of facilities, poor maintenance systems, weak governance, lack of coordination between institutions, and limited transparency (Parameswaran, 2024; Migration Letters, 2024; Ali, et al., 2023). Social and cultural factors also play a major role, especially restrictions on girls' participation and stigma faced by persons with disabilities (Laar et al., 2019; Arshad, 2020). In addition, there is limited technical expertise in accessible design and no enforced national standards for safety and inclusion (Parameswaran, 2024; ASTM International, 2023; Maciá et. al., 2020).

At the same time, the review highlights important opportunities for improvement. Stronger policies with clear targets and accountability, better coordination between government departments, and enforcement of accessibility and safety standards can make a difference (Punjab Sports Board, 2023; GOP, 2023; Abu Dhabi Sports Council, 2023). Public–private partnerships, community involvement, and corporate social responsibility initiatives can help mobilize resources (Mian, 2024; UNICEF, 2019). Adopting universal design from the start, making low-cost improvements to existing facilities, and using data to guide planning can also improve access (Paralympics Australia, 2024; Disability Sport Northern Ireland, 2022). Community engagement, awareness campaigns, school-based sports programs, and sharing successful local examples are key to changing attitudes and increasing participation (Sayyd et. al., 2021; Sayeed, 2024; Legends Academy Pakistan, 2022).

In summary, the review shows that Pakistan's youth sports infrastructure is far behind international standards, especially in terms of accessibility, safety, and inclusion. However, with better planning, stronger governance, community involvement, and sustained investment, meaningful improvements are possible. Investing in safe and inclusive sports facilities should be seen not as an extra cost, but as an essential investment in youth health, social inclusion, and national development (World Bank, 2020; OECD, 2021; Tremblay et al., 2014; UNESCO, 2015; Kohl & Cook, 2013; Bailey et al., 2013).

4.3. Results from Qualitative Research

Following themes and patterns were derived from the FGDs:

4.3.1. Youth Focus Group Discussions

Participants: 20 youth (12 from Karachi, 8 from Hyderabad), aged 18–24 years
Date: Sep 2, 2025
Facilitators**:** Ms. Sana Farooq (facilitator), Dr. Sehrish Irshad (co-facilitator)

Theme 1: Leisure Patterns, Technology, and Lifestyle Shifts

Sub-theme 1.1: Digital Engagement and Sedentary Behavior
Youth reported a significant increase in digital entertainment, with social media, mobile games, and streaming replacing outdoor activity.

Illustrative Quote:

"Most of us spend more time on our phones than playing outside. Parents think it's safer this way." — Karachi participant

Sub-theme 1.2: Parental Safety Concerns
Parents' fear of crime, harassment, or negative news online reinforces indoor leisure, limiting youth outdoor play.

Theme 2: Availability and Accessibility of Sports Facilities

Sub-theme 2.1: Infrastructure in Karachi
While Karachi has multiple sports facilities (clubs, complexes, gyms), access is unequal due to high fees and informal barriers. Public spaces are overcrowded or poorly maintained.

Sub-theme 2.2: Infrastructure in Hyderabad
Hyderabad lacks well-maintained public spaces. Open grounds are uneven, unsafe, and primarily used for informal practice. Private facilities are expensive.

Sub-theme 2.3: Missing Amenities
Participants highlighted the absence of:

- Multi-sport community grounds
- Female-only spaces or timings
- Facilities for persons with disabilities
- Affordable indoor facilities, gyms
- Basic amenities such as washrooms, lighting, and seating

Illustrative Quote: "There are grounds, but most are broken or dirty. Girls can't play there safely, and gyms are too expensive." — Hyderabad participant

Theme 3: Barriers to Participation

Sub-theme 3.1: Financial Constraints
High costs of memberships, equipment, coaching, and transport restrict access, particularly for lower-income youth.

Sub-theme 3.2: Safety and Distance
Concerns about street safety, harassment, and long distances to facilities prevent both boys and girls from regular participation.

Sub-theme 3.3: Time Constraints
Academic pressure, work, and household responsibilities reduce available time for sports, especially among lower-income youth.

Sub-theme 3.4: Gender Norms
Girls face additional restrictions due to mobility limitations, cultural norms, and fear of community judgment.

Illustrative Quote: "Even if we want to play, it's not easy for girls in our neighborhood. Parents worry about gossip and safety." — Hyderabad participant

Theme 4: Role of Family, Community, and Educational Institutions

Sub-theme 4.1: Family Influence
Families can either encourage or discourage sports. Encouragement is often linked to health and discipline; discouragement arises from safety concerns or cultural expectations.

Sub-theme 4.2: Educational Facilitation
Schools and colleges have potential to facilitate sports through grounds, periods, and competitions; however, inconsistent implementation and lack of trained staff limit impact.

Sub-theme 4.3: Community Attitudes
Fear of gossip, social judgment, or stigma, particularly against girls, affects participation.

Illustrative Quote: "Schools say sports are important, but no one organizes anything properly. We end up playing cricket on weekends with friends." — Karachi participant

Theme 5: Participation Patterns and Preferences

Sub-theme 5.1: Preferred Sports

- Cricket is the most common sport; football is popular in Karachi; hockey is limited to elite clubs.

Sub-theme 5.2: Frequency and Mode

- Participation is mostly informal and irregular, occurring during weekends or peer gatherings.

Sub-theme 5.3: Unmet Desire

- Youth expressed a desire for more frequent participation but face barriers of time, money, family support, and limited facilities.

Theme 6: Perceived Benefits of Sports

Sub-theme 6.1: Physical Health

- Regular participation improves fitness, stamina, strength, energy levels, and sleep patterns.

Sub-theme 6.2: Mental Health

- Sports relieve stress, improve confidence, motivation, and emotional regulation.

Sub-theme 6.3: Academic and Work Implications

- Some youth report improved concentration and time management; others note fatigue without structured schedules.

Sub-theme 6.4: Social and Community Benefits

- Sports develop teamwork, leadership, and communication; community tournaments promote cohesion and reduce negative behaviors.

Illustrative Quote: "When we play regularly, we feel happier, more confident, and less stressed with exams." — Karachi participant

Theme 7: Gender and Socioeconomic Influences

Sub-theme 7.1: Socioeconomic Barriers

- Low-income youth face compounded challenges due to cost, distance, and lack of local facilities.

Sub-theme 7.2: Gender-Sensitive Access

- Female youth require culturally appropriate, safe, and inclusive spaces for meaningful participation.

Theme 8: Recommendations from Youth

Sub-theme 8.1: Infrastructure Development

- Rehabilitate local sports grounds, develop multi-sport and inclusive facilities.

Sub-theme 8.2: Affordability and Accessibility

- Provide free or low-cost access to public facilities; ensure female-only spaces and timings.

Sub-theme 8.3: Community Engagement

- Establish community-based coaching, mentorship programs, and regular inter-school/community tournaments.

Sub-theme 8.4: Awareness and Policy Support

- Increase public awareness campaigns; government oversight and funding for youth sports programs.

Illustrative Quote: "If there were clean grounds nearby, with female-friendly timings and affordable access, more of us would play." — Hyderabad participant

4.3.2. Focus Group with Parents and Coaches

Participants: 19 Parents and Coaches of children aged 12–22 from Hyderabad and Karachi

Date: 25th September 2025
Facilitators: Ms. Zaib-un-Nisa, Dr. Sehrish Irshad

Theme 1: Perceptions of Sports and Child Development

Sub-theme 1.1: Academic Priority vs. Awareness of Benefits

- Parents often prioritize grades and academic achievement over physical activity.
- Limited awareness exists regarding the role of sports in physical health, mental resilience, and social skills.
- Coaches emphasized that without parental encouragement, children's participation remains low.

Illustrative Quotes: "I want my child to focus on studies; sports are fun but not necessary for the future." — Parent

"Even if children want to practice, broken grounds and no lights make it impossible." — Coach

Theme 2: Safety, Gender, and Social Norms

Sub-theme 2.1: Safety Concerns

- Parents' fear of harassment, accidents, or unsafe environments limits children's outdoor sports.
- Coaches noted absenteeism linked to parental safety concerns, affecting regular attendance.

Sub-theme 2.2: Gender Norms

- Cultural norms restrict girls' mobility; female-only spaces and timings are often lacking.
- Both parents and coaches highlighted that social judgment reinforces these barriers.

Illustrative Quotes: "Parents themselves sit at home on mobiles; children copy them and stay indoors." — Parent

"Many parents don't allow girls to play outside. Even boys sometimes miss practice because parents fear harassment." — Coach

Theme 3: Availability and Quality of Sports Facilities

Sub-theme 3.1: Public Facilities

- Many playgrounds are overcrowded, poorly maintained, dirty, or unsafe.
- Limited lighting, seating, and equipment were highlighted.

Sub-theme 3.2: Private and Community Programs

- Private academies exist but are expensive and inaccessible to low-income youth.
- Community programs are limited in reach and often sporadic.

Illustrative Quotes: "There is a lack of maintenance. Since there is no maintenance, facilities are not being provided." — Parent

"Even if children want to practice, broken grounds and no lights make it impossible." — Coach

Theme 4: Role of Family, School, and Community Support

Sub-theme 4.1: Modeling Active Lifestyles

- Parents' sedentary habits influence children's activity patterns.
- Coaches observed that engagement is higher where families actively support sports.

Sub-theme 4.2: School and Community Facilitation

- Schools and community initiatives are sporadic and lack structured programs.
- Regular mentorship, competitions, and organized sessions are limited.

Illustrative Quotes: - "Parents themselves stay indoors and use mobile phones; children follow their example." — Parent

"Structured programs and mentorship pathways are limited, so skill development is slow." — Coach

Theme 5: Barriers to Participation

Sub-theme 5.1: Financial Constraints

- Costs of coaching, equipment, travel, and membership fees restrict access.

Sub-theme 5.2: Time Constraints

- Academic pressures, household responsibilities, and work reduce available time for sports.

Sub-theme 5.3: Programmatic Limitations

- Limited trained coaches, lack of structured sessions, mentorship, competitions, and progression pathways.

Theme 6: Recommendations from Parents and Coaches

- Conduct awareness workshops for parents highlighting sports' benefits for physical, mental, and social development.
- Expand and maintain public sports facilities consistently.
- Create female-friendly, safe, and inclusive sports spaces, with female coaching staff and timings.
- Provide structured coaching programs, mentorship, and competitions to develop skills and sustain engagement.
- Actively involve parents and communities to support youth participation.

4.3.3. Policy Makers Focus Group Discussion

Participants: 15 Policy makers and local government representatives in Hyderabad

Date: 6th December, 2025

Facilitators: Ms. Sana Farooq

Theme 1: Policy and Funding Challenges

Sub-theme 1.1: Insufficient Budget Allocation

- Youth sports programs often receive limited funding; implementation is inconsistent.

Sub-theme 1.2: Fragmented Policy Frameworks

- Lack of clear policy coordination between local authorities, schools, and community organizations.

Illustrative Quote: "We have policies on paper, but implementation is inconsistent. Facilities are not maintained properly."

Theme 2: Infrastructure and Urban Planning

Sub-theme 2.1: Urban Development Constraints

- Urban expansion, encroachments, and limited public land reduce space for sports facilities.

Sub-theme 2.2: Safety and Accessibility

- Inadequate lighting, security, and transport options affect usability.

Theme 3: Social and Cultural Considerations

Sub-theme 3.1: Gender Inclusion

- Cultural norms restrict female participation; need for gender-sensitive programming.

Sub-theme 3.2: Community Engagement

- Community involvement and public-private partnerships are critical to enhance participation.

Theme 4: Recommendations from Policy Makers

- Increase budget and accountability for youth sports programs.
- Develop public-private partnerships to expand access and quality.
- Create gender-inclusive and safe sports spaces.
- Implement monitoring and evaluation frameworks for program effectiveness.

4.3.4. Key Policy Recommendations from FGD Participants

Decentralize Sports Financing: Sindh Government should allocate ring-fenced budgets at the Union Council level to ensure resources reach underserved neighborhoods. Funds should cover playground rehabilitation, amenities, equipment, and community programs, with clear timelines, standardized reporting, and oversight by Finance and Sports Departments.

1. Professionalize Facility Management: Sindh Sports Department and Municipal Corporations should appoint qualified facility managers responsible for maintenance, safety, scheduling, and community engagement. Implementation should prioritize high-use public grounds, sports complexes, and school facilities within 6–12 months.
2. Reintegrate Structured Physical Education: Education Departments should recruit trained PT and sports teachers and protect weekly sports time. Schools should open grounds after hours for community use. Medium-term implementation within 1–2 years, starting with low-income urban schools.
3. Ensure Gender-Responsive Access: Sports and Women Development Departments, along with local governments, should create female-friendly spaces with secure boundaries, lighting, washrooms, female-only timings, and female coaches. Immediate safety improvements within 0–6 months; full infrastructure development over 1–2 years.
4. Integrate Mental Health Promotion: Health and Sports Departments, NGOs, and mental health programs should embed counseling, mentorship, and psychosocial support in school and community sports programs. Pilot within 6–12 months, followed by phased scale-up.
5. Invest in Coach Training and Certification: Sports Boards and professional associations should establish standardized training and certification emphasizing safety, inclusion, and youth development. Medium-term rollout (1–2 years) with annual refreshers.
6. Revive Community Tournaments and Traditional Sports: Local governments and sports departments should organize regular inter-school and community tournaments, including traditional sports, in neighborhood grounds, schools, and community centers. Short-term start within 6 months; ongoing seasonal events thereafter.

7. Strengthen Monitoring, Evaluation, and Accountability: Planning & Development and Sports Departments should implement frameworks to track facility use, participation, gender inclusion, youth outcomes, and public fund utilization. Develop framework within 6 months, with continuous reporting at district and provincial levels.

4.4. Results from Quantitative Research

The results of the quantitative analysis are presented below, describing participant characteristics and examining patterns of sports availability, access, utilization, and associated academic, physical, and psychological outcomes. (See Appendix D for tests of assumptions and cross tabulations).

Prior to conducting inferential statistical analyses, the normality of continuous variables was assessed to ensure that model assumptions were reasonably met. Visual inspection of histograms overlaid with normal distribution curves indicated an approximately normal distribution for key outcome variables. Minor deviations from normality were observed in some measures; however, these were not considered substantial given the large sample size. The histograms and normality curves for all relevant variables are provided in the Appendix for reference.

Table 1: Demographics Characteristics of Participants

Variables	**n = 1032**	**%**
Age		
18 Years	213	20.6
19 Years	147	14.2
20 Years	102	9.9
21 Years	108	10.5
22 Years	128	12.4
23 Years	127	12.3
24 Years	207	20.1
Gender		
Male	583	56.5
Female	449	43.5
Marital Status		
Single	920	89.1
Married	82	7.9
Engaged	30	2.9
Education status		
Secondary	60	5.8
Higher Secondary	677	65.6
Attending Graduate program	284	27.5
Attending a Postgraduate program	11	1.1
Household Monthly Income (PKR)		
< 20,000	24	2.3
20,000-40,000	272	26.4
40,001-80,000	494	47.9
80,001-150,000	215	20.8
150,001 - 300,000	26	2.5
> 300,000	1	0.1

Ownership of House		
Own	795	77
Rent	229	22.2
Other	8	0.8
Access to Clean Drinking Water		
No	104	10.1
Yes	928	89.9
Access to Sanitation Facilities (bathrooms in the house)		
No	31	3
Yes	1001	97

Source: Authors' computations.

Table 1 presents demographic and household characteristics of 1,032 youth surveyed. Participants were evenly distributed across ages 18 to 24, ensuring balanced representation of late adolescents and young adults. Slightly more than half were male, though females also formed a significant proportion. Most respondents were single, consistent with the young age profile. Educationally, the majority were enrolled in higher secondary or undergraduate programs, reflecting an active academic phase. Household income patterns showed that most belonged to low- to middle-income groups, with nearly half reporting monthly earnings between PKR 40,001 and 80,000. Housing conditions were relatively stable, as most lived in owned homes rather than rented ones. Access to basic services was high, with the majority reporting clean drinking water and sanitation facilities within households. Overall, the demographic profile indicates a relatively stable socioeconomic context, providing a critical baseline for interpreting variations in sports access, participation, and related youth outcomes.

4.4.1. Availability of Sports Infrastructure or Spaces and Mental, Physical and Academic Outcomes

Table 2: Independent Samples t-Test: Youth Outcomes With vs. Without Sports Facilities

	Without Sport Facility (n=516) M (SD)	**With Sport Facility (n=516) M (SD)**	**t**	**df**	**Sig.**	**Mean Diff.**	**S. E, Diff.**	**95% C I of Diff.**
Psychological Distress	16.64 (5.11)	13.17 (4.11)	11.99	1030	<.001	3.46	.29	[2.89, 4.03]
Physical Health	12.73 (2.74)	11.47 (2.33)	7.96	1030	<.001	1.26	.16	[0.95, 1.57]
Academic Resilience	20.37 (4.77)	24.44 (6.40)	-11.58	1030	<.001	-4.07	0.35	[-4.75, -3.38]

Source: Authors' computations.

Comparisons by sports facility availability revealed consistent and statistically significant differences across all three outcomes. Youth residing in Union Councils without sports facilities reported higher psychological distress (M = 16.64, SD = 5.11) than those with facilities (M = 13.17, SD = 4.11), $t(1030) = 11.99$, $p < .001$. Similarly, physical health scores were poorer among youth without facilities (M =

12.73, SD = 2.74) compared to those with facilities (M = 11.47, SD = 2.33), $t(1030) = 7.96$, $p < .001$. In contrast, academic resilience was significantly higher among youth with sports facilities (M = 24.44, SD = 6.40) compared to those without (M = 20.37, SD = 4.77), $t(1030) = -11.58$, $p < .001$.

4.4.2. Gender and Physical, Psychological Status and Academic Resilience

Table 3: Independent Samples T-test – Gender Differences in Youth Outcomes

	Male (n=583) M (SD)	Female (n=449) M (SD)	t	df	Sig.	Mean Diff.	S. E, Diff.	95% C I of Diff.
Psychological Distress	14.73 (4.90)	15.12 (5.01)	-1.26	1030	.209	-.39	.31	[-1.00, .219]
Physical Health (GHA)	11.59 (2.40)	12.77 (2.75)	-7.18	1030	<.001	-1.17	.16	[-1.49, -.85S]
Academic Resilience	21.01 (5.32)	24.22 (6.34)	-8.65	1030	<.001	-3.21	0.37	[-3.94, -2.48]

Note: Outcome variable where Male =1 and Female = 2.
Source: Authors' computations.

The table presents independent samples t-test results comparing mean scores across gender and by Union Council classification (with and without sports facilities) for psychological distress (KPDS), general health and activities of daily living (GHA), and academic performance (AP_RS).

For gender comparisons, results indicated no significant difference in psychological distress between males (M = 14.73, SD = 4.90) and females (M = 15.12, SD = 5.01), $t(1030) = -1.26$, $p = .21$. However, significant differences were observed for physical health and academic resilience. Female participants reported poorer physical health (M = 12.77, SD = 2.75) compared to males (M = 11.59, SD = 2.40), $t(1030) = -7.18$, $p < .001$. In addition, females demonstrated higher academic resilience (M = 24.22, SD = 6.34) than males (M = 21.01, SD = 5.32), $t(1030) = -8.65$, $p < .001$.

Overall, these findings suggest that while gender differences are most pronounced in physical health and academic resilience, the presence of sports facilities at the community level is consistently associated with lower psychological distress, better physical health, and stronger academic resilience.

Regression Estimates

Following the descriptive analyses and bivariate comparisons, multivariate regression models were conducted to examine the independent contribution of sports-related factors and sociodemographic covariates to the outcome variables. While the earlier tests highlighted group differences across individual predictors, the regression analyses allow for simultaneous adjustment of confounding variables and provide a clearer picture of the relative strength and direction of these associations. The results presented below summarize the predictors that significantly influenced academic performance and substance use risk after controlling for age, gender, household income, and population density.

4.4.3. Sports Availability, Access, and Utilization as Predictors of General Physical Health

Lower GHA scores reflect better general health and better functionality in activities of daily living. After adjusting for age, gender, household income, and population density, sports facility availability was significantly associated with better health outcomes. Students with access to sports facilities scored, on average, 1.35 points lower on the GHA compared to those without access (B = –1.349, SE = .184, p < .001).

Distance to facilities (>8 km) was not significantly related to general health (B = –0.097, SE = .218, p = .658). In terms of utilization, students reporting low use of sports facilities had significantly lower GHA scores compared to those with high utilization (B = –0.879, SE = .273, p < .001), while moderate utilization did not differ significantly (B = –0.531, SE = .328, p = .106).

Among covariates, older age (B = –0.104, SE = .039, p = .007), female gender (B = –1.026, SE = .179, p < .001), higher household income (B = –0.377, SE = .105, p < .001), and residence in higher population density areas (B = –0.508, SE = .156, p < .001) were all significantly associated with better health status.

The overall model explained approximately 18% of the variance in general health and activities of daily living (R^2 = .184), indicating a modest but meaningful level of explanatory power in the context of social and health research.

Table 4: Multiple Linear Regression Predicting General Health and Activities Of Daily Living (GHA)

Predictors		*B*	*SE*	*OR*	*95% confidence interval for OR*	*p-value*
Sport availability						
	No (Ref)	-	-	-	-	**-**
	Yes	-1.349	.184	.260	.181 to .372	**<.001**
Sport access						
	<8KM (Ref)	-	-		-	-
	>8KM	-.097	.218	.908	.592 to 1.392	.658
Sport utilization						
	High (Ref)	-	-		-	-
	Moderate	-.531	.328	.588	.309 to 1.119	.106
	Low	-.879	.273	.415	.243 to .710	**<.001**
Model adjusted with						
	Age	-.104	.039	.901	.835 to .971	**.007**
	Gender (1=M, 2=F)	-1.026	.179	.359	.252 to .510	**<.001**
	Household income	-.377	.105	.686	.558 to .843	**<.001**
	Population density	-.508	.156	.602	.444 to .816	**<.001**
		R^2 = .184				

Note: Outcome variable = GHA lower score depicts better general health and daily functionality.
Source: Authors' computations.

4.4.4. Sports Availability, Access, and Utilization as Predictors of Psychological Distress

Higher KPDS scores reflect greater psychological distress. After adjusting for age, gender, household income, and population density, sports facility availability was strongly associated with lower distress. Students with access to sports facilities scored, on average, 3.83 points lower on the KPDS compared to those without access (B = –3.830, SE = .340, p < .001), indicating a substantial protective effect.

In contrast, greater distance to facilities (>8 km) was significantly associated with higher distress scores (B = 1.448, SE = .403, p < .001), suggesting that proximity plays an important role in psychological outcomes. Regarding utilization, students reporting low use of sports facilities had significantly lower distress scores compared to those with high utilization (B = –2.123, SE = .505, p < .001), while moderate utilization did not differ significantly (B = –0.852, SE = .606, p = .160).

Among covariates, older age was associated with slightly higher distress (B = .161, SE = .071, p = .024), while gender differences were not statistically significant (B = .494, SE = .332, p = .137). Household income showed a marginal protective trend (B = –0.366, SE = .195, p = .060), and residence in higher population density areas was significantly associated with lower distress (B = –1.878, SE = .287, p < .001).

The overall model explained approximately 21% of the variance in psychological distress (R^2 = .208), indicating a moderate level of explanatory power in the context of social and health research.

Table 5: Multiple Linear Regression Predicting Psychological Distress (KPDS)

Predictors		*B*	*SE*	*OR*	*95% confidence interval for OR*	*p-value*
Sport availability						
	No (Ref)	-	-	-	-	**-**
	Yes	-3.830	.340	.022	.011 to .042	**<.001**
Sport access						
	<8KM (Ref)	-	-		-	-
	>8KM	1.448	.403	4.256	1.933 to 9.370	**<.001**
Sport utilization						
	High (Ref)	-	-		-	-
	Moderate	-.852	.606	.427	.130 to 1.400	.160
	Low	-2.123	.505	.120	.044 to .322	**<.001**
Model adjusted with						
	Age	.161	.071	1.174	1.021 to 1.350	**.024**
	Gender	.494	.332	1.639	.855 to 3.140	.137
	Household income	-.366	.195	.693	.474 to 1.016	.060
	Population density	-1.878	.287	.153	.087 to .269	**<.001**
		R^2 = .208				

Source: Authors' computations.

4.4.5. Sports Availability, Access, and Utilization as Predictors of Academic Performance

Academic performance was modeled as an ordinal outcome, with higher categories representing better grades. In the ordinal logistic regression model predicting academic grades, the availability of sports facilities was a significant positive predictor, with students reporting access to such facilities having 42% higher odds of achieving better grades compared to those without (OR = 1.42, 95% CI: 1.07–1.89, p = .016). In contrast, distance to facilities (>8 km vs. <8 km) and levels of sport utilization (moderate or low vs. high) were not significantly associated with academic performance. Among the covariates, age was negatively related to grades (OR = 0.85, p < .001), indicating that older students were less likely to achieve higher academic outcomes. Gender showed a significant effect (OR = 1.46, p = .008), with female students 45% more likely to attain better grades than males. Household income was a strong positive predictor (OR = 1.75, p < .001), suggesting that students from higher-income households had substantially greater odds of academic success. Population density also exerted a positive influence (OR = 1.31, p = .028), with students in more densely populated areas more likely to achieve higher grades. Overall, the model explained approximately 13.5% of the variance in academic performance (pseudo-R^2 = .135).

Table 6: Ordinal Logistic Regression Predicting Academic Performance

Predictors		*B*	*SE*	*OR*	*95% confidence interval for OR*	*p-value*
Sport availability						
	No (Ref)	-	-	-	-	**-**
	Yes	.351	.146	1.420	1.066 to 1.891	**.016**
Sport access						
	<8KM (Ref)	-	-		-	-
	>8KM	-.212	.172	.809	.577 to 1.133	.217
Sport utilization						
	High (Ref)	-	-		-	-
	Moderate	-.238	.268	.788	.466 to 1.334	.375
	Low	.069	.226	1.072	.689 to 1.669	.758
Model adjusted with						
	Age	-.162	.031	.851	.800 to .904	**<.001**
	Gender	.375	.142	1.455	1.102 to 1.920	**.008**
	Household income	.562	.086	1.754	1.481 to 2.078	**<.001**
	Population density	.272	.124	1.312	1.030 to 1.672	**.028**
		R^2 = .135				

Note: Outcome variable = Academic Grades where D grade = 0, C grade = 1, B grade = 2, A & above A = 3.
Source: Authors' computations.

4.4.6. Sports Availability, Access, and Utilization as Predictors of Risk for Substance Use

In the logistic regression model predicting risk of substance use, sport availability was a strong positive predictor, with students reporting access to sports facilities having over four times higher odds of substance use compared to those without (OR = 4.17, 95% CI: 2.22–7.85, p < .001).

Conversely, greater distance to facilities (>8 km) was protective, reducing the odds of substance use by 66% relative to those living closer (OR = 0.34, p = .005). Sport utilization showed mixed effects: moderate utilization was associated with significantly higher odds of substance use compared to high utilization (OR = 4.74, p = .044), while low utilization was not significantly related (OR = 0.78, p = .666). Among covariates, age was negatively associated with substance use (OR = 0.45, p < .001), indicating that older students were less likely to engage in such behavior. Gender showed a very strong protective effect, with females (coded as 2) having substantially lower odds of substance use compared to males (OR = 0.001, p < .001). Household income also reduced risk (OR = 0.18, p < .001), suggesting that students from higher-income households were less likely to report substance use. In contrast, population density was positively associated (OR = 1.97, p = .012), with students in denser areas nearly twice as likely to engage in substance use. Overall, the model demonstrated strong explanatory power, accounting for 64% of the variance in substance use risk (pseudo-R^2 = .640).

Table 7: Logistic Regression Predicting the Risk of Substance Use

Predictors		*B*	*SE*	*OR*	*95% confidence interval for OR*	*p-value*
Sport availability						
	No (Ref)	-	-	-	-	**-**
	Yes	1.428	.323	4.170	2.215 to 7.847	**<.001**
Sport access						
	<8KM (Ref)	-	-		-	-
	>8KM	-1.079	.381	.340	.161 to .718	**.005**
Sport utilization						
	High (Ref)	-	-		-	-
	Moderate	1.555	.772	4.737	1.043 to 21.508	**.044**
	Low	-.246	.571	.782	.255 to 2.392	.666
Model adjusted with						
	Age	-.803	.106	.448	.364 to .552	**<.001**
	Gender	-9.604	.827	.001	.001 to .010	**<.001**
	Household income	-1.697	.209	.183	.122 to .276	**<.001**
	Population density	.679	.271	1.972	1.160 to 3.354	**.012**
		R^2 = .640				

Note: Outcome variable DAST Score as binary outcome = 0 = no risk, 1 = at risk.
Source: Authors' computations.

The findings demonstrate that sports facility availability in Sindh is consistently linked to improved youth outcomes, including reduced psychological distress, better physical health, and stronger academic performance. At the same time, the analysis revealed a significant unintended risk: access to sports facilities was associated with greater likelihood of substance use, while distance and utilization patterns influenced this relationship in complex ways. Protective factors such as older age, female gender, and higher household income reduced vulnerability, whereas population density heightened it. Taken together, these results underscore the dual nature of sports infrastructure—serving as a reliable driver of health and academic achievement, yet also creating environments

where risks may emerge. This highlights the importance of pairing infrastructure investment with preventive programming and supervision to ensure that the benefits of sports facilities are maximized while potential harms are effectively mitigated.

DISCUSSION

The triangulation of evidence from the systematic review, focus group discussions, and quantitative survey provides a comprehensive understanding of the barriers and enablers shaping youth sports participation in Pakistan. Together, these strands highlight the interplay between infrastructure availability, cultural norms, socioeconomic constraints, and individual outcomes.

This study pursued three core objectives:

1. to assess the relationship between availability and access to sports spaces, their utilization, and impacts on youth outcomes such as academic performance, physical health, psychological wellbeing, and risk for substance misuse. Out study showed that Sports facility availability emerged as the strongest predictor of positive youth outcomes, while actual utilization enhanced—but did not independently determine—these benefits. In short, infrastructure provides a necessary foundation, but supportive engagement and equity measures are essential for it to translate into meaningful impact.

2. to propose evidence-based policies for expanding sports spaces in underserved areas, drawing on qualitative insights from youth, parents, sports authorities, and policymakers. This objective was met through qualitative insights: youth emphasized affordability, safety, and inclusivity, demanding female-friendly, disability-accessible, and community-based facilities. Parents and coaches highlighted academic pressures, cultural restrictions, and poor facility quality as barriers. Policymakers acknowledged underfunding and fragmented governance but pointed to decentralization, public–private partnerships, and gender-responsive planning as viable opportunities.

3. The third and final objective was to determine the optimal level of sports infrastructure needed by comparing national and global standards with current availability in Pakistan. The review showed that international guidelines stress accessibility, safety, and inclusivity as the basics of youth sports facilities. In Pakistan, however, policies and practices are still fragmented, with gaps in funding, governance, and quality. This comparison highlights a clear tension: while global standards set high goals, making them work in Pakistan means adjusting to local culture, resources, and realities.

Global Benchmarks vs. Local Realities:

The systematic review established that international guidelines emphasize accessibility, safety, and inclusivity as core principles of youth sports infrastructure. Yet, Pakistan's policy framework and practice remain fragmented, with persistent gaps in governance, funding, and facility quality. The comparative analysis underscores some marked gaps: while aspirational standards exist globally, their translation into Pakistan's context requires adaptation to local sociocultural and resource realities.

Youth Voices:

Qualitative findings reveal how digital engagement, parental safety concerns, and restrictive gender norms have reshaped leisure patterns, limiting outdoor play. Youth consistently identified affordability, safety, and inclusivity as unmet needs, with strong demand for female-friendly spaces, disability-accessible facilities, and community-based programming. Parents and coaches reinforced these concerns, emphasizing academic priorities, cultural restrictions, and poor facility quality as barriers. Policymakers acknowledged systemic challenges of underfunding and fragmented frameworks, but also pointed to opportunities through decentralization, public-private partnerships, and gender-responsive planning.

Quantitative Evidence of Impact:

Survey results provide robust statistical confirmation of these qualitative insights. Youth in Union Councils with sports facilities reported significantly lower psychological distress, better physical health, and higher academic resilience and performance. Regression analyses consistently identified sports availability as the strongest predictor of positive outcomes, while utilization amplified benefits but was not determinative on its own. In other words, the results suggest that sports infrastructure availability is a necessary but not sufficient condition for positive youth outcomes. Utilization, gender equity, and supportive contextual factors are equally important in determining whether facilities deliver their intended benefits.

Gender Differences Were Notable:

Females demonstrated higher academic resilience and performance but poorer physical health, reflecting both resilience in constrained contexts and structural inequities in access. Substance use risk and GPA patterns further highlighted that sporadic or absent facility use correlated with vulnerability, though effect sizes were modest, suggesting that infrastructure alone is insufficient without supportive programming.

Our study showed a positive relationship between Substance use risk and GPA patterns which seemed counter intuitive and begged a closer look. We found that sporadic or absent facility use correlated with vulnerability, though effect sizes were modest, suggesting that infrastructure alone - is insufficient without supportive programming.

Sports can create conditions where drug use rises, as performance pressure, gym culture, and easy access to substances intersect (de Grace et al., 2017). In Pakistan, scandals about use of banned substances to enhance bodybuilding and weightlifting illustrate how athletes turn to drugs for competitive advantage. Research further shows that without awareness, regulation, and supportive environments, sports infrastructure can unintentionally reinforce substance misuse, as many athletes hold permissive attitudes toward doping despite its risks (Anjum et al., 2020).

International reviews also confirm this trend, noting that across countries, athletes' attitudes and behaviors toward doping are shaped by cultural norms, accessibility, and gaps in education,

underscoring the need for evidence-based anti-doping programs worldwide (Backhouse et al., 2006). Based on the research evidence discussed, it would be valuable to conduct a more targeted study to examine the relationship between sports participation, the availability of sports facilities, and drug use.

Hence, these findings highlight what the quantitative evidence reinforces and extends the insights from the systematic review and focus group discussions. The patterns observed across psychological distress, physical health, academic resilience, and performance confirm that infrastructure availability provides a foundational advantage, yet outcomes are shaped by broader contextual factors such as utilization, gender equity, and socioeconomic conditions. This integrated perspective allows us to distill the key themes that cut across all strands of evidence.

Across all strands, three themes converge:

- Availability matters most: The presence of facilities is consistently associated with better psychological, physical, and academic outcomes, more so than proximity alone.
- Utilization and quality moderate outcomes: Regular engagement enhances protective effects, but program quality, peer networks, and psychosocial supports are critical to sustaining impact.
- Gender and socioeconomic inequities persist: Female youth and low-income groups face compounded barriers, requiring culturally sensitive, affordable, and inclusive interventions.

CONCLUSION

This study highlights sports infrastructure and utilization as critical determinants of youth wellbeing, academic performance, and resilience in Sindh. Quantitative analyses confirmed that access to facilities is consistently linked to reduced psychological distress, improved physical health, and stronger academic outcomes. At the same time, the findings revealed an unintended risk: availability of sports facilities was associated with greater likelihood of substance use, with distance and utilization patterns shaping this relationship in complex ways. Protective factors such as age, gender, and household income reduced vulnerability, while population density heightened it.

Qualitative insights from youth, parents, coaches, and policymakers reinforced these results, pointing to systemic barriers including high costs, poor maintenance, safety concerns, gender restrictions, weak institutional support, and a broken pipeline of funding and governance. Parents often prioritized academics over sports, coaches emphasized the importance of family encouragement, and policymakers noted the erosion of a "play culture." The policy review further confirmed Pakistan's lag behind global standards of accessibility, safety, and inclusion.

Taken together, these findings underscore the dual nature of sports infrastructure: while it reliably promotes health, resilience, and academic achievement, it can also create environments where risks such as substance use may emerge. To maximize benefits and mitigate harms, sports facilities must be prioritized as essential investments, accompanied by reforms in governance, inclusive design, preventive programming, and sustained community engagement. Only through such integrated approaches can sports infrastructure serve as a protective force for youth development and wellbeing in Sindh.

RECOMMENDATIONS / POLICY IMPLICATIONS

The findings underscore the urgent need for coordinated policy action in Sindh and Pakistan more broadly, with reforms tailored to the country's governance structures, cultural norms, and socioeconomic realities. Specific recommendations include:

- Allocate ring-fenced budgets through Sindh's Finance and Sports Departments directly to Union Councils, ensuring funds reach underserved neighborhoods. Budgets should cover playground rehabilitation, lighting, washrooms, seating, and equipment, with standardized reporting and oversight mechanisms.
- Appoint trained facility managers under Municipal Corporations and the Sindh Sports Department to oversee maintenance, safety, scheduling, and community engagement. Priority should be given to high-use public grounds in Karachi, Hyderabad, and peri-urban districts where neglect is most acute.
- The Sindh Education Department should recruit trained PT teachers, protect weekly sports periods, and open school grounds after hours for community use. This is especially critical in low-income urban schools where private facilities are inaccessible.
- The Sindh Women Development Department, in collaboration with local governments, should establish female-friendly spaces with secure boundaries, lighting, female-only timings, and female coaches. Immediate improvements (washrooms, lighting, privacy walls) should be prioritized in Karachi East, Kemari, and Hyderabad, where gender barriers are most pronounced.
- Not for Profits working on mental health should partner with the Sindh Health and Sports Departments to embed counseling, mentorship, and psychosocial support into school and community sports programs. Pilot programs can be launched in high-stress urban areas such as Karachi and Hyderabad within 6–12 months.
- The Pakistan Sports Board and Sindh Sports Department should establish standardized training and certification programs emphasizing safety, inclusion, and youth development. Annual refreshers should be mandated, with incentives for coaches working in underserved districts.
- Local governments should revive neighborhood-level tournaments and traditional games (kabaddi, Gilli Danda, wrestling) alongside cricket and football. Seasonal events should be organized in Union Council grounds to foster cohesion and sustain engagement.
- Awareness workshops led by schools, NGOs, and local councils should highlight the physical, mental, and academic benefits of sports. Campaigns should specifically target parents in low-income urban areas, where academic pressures and safety concerns most restrict youth participation.

- Pair investments in sports infrastructure with structured preventive programming that integrates life skills training, peer mentorship, and substance use awareness. Facilities should not only provide physical spaces but also embed supervised, inclusive programming that fosters healthy peer networks, gender equity, and psychosocial supports. This dual approach ensures that while availability reduces distress and boosts resilience, it does not inadvertently create unsupervised environments where substance use risk may rise.
- The Planning & Development Department should map facility distribution, track utilization rates, and monitor outcomes (gender inclusion, participation levels, health indicators). Transparent reporting at district and provincial levels will ensure accountability and guide resource allocation.

In sum, Pakistan's youth sports agenda must move beyond infrastructure provision to embed inclusivity, affordability, and programmatic quality. Only through coordinated reforms across Sindh's Education, Sports, Women Development, Health, and Municipal Departments can sports become a transformative pathway for youth well-being and resilience.

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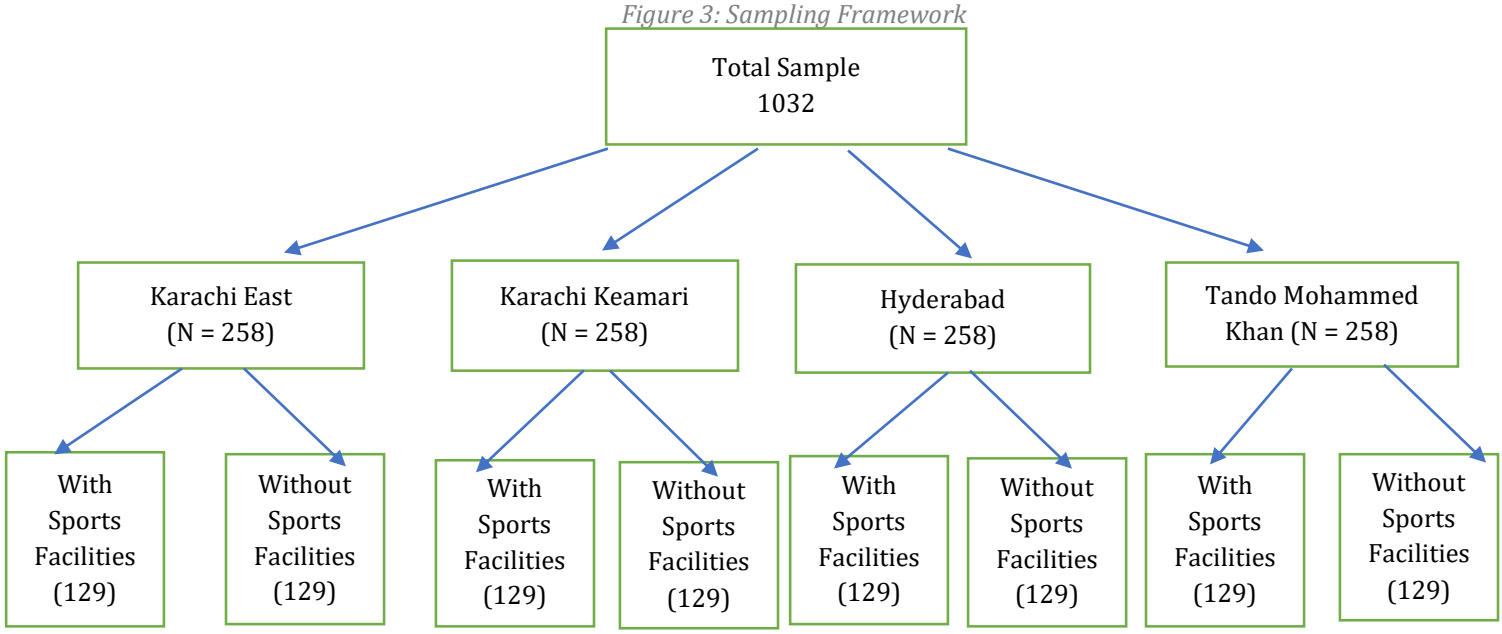
APPENDICES

Appendix A: Sampling

Figure 3: Sampling Framework



Source: Authors' compilations.

Table 8: List of UCs in Tando Mohammad Khan, Hyderabad

S#	Name of District	Taluka/ Town	Union Council
1	TM Khan	TM.Khan	TMK I
2	TM Khan	TM.Khan	TMK II
3	TM Khan	TM.Khan	TMK III
4	TM Khan	TM.Khan	Tando Saindad
5	TM Khan	TM.Khan	Sheikh Bhirkio
6	TM Khan	TM.Khan	Lakhat
7	B.S.Karim	B.S.Karim	B.S.Karim
8	TM Khan	B.S.Karim	Mulakatiar
9	TM Khan	B.S.Karim	Allah Yar Turk
10	TM Khan	B.S.Karim	Saeed Pur
11	TM Khan	B.S.Karim	S.K.Lund
12	TM Khan	B.S.Karim	Saeed Mattao
13	TM Khan	B.S.Karim	Janhan Soomro
14	TM Khan	T.G.Hyder	T.G.Hyder
15	TM Khan	T.G.Hyder	Dando
16	TM Khan	T.G.Hyder	Nazar Pur
17	TM Khan	T.G.Hyder	G.S.Bagrani

Source: Authors' compilations.

Appendix B: Qualitative Component: Topic Guide for Focus Group with Youth

Aim: To explore key themes related to access to sports facilities, barriers to participation, and perceived benefits.

Hello, and thank you for taking the time to participate today.

My name is [Interviewer's Name], and I am part of the research team conducting this study

on youth access to sports facilities and its impact on well-being and development.

We are interested in learning about your personal experiences and opinions. There are no right or wrong answers, we just want to understand your perspective.

- This discussion will take about [45–60 minutes].
- With your permission, we will audio-record the session so that we don't miss anything. Only the project research team will have access to these recordings, and your responses will remain confidential.
- Your participation is voluntary. You can skip any question or stop at any time. Do you have any questions before we begin?

If you agree, can you please confirm verbally that you consent to participate?

Ground Rules for Focus Groups

- Please allow one person to speak at a time.
- There are no right or wrong answers — we want to hear everyone's experiences.
- Please respect each other's opinions, even if they differ.
- Everything discussed here will remain confidential; we ask that you do not share others' comments outside the group.
- If you feel uncomfortable with a question, you may choose not to answer.

Opening Question:

- In your opinion, what are the Sports facilities usually available?
- Which are the sports activities people usually prefer?

1. Access to Sports Facilities in your community/ area?

1.1 what are the indoor or out-door support facilities (e.g., parks, grounds, clubs, gyms) are available in your community? /Can you describe the sports facilities or spaces available in your community?

Indoor Activities are physical, recreational, or leisure pursuits that take place within an enclosed or covered space, where external factors such as weather, temperature, or daylight do not significantly influence participation (e.g. badminton, basketball, Yoga, aerobics, gym workouts, dance, chess, board games)

Outdoor Activities are physical, recreational, or leisure pursuits carried out in open- air environments, where natural surroundings and weather conditions play an important role. Football, hockey, cricket, tennis, athletics, cycling

Prompts: Are they well-maintained and fully equipped? Who usually uses them (youth, female, disabled)? How easy or difficult is it to use these facilities? What factors make access easier (cost, timing, location), Trainer

2. Facilitators

1.2 In your opinion, what are the benefits of participating in sports or physical activity? **Prompts:** For young people (skills, discipline, teamwork), for girls, for people with disabilities.

2.2. How do sports affect physical health?

Prompts: Obesity, diabetes, cardiac health or any other

2.3. How do sports affect mental health?

Prompts: mood regulate, stress release, improving concentration,

2.4. How do sports affect social health?

Prompts: discipline, team work, relationship, opportunities to play at national level

2.5 What role do family, community or schools play in encouraging sports or physical activities?

2.6 Do you think sports facilities and or activities can bring people or communities together? If yes, How?

2. Barriers

1.3 What challenges do you face in accessing or using these facilities?

Prompts: What facilities are missing in your area that you would like to see? Distance? Safety? Costs? Timing? Gender restrictions? Lack of awareness about the availability of the facilities? Gender? Discouragement from families' community, or schools, Stigma/ Judgments.

2. Are there any changes required in infrastructure (e.g., quality, quantity, accessibility of facilities)?

   Prompts: More safe spaces? Better facilities? Affordable equipment? Gender based? Age appropriate?

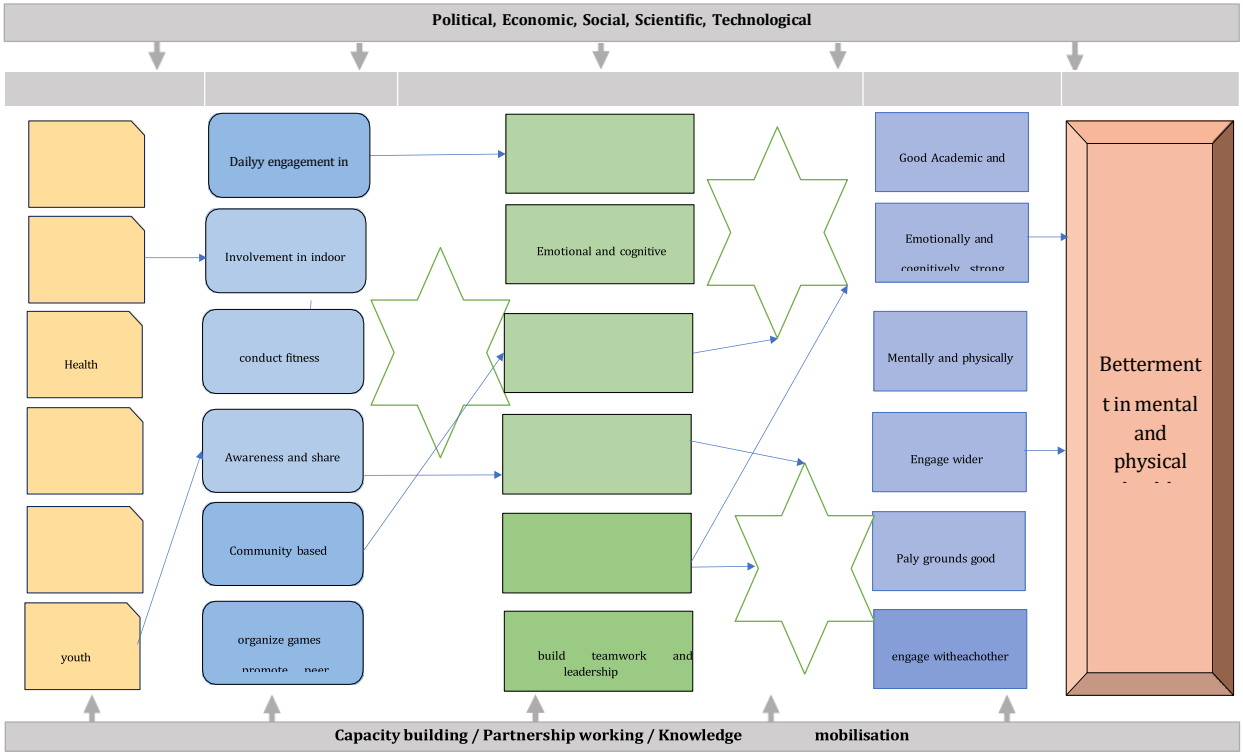
3. How should sports facilities be maintained and managed so that people actually use them?

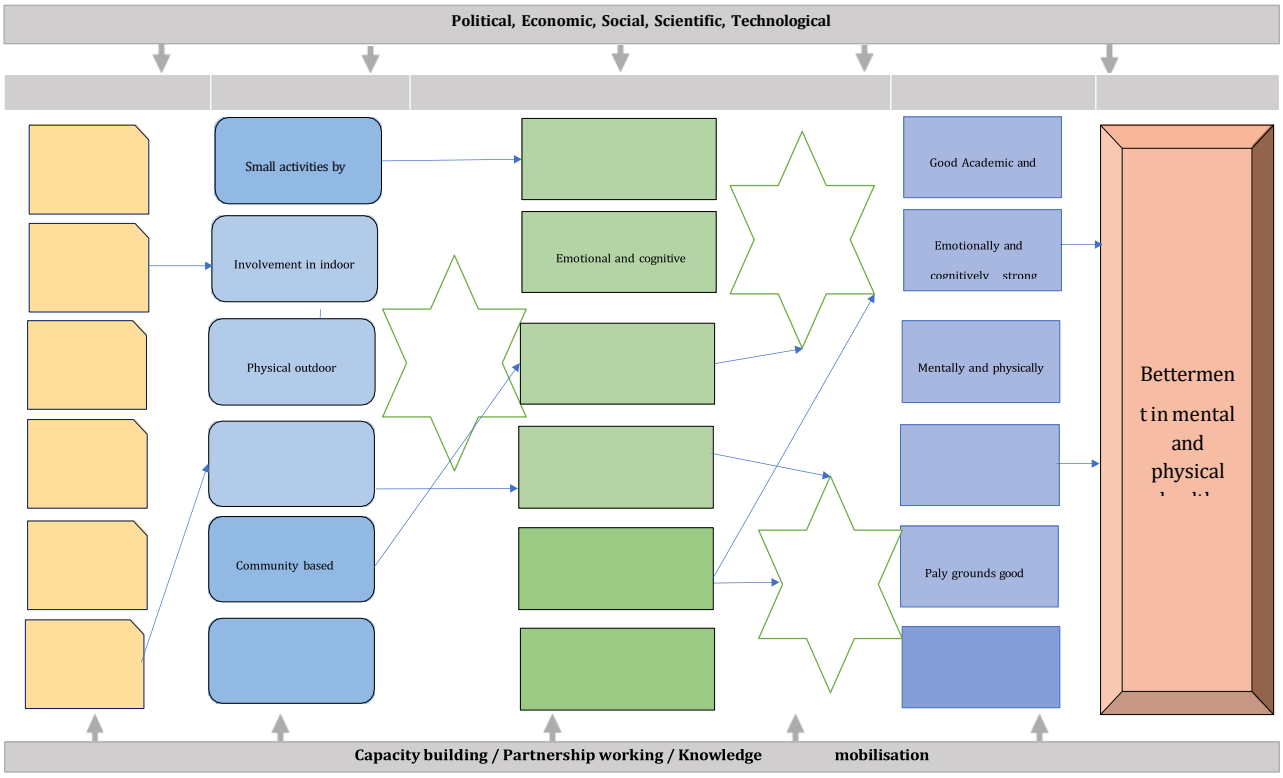
   Prompts: Government, local bodies, organizations, communities, self-pocket

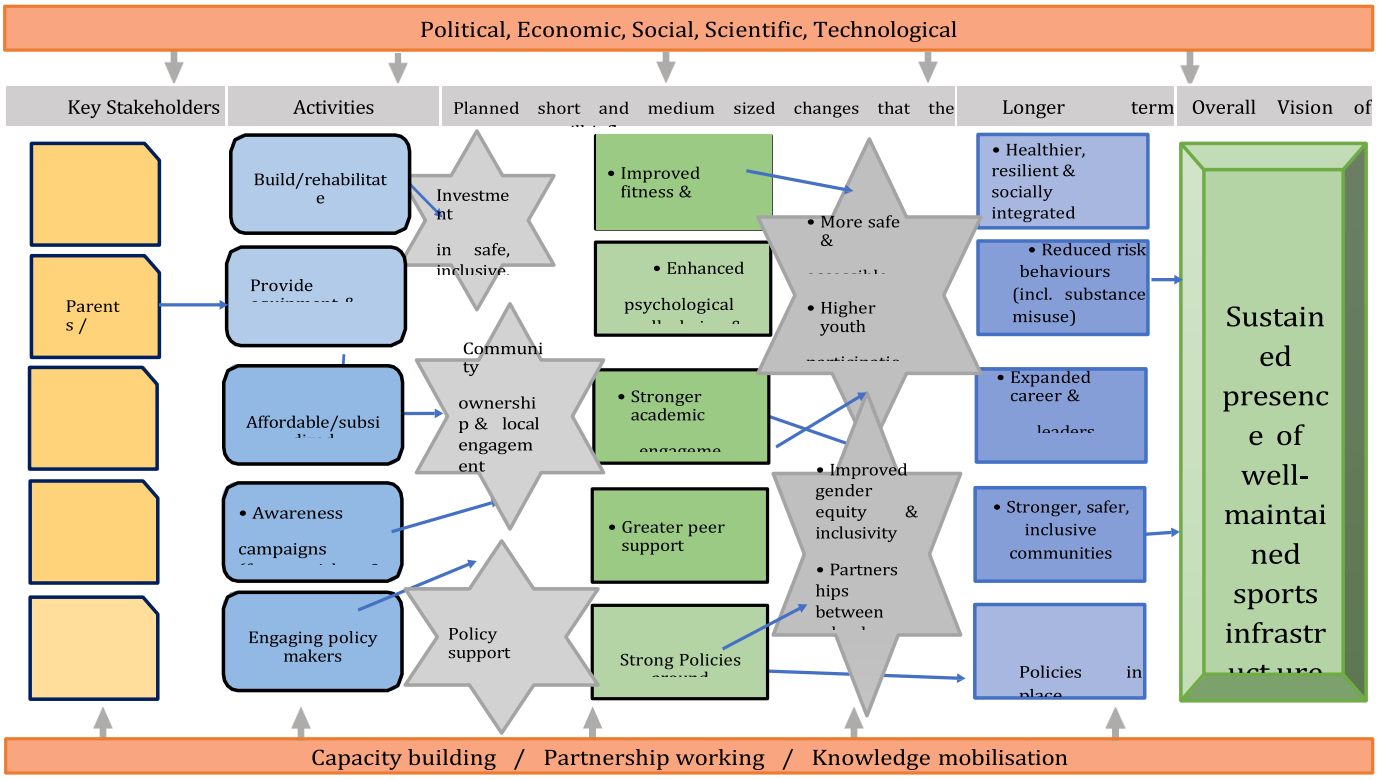
4. How could facilities be improved to meet the needs of different groups (youth, female, disabled)?
5. Is there anything else you would like to share about sports participation or facilities?
6. Any other suggestions

Brief the main key points from the discussion and Thank participants

Appendix C: Theory of Change

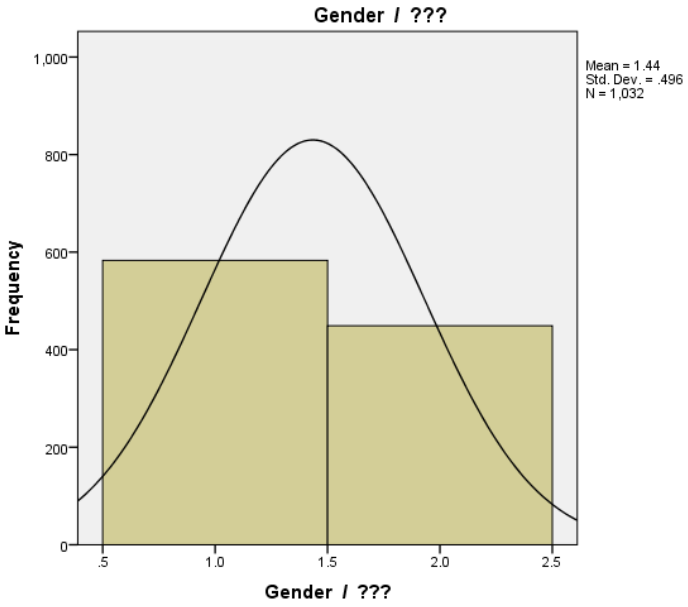



Political, Economic, Social, Scientific, Technological
Small activities by
Involvement in indoor
Physical outdoor
Community based
Emotional and cognitive
Good Academic and
Emotionally and
Mentally and physically
Paly grounds good
Bettermen
t in mental
and
physical
Capacity building / Partnership working / Knowledge
mobilisation

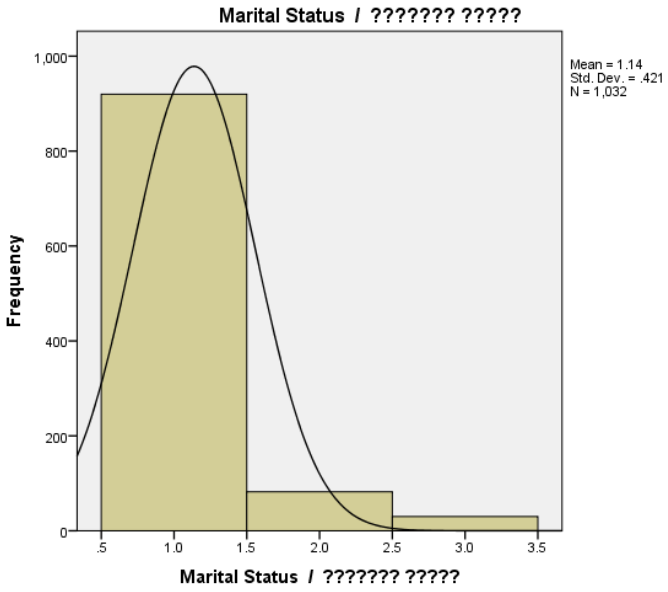

Political, Economic, Social, Scientific, Technological
Key Stakeholders
Activities
Planned short and medium sized changes that the
Longer term
Overall Vision of
Parents /
Build/rehabilitate
Provide
Affordable/subsi
• Awareness campaigns
Engaging policy makers
Investment in safe, inclusive
Community ownership & local engagement
Policy support
• Improved fitness &
• Enhanced psychological
• Stronger academic
• Greater peer support
Strong Policies
• More safe &
• Higher youth
• Improved gender equity & inclusivity
• Partnerships between
• Healthier, resilient & socially integrated
• Reduced risk behaviours (incl. substance misuse)
• Expanded career &
• Stronger, safer, inclusive communities
Policies in
Sustained presence of well-maintained sports infrastructure
Capacity building / Partnership working / Knowledge mobilisation

Appendix D: Output of Statistical Analysis

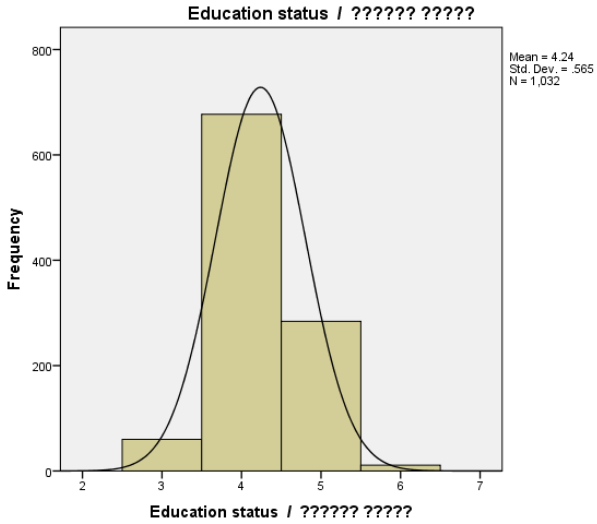
1 = Male
2 = Female



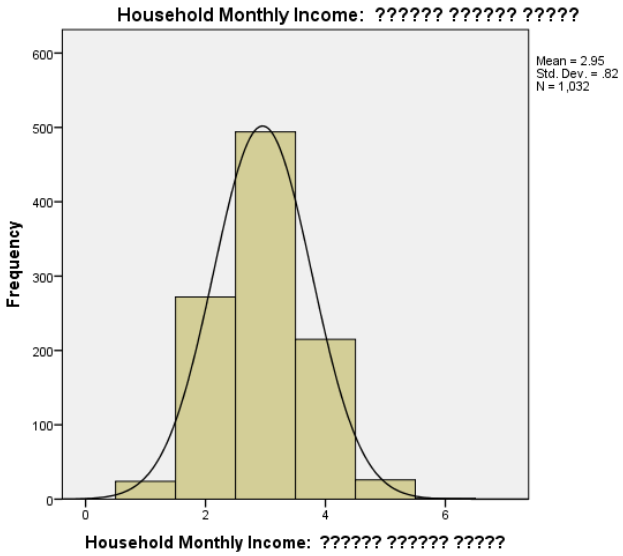
1 = Single
2 = Married
3 = Engaged



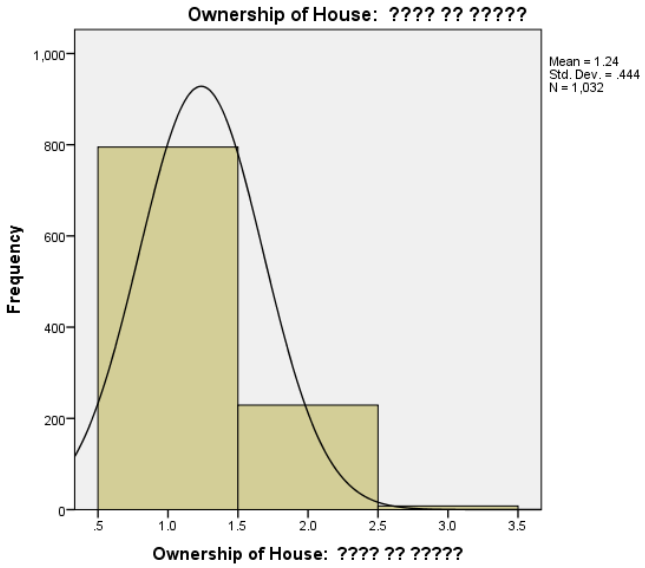
1 = No schooling
2 = Primary
3 = Secondary
4 = Higher Secondary
5 = Currently attending Graduate (BS or equivalent) program
6 = Currently attending a Postgraduate or professional degree (MBBS, MD, MS, or M Phil)



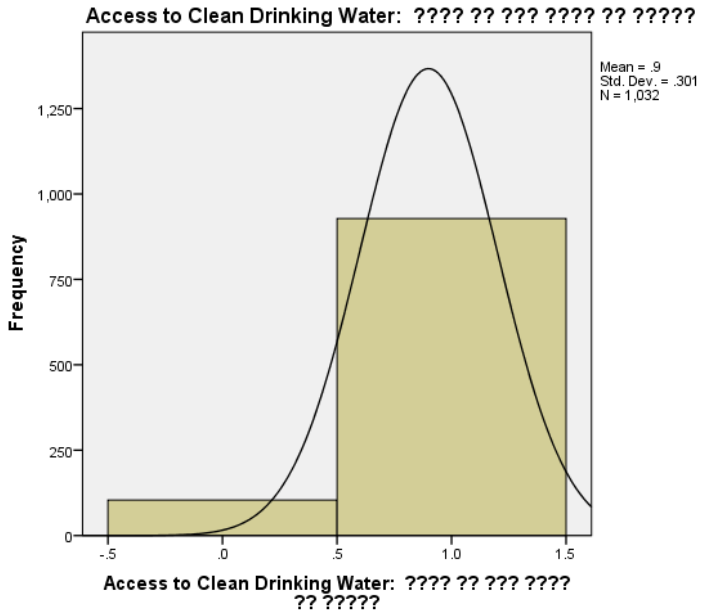
1 = < PKR 20,000
2 = 20,000-40,000
3 = 40,001-80,000
4 = 80,001-150,000
5 = 150,001 - 300,000
6 = > 300,000



1 = Own
2 = Rent
3 = Other



0 = No
1 = Yes



0 = No
1 = Yes

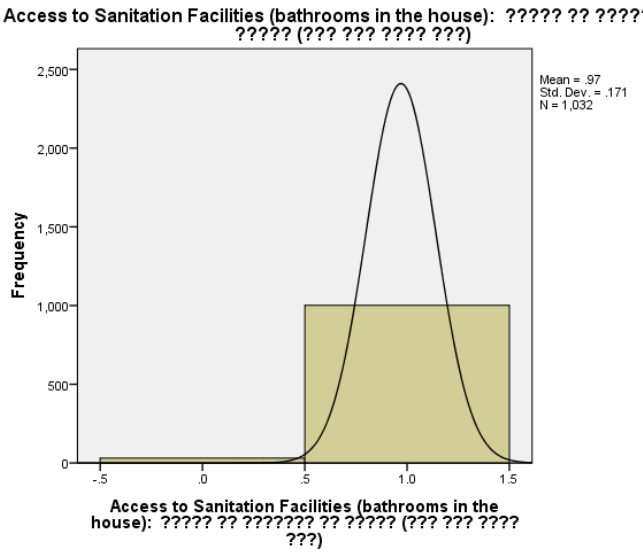


Table 9: Academic Performance of Youth by Availability of Sports Facilities (With vs. Without Sports)

	Academic Performance					Total
	A+ (GPA 4, above 80%)	A (GPA 4, above 70 - 79%)	B (GPA 3.5, 60 - 69)	C (GPA 3, 50 - 59)	D (GPA 2.5, 40 - 49%)	
TMK - WOS	31 (8.9%)	10 (10.9%)	65 (15%)	8 (10.4%)	15 (18.5%)	129 (12.5%)
TMK - WS	41 (11.7%)	14 (15.2%)	60 (13.9%)	9 (11.7%)	5 (6.2%)	129 (12.5%)
HYD - WOS	60 (17.1%)	11 (12%)	56 (13%)	2 (2.6%)	0 (0%)	129 (12.5%)
HYD - WS	84 (24%)	1 (1.1%)	41 (9.5%)	0 (0%)	3 (3.7%)	129 (12.5%)
KMR - WOS	29 (8.3%)	8 (8.7%)	57 (13.2%)	18 (23.4%)	17 (21%)	129 (12.5%)
KMR - WS	40 (11.4%)	21 (22.8%)	41 (9.5%)	17 (22.1%)	10 (12.3%)	129 (12.5%)
EST - WOS	28 (8%)	12 (13%)	57 (13.2%)	12 (15.6%)	20 (24.7%)	129 (12.5%)
EST - WS	37 (10.6%)	15 (16.3%)	55 (12.7%)	11 (14.3%)	11 (13.6%)	129 (12.5%)
Total	350 (100%)	92 (100%)	432 (100%)	77 (100%)	81 (100%)	1032 (100%)

Source: Authors' computations.

Table 10: Cross-tabulation of Physical Health Status by Availability of Sports Facilities

	Physical Health Status			
	No or minimal difficulty	**Mild to moderate difficulty**	**Severe functional difficulty**	**Total**
TMK - WOS	5 (2.7%))	109 (16.2%)	15 (8.6%)	129 (12.5%)
TMK - WS	34 (18.6%)	69 (10.2%)	26 (14.9%)	129 (12.5%)
HYD - WOS	27 (14.8%)	98 (14.5%)	4 (2.3%)	129 (12.5%)
HYD - WS	31 (16.9%)	98 (14.5%)	0 (0%)	129 (12.5%)
KMR - WOS	11 (6%)	66 (9.8%)	52 (29.7%)	129 (12.5%)

KMR - WS	34 (18.6%)	78 (11.6%)	17 (9.7%)	129 (12.5%)
EST - WOS	20 (10.9%)	66 (9.8%)	43 (24.6%)	129 (12.5%)
EST - WS	21 (11.5%)	90 (13.4%)	18 (10.3%)	129 (12.5%)
Total	183 (100%)	674 (100%)	175 (100%)	1032 (100%)

Source: Authors' computations.

Table 11: Patterns of Psychological Distress by Availability of Sports Facilities across the Study Districts

	Psychological Distress				
	(Likely to be Well)	(Likely to Have a Mild Disorder)	(Likely to Have a Moderate Disorder)	(Likely to Have a Severe Disorder)	Total
TMK - WOS	78 (9.1%)	39 (31.5%)	6 (14.3%)	6 (60%)	129 (12.5%)
TMK - WS	113 (13.2%)	15 (12.1%)	1 (2.4%)	0 (0%)	129 (12.5%)
HYD - WOS	122 (14.3%)	7 (5.6%)	0 (0%)	0 (0%)	129 (12.5%)
HYD - WS	128 (15%)	1 (0.8%)	0 (0%)	0 (0%)	129 (12.5%)
KMR - WOS	96 (11.2%)	17 (13.7%)	15 (35.7%)	1 (10%)	129 (12.5%)
KMR - WS	106 (12.4%)	17 (13.7%)	5 (11.9%)	1 (10%)	129 (12.5%)
EST - WOS	91 (10.6%)	26 (21%)	11 (26.2%)	1 (10%)	129 (12.5%)
EST - WS	122 (14.3%)	2 (1.6%)	4 (9.5%)	1 (10%)	129 (12.5%)
Total	856 (100%)	124 (100%)	42 (100%)	10 (100%)	1032 (100%)

Source: Authors' computations.

Table 12: Risk for Substance Misuse by Availability of Sports Facilities across Districts

	Risk Substance Misuse					Total
	0 (No Problem Reported)	1-2 (Low Level)	3-5 (Moderate Level)	6-8 (Substantial Level)	9-10 (Severe Level)	
TMK - WOS	16 (2.7%)	37 (15.4%)	59 (36.9%)	16 (57.1%)	1 (50%)	129 (12.5%)
TMK - WS	62 (10.3%)	51 (21.2%)	15 (9.4%)	1 (3.6%)	0 (0%)	129 (12.5%)
HYD - WOS	26 (4.3%)	28 (11.6%)	65 (40.6%)	9 (32.1%)	1 (50%)	129 (12.5%)
HYD - WS	0 (0%)	106 (44%)	21 (13.1%)	2 (7.1%)	0 (0%)	129 (12.5%)
KMR - WOS	128 (21.3%)	1 (0.4%)	0 (0%)	0 (0%)	0 (0%)	129 (12.5%)
KMR - WS	114 (19%)	15 (6.2%)	0 (0%)	0 (0%)	0 (0%)	129 (12.5%)
EST - WOS	127 (21.1%)	2 (0.8%)	0 (0%)	0 (0%)	0 (0%)	129 (12.5%)
EST - WS	128 (21.3%)	1 (0.4%)	0 (0%)	0 (0%)	0 (0%)	129 (12.5%)
Total	601 (100%)	241 (100%)	160 (100%)	28 (100%)	2 (100%)	1032 (100%)

Source: Authors' computations.

Table 13: Cross-tabulation of Self-Reported Sports Facility Availability with Union Council Classification (with Sports vs. without Sports)

Availability of sports facilities by UCs			Sports Availability		Total
			No	Yes	
Sport Facility available or not available	TMK - WOS	Count	127	2	129
		% within Sports Availability	26.4%	.4%	12.5%

	TMK - WS	Count	0	129	129
		% within Sports Availability	0.0%	23.4%	12.5%
	HYD - WOS	Count	129	0	129
		% within Sports Availability	26.8%	0.0%	12.5%
	HYD - WS	Count	2	127	129
		% within Sports Availability	.4%	23.0%	12.5%
	KMR - WOS	Count	122	7	129
		% within Sports Availability	25.4%	1.3%	12.5%
	KMR - WS	Count	5	124	129
		% within Sports Availability	1.0%	22.5%	12.5%
	EST - WOS	Count	94	35	129
		% within Sports Availability	19.5%	6.4%	12.5%
	EST - WS	Count	2	127	129
		% within Sports Availability	.4%	23.0%	12.5%
Total		Count	481	551	1032
		% within Sports Availability	100.0%	100.0%	100.0%

Source: Authors' computations.

Table 14: Tests of Normality-I [b,c,e]

	Sport Access 2	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
GHA: Total Score	< 1 km	.260	2	.			
	1 to 3 km	.309	8	.023	.877	8	.178
	4 to 8 km	.124	217	.000	.957	217	.000
	> 8 km	.150	805	.000	.914	805	.000
DAST-Total Score	1 to 3 km	.391	8	.001	.641	8	.000
	4 to 8 km	.342	217	.000	.715	217	.000
	> 8 km	.310	805	.000	.662	805	.000
KPDS: Total Score	1 to 3 km	.220	8	.200*	.868	8	.144
	4 to 8 km	.119	217	.000	.921	217	.000
	> 8 km	.174	805	.000	.861	805	.000
APQ_Status_New	1 to 3 km	.226	8	.200*	.899	8	.283
	4 to 8 km	.254	217	.000	.839	217	.000
	> 8 km	.234	805	.000	.841	805	.000
ap_rs_Total	< 1 km	.260	2	.			
	1 to 3 km	.240	8	.194	.921	8	.438
	4 to 8 km	.097	217	.000	.967	217	.000
	> 8 km	.068	805	.000	.979	805	.000

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

b. DAST- Total Score is constant when Sport Access 2 = < 1 km. It has been omitted.

c. KPDS: Total Score is constant when Sport Access 2 = < 1 km. It has been omitted.

e. APQ_Status_New is constant when Sport Access 2 = < 1 km. It has been omitted.

Source: Authors' computations.

Table 15: Tests of Normality-II

	Sport Utilization	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
GHA: Total Score	Never	.178	306	.000	.928	306	.000
	Rarely	.133	508	.000	.940	508	.000
	Monthly	.121	126	.000	.946	126	.000
	Weekly	.157	81	.000	.914	81	.000
	Daily	.167	11	.200*	.912	11	.257
DAST - Total Score	Never	.303	306	.000	.706	306	.000
	Rarely	.297	508	.000	.732	508	.000
	Monthly	.487	126	.000	.268	126	.000
	Weekly	.445	81	.000	.458	81	.000
	Daily	.301	11	.006	.747	11	.002
KPDS: Total Score	Never	.248	306	.000	.836	306	.000
	Rarely	.148	508	.000	.881	508	.000
	Monthly	.141	126	.000	.892	126	.000
	Weekly	.145	81	.000	.895	81	.000
	Daily	.211	11	.184	.909	11	.240
APQ_Status_New	Never	.248	306	.000	.817	306	.000
	Rarely	.247	508	.000	.831	508	.000
	Monthly	.226	126	.000	.887	126	.000
	Weekly	.217	81	.000	.856	81	.000
	Daily	.211	11	.185	.842	11	.034
ap_rs_Total	Never	.078	306	.000	.974	306	.000
	Rarely	.088	508	.000	.968	508	.000
	Monthly	.137	126	.000	.947	126	.000
	Weekly	.088	81	.191	.970	81	.057
	Daily	.167	11	.200*	.931	11	.417

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

Source: Authors' computations.

Table 16: : Tests of Normality-III

	Sports Availibility	Kolmogorov-Smirnova			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
GHA: Total Score	No	.144	481	.000	.947	481	.000
	Yes	.195	551	.000	.900	551	.000
DAST- Total Score	No	.311	481	.000	.746	481	.000
	Yes	.332	551	.000	.604	551	.000

KPDS: Total Score	No	.107	481	.000	.945	481	.000
	Yes	.222	551	.000	.780	551	.000
APQ_Status_New	No	.247	481	.000	.849	481	.000
	Yes	.241	551	.000	.833	551	.000
ap_rs_Total	No	.080	481	.000	.976	481	.000
	Yes	.067	551	.000	.986	551	.000

a. Lilliefors Significance Correction

Source: Authors' computations.

Table 17: Other Tables

Population_Density * Substence_Misuse_At_Risk Crosstabulation

Count

		Substence_Misuse_At_Risk		Total
		No Risk	At Risk	
Population_Density	Low Density	320	196	516
	High Density	281	235	516
Total		601	431	1032

Source: Authors' computations.

Population_Density * Risk_Substence_Misuse Crosstabulation

Count

		Risk_Substence_Misuse					Total
		0 (No Problem Reported)	1-2 (Low Level)	3-5 (Moderate Level)	6-8 (Substantial Level)	9-10 (Severe Level)	
Population_Density	Low Density	320	104	74	17	1	516
	High Density	281	137	86	11	1	516
Total		601	241	160	28	2	1032

Source: Authors' computations.

Population_Density * Physical_Health_Status Crosstabulation

Count

		Physical_Health_Status			Total
		7-9 (No or minimal difficulty)	10-14 (Mild to moderate difficulty)	>15 (Severe functional difficulty)	
Population_Density	Low Density	84	322	110	516
	High Density	99	352	65	516
Total		183	674	175	1,032

Source: Authors' computations.

Population_Density * Psychological_Distress Crosstabulation

Count

		Psychological_Distress				Total
		10-19 (Likely to be Well)	20-24 (Likely to Have a Mild Disorder)	25-29 (Likely to Have a Moderate Disorder)	30-50 (Likely to Have a Severe Disorder)	
Population_Density	Low Density	393	88	27	8	516
	High Density	463	36	15	2	516
Total		856	124	42	10	1,032

Source: Authors' computations.

Population_Density * Academic Performance Crosstabulation

Count

		Academic Performance					Total
		A+ (GPA 4, above 80%)	A (GPA 4, above 70 - 79%)	B (GPA 3.5, 60 - 69)	C (GPA 3, 50 - 59)	D (GPA 2.5, 40 - 49%)	
Population_Density	Low Density	141	53	223	52	47	516
	High Density	209	39	209	25	34	516
Total		350	92	432	77	81	1032

Source: Authors' computations.

Population_Density * Age (years) Crosstabulation

Count

		Age (years)							Total
		18	19	20	21	22	23	24	
Population_Density	Low Density	113	74	51	51	59	65	103	516
	High Density	100	73	51	57	69	62	104	516
Total		213	147	102	108	128	127	207	1032

Source: Authors' computations.

Population_Density * Gender Crosstabulation				
Count				
		Gender		Total
		Male	Female	
Population_Density	Low Density	453	63	516
	High Density	461	55	516
Total		914	118	1,032

Source: Authors' computations.

Population_Density * Marital Status Crosstabulation					
Count					
		Marital Status			Total
		Single	Married	Engaged	
Population_Density	Low Density	451	56	9	516
	High Density	469	26	21	516
Total		920	82	30	1032

Source: Authors' computations.

Population_Density * Education status Crosstabulation						
Count						
		Education status				Total
		Secondary	Higher Secondary	Currently attending Graduate (BS or equivalent) program	Currently attending a Postgraduate or professional degree (MBBS, MD, MS, or M Phil)	
Population_Density	Low Density	25	337	150	4	516
	High Density	35	340	134	7	516
Total		60	677	284	11	1032

Source: Authors' computations.