

# Gender Equality In Sports Participation: A Case Study Of Transgender Athletes

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## ABSTRACT

**Background:** Over time, the historically male-dominated world of sports has become more aware of equal rights and offers female athletes the same level of sports participation as male athletes. Barriers between gender identities still exist, making it difficult for certain groups to participate in sports.

**Objectives:** The main objective of this study was to highlight the current situation regarding transgender athletes and the injustice they endure and its implications on their participation in sports.

**Methodology:** A five-point Likert Scale with eight statements was developed. A pilot study was conducted and the pilot data was not included in the original study. The pilot study was carried out to assess the appropriateness and articulation of the study instrument. The original study employed a cross-sectional research design to identify sports coaches' perceptions of the inclusion of transgender athletes in their respective sports programs and the potential effect on sports teams. There were 60 coaches, who identified themselves as a male (n=30) and female (n=30), recruited from different colleges and universities in Lahore, Pakistan.

**Results:** Out of 60 participants, 35% were between 18-25 years of age; 33.3% were in the range of 26-35 years of age; 10% were between 36-45 years of age; 20% were between 46-55 years of age; and 1.7% were 56-65 years of age. There were 58.3% of the participants, who reported working with transgender athletes; 21.7% had no experience of working with transgender athletes; and 20% were not sure of working with transgender athletes. There were 56.6% participants who reported discrimination against transgender athletes in their educational institutes and 26.6% reported no discrimination. Only 46.6% respondents agreed that transgender athletes can participate in competitive sports; 41.6% did not agree with the sports participation of transgender athletes. Mean comparisons indicated difference in the responses of male and female coaches on all the variables. The findings of Paired Sample T-Test indicated significant differences in Knowledge and understanding about transgender athletes ( $p=.000 < 0.05$ ) and stigma against transgender athletes ( $p=.000 < 0.05$ ).

**Conclusion:** Policy makers need to take this issue seriously. There is a strong need to develop and implement clear policies about sports participation of transgender athletes.

**Keywords:** Gender Equality, Sports Participation, Transgender Athletes, Discrimination

## Introduction

In serious occupations like sports, unfair discrimination based on gender or sexual orientation should not be considered. Over time, the historically male-dominated world of sports has become more egalitarian, offering female participants an equal level of sports participation (SP) on the field. A high percentage of the population is attributed to this increasing change in perspectives of society at large (Jones et al., 2017). A large number of inequalities still exist around the world when it comes to sexual orientation and SP. There are barriers between gender identity and SP, which makes it difficult for certain groups to participate in sports. Gender and social exclusion is a pervasive concept, with its origins in academic institutions (Stamarski & Son Hing, 2015).

An open and equitable depiction in the media is supposed to ensure that everyone in social structure is given equal opportunities as far as SP is concerned. Male-To-Female athletes (MFTA) are more adversely perceived in the media stories, text, and photographs presented. MFTA are commonly referred to by their birth names with “erroneous pronoun language”, and before and after conversion comparison photographs are published, both of which are not in accordance with standards (Asare, 2019). The participation of Transgenders (TG) athletes in the women's class has seen a surge in media interest in the last few years. A “balance between TG inclusion based on a fundamental human right for everyone to be recognized in the gender in which they identify” and fairness in contexts of how much of a potential advantage a TG athlete has over female athletes is the subject of constructive discussion. Further down the puzzle, there is no doubt that TG needs to be mainstreamed in all demographics, especially in competitive sports, but fairness is also paramount to the legitimacy of competitive sports (Fink et al., 2016).

Individuals who do not recognize as females or heterosexual face a significant burden in the sports world due to the sheer male-dominated hegemony. Regardless of the fact that sports has long been acknowledged as a great tool for teaching fairness, equality, and good conduct, the portrayal of TG “difficulties” by sports regulatory authorities and the sports media has cast aspersions on this ideal (Tishev, 2019). In sports, TG individuals face a multitude of barriers and transphobic hostility, according to several reports. It is established that gender revelation has a deleterious effect on TG’s participation in competitive sports, most probably linked to a desire to avoid prejudiced confrontations and rejection in these areas (Pereira-García et al., 2021). Individuals who identify as TG have inconsistencies between the gender given to them at birth and their gender identity/experienced gender. The premise of competitive sports is fair and equitable, and because of considerations regarding TG's perceived overwhelming advantage, the conundrum of whether TG should be allowed to take part in consonance with their gender identity has been lifted and fiercely disputed among sporting organizations, among competitors, and among spectators.

There are certain “hormones mainly testosterone are assumed to provide an athletic advantage in competitive sports”. As a result of its high intrinsic “testosterone” levels, TG females are believed to have an advantage in competitive sports. Notwithstanding being treated with “testosterone” if they choose to medically transition using cross-sex hormones, TG males are not regarded to have an athletic advantage. However, there has been a dearth of research that has looked specifically at how androgenic hormone levels are correlated to athleticism in both genders and TG athletes. To make things simpler for TG athletes to compete, the International Olympic Committee (IOC) stated that they would be allowed to compete in all future games if they have concluded their medical

transition (Baiocco et al., 2018). Whereas, TG athletes encounter prejudice, discrimination and face self-stigma since they are cognizant of biases and various forms of bigotry levelled at them. The IOC modified its standards on transgender athletes' participation (Harper, 2015). The new rules cut the time it takes for a "TG female to be in the typical female range of testosterone suppression and estrogen medication from two to one year". The most significant alteration was the elimination of the need for a full lower part surgery, which included internal and external genital modification (Cunningham & Pickett, 2017)

Many sports regulating bodies have proceeded under the presumption that sex is constant and binary (Jones et al., 2017), culminating in a hostile atmosphere for TG athletes (Chih et al., 2020). Although there have been recent debates about TG females in competitive sports, even then TG participation in competitive sports has a much medieval history (Pérez-Samaniego et al., 2019). To break stereotypical views about the TG community, society today needs to be informed about the third gender. This will provide an amenable educational environment for TG to pursue higher education and entering the workforce with dignity, which will be socially acceptable and economically beneficial, resulting in a better social standing in the society. The biological differences between males and females are being used to establish SP criteria, as "males have a physiological edge in strength and endurance due to testosterone exposure" (Frost & Elichao, 2014). The quandary for sports regulating organizations is identifying which category of TG athletes should be entitled to engage in competitive sports so that competition equality is maintained while TG athletes are offered equal opportunity. As IOC recommendations from 2015, "testosterone levels in female athletes should be less than 10nmol/L for the preceding 12 months" (Handelsman et al., 2018). A study was conducted to examine the

effects of gender affirming hormones in TG people and reported that TG females undergoing gender transition via hormone therapy preserved their athletic superiority over women athletes even after 12 months of treatment (Channon et al., 2018). As a consequence, regulating bodies such as the IOC faced a daunting task in upholding the delicate balance between justice and equality in competitive sports when it comes to TG's SP. More research is clearly required in order to develop updated and evidence-based guidelines that aid in striking the balance between equality and ethics (Fogel & Quinlan, 2015) related to SP. In short, the objective of this study was to highlight the current predicament in respect to TG athletes and the unfairness they endure and its implications on their participation in competitive sports.

### **Literature Review**

The term TG refers to individuals whose gender identity does not correspond with 'their gender assignment or phenotypic sex, either because one identifies as the "opposite" sex, or because one's gender identity defies the male/female classification' (Barabasch, 2018). Although some TG individuals may undergo "sex reassignment surgery referred as gender confirmation surgery or hormone therapy" (Devís-Devís et al., 2017) so that their sexual anatomy aligns with their gender identity, one does not need to pursue such procedures in order to be TG. Often TG individuals encounter discrimination that stem from socio-cultural factors regarding what it means to be male or female (Jones et al., 2016). This stigma and discrimination at times have significant consequences for TG individuals.

As the number of people identifying as TG rises, the question of whether they should be allowed to compete in the category of their gender identity in competitive sports is becoming increasingly controversial (Teetzel & Weaving, 2017). In the area of competitive sports, where slight physical

advantages can distinguish winners from losers and where participation is divided by gender, questions regarding TG's taking part in sports is framed differently than in any other setting (Barras, 2021). While heightened sensitivities exist with respect to how TG individuals should be accommodated in different social settings, the area of sports is unique because TG women may have advantages, and those advantages may be unfair in some way (Clarkson, 2014). Sporting activities need to respond to this potential problem by developing a fair and positive method to allow TG women to compete in female categories.

In considering whether TG individuals should be permitted to compete in the category of their gender identity, the main focus remains on TG women because they encounter the most amount of criticism when competing in female categories (Hilton & Lundberg, 2020). One of the main arguments against allowing TG women to compete in female categories is that it is unfair. Specifically, the argument is that TG women have an unfair advantage since they have an exceptional amount of "testosterone" that supposedly makes them perform better than female athletes (Sudai, 2017). Since males are, on average, faster and stronger than biological women, this argument suggests that TG women will be unfairly advantaged if they are allowed to compete in female categories. So, the idea is that TG women should not be allowed to compete in female categories because they possess unfair genetic advantages, which is mostly due to high "testosterone" levels. This argument is referred as the "fairness argument" (Stewart et al., 2018).

The "fairness argument" will reflect upon cases involving "intersex and TG individuals" in sports. Although what it means to be "intersex and TG" is importantly distinct, they have prompted similar controversies because they raise relevantly similar kinds of issues. Intersex individuals are those "whose phenotype or

genotype is atypical with respect to sex markers" (Bianchi, 2017). Alternatively, TG individuals are typically born with male/female anatomy but feel as though they are in the wrong body (Elling-Machartzki, 2017). Although these differences are significant, it is important to consider "intersex individuals" because they are often criticized for having too much "testosterone" to compete in female categories, which is thought to give them an unfair advantage. This is the same criticism that is applied to TG women (Hargie et al., 2017).

Sex tests are frequently required to determine whether an athlete can compete in sports as a male or female (Martnková et al., 2022). The purpose of sex tests is to make sure that people compete in the right category based on their sex, which is determined by their sex chromosomes. This chromosomal distinction is the basis for sports classifications. Various sex tests have been used in the past; however, in the late 1990s, the most recent test, which used a gene amplification technique known as a "polymerase chain" reaction, was introduced. The purpose of this technology, which is still in use today, is to look for "Y chromosomes". If a person has a "Y chromosome", further testing is done to find out where it is. The athlete is frequently ineligible to compete in female categories if the "Y chromosome is located in the sex chromosome region" as per Masuyama et al., (2017). For "intersex and TG athletes," the results of sex chromosomal tests were and continue to be significant.

Because it is believed that "an athlete should not be enjoying the benefits of natural testosterone predominance that is normally seen in a biologically-born male," the "fairness argument" frequently prevents "intersex persons and TG women" from competing in female categories (Kulick et al., 2018). "Skillful theory" is one way to explain the "fairness argument". Being skilled, as "sports are meant to determine which opponent

is more skillful" states (Giblon & Bauer, 2017). The significance of unfair external influences (Adom et al., 2016) is used to test competitors' skill must be minimized. There are a variety of external influences, some of which must be reduced in order to create the conditions that determine which competitor is the most skillful for a particular sport.

Mitigating influences that are physically external to the athlete, such as sporting equipment, is one way to maintain the "skillful theory." According to Kim & Park (2020), if every athlete uses the same equipment, then any subsequent actions will be determined by an athlete's skill, preserving the "skillful theory." "One more method for keeping up with the capable or skillful hypothesis is to moderate hormonal benefits, independent of how these benefits happen (Morris and van Raalte, 2016). Even though hormonal advantages may exist for a variety of reasons, some of which, like steroid use, may be viewed as immoral (Devine, 2018), the purpose of mitigating all hormonal advantages is to promote fairness in the competition, specifically the skill theory. "Sportspersons deserve praise for their skills only to the extent they express expertise that is precisely a matter of personal development or the result of persistent hard work, practice, and effort," according to Oakleaf & Richmond, (2017). This is due to the very nature of sports. Therefore, it is regarded as unfair when a person enjoys unnatural competitive advantages and their rivals are unable to naturally compete within these parameters.

## Methodology

**Table 1 Mean Comparisons of Male and Female Coaches**

Gender		KTG	WTG	DTG	JOBTG	IDTG	UFATG	TFTG
Male	Mean	4.2333	1.5667	2.5333	3.1000	2.8000	4.2333	4.2667
	N	30	30	30	30	30	30	30
	Std. Deviation	1.00630	.77385	1.25212	1.29588	1.47157	1.10433	1.08066
Female	Mean	3.4333	1.6667	2.4667	3.1333	3.2000	3.3333	3.9667
	N	30	30	30	30	30	30	30

A five-point Likert Scale with eight statements was developed. A pilot study was conducted and the pilot data was not included in the original study. The pilot study was carried out to assess the appropriateness and articulation of the study instrument. The original study employed a cross-sectional research design to identify sports coaches' perceptions of the inclusion of transgender athletes in their respective sports programs and the potential effect on sports teams. There were 60 coaches, who identified themselves as a male (n=30) and female (n=30), recruited from different colleges and universities in Lahore, Pakistan. The participants were asked to complete a questionnaire about "rules and regulations of sports participation of TG athletes".

## Results

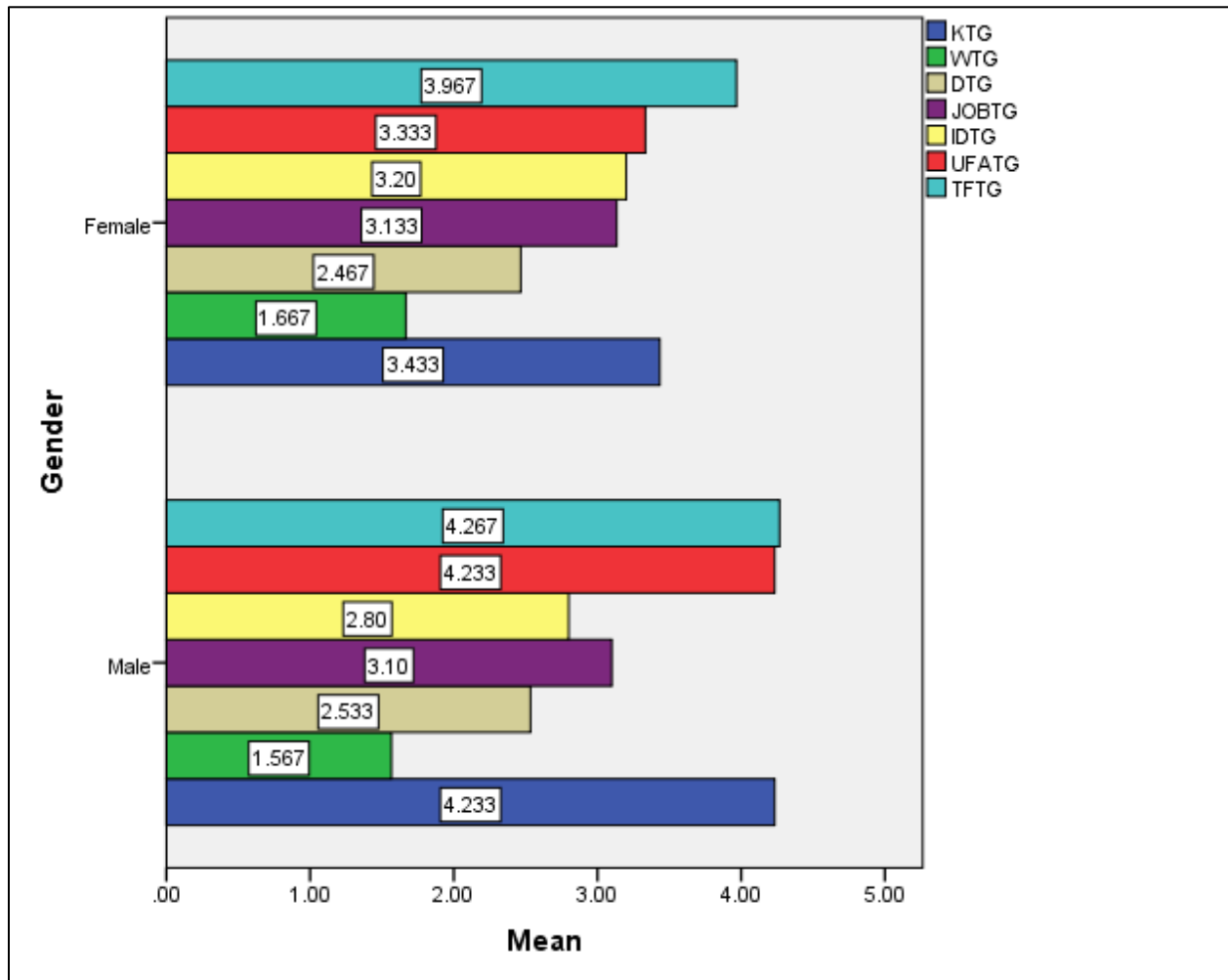
Out of 60 participants, 35% were between 18-25 years of age; 33.3% were in the range of 26-35 years of age; 10% were between 36-45 years of age; 20% were between 46-55 years of age; and 1.7% were 56-65 years of age. There were 58.3% of the participants, who reported working with TG athletes; 21.7% had no experience of working with TG athletes; and 20% were not sure of working with TG athletes. There were 56.6% participants who reported discrimination against TG athletes in their educational institutes and 26.6% reported no discrimination. Only 46.6% respondents agreed that TG athletes can participate in competitive sports with female identity and 41.6% did not agree with the sports participation of TG athletes with female identity.

	Std. Deviation	1.35655	.84418	1.13664	1.27937	1.24291	1.51620	.92786
Total	Mean	3.8333	1.6167	2.5000	3.1167	3.0000	3.7833	4.1167
	N	60	60	60	60	60	60	60
	Std. Deviation	1.25099	.80447	1.18608	1.27680	1.36543	1.39115	1.00998

Mean comparisons indicated difference in the responses of male and female coaches on all the variables including knowledge about TG athletes; working with TG athletes; discrimination against

TG athletes; Coaches' job at risk because of TG athletes; TG athletes taking part in sports with female identity; taking unfair advantages by TG athletes and threatening fairness by TG athletes.

**Figure 1 Mean Comparisons of Male and Female Coaches**



Mean comparisons indicated difference in the responses of male and female coaches on all the variables.

**Table 2 Differences between Male and Female Coaches on Different Variables**

		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference		T	df	Sig.
					Lower	Upper			
Pair 1	Gender - KTG	-2.33333	1.49197	.19261	-2.71875	1.94792	-12.114	59	.000
Pair 2	Gender - DTG	-1.00000	1.30189	.16807	-1.33631	-.66369	-5.950	59	.000
Pair 3	Gender - IDTG	-1.50000	1.38393	.17866	-1.85751	1.14249	-8.396	59	.000
Pair 4	Gender - UFATG	-2.28333	1.62701	.21005	-2.70364	1.86303	10.871	59	.000

The findings of Paired Sample T-Test indicated significant differences of male and female coaches in Knowledge and understanding (KTG) about transgender athletes ( $p=.000 < 0.05$ ); discrimination (DTG) against transgender athletes ( $p=.000 < 0.05$ ); taking part in sports (IDTG) with female identity ( $p=.000 < 0.05$ ) and having unfair benefits (UFATG) as ( $p=.000 < 0.05$ ).

### Discussion

According to the findings of this study, coaches expressed some reservations regarding the inclusion of TG athletes in college and university sports. The first concern is that TG men will not have a significant advantage over their peers in male sports, whereas TG women will have an advantage in female sports at the college or university level. According to Voyles, (2019), this response may be due to coaches' misperceptions regarding TG participation in competitive sports. According to Müller (2016), the perception that a female TG has a higher "testosterone count which takes into account muscle mass and bone density" gives the TG female an advantage over female athletes.

This belief contributes to the perception that female athletes are the weaker sex and creates the

fear that female athletes will be injured by TG female athletes. Almost all of the coaches felt confident explaining TG SP because they had a solid understanding of the subject. While more than half of respondents stated that they lack sufficient knowledge regarding the SP of TG athletes. According to Patel (2000), this finding suggests that there is a lack of uniformity among educational establishments regarding the SP of TG athletes. This, in conjunction with the fact that 66% of coaches indicated that their institution is not prepared to accommodate a TG male athlete, points to a lack of administrative guidance that could lead coaches to mishandle TG athlete-related situations (Jones et al., 2017). According to Stenling (2016), a coach may not be able to make decisions objectively, which will cause the coach to use their own personal value system to enforce procedures, putting them at risk for discriminatory practices.

Despite seventy-three percent of college/university level coaches responded that competitive sports are an integral part of a student's personal and social development, sixty-five percent of coaches do not believe that male TG athletes would be accepted socially within a respective competitive sports team. Seventy-five percent of coaches also believe that female TG

athletes would not be accepted socially within a respective competitive sports team. The finding forms another question to be answered. If sports are an avenue for athletes to be socially accepted by their peers, what are some reasons why coaches feel that TG athletes would not be socially accepted by their peers (Tanimoto & Miwa, 2021)?

Although coaches' responses show an agreeance that educational institutes have the responsibility to provide guidance supporting or rejecting the idea of TG participation and eligibility in college/university level competitive sports, coaches also show that there is an issue with the implementation with consideration to fairness that has yet to be decided. All the coaches responded that educational institutes have a responsibility to draft policy that outlines in what capacity TG athletes are eligible to participate in college/university level athletics (Jones et al., 2017). However, coaches also felt that a policy that allows college/university level TG athletes to participate in college/university level competitive sports based on gender identity is unfair.

Diverse strategies exist to increase TG athletes' participation in college and university level sports. They include open categories as well as a protected female category that does not include males who have reached puberty (Reynolds & Hamidian, 2021). There are female and open categories for participation in competitive sports in some nations, but there are no restrictions for recreational sports (Martnková et al., 2021). Other people have suggested adding a third category for any competitor, but it's not clear if there would be enough people in it to have any real competition. Ivy & Conrad, (2018) suggested the use of handicap systems that take into account a player's individual skill to reduce performance advantages in sports. Some people suggested using divisions based on other metrics, like TG athletes' height, skill, and strength, instead of sex categories (Andreato et al., 2017). Mixed-gender

non-contact sports teams are one strategy that has been used to increase grassroots sports participation. Diverse players are permitted to choose which sex category they want to participate in by some amateur and youth organizations.

## References

1. Adom, A., Kofi Nyarko, I., Narki, G., & Som, K. (2016). Journal of Resources Development and Management [www.iiste.org](http://www.iiste.org) ISSN. An International Peer-Reviewed Journal, 24(1). <https://core.ac.uk/download/pdf/234696346.pdf>
2. Andreato, L. V., Lara, F. J. D., Andrade, A., & Branco, B. H. M. (2017). Physical and Physiological Profiles of Brazilian Jiu-Jitsu Athletes: a Systematic Review. *Sports Medicine - Open*, 3(1). <https://doi.org/10.1186/s40798-016-0069-5>
3. Asare, J. G. (2019). Why The "I Don't See Color" Mantra Is Hurting Your Diversity And Inclusion Efforts. *Forbes*. <https://www.forbes.com/sites/janicegassam/2019/02/15/why-the-i-dont-see-color-mantra-is-hurting-diversity-and-inclusion-efforts/?sh=2ad8838a2c8d>
4. Baiocco, R., Pistella, J., Salvati, M., Ioverno, S., & Lucidi, F. (2018). Sexual prejudice in sport scale: A new measure. *Journal of Homosexuality*, 1–24. <https://doi.org/10.1080/00918369.2018.1547560>
5. Barabasch, A. (2018). The narrative approach in research and its use for policy advice. *International Journal of Lifelong Education*, 37(4), 468–481. <https://doi.org/10.1080/02601370.2018.1506517>
6. Barras, A. (2021). THE LIVED EXPERIENCES OF TRANSGENDER AND NON-BINARY PEOPLE IN



- EVERYDAY SPORT AND PHYSICAL EXERCISE IN THE UK. [https://cris.brighton.ac.uk/ws/portalfiles/portal/31240349/BARRAS\\_thesis.pdf](https://cris.brighton.ac.uk/ws/portalfiles/portal/31240349/BARRAS_thesis.pdf)
7. Bianchi, A. (2017). Transgender women in sport. *Journal of the Philosophy of Sport*, 44(2), 229–242. <https://doi.org/10.1080/00948705.2017.1317602>
  8. Chan Swe, N., Ahmed, S., Eid, M., Poretsky, L., Gianos, E., & Cusano, N. E. (2022). The effects of gender-affirming hormone therapy on cardiovascular and skeletal health: A literature review. *Metabolism open*, 13, 100173. <https://doi.org/10.1016/j.metop.2022.100173>
  9. Channon, A., Dashper, K., Fletcher, T., & Lake, R. J. (2015). The promises and pitfalls of sex integration in sport and physical culture. *Sport in Society*, 19(8-9), 1111–1124. <https://doi.org/10.1080/17430437.2016.1116167>
  10. Chih, C., Wilson-Yang, J. Q., Dhaliwal, K., Khatoon, M., Redman, N., Malone, R., Islam, S., & Persad, Y. on behalf of the Trans PULSE Canada Team (2020). Health and wellbeing among racialized trans and non-binary people in Canada. *TransPulse*. <https://transpulsecanada.ca/results/report-health-and-well-being-among-racializedtrans-and-non-binary-people-in-canada/>
  11. Clarkson, N. L. (2014). *Biometrics*. In *TSQ: Transgender Studies Quarterly* (pp. 35-38). Durham, North Carolina: Duke University Press.
  12. Cunningham, G. B., & Pickett, A. C. (2017). Trans prejudice in sport: Differences from LGB prejudice, the influence of gender, and changes over time. *Sex Roles*, 78(3-4), 220– 227. <https://doi.org/10.1007/s11199-017-0791-6>
  13. Devine, J. W. (2018). Gender, Steroids, and Fairness in Sport. *Sport, Ethics and Philosophy*, 13(2), 161–169. <https://doi.org/10.1080/17511321.2017.1404627>
  14. Devís-Devís, J., Pereira-García, S., López-Cañada, E., Pérez-Samaniego, V., & FuentesMiguel, J. (2017). Looking back into trans persons' experiences in heteronormative secondary physical education contexts. *Physical Education and Sport Pedagogy*, 23(1), 103–116. <https://doi.org/10.1080/17408989.2017.1341477>
  15. Elling-Machartzki, A. (2017). Extraordinary body-self narratives: Sport and physical activity in the lives of transgender people. *Leisure Studies*, 36(2), 256–268. <https://doi.org/10.1080/02614367.2015.1128474>
  16. Fink, J. S., Lavoie, N. M., & Newhall, K. E. (2016). Challenging the gender binary? Male basketball practice players views of female athletes and womens sports. *Sport in Society*, 19(8-9), 1316–1331. <https://doi.org/10.1080/17430437.2015.1096252>
  17. Fogel, C. A., & Quinlan, A. (2015). Cyber backlash and the maintenance of sex segregation in professional sport. *Gender Studies*, 14(1), 171–189. <https://doi.org/10.1515/genst2016-0011>
  18. Frost, N., & Elichaooff, F. (2014). Chapter 3: Feminist postmodernism, poststructuralism and critical theory. In S. N. Hesse-Biber (Ed.), *Feminist research practice: A primer*, second edition (pp. 42-72). Thousand Oaks, California: SAGE Publications

19. Giblon, R., & Bauer, G. R. (2017). Health care availability, quality, and unmet need: A comparison of transgender and cisgender residents of Ontario, Canada. *BMC Health Services Research*, 17(1), 283-283. <https://doi.org/10.1186/s12913-017-2226-z>
20. Handelsman, D. J., Hirschberg, A. L., & Bermon, S. (2018). Circulating Testosterone as the Hormonal Basis of Sex Differences in Athletic Performance. *Endocrine reviews*, 39(5), 803-829. <https://doi.org/10.1210/er.2018-00020>
21. Hargie, O. D., Mitchell, D. H., & Somerville, I. J. (2017). 'People have a knack of making you feel excluded if they catch on to your difference': Transgender experiences of exclusion in sport. *International Review for the Sociology of Sport*, 52(2), 223-239. <https://doi.org/10.1177/1012690215583283>
22. Harper, J. (2015, April 1). Do transgender athletes have an edge? I sure don't. Retrieved from The Washington Post: [http://www.washingtonpost.com/opinions/do-transgender-athletes-have-an-edge-i-sure-dont/2015/04/01/ccacb1da-c68e-11e4-b2a1-bed1aaea2816\\_story.html](http://www.washingtonpost.com/opinions/do-transgender-athletes-have-an-edge-i-sure-dont/2015/04/01/ccacb1da-c68e-11e4-b2a1-bed1aaea2816_story.html)
23. Hilton, E. N., & Lundberg, T. R. (2020). Transgender Women in the Female Category of Sport: Perspectives on Testosterone Suppression and Performance Advantage. *Sports Medicine*, 51(2), 199-214. <https://doi.org/10.1007/s40279-020-01389-3>
- a. <https://www.diva-portal.org/smash/get/diva2:1014932/FULLTEXT01.pdf>
24. Ivy, V., & Conrad, A. (2018). Including Trans Women Athletes in Competitive Sport: Analyzing the Science, Law, and Principles and Policies of Fairness in Competition. *Philosophical Topics*, 46(2), 103-140. <https://www.jstor.org/stable/26927952>
25. Jones, B. A., Arcelus, J., Bouman, W. P., & Haycraft, E. (2017). Sport and Transgender People: A Systematic Review of the Literature Relating to Sport Participation and Competitive Sport Policies. *Sports medicine (Auckland, N.Z.)*, 47(4), 701-716. <https://doi.org/10.1007/s40279-016-0621-y>
26. Jones, B. A., Arcelus, J., Bouman, W. P., & Haycraft, E. (2017). Barriers and facilitators of physical activity and sport participation among young transgender adults who are medically transitioning. *The International Journal of Transgenderism*, 18(2), 227-238. <https://doi.org/10.1080/15532739.2017.1293581>
27. Kim, Y., & Park, I. (2020). "Coach Really Knew What I Needed and Understood Me Well as a Person": Effective Communication Acts in Coach-Athlete Interactions among Korean Olympic Archers. *International journal of environmental research and public health*, 17(9), 3101. <https://doi.org/10.3390/ijerph17093101>
28. Kulick, A., Wernick, L. J., Espinoza, M. A. V., Newman, T. J., & Dessel, A. B. (2018). Three strikes and you're out: Culture, facilities, and participation among LGBTQ youth in sports. *Sport, Education and Society*, 24(9), 939-953. <https://doi.org/10.1080/13573322.2018.1532406>
29. Martínková, I., Knox, T., Anderson, L., & Parry, J. (2022). Sex and gender in

- sport categorization: aiming for terminological clarity. *Journal of the Philosophy of Sport*, 49(1), 1–17. <https://doi.org/10.1080/00948705.2022.2043755>
30. Masuyama, K., Shojō, H., Nakanishi, H., Inokuchi, S., & Adachi, N. (2017). Sex Determination from Fragmented and Degenerated DNA by Amplified Product-Length Polymorphism Bidirectional SNP Analysis of Amelogenin and SRY Genes. *PLoS one*, 12(1), e0169348. <https://doi.org/10.1371/journal.pone.0169348>
31. Morris, J. F., & van Raalte, J. L. (2016). Transgender and gender nonconforming athletes: Creating safe spaces for all. *Journal of Sport Psychology in Action*, 7(2), 121–132. <https://doi.org/10.1080/21520704.2016.1184732>
32. Müller, M. (2016). Constructing gender incommensurability in competitive sport: Sex/gender testing and the new regulations on female hyperandrogenism. *Human Studies*, 39(3), 405–431. <https://doi.org/10.1007/s10746-016-9397-1>
33. Oakleaf, L., & Richmond, L. P. (2017). Dreaming about access: The experiences of transgender individuals in public recreation. *Journal of Park and Recreation Administration*, 35(2), 108–119. <https://doi.org/10.18666/jpra-2017-v35-i2-7363>
34. Patel, S. (2021). Gaps in the protection of athletes gender rights in sport—a regulatory riddle. *The International Sports Law Journal*. <https://doi.org/10.1007/s40318-021-00182-2>
35. Pérez-Samaniego, V., Fuentes-Miguel, J., Pereira-García, S., López-Cañada, E., & DevísDevís, J. (2019). Experiences of trans persons in physical activity and sport: A qualitative meta-synthesis. *Sport Management Review*, 22(4), 439–451. <https://doi.org/10.1016/j.smr.2018.08.002>
36. Reynolds, A., & Hamidian Jahromi, A. (2021). Transgender Athletes in Sports Competitions: How Policy Measures Can Be More Inclusive and Fairer to All. *Frontiers in sports and active living*, 3, 704178. <https://doi.org/10.3389/fspor.2021.704178>
37. Stamarski, C. S., & Son Hing, L. S. (2015). Gender inequalities in the workplace: the effects of organizational structures, processes, practices, and decision makers' sexism. *Frontiers in psychology*, 6, 1400. <https://doi.org/10.3389/fpsyg.2015.01400>
38. Stenling, A. (2016). Sports coaches' interpersonal motivating styles: Longitudinal associations, change, and multidimensionality.
39. Stewart, L., Oates, J., & O'halloran, P. (2018). “My voice is my identity”: The role of voice for trans women's participation in sport. *Journal of Voice*, 34(1), 78–87. <https://doi.org/10.1016/j.jvoice.2018.05.015>
40. Sudai M. (2017). The testosterone rule-constructing fairness in professional sport. *Journal of law and the biosciences*, 4(1), 181–193. <https://doi.org/10.1093/jlb/lx004>
41. Tanimoto, C., & Miwa, K. (2021). Factors influencing acceptance of transgender athletes. *Sport Management Review*, 24(3), 452–474.

<https://doi.org/10.1080/14413523.2021.1880771>

42. Teetzel, S., & Weaving, C. (2017). Gender discrimination in sport in the 21st century: A commentary on trans-athlete exclusion in Canada from a sociohistorical perspective. *Sport History Review*, 48(2), 185-193. <https://doi.org/10.1123/shr.2017-0004>
43. Voyles, C. (2019). Sex segregation in sport: A denial of rights and opportunities for health. *Health and Human Rights Journal*. <https://www.hhrjournal.org/2019/06/sex-segregation-in-sport-a-denial-of-rights-and-opportunities-for-health/>