

Environment as a Vulnerability Factor for Doping: A Qualitative Examination of Indian Track and Field Athletes' Hurdles to Compete Clean.

Abstract

India has one of the highest rates of doping, without accompanying international sporting success. Research on doping and developing countries has been sparse, and cases, such as India, warrant exploration. One approach to examining such a phenomenon is to move beyond interpersonal explanations and explore the athletes' environment. Although environmental influence on athletes' doping has been underscored, previous research in this regard has been limited. Hence this study explored the factors that contribute to Indian athletes' vulnerability to doping by accounting for situational and systematic factors in the environment.

Using a qualitative methodology, semi-structured interviews were conducted with twenty-one elite Indian track and field athletes of which seven admitted using prohibited substances.

Athletes discussed factors that influence their vulnerability to doping. Through data analysis, the following four themes were developed: (a) Coaching Structure and Deference, (b) Obligations, (c) Limited Oversight and Enforcement, and (d) Doping Reinforcement. Together, these themes highlight that the distinct cultural nuances within Indian society, pressure from, and interactions among influential others, the lack of coach development, added incentives, coupled with limited trust in anti-doping organizations engender a system where doping is openly witnessed.

Moreover, the results demonstrate the interactions among environmental levels, illustrative of a complex system where doping is an emergent product. This study provides insights into the challenges of managing doping in developing country and highlights the need for research in the Global South and for structural interventions to effectively prevent doping rather than just focus on the individual athlete level.

Keywords: anti-doping, coaching, education, elite athletes, qualitative interview, sport policy

Word Count: 9,567

Environment as a Vulnerability Factor for Doping: A Qualitative Examination of Indian Track and Field Athletes' Hurdles to Compete Clean.

India is widely regarded as a nation with great sporting potential. While investment in sport in India has significantly increased in recent years (Clarke & Mondal, 2022), their performance internationally has remained relatively poor (Khasnis et al., 2021a). Despite the lack of success, surprisingly India has the second-highest number of anti-doping rule violations (ADRV) globally (WADA, 2023). Doping, as defined by the World Anti-Doping Agency (WADA, 2021), involves the violation of one or more of the eleven anti-doping rules listed in the World Anti-Doping Code (WADC). Many of these rules pertain to athletes (e.g., using prohibited substances), though athlete support personnel (e.g., coaches) are also subject to the WADC. Given the prevalence of ADRVs in India and the paradoxical poor performances internationally, it is important to understand what makes Indian athletes vulnerable to dope. That necessitates considering the context in which Indian sport takes place.

India, home to 1.4 billion people, is the most populous country in the world (Pew Research Center, 2023). There are 28 states and eight union territories (Know India, 2023), and these regions are religiously, culturally, and ethnically diverse. Hinduism is the dominant religion practiced, with Islam steadily growing (Pew Research Center, 2021). Hundreds of languages are spoken in India, with 22 identified as official languages in the country's constitution (Britannica, 2023). Poverty, while historically high, has been declining, though 16.4% of Indians are classified as poor, many of whom live in rural locations (United Nations Development Programme, 2022).

The fragmented nature of sport organizing bodies in India, political inference, poor governance, and corruption within sport organizations have hindered the implementation of

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India's national sport policy (Khasnis et al., 2021a; McLeod et al., 2020, 2021; Polson & Whiteside, 2016). The Ministry of Youth Affairs and Sports (MYAS) is the centralized government agency that oversees sport policy (Clarke & Mondal, 2022). The Sports Authority of India (SAI) was established under India's inaugural National Sports Policy to enhance sports participation and excellence. The SAI collaborates with the Indian Olympic Association, National Sport Federations, and Regional Sports Authorities to develop elite sport. These efforts include coach development and education. Also housed under the MYAS is India's independent anti-doping organization, the National Anti-Doping Agency (NADA), which is responsible for planning, implementing, and monitoring aspects of doping control, including education programs (nadaindia.org).

Many Indian athletes come from rural areas (Dasgupta, 2018) with low literacy making athletes dependent upon their coaches for anti-doping information (Dasgupta, 2019). Yet, many coaches lack formal training and familiarity with the WADC, which may contribute to inadvertent ADRV among Indian athletes (Prabhath, 2022). Even doctors within the SAI have reportedly prescribed athletes substances that violate the WADC (Mulchandani, 2018). Most Indian athletes have not received anti-doping education (Krishnan et al., 2022), with programs typically restricted to elite athletes attending national training camps (Prabhath, 2022). Some elite athletes train abroad where better resources and anti-doping information are available (Bindra, 2017). However, most athletes train under a sport system that lacks infrastructure, and access to quality coaching and sport science support (Polson & Whiteside, 2016). Furthermore, unregulated pharmaceutical markets increase access to drugs (Prabhath, 2022), medicines, and contaminated substances that may trigger ADRVs (Star, 2023). Finally, incentives to dope are

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speculated to extend beyond sporting ambitions, as athletes can obtain well-paid and permanent government employment based on their sport performance (Deep, 2013).

The NADA efforts to combat doping include making education materials available in 14 local languages. Educational initiatives on anti-doping have expanded to colleges and universities, though primarily in English or Hindi (Mulchandani, 2018). Still, state and district-level athletes may not receive anti-doping education, increasing their risk of intentional and inadvertent doping (Prabhath, 2022). While the NADA efforts are encouraging, it has limited resources, which makes fulfilling its mandate challenging. For instance, doping control officers are often hired on short-term contracts (Prabhath, 2022), leading to issues with retention, turnover, and the subsequent need to continually recruit and train anti-doping staff. Moreover, India's vast size, population, and diversity create obstacles to effectively managing doping in sport. Compared to other countries, India conducts fewer doping tests and the NADA has been inefficient at testing at important qualifying competitions, leading to delayed results (Star, 2023). These limitations enable athletes to evade anti-doping detection efforts more easily (Kulkurani, 2022), and may (perhaps rightly) perceive the risks of being caught doping are low.

Underrepresentation of the Global South in Anti-Doping Research

Research on doping in sport has largely focused on developed countries in the Global North. Few studies of doping occur in developing countries (Juma et al., 2022), yet athletes from such countries have different experiences with anti-doping policies (Efverström et al., 2016). This lack of diversity in research, often centered around Western, Educated, Industrialized, Rich, and Democratic (WEIRD) societies (Henrich et al., 2010), can lead to a gap in understanding the unique challenges athletes from non-Western countries face. To illustrate, the availability of and access to anti-doping educational materials in local languages may be limited, while funding for

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sport may be a relegated concern as governments in developing countries grapple with more pressing policy concerns, such as poverty alleviation, public education provision, and trade promotion (Read et al., 2024; Ruwuya et al., 2022). Given the global nature of doping in sport and the universal application of the WADC (WADA, 2021), accurate representation of athletes from developing nations is crucial in policy development and implementation.

For instance, Western elite athletes perceive that athletes from developing countries have different values and attitudes towards fairness and rule adherence, leading to an assumption that doping is not considered a moral issue (Veltmaat et al., 2023). Moreover, they assume that the primary motive for sport participation among athletes from developing nations is to escape poverty and provide for their families and even their village. These views, though arguably antiquated and more reminiscent of a bygone age, persist. Furthermore, the language used by some Western athletes to describe their non-Western counterparts reflects historical colonial perspectives, perpetuating notions of Western superiority and the denigration of non-Western cultures (Mbembe, 2001). Left unchallenged, such views are dangerous as these perpetuate racial myths and undermine athletes from the Global South. The current study contributes significantly to the anti-doping discourse by offering a more nuanced account of the experiences of athletes from a developing country (i.e., India), facilitating more informed discourse and recommendations.

Complexity of Doping

Doping in sport is widely acknowledged as a “wicked” problem (Petróczi & Boardley, 2022), meaning it is intricate and multifaceted, creating significant challenges for effective resolution. Wicked problems are also situated and dynamic, and as such, will remain unsolved, particularly if past strategies are implemented. Consequently, wicked problems necessitate

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alternative approaches, focusing on managing its impact instead of trying to eradicate doping, that embrace the inherent complexity of the issue. Although research has sought to understand why athletes may engage or refrain from doping (e.g., Cox et al., 2021; Christiansen, 2010; Engelberg et al., 2015; Kegelaers et al., 2018; Kirby et al., 2011; Overbye et al., 2013; Pappa & Kennedy, 2013; Shelley et al., 2021; Woolf & Mazanov, 2017), scholars have recommended that greater emphasis be placed on examining environment influences on doping (Boardley et al., 2021). The 'Athlete Vulnerability' concept introduced by Petróczi & Aidman (2008) underscores doping as a product of a complex interaction of environmental factors that hypothetically affect athletes' vulnerability to dope. These include situational factors, such as interaction with one's peers and significant others, and systematic factors, which include a sport's culture, the structure of authority, and the perceived legitimacy and fairness of anti-doping organizations.

Interactions between various factors may increase or decrease an athlete's propensity to dope. By understanding these vulnerability and protective factors, recommendations can be prescribed to build athletes' resiliency against the impact of doping in their environment (Blank & Petróczi, 2023). Similarly, Naughton et al. (2024) argue that to understand doping, the broader system in which doping occurs needs to be studied. They advocate for a system-based approach to anti-doping that considers all actors and elements within the system, rather than just trying to change individual athlete behaviour. Hence, in studying the 'dopogenic environment' (Backhouse et al., 2018), the complexity of doping is considered.

A difficulty researchers face is recruiting athletes willing to discuss their doping practices. Doping is clandestine in nature and is surrounded by stigma. Hence previous research that has explored the athletes' environment has been constrained because they did not involve self-identified doping participants, making findings speculative. For example, Ohl and

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colleagues (2015), explored the work environment of professional cycling teams. While they showed that the organizational structure of teams influences discourse and attitudes toward doping a direct link to doping was not possible. Likewise, Aibel and Ohl (2014) propose that athletes' training load and organizational differences among teams may increase cyclists' propensity to dope. Hence, these (and other studies) while informative, are limited by athletes' willingness to reveal their doping behaviour.

Several studies with Western athletes have successfully recruited doping users, and while informative, have limitations. Kirby et al. (2011) described the internal (e.g., personality) and external (e.g. availability) factors that influenced doping among five, older inactive athletes. Pappa and Kennedy (2013) provided limited information on their participants but did document that athletes considered doping to be normalized within their sport, with some coaches being supportive and at least one complicit in doping practices. Meanwhile, Engelberg et al. (2015) and Smith et al. (2010) had to rely on a mixture of recreational and competitive athletes to discuss doping. In the former case, participants provided brief descriptions of the short- and long-term effects of doping, along with their reasons for and deterrents to doping. Finally, Smith et al. (2010) explicitly adopted an environmental approach to study general substance use that included licit (e.g., alcohol) and illicit (e.g., recreational, and performance-enhancing drugs) substances. They used McLeroy et al.'s (1988) ecological model for health promotion to understand the contextual influences on athletes' drug use. Commercial pressures, performance incentives, influential others, and the culture of sport were identified as environmental factors that could explain and contribute to athletes' attitudes toward and use of drugs. While their use of McLeroy's theory informed their results, it was limited in its application. Each level of the model was not utilized, and similar to other doping studies did not explore the interconnections

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and dynamic nature among different environmental levels, which Naughton et al. (2024) suggest is needed for informed discussion on doping prevention. The current research builds on this by thoroughly applying McLeroy's model to the context of athletes from developing countries, aiming to understand the complexities that heighten their doping vulnerability (Petróczi & Aidman, 2008).

Ecological model for health promotion

McLeroy et al.'s (1988) ecological model for health promotion provides a lens to examine the influence of the athlete's environment. McLeroy's theory has been used to study the environmental influence on recreational drugs, physical activity, and other health behaviours (Sallis et al, 2015), though as mentioned, only one study has focused on substance use broadly among athletes (Smith et al., 2010). This model was adapted from Bronfenbrenner et al. (1977) ecological model of human development, which acknowledges the role of the different levels of the environment (micro through to macro) in influencing individual behaviour that is inherently complex, and vice versa, circumventing simple resolution. The advantage of adapting McLeroy's model to doping is that we can discern the influence of different factors (e.g., coaches) at different levels (e.g., organizational) in the athletes' environment. Moreover, focusing only on the athlete risks blaming them without considering broader circumstances. This can lead to recommendations that, while intuitive, may not account for the complexities of the individual's environment. For example, education may be offered to address athletes' doping behaviour, yet educational interventions are often poorly designed and have questionable efficacy in increasing athletes' knowledge or preventing doping (Woolf, 2020). Taking an expansive lens, by adopting McLeroy's socio-ecological model, provides a means to identify multiple issues that may

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influence behaviour, that may interact, and hence prescribe intervention strategies that target different sources of environmental influence.

McLeroy's model identifies five levels of analysis – intrapersonal, interpersonal processes and groups, organizational, community, and public policy – each providing a lens on doping influences. Intrapersonal factors focus on the individual and include their knowledge, values, attitudes, and beliefs. For instance, personality factors, such as perfectionism, and external motivation are related to positive attitudes toward doping (Zucchetti et al., 2015). Interpersonal processes and groups involve athletes' networks and close others, such as their coaches, who are prominent and influential at all stages of athletes' careers (WADA, 2022). Close others, such as one's peers (Pappa & Kennedy, 2013; Woolf et al., 2014), and contact with others who dope (Zucchetti et al., 2015) influence athletes' assessment of doping. The organizational level includes entities such as the sports club or team where athletes have contact with the members. Here, rules, whether formal or informal may influence doping behaviour by tacitly approving doping (Cox et al., 2021). Community-level factors involve influences from sport governing bodies and sports competitions and the relationship these have with other organizations and institutions. Anti-doping rules and the requirements of NADOs (e.g., whereabouts rules) may serve to affect athletes' doping behaviour (Valkenburg et al., 2014). Finally, the public policy level includes the factors emanating from the country or state.

While McLeroy's model offers valuable insights into understanding the environment, its effectiveness in driving change, particularly individual behaviours, hinges on the willingness of those within the system to enact meaningful transformations and resolve conflicting values surrounding proposed changes. Nonetheless, considering the intricate nature of doping and its classification as a wicked problem, McLeroy's model provides a suitable approach to studying

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doping. Hence, the purpose of the study was to understand the situational and systemic (Petróczi & Aidman, 2008) factors that may make Indian athletes vulnerable to doping in the environment using McLeroy's (1988) ecological model for health promotion. Considering that there have been calls for more empirical research that identifies environmental triggers (e.g., Backhouse et al., 2018; Whitaker et al., 2017), along with the limited literature on Indian athletes and doping, such an approach is warranted.

Methods

A qualitative methodology was employed to explore how socio-environmental factors may influence Indian athletes' doping behaviour. Semi-structured interviews were used, as these provide the structure to cover core topics along with the flexibility to explore participants' answers and additional lines of inquiry (Kvale & Brinkman, 2014).

Participants

Twenty-one Indian track and field athletes (14 males, 7 females) competing at the state (6), national (6), and international (9) level participated in the study. Athletes were between 17 to 40 years of age ($M = 25.2$, $SD = 5.9$). Four athletes chose not to reveal their age, however, visual confirmation and the recruitment strategy ensured their eligibility (see Table 1 for a summary of participants' characteristics). Among the 21 athletes, 16 were actively competing and 5 had retired (3 recently) from competition. Of these five, three became coaches. One active athlete also coached other athletes. Track and field is a sport that is vulnerable to doping as performance is highly dependent on bio-motor qualities (e.g., speed, strength), which can be manipulated by using performance-enhancing substances, more so than technical and tactical skills-based sports (Loland, 2005). Furthermore, WADA (2023) has reported that most ADRVs in India are attributed to track and field. Criterion sampling (i.e., current, or recently retired competitive

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Indian track and field athletes, living in India, fluent in either English or Tamil) was used to identify and recruit athletes from a southern Indian city using a combination of direct solicitation and introduction via gatekeepers (e.g., coaches, sport officials) followed by snowball sampling.

Athletes did not need to admit to doping to be in the study. Regardless of their doping behaviour, athletes face socio-environmental factors that may influence them to dope. Some athletes resist these factors, remain rule-compliant, and compete clean, while some do not. Studying both groups provides insights into how the environment may serve to influence athletes' doping behaviour. However, it was planned that athletes would be asked whether they engaged in doping during the interview. None of the participants had been sanctioned for an ADRV, though seven revealed they had used a banned substance, with one having done so inadvertently. According to the WADC, as the first author is not affiliated with any sporting organization, she was not obligated to report doping behaviour. This was communicated to the athletes before the interview.

Procedure

The study received research ethics approval. Before data collection, a pilot interview with a representative athlete (not included as a participant) was completed to ensure questions were comprehensible and similarly interpreted in Tamil and English and to identify potential issues related to terminology or colloquiality. Recruitment material and the informed consent forms were provided to participants in both languages. Translations were created by the first author (who also conducted all interviews), who is fluent in both languages, written and oral. This procedure was utilized to minimize the potential for the loss of context, meaning, and cultural nuances that often accompany the translation process (Brislin, 1970; Temple & Young, 2004). Participants were given the informed consent forms a week in advance. The first author also

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explained the consent form to participants verbally before the scheduled interview. Written consent was obtained before the interview, with verbal consent was reaffirmed. Interviews were videorecorded using a university Zoom platform and lasted 40 minutes on average.

To place the athletes at ease while discussing doping-related topics, they were reminded of the purpose and the non-judgmental nature of the study, and that their answers were confidential. Interviews were conducted in their preferred language, with the majority choosing Tamil. The interview guide was constructed to explore the athletes' experience of doping in their sport and to understand how different socio-environmental factors may have tempted or influenced them to dope. Initial questions covered their sports career, which provided background information on each participant while also developing rapport. As the interview progressed, the conversation shifted to focus on the challenges and pressures they experienced, and within this, the topic of doping was broached. Hence, at this phase of the interview, questions focused on the Intrapersonal level of the ecological theory. For example, athletes were asked their opinion of the use of banned substances in sport. Clarification was sought to ensure participants recognized the difference between supplements and prohibitive substances. Vulnerability factors were investigated at different levels as identified in the ecological theory. For example, questions related to the Interpersonal level focused on relationships with coaches and peers. Questions about their club, training group, and anti-doping organizations were used to discuss the Organizational level. This included their experience with NADA and their national/regional sport federation and the education they had received from these organizations. Other aspects of the ecological model (e.g., Community, Public Policy) were explored based on the athletes' account of the vulnerability and protective factors they experienced regarding doping. For example, when athletes talked about their careers, this opened opportunities to

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discuss topics related to public policy (e.g., government sport quotas), while also addressing issues related to Interpersonal factors (e.g., family pressure). Sensitive questions concerning doping behaviour were asked at appropriate times, such as when the athlete hinted at use, raised the issue themselves or discussed doping positively. Athletes were informed they could decline to answer such questions. The researcher also asked the participants' opinions on others' doping behaviour, and their experience of witnessing evidence of doping behaviour. This served to enable participants to discuss doping in an indirect manner, which could also be linked to different levels of the ecological model during our analysis. The interview concluded by asking participants if everything had been sufficiently covered and if they had any final thoughts or questions. Similar interview questions were asked to all the participants regardless of their active status or level of competition.

Data Analysis

All interviews were transcribed and translated into English by the first author. The use of filler words, pauses, and notes on emotional reactions and tone were included. The participants were assigned pseudonyms based on popular Indian names representative of their age. The first author began the analysis by immersing themselves in the data. This involved reading and re-reading the transcripts, writing summaries of each interview along with reflective commentary, and analytic memos (Miles et al., 2014). The coding of data involved several rounds of analysis. Initially, semantic coding was performed inductively to generate a list of codes. Definitions were added to these codes, and after a period of reflection, the codes were returned and grouped under different levels of the socio-ecological theory. For example, an initial code of "performance factors" was grouped under "intrapersonal factors" (i.e., the Intrapersonal level of the socio-ecological model).

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After different levels of the ecological theoretical framework were used to categorize the initial codes, another cycle of coding was conducted and the development of themes within and across each ecological level began. Throughout this process, concept mapping was performed to develop themes and the relationships among themes. These themes were discussed with the second and third authors, who served as “critical friends” and assisted with the refinement of themes. This resulted in several themes being combined and others eliminated. The selection of final themes was informed by Braun and Clarke’s (2022) recommendation that these should tell a concise, coherent, and interesting story where connections may be evident. In presenting our results, a “data-near” approach (Sandelowski, 2010) was adopted to provide a rich and detailed account of our findings. Furthermore, we emphasize the connections among themes and the different levels of the ecological model.

With qualitative research, concerns about sample size can be addressed by considering the information power of the sample (Malterud, et al. 2015). We consider the sample size to be sufficient as the study had a narrow aim that involved a specific population (i.e., Indian competitive track and field athletes), and because an established theoretical framework (ecological theory) guided the study. Moreover, the interviewer was of similar age, nationality, and bilingual, which enhanced the quality of discourse, further contributing to the information power.

The issue of reliability, validity, and generalizability in qualitative research is contentious, with no universal agreement on how these terms should be applied (Lewis, et al., 2014). We assessed the quality of our analysis using Tracy’s (2010) indicators for qualitative research. Based on the ontological and epistemology assumptions that multiple realities exist and are context-dependent (i.e., relativism) and that knowledge is constructed based on participants’

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understanding of their relativity (i.e., constructivism) (Sparkes & Smith, 2014), the relevant indicators of quality included worthiness (doping being a concern for sport integrity and athletes' health), credibility (multiple researchers developed themes), and significant contribution (by extending knowledge of doping in an underexplored region). Furthermore, the quality of our analysis is supported by having multiple rounds of coding, avoiding the premature closing of themes, having limited themes presented, and developing themes that tell a story rather than topic summaries of respondents' answers (Braun & Clarke, 2022).

Results

Each theme is presented below. Participants used the term, 'medicines,' as a euphemism for doping because the exact translation of doping in Tamil is not widely known or used. We use this term in participants' quotes to present an authentic account of their words and experiences. Figure 1 summarizes the relationships among socio-environmental levels and the developed themes.

Coaching Structure and Deference

The first theme, "Coaching Structure and Deference" describes the structure of coaching, how coaches are developed, and how a culture of deference and respect for authority in India, heightens athletes' vulnerability to doping. This theme illustrates the interconnectedness of Community and Organizational level factors with Interpersonal and Intrapersonal level factors. The National Institute of Sports (NIS), acting at the Community level, provides a certification course for aspiring coaches. Track and field clubs, acting at the Organizational level, require prospective coaches to have completed this certification. Hence, the NIS certification becomes necessary to coach. However, athletes expressed dissatisfaction with coach development and the NIS training course, questioning its adequacy for coaches. They lamented that coaches often had

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not been competitive athletes themselves, and lacked higher-level sporting experience, leading athletes to question the depth of their coaches' expertise. Ram, who is also a coach, explained:

The basic qualification for the NIS is if you represent nationals, state, or if you represent a university in the All-India university competitions, then you are qualified to study [at] NIS. In [name] University they are giving direct entry. If I know how to run with spikes, that's enough... I will apply to NIS and with that then I can become a coach and kill [euphemism for injuring] ten students.

Coaching courses were described as simplistic, with little technical or scientific content. This directly affected the athlete and their experience of and approach to sport (an Intrapersonal factor). For example, Santosh criticized the quality of coaching he received, noting his performance had plateaued. Due to his coach's inadequate training, he felt compelled to dope as the only means of improvement. This sentiment is encapsulated in his statement:

...no one is applying their knowledge... If my coach studied [sport] I would have developed...Or if I studied these things, I would have run better and not believed those medicines. I thought I could run well by using those [doping] techniques.

Many athletes place unwavering trust in their coaches and may be unaware of the potential risks posed by their coach's limited knowledge of the WADC. This trust stems from cultural respect for authority figures in India, where coaches' directives are followed without question. However, this places athletes in a position that could have serious consequences. For instance, Gita's coach instructed her to take dexamethasone (a glucocorticoid) during the lead-up to a competition. She took it assuming it was safe. Later, she learned that glucocorticoids are banned in competition, which could have led to an ADRV had she been tested. This scenario highlights how Organizational and Community-level factors have downstream effects that make the athlete

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vulnerable to doping, even if they trust their coach and take a substance they assume is permitted.

Despite the poor training they receive, coaches face pressures to have athletes perform well. With their positions at stake, promoting doping among their athletes offers an attractive option to improve performance. Athletes reported coaches recommended and even pressured them to dope. Coaches also persuaded parents that their child should dope. The hierarchical nature of sport and the deference afforded coaches, often made athletes feel compelled to follow these instructions. Adding to this subservience was that some coaches were former “senior” athletes (a term that denotes their advanced competitive status) themselves, accentuating their authority. Asha recounted a situation where her coach explained when he planned to start her doping regiment. As she explains below, it is apparent that she does not believe she has a choice:

...my coach always tell me that, “you have to use medicine but I will not make you use it now, but you will use only when you reach [time]... If you run [faster time] you will qualify for the Olympics”. So, I should break this timing and then I will [dope]... I am scared of medicines since my childhood. My dad used to tie me while I am getting injections. I do not have the courage to [inject myself]. But my coach seriously tells me, “I will definitely use this medicine on you.”

Asha went on to explain (as did others) that her coach supplied other athletes with drugs, as acting as suppliers, coaches could supplement their income. The concept of a coach supplying drugs to competitors would appear unimaginable in a Western sport context. She recalled a brazen encounter where:

One time, we were in a stadium. He [my coach] got a call. He was saying some names of medicines...he called me and turned on the speaker and spoke. [It was] one of my

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competitors [and she] was asking for medicine for her...I was shocked because she was a very good friend of mine. I did not expect that from her.

Coaches, as former athletes, could also be understanding, and only advise doping for those athletes in financial need. Ram, in his position as a coach explained:

If I am training my students, I will not recommend [doping]. I say this because I have suffered [doping]. Unless the athlete is so poor or if he is in a do or die situation, I will suggest [doping to] them.

Athletes' accounts made clear that the coach plays a central role in their lives. They place great trust in their coaches' decisions, even if this results in them doping. Dinesh, who competes internationally, explained his circumstances:

I do [what the coach says] because I trust the coach. If he makes me understand why I should take that drug and I went there trusting him, I would have definitely taken those drugs. It is in the way they approach us.

Western scholars have reported that coaches may be aware of or even assist in athletes' doping practices (e.g., Pappa & Kennedy, 2013). However, the finding that coaches directly supply substances to their own and other athletes appears to be a novel discovery in this context.

Furthermore, while coaches in developed countries are also offered a degree of deference, it does not appear as institutionalized as witnessed in this study. By showing the interconnections between Community, Organizations, Interpersonal and Intrapersonal level factors, this study demonstrates how action at the Interpersonal level – such as coach education – is insufficient to protect athletes from doping as it would not address coaches' incentive structure, coach development, and cultural nuances in India that increase athletes' vulnerability.

Obligations

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The theme, “Obligations”, is representative of the deep-rooted emphasis on filial piety in Indian society, where children are expected to support their families financially (Detzner, 2004). This obligation is deeply ingrained in cultural values such as respect for elders, reflecting the concept of deference and respect for authority previously described. Legal frameworks also underscore this expectation. For instance, the welfare system in India primarily supports older individuals who are destitute and lack support from surviving adult sons (Deosthale & Hennon, 2011). Consequently, obligations in Indian families are shaped not only by cultural norms but also at the Public Policy level. These obligations influence family dynamics and create significant pressure on athletes to perform and provide for their families. Hence, both the Interpersonal and Intrapersonal level are affected.

Interviewees revealed the profound impact filial piety and obligations had on their choices and vulnerability to doping. Athletes felt pressure from their parents to contribute to the family expenses, which included repayment for training and travel expenses. For example, Sunita listed how much her parents had contributed to her sport expenses and extended to buying her a new bed to aid her recovery. She noted in despair, “When we [her family] are spending like that, I get so hurt”. Consequently, to fulfil their obligation to the family, many athletes sought ways to use sport as a means of social mobility, and this often entailed competing for university placements and government employment.

In India, the government’s sport quota policy offers government employment in various sectors (e.g., transportation, military) to athletes in recognition of the potential academic and career sacrifices made for sport. Employment is provided during and after one’s athletic career and can include admission to universities and colleges (Chelladurai et al. 2013). International-level athletes from select sports automatically qualify for employment, whereas less successful

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athletes can compete via sport trials to be selected. The appeal of these government jobs was unmistakable from the athletes' accounts. As Santosh exemplified, "From my first year of college, I started running in the appointment [sport quota] trials. It was my main target because of my family situation. Whether I become big in sports or not... I wanted to get the [government] job." He went on to explain that it was because of his family situation that he began doping.

These jobs provide financial security. Many athletes come from poor backgrounds and in athletics, there are few financial rewards. Therefore, getting a government job to cover training expenses and to take care of their family is attractive. Moreover, the quota system can compensate for academic performance, which Santosh found appealing as: "Getting in through studies may be very stressful, so I chose sports".

The sports quotas are determined based on job, industry, and region, and given the limited number of positions, the competition is intense. Success in sports can significantly improve an athlete's prospects of securing these coveted positions. Athletes explained that drug tests are not conducted at the selection trials where athletes compete to gain points for consideration for the sports quota. The combination of the Public Policy level factor of sports employment and the Community level factor of non-existent doping tests leads to speculation that doping is rampant at these events. Kamal described it as brazen when he proclaimed "...they will call athletes only for the selected events. So, there will be less participants during that event. At that time, they will [dope] very daringly". Moreover, participants observed that once government employment has been secured, performance may decline and some athletes leave sport altogether. Doping is perceived as a strategy to boost performance, primarily to secure government jobs through sports quotas rather than to achieve sports or competitive success

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alone. In contrast to the assertion from Western athletes (Veltmaat et al., 2023), Indian athletes did not dope for fame and fortune but for social mobility and security.

Athletes' obligations to their families were also exploited by their coaches. Most parents were described as uneducated about sport and doping, making them susceptible to pressure from the coach who would claim doping was necessary for success. Thus, a triad of influence emerges. The athlete experiences pressure from their coach directly and parents indirectly to dope because of filial piety, with the coach proselytizing the merits of doping to the parents.

Santosh's story is representative of this pressure:

I had no other way. Because I completed my third year [of college] and my family started putting pressure on me. I have to earn money and give it to them. I did not know what to do. So, I started to train with that coach. They used medicines on me. I was in a hurry [to perform well]

However, some coaches were described as having strict anti-doping opinions and would prohibit athletes from communicating with clubs that were associated with doping and dismiss athletes from their squad if they suspected doping. Thus, as reported in Western literature, coaches can (though rarely intentionally) act as protective as well as vulnerability factors (see Barnes et al. 2022). Still, what differentiates the context described from its Western counterpart is how Public Policy factors, such as legislative filial piety and government sport quotas, interact with Interpersonal level factors that entail a triad of parent-coach-athlete relationships to influence athletes' vulnerability to dope.

Limited Oversight and Enforcement

The theme, "Limited Oversight and Enforcement" provides an account of the insufficient regulations that increases access to doping substances, and the limited efforts to enforce anti-

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doping policies. The accessibility of banned substances, exacerbated by insufficient government regulation, acts as a Public Policy level factor contributing to doping. Inadequate oversight and enforcement allow such substances to be readily available in pharmacies without a prescription.

From international athlete Ram's experience:

If I go to a medical shop [customary term for pharmacy] ...to buy vitamins, they ask, "if you need *anything else* [emphasized] tell me, I will buy that for you." ...There is nothing like asking for a prescription [laughing]. I have asked [for drugs] in many areas in India when I went for competitions...So easily available.

Whereas Western athletes have access to doping substances through different channels, it generally does not involve this level of ease. Besides pharmacies, prohibited substances were bought via online retailers and from social media entrepreneurs, who advertised doping substances alongside other athletic equipment needs. As Asha explained, "...they are selling medicines on Instagram. I saw a page – they always sell spikes [shoes], and they were also selling medicines along with it". Moreover, coaches and senior athletes were also suppliers. Gym trainers and bodybuilders provided another source of solicitation, and Santosh had athletes approach him seeking banned substances, when he worked as a fitness trainer. These practice places athletes' health and welfare at greater risk, as purchases of substances from illicit markets often have questionable quality and content (Heinsvig et al., 2022).

Along with easy access, the danger of inadvertent doping was raised. Ganesh recounted an experience where he learned from an anti-doping official that the supplement he used contained a banned substance. Additionally, inadvertent doping could occur from culturally accepted medical treatments like Unani and Ayurveda, which both involve herbal and plant-

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based therapies that may produce an adverse analytical finding (i.e., a positive doping test) and trigger an ADRV. Athletes described a prominent case in Indian sport where this happened.

Athletes also expressed dissatisfaction with NADA and their efforts to combat doping. NADA operates at the Community level by overseeing and coordinating anti-doping efforts in India. Dissatisfaction with anti-doping efforts emerged from beliefs that drug tests could be anticipated and manipulated, and from concerns over the quality of anti-doping education provided. Athletes perceive that NADA, which operates under the Tamil Nadu Athletic Association (TNAA) and the Athletic Federation of India (AFI), lacks independence. They suspect that test selections are influenced by these bodies, citing instances where athletes reportedly received prior notice of drug tests, allowing them to either skip testing or manipulate their performance (i.e., underperform) to evade it. For example, Dinesh recalled traveling to an event with fellow international athletes. He was informed that “[anti-doping officers] are coming to dope check [test] in the morning. Olympian [name] got news yesterday that they are coming.” Despite the Olympian knowing that anti-doping officers were coming, they were not called to be drug tested. Similarly, Sunita declared “we went to one competition, and they said that NADA is going to come for testing. Because of that, one athlete who performed well in the [event] where they did not drug test, but when they said that there are going to test [at this event], she did not participate.” Dinesh gave another example when anti-doping officers came to test the team and his coach had instructed him to take the day off to avoid being present because his coach was giving him doping substances. Finally, several athletes question why athletes of one coach, who was a committee member on a sport governing organization, were not getting selected for testing – the presumption being they were receiving preferential treatment.

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Access to and the quality of NADA's anti-doping education was criticized. Only four interviewees had received anti-doping education, and for others, contrary to WADA's education goal, their first exposure to anti-doping was when they were drug tested. The educational efforts that did take place were characterized as insufficient – reduced to simple pamphlets or overly technical sessions that left athletes confused. In Sunita's recollection:

The words, the sentences they were making, names of the medicines, I don't even remember a single word now. The name was like some chemistry-related. There was nothing useful that I can keep it in my mind...I attended, but I do not remember much about the medicines they talked about.

Inadequate anti-doping education led to instances where athletes unwittingly used medications containing banned substances, increasing their risk of an inadvertent ADRV. As Suman declared, "I realized that medicines that are available in medical shops and performance-enhancing drugs are not different only after that [inadvertent doping] incident." Yet, many of the athletes desired anti-doping education and wished it started at an early age and competitive level.

In sum, this theme demonstrates how multiple levels of the socio-ecological model interact to influence athletes. Drug access via pharmacies, online retailers, and cultural medical treatments are representative of Public Policy level factors, while contaminated supplements involve both Public Policy (from limited government regulations) and Community level factors (from the interaction between sport supplement companies and sport organizations). At the Interpersonal level, athletes obtain drugs from other people in their social network, such as coaches, senior athletes, and gym trainers. The role of NADA, as a Community level factor, provided evidence of athletes' mistrust in the system, exacerbated by the subpar education they have received.

Doping Reinforcement

The final theme, “Doping Reinforcement”, explains how athletes’ experience in their environment at both the Interpersonal and Community levels reinforces their perception that doping is ubiquitous (e.g., an Intrapersonal level factor). Athletes recounted numerous instances where they directly or indirectly encountered doping practices. Examples of Interpersonal level interactions include Sita who received a photo from a senior athlete of a fridge stocked with vials and syringes along with a statement that “he is fully getting ready for the next event”. When she inquired further, his response implied he was doping. Asha also reported seeing doping paraphernalia in an adolescent athlete’s cupboard. In another instance, she accidentally saw vials and syringes in a rival’s training bag:

My competitors were standing in front of me. We are all good friends...My friend had a banana on the side of her bag. I was playing with her and taking the banana. Her bag was open. There was a brown paper [bag], and I thought there will be some bread inside it. So, I put my hand in and it was full of [syringes]. I just looked at it and just dropped [the bag backed] inside.

In addition, athletes reported seeing doping substances at sport events and noted their use by competitors. The presence of these substances at sport events, a Community level factor, suggests a normalization of doping within the sporting community. Krishna observed, “during the time of competition, you will see a bunch of stuff”, which was acknowledged as a clear reference to doping. Sunitha also saw doping paraphernalia at local competitions and that she had “seen many syringes, even while we spread our mats out to do stretches.” Thus, there was little effort made to hide the use of doping substances. The visual presence of doping substances is quite uncommon in contemporary Western contexts, and Western athletes are unlikely to see

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direct evidence of doping practices (Erickson et al., 2019). In contrast, almost all athletes in the present study encountered doping practices, which further normalizes doping.

Other athletes admitted they used banned substances when competing multiple times at an event. However, there was some confusion about the type of substances they allegedly witnessed. This included descriptions of “stimulants”, “vitamins”, “ATP-PC injections”, which were also accompanied by claims that these substances enhanced performance. This is captured in international athlete Prem’s recollection “They will take vitamin injections before running. Long-distance runners take it for stamina and take many injections to relax.”

Athletes' exposure to doping was not limited to environmental cues and some were introduced to doping by their peers, which represents another Interpersonal level factor. In Abdhul’s case, a senior athlete supplied him with an unknown substance, and as he recounted, “I started performing very well. When I asked him [what it was], he said ‘we are doping.’” Abdhul shared that it was explained to him that this was the only way to perform well. Furthermore, he expressed gratitude for his training partner’s assistance. He was not troubled by having begun doping without his knowledge. Dinesh explained that coaches would prohibit junior athletes from talking to seniors for fear they would be introduced to doping. The assumption was that most elite athletes are doping. This interpersonal dynamic, coupled with coaches' warnings against interactions with senior athletes, underscored the perceived prevalence of doping within elite sporting circles. Gita’s statement about moving up to the senior circuit reflects this perceived reality:

When I was moving from junior to senior level, the level of competition was completely changed. The senior category was very competitive, and we know that most of the athletes take dope. We know that surely.

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Such was the perception of widespread doping that athletes reported that their junior counterparts would ask for drugs. Furthermore, this highly pervasive doping culture in India led athletes and coaches to be suspicious of other athletes' performances. For instance, if an elite athlete decided not to compete, the assumption was they were still 'hot'. Asha provided this exchange:

[a friend of my coach] asked me "why are you not participating" ...I told him "yes, I trained but not to that level". His friend said ..."you can win with your current performance". I said, "it is not about winning", then immediately he asked me "what happened, did it not washout correctly?" I was shocked. What is there to washout? In this season, I did not even use protein.

These types of experiences fuelled speculation that doping was a requirement. However, amidst the pervasive culture of doping, it was evident that not all athletes succumbed to these pressures, and some held strong anti-doping stances. Even among those who did dope, some did so reluctantly. This is conveyed in Santosh's statement: "When I went to camp my performance plateaued. I did not understand anything. Other athletes keep on running [well]. So, I came to the situation where steroids was the only way."

In sum, Interpersonal interactions with peers, senior athletes, and coaches, along with witnessing doping practices at the Community level of sport competitions, reinforced athletes' perception of doping prevalence and encouraged doping among athletes. This reveals how these factors from different environmental levels interact and contribute to the normalization and reinforcement of doping within Indian track and field.

Discussion

This research sought to understand the factors that contribute to Indian athletes' vulnerability to doping by accounting for situational and systematic factors (Petróczi & Aidman,

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2008) in the environment using McLeroy's (1988) ecological model for health promotion. We demonstrate not just how each level of the ecological model may affect athletes' vulnerability to dope, but also how these levels can interact and have downstream effects that make the management of doping a complex systems issue. Such findings support recent work that recommends as a prerequisite to manage doping to map the multiple interactive components of the sport system (Naughton et al., 2024). Hence, this study extends the application of McLeroy's (1988) ecological model for health promotion by demonstrating the utility of adopting a whole system approach and examining each level and its interactions.

The paradox of Indian sport is that despite increased financial investment and sport policy enactments, international sporting success has been elusive, while ADRV rates have been discouragingly frequent. Our results provide insights into how socio-environmental factors and their interactions affect Indian athletes' vulnerability to doping. Moreover, the combination of factors signals why the number of ADRVs in India is high, yet international athletic success remains modest. The added incentives to dope, cultural nuances within Indian society, pressures from, and interaction among close others, coupled with doping accessibility, lack of quality coaching and education provision, contribute to an environment where doping is perceived as widespread and trust in anti-doping authorities is minimal. This study adds to the doping literature by illustrating the complexity of doping, and how doping is influenced by non-sport factors, such as government policies that serve to enshrine filial piety into the legal and cultural fabric of Indian society. Our study further demonstrates why doping is a "wicked" problem and why efforts to address doping will require new approaches that consider multiple stakeholders and factors at different levels within the environment and their interactions.

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Doping is not the result of a singular influence but rather the outcome of a web of factors (Christiansen 2010; Woolf & Mazanov, 2017). Recognizing the ‘dopogenic environment’ (Backhouse et al. 2018), is essential as this type of approach increases the probability that health behaviour policies, such as preventing doping, will be more successful (Glanz & Bishop, 2010). Research that zeroes in on environmental influences, rather than solely on athlete behaviour, offers a deeper understanding of doping (Boardley et al., 2021; Naughton et al., 2024). By considering situational and systematic factors that may make athletes vulnerable to doping (Petróczi & Aidman, 2008), and by examining Indian sport through an ecological theoretical perspective, a rich tapestry of India and the antecedents to doping has been provided. This analysis paints a portrait where athletes may lack agency, with doping seen as ubiquitous, and for some inevitable, within a system that incentivizes use.

Furthermore, conducting research with athletes who dope, as opposed to those who speculate why athletes might dope, has important implications for both research and practice. While some athletes embark on doping as part of a gradual, rational, and deliberate process (e.g., Kirby et al., 2011), this research reveals that for others, especially among Indian athletes, the path to doping can be less intentional and more influenced by circumstances. This challenges the notion that doping is always a calculated, deliberate decision, highlighting the need for nuanced anti-doping strategies that address a variety of pathways leading to doping.

Moreover, this study extends the literature on doping by focusing on an understudied population. Doping is a global issue, and the WADC is a global policy, with the latter being mostly influenced by the Western countries (Gray, 2019). This makes it imperative for research to extend beyond the Global North. The danger of not doing so may result in assuming that policies are easily transferable to countries in the Global South (Read et al., 2024; Ruwuya et al.,

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2022) or worse, subjecting outdated, uninformed, racial stereotypes to athletes from the Global South. Also, it is crucial to consider the realities of anti-doping policy implementation and the compliance challenges due to inter-signatory inconsistencies (Read et al. 2024). Even with well financed and resources efforts, developing countries may still face challenges with implementing Western-centric anti-doping policies (Yang et al., 2022). Indeed, the management of doping and efforts to address the doping problem using knowledge derived almost exclusively from WEIRD population is doomed to fail.

This study provides several instances where the combination of environmental factors that affect athletes' vulnerability to dope differ from those in WEIRD countries. The government sport quota system, filial piety, and lacked doping controls created an environment where athletes may dope not for selfish performance motives or to achieve substantial financial success but as part of a quest for a better life (e.g., Veltmaat et al., 2023). While in a Western context, sport is often romanticized as a means for upward social mobility (Coakley, 2017) in the Indian context, this may be more reality than fictionalization. However, Indian parents' unfamiliarity with sport and pressure to contribute financially to the home, may indirectly motivate doping. In contrast, Western parents, even those from working class backgrounds, are supportive of sport participation and believe it can increase social mobility in and of itself (Longchamp et al. 2023).

Securing government employment is valued not only for their financial benefits but also for allowing athletes to pursue their sporting goals. Government officials should be concerned with athletes doping to improve their employment prospects, as those who engage in rule-breaking behaviour in a sport context, may transgress in other contexts (Kavussanu et al., 2013). Ensuring government employment acquired through sport performance is ethically achieved is in the best interest of the Indian government.

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Hence, our results call into question the utility of global anti-doping efforts that do not consider multi-level factors and cultural context. For instance, targeting individual-level factors, like knowledge of the WADC through education provision, while necessary, is insufficient. As revealed, despite their competitiveness, few athletes in this study received structured anti-doping education and doping knowledge was generally poor. While education may help, its design will need to consider the doping predicament India faces. Illiteracy (Dasgupta, 2019) and other cultural nuances may impede progress. For instance, athletes learn about doping from senior athletes and coaches who, based on interpersonal, organizational, and cultural factors, may hold more sway over them than anti-doping educators. In some cases, these influential figures not only impart knowledge about doping but also actively endorse and facilitate its use. Furthermore, this influence can involve the athletes' family members, creating a web of pressure that contributes to their doping vulnerability. Parent-coach dynamics can undermine youth sport development in Western countries (Horne et al., 2022), though this study demonstrates how this may extend to encouraging doping, at least in a non-WEIRD context.

A further challenge for anti-doping efforts in India is that cultural norms on hierarchy and the unquestionable acceptance of authority are deeply embedded (McLeod, et al. 2020). Getting coaches educated and aligned with anti-doping efforts will be a necessary aspect of doping prevention. Such a revelation is not new. However, the quality of coaching and the remuneration afforded coaches in India is poor (Khasnis, et al. 2021b), which may explain why some coaches sell drugs to their own and rival athletes. Moreover, the perception of the value of coach education and what makes a good coach is a contentious issue in India. This creates additional barriers not witnessed in Western countries. Investment is needed to improve the quality and

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prestige of coach education in India (Khasnis, et al. 2021b), and anti-doping education should accompany these efforts.

As outlined, doping in India is affected by multiple factors. The accessibility of substances and the combination of factors described present doping as an open secret in Indian sport. Addressing doping among Indian athletes will take a multi-prong approach. If organizations, such as NADA, are to lead these efforts, they will need to address concerns over their perceived legitimacy (Woolway et al., 2020). Athlete outreach and continual efforts to improve education availability may help in this regard (Barkoukis et al., 2022). However, attempts to address doping at an individual level, whether this be via athlete or coach education and outreach, will surely fall short. As this study demonstrates, doping is a systemic issue, and these types of problems require systematic solutions (Petróczi et al., 2021).

To address the issue of the universal nature of the WADC and the environmental and cultural nuances of non-WEIRD countries, adopting and adapting policies from other countries may be beneficial. However, such efforts would need to account for the unique social-cultural context, lest these attempts lead to unintended negative consequences (Khasnis, et al. 2021a). For instance, in India obstacles to policy adoption may surface from those who currently hold positions of authority and may be reluctant to promote change if their status is threatened. Efforts towards reform in other aspects of Indian sport have previously encountered this reality (McLeod et al., 2020). This means that structural interventions will be needed to address doping in India. Still, as evident in this study, even among those who doped, clean sport is desirable. Hence, the political will for change exists. Grassroots efforts and athletic advocacy may enable sufficient pressure on sport entities such that change is forced.

Conclusion

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This study has provided numerous theoretical contributions and practical implications to the global study of the management of doping in sport. We demonstrated the utility of taking a comprehensive ecological approach to studying doping in an understudied context, which enabled us to consider the situational and systematic factors that made Indian athletes vulnerable to doping. Moreover, we have shown that doping is an emergent property of a complex system. In doing so, we have highlighted the interactions among different levels within the environment and how this can affect clean sport behaviour. We showed that doping extends beyond individual athlete choice and involve government policies that create an environment where doping flourishes. Moreover, our research extends previous research by chronicling how doping vulnerability is influenced by the interaction of different factors and environmental levels. While such circumstances may not be intentional, they nevertheless demonstrate the challenges of implementing a global policy, such as the WADC. This study also theoretically contributes to the literature by considering the cultural nuances of anti-doping and by addressing the underrepresentation of the Global South in anti-doping research. We have highlighted the experiences and challenges athletes in the Global South face, and how policy transfer may have to navigate the unique legislative and cultural environment of India.

There are several limitations to this study. First, participants were from one sport and recruited from an urban centre. Athletes from rural regions and other sports may have different experiences related to doping. Future research should consider different sports, particularly those that are commercially favoured. Second, the data was translated from Tamil, and some nuances of participants' statements may have been compromised. Still, this study provides new insights into doping in sport and helps to answer why ADRVs are so prominent in a country not known for its sporting prowess.

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Future anti-doping research should focus on ways to minimize the negative influence of athletes' environment on their doping behaviour and how anti-doping organizations can be managed to operate within a complex and dynamic environment that may well be uncondusive to their mission. This may include examining whether and, if so, how changes to the environment could be achieved to make athletes less vulnerable to doping. Moreover, it should consider the complex interactions that may occur and how taking a systems approach to anti-doping may enable researchers and policy makers to develop ways to increase athletes' resiliency against multiple environmental factors that favour doping. Finally, given the family dynamics and filial obligations discussed, future research should consider investigating the influence of parents and how gender may affect vulnerability to doping.

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