

Examining Constraints to Sport Participation among Immigrant Adolescent Girls who reside in the Greater Toronto Area

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Abstract:

Despite numerous benefits associated with sport, rates of sport participation are low among adolescent girls. Although research has documented this decline, it tends to ignore diverse samples such as immigrants. This study examined constraints to sport participation among immigrant adolescent girls who reside in the Greater Toronto Area. Guided by Newell's theory of constraints, a secondary analysis was conducted on survey responses from 90 participants. Constraints found among immigrant girls included family sport participation, friends encouragement, belief that certain sports were not for girls and physical intensity. Additionally, findings showed that immigrant girls face more environmental constraints compared to those who did not immigrate. Information gathered highlights constraints among this sample which may aid in informing future programs.

Keywords: Sport, Immigrant, Girls, Constraints, Adolescent

Highlights

- Sport participation is low among adolescent girls especially among minority sub-groups
- Results suggest girls who immigrate face more environmental constraints
- Findings are relevant for programs that increase sport participation among girls

1.1 Introduction

Participation in sport influences many aspects of one's life including their health, social networks, and overall quality of living. Research has shown that regular sport participation is linked to numerous benefits such as reduction in chronic diseases, greater mental health, and better quality of life¹⁻³. Despite this knowledge, there is concern regarding the rates of sport participation among adolescents, especially among female adolescents, as many girls transition away from sport during this time period^{1,4}.

During adolescence, which is a key time period in determining future participation in sports, sport participation for girls is shown to drop by 22%⁵. As a

result, potential factors or constraints to sport participation have been explored and identified among adolescent girls. Common constraints to sport participation include lack of time, energy or family support, low perceived competence and self-efficacy, and importance for priorities and responsibilities⁶⁻⁹. Although research has examined constraints among adolescent girls, studies have used homogenous samples with minimal diversity in relation to participants' characteristics^{8,10}. This has resulted in limited representation of certain groups such as minorities or immigrants within sport research.

According to Statistics Canada (2010), an immigrant is defined as an individual who is residing in Canada and was born outside of Canada. As Canada's

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population continues to become more diverse with increased immigration, there is a need to examine differences in sport participation levels especially among adolescents from immigrant families¹². Within Canada, the Greater Toronto Area (GTA) has one of the largest shares of foreign born individuals and remains one of the main destinations for individuals who immigrate to Canada¹³. Thus, when examining constraints to sport participation among immigrant populations, it is critical to focus on regions such as the GTA, which represent a significant portion of individuals who have immigrated to Canada. Furthermore, it is important to focus on adolescent girls as rates of sport participation are lower among immigrant females compared to males^{14,15}.

In regards to the Canadian population, despite research exploring constraints to sport participation among immigrant adolescents, there is limited literature specific to sport participation among girls¹⁶⁻²². At the same time, literature suggests that there were differences in the challenges faced by immigrant girls compared to boys, which needed to be explored in future studies^{16,17}. To address this gap, this research examined constraints to sport participation among immigrant adolescent girls who resided in the Greater Toronto Area (GTA). The research objectives for this study included the following:

1. To identify individual, environmental, and task constraints to sport participation among immigrant adolescent girls who reside in the Greater Toronto Area (GTA).
2. To determine the most significant constraints that are negatively associated with sport participation among immigrant adolescent girls who reside in the Greater Toronto Area (GTA).

3. To compare the most significant constraints to sport participation between immigrant and non-immigrant adolescent girls who reside in the Greater Toronto Area (GTA).

In meeting the study objectives, Newell's model of constraints is used to guide the identification of the significant constraints. The model illustrates how individual, environmental, and task constraints can interact and affect one's motor development and performance²³. In regard to sport participation, Newell's model aids in identifying how different categories of constraints may affect sport participation among immigrant adolescents. Individual constraints are related to an individual's structural characteristics such as height or weight and functional characteristics such as motivation. Environmental constraints relate to the constraints that surround an individual such as social support, location, or cultural norms. Lastly, task constraints relate to the skills that are involved in a specific task such as having the strength or ability to do a certain sport. Thus, the constraints found within the study will be examined through Newell's model to determine what type of constraints are present among immigrant adolescent girls.

1.2 Methodology

1.2.1 Participants

For this study, a secondary analysis was performed on a subsample of survey responses collected from adolescent girls in Ontario. A total of 410 participants were selected based on the inclusion criteria, which required girls between the age of 13-19, who resided in the Greater Toronto Area. Those who did not reside in the GTA were excluded. Participants included 90 immigrants (Table 1) and 320 non-immigrants (Table 2). This study was approved by the Ontario Tech University Ethics Committee.

Table1. Sociodemographic Variables for our sub-sample of Immigrant Adolescent Girls (n=90)

Variable	References	Frequencies (n)	Percent	Mean/SD
Age				16.3/1.45
Years since Immigration				8.25/4.973
GTA region	Toronto	37	41.1%	
	Durham	20	22.2%	
	York	17	18.9%	
	Peel	6	6.7%	

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Country born	Halton	10	11.1%
	British Isles	4	4.4%
	Europe	9	10.0%
	United States	9	10.0%
	South America	4	4.4%
	Africa	6	6.7%
	Asia	56	62.2%
Ethnicity	Oceania and others	2	2.2%
	Black	5	5.7%
	East Asian	13	14.8%
	Latin American	1	1.1%
	Middle Eastern	9	10.2%
	South Asian	21	23.9%
	South East Asian	14	15.9%
	White	14	15.9%
Sport Participation	Other	4	4.5%
	Mixed	7	8.0%
	Don't Participate	44	48.9%
	Participate	46	51.1%

Table 2. Sociodemographic Variables for our sub-sample of Non-immigrant Adolescent Girls (n=320)

Variable	References	Frequencies (n)	Percent	Mean/SD
Age				16.05/1.259
GTA region	Toronto	111	34.7%	
	Durham	110	34.4%	
	York	56	17.5%	
	Peel	22	6.9%	
	Halton	21	6.6%	
Ethnicity	Black	12	3.8%	
	East Asian	33	10.9%	
	First Nations, Métis or Inuit	3	0.9%	
	Latin American	6	1.9%	
	Middle Eastern	9	2.8%	
	South Asian	38	11.9%	
	South East Asian	5	1.6%	
	White	158	49.5%	
	Other	19	6.0%	
Sport Participation	Mixed	36	11.3%	
	Don't Participate	112	35.1%	
	Participate	207	64.9%	

Instrument

The survey was developed by a team of researchers and consists of questions related to constraints to sport participation among adolescent girls. Survey validation was conducted through a consultation of an expert panel and was piloted to test for reliability²⁴. Data referred to a total of 51 different categories of constraints which were selected based on previous literature regarding sport participation, and were further sorted into either individual, environmental, or task constraints based on Newels model²⁴.

1.2.2 Data Analysis

Data analysis for this subsample involved determining an association

between each constraint and regular sport participation. In regards to measuring constraints, 77 variables were examined in the survey which were based on constraints to sport participation found in previous literature²⁴. Bivariate analyses were held to identify which individual, environmental, and task constraints were associated with sport participation among immigrant girls. A significant association between a variable and regular sport participation was determined as any p value less than 0.05 within the Pearson chi-square test or independent t-test. Multivariate analyses were performed through binary logistic regression in which the most influential constraints to sport participation were determined among immigrant girls. All variables that had a p-value of less than 0.1

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in either the Pearson chi-square test or independent t-test were entered into the logistic regression model through a forward conditional model to identify up to five significant variables based on recommendations from experts in the field.

1.3 Results

1.3.1 Bivariate Analysis among Immigrant Girls

Based on the bivariate analyses, 15 constraints were found to have a significant association with sport participation among immigrant adolescent girls which consisted of eight individual constraints (Table 3), five environmental constraints (Table 4) and two task constraints (Table 5).

Statistically significant individual constraints included perceived speed ($p=0.001$), birth order ($p=0.003$), having energy ($p=0.004$), comfort with dress code ($p=0.017$), perceived flexibility ($p=0.017$), housekeeping ($p=0.039$), perceived assertiveness ($p=0.047$) and perceived competence ($p=0.049$). In regards to association, among girls who reported low perceived speed, 84.2% of participants did not regularly participate in sports compared to 15.8% of participants who regularly participated in sports. Similarly, among those who reported low perceived flexibility, 73.7% did not participate in sports regularly compared to 26.3% of participants who did participate. Information on associations for all individual variables are presented in Table 3.

Table 3 Significant Individual Constraints for Immigrant Adolescent Girls($n=90$)

Variable	Reference	Does not Participate in sports	Participates in sports	Chi-Square	P value
Perceived Speed*	Low	84.2%	15.8%	12.025	0.001
	High	39.4%	60.6%		
Birth Order*	Only Child	33.3%	66.7%	12.706	0.003
	First Born	63.8%	36.2%		
	Youngest	55.0%	45.0%		
	Middle	8.3%	91.7%		
Has Energy to Participate in sports*	Disagree	100%	0%	8.364	0.004
	Agree	43%	57%		
Comfortable with Dress code of sport*	Disagree	100%	0%	6.301	0.017
	Agree	42.3%	57.7%		
Perceived Flexibility	Low	73.7%	26.3%	5.681	0.017
	High	42.9%	57.1%		
Housekeeping Duties	No	27.8%	72.2%	4.276	0.039
	Yes	55.2%	44.8%		
Perceived Assertiveness*	Low	80%	20%	4.358	0.047
	High	45%	55%		
Perceived Competence *	Disagree	73.3%	26.7%	4.304	0.049
	Agree	44%	56%		

* Fisher's Test P-value used for those constraints that had cell count less than 5

In regards to environmental constraints, variables such as air quality ($p=0.01$), family sport participation ($p=0.005$), having opportunities available outside of school ($p=0.006$), belief that certain sports are not for girls ($p=0.017$) and friends' encouragement ($p=0.019$), were all significant. Results showed that

among girls who reported not having family members who regularly participate in sports, or not having encouragement from their friends, 66.7% did not participate in sports regularly whereas 33.3% of girls did participate regularly in sports. Results for each environmental variable are demonstrated in Table 4.

Table 4. Significant Environmental Constraints for Immigrant Adolescent Girls($n=90$)

Variable	Reference	Does not Participate in sports	Participates in sports	Chi-Square	P value
Family Participates Regularly in Sports	Disagree	66.7%	33.3%	7.859	0.005
	Agree	34.6%	65.4%		

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Has opportunities outside of School for sport	Disagree	65.8%	34.2%	7.518	0.006
	Agree	36.5%	63.5%		
Outdoor Air quality affects sport participation	Disagree	54.7%	45.3%	6.722	0.01
	Agree	22.7%	77.3%		
Belief that there are certain sports in which girls should NOT participate *	Disagree	55.6%	44.4%	6.403	0.017
	Agree	22.2%	77.8%		
Friends Encourage sport participation	Disagree	66.7%	33.3%	5.470	0.019
	Agree	39.3%	60.7%		

* Fisher's Test P-value used for those constraints that had cell count less than 5

In terms of task constraints, physical intensity of the sport ($p=0.001$) and long duration of the sport ($p=0.022$) were both significant among this sample. Among participants who were not likely to participate in physically intense sports, 73.8% did not participate regularly

compared to 21.7% who participated. Similarly, among participants who were less likely to participate in sports that had a long duration, 70.0% did not regularly participate in sports compared to 30.0% who did regularly participate in sports (Table 5).

Table 5. Significant Task Constraints for Immigrant Adolescent Girls (n=90)

Variable	Reference	Does not Participate in sports	Participates in sports	Chi-Square	P value
Participate in Sport that is Physically Intense	Not Likely	78.3%	21.7%	10.667	0.001
	Likely	38.8%	61.2%		
Participate in Sport that has Long Duration	Not Likely	70%	30%	5.271	0.022
	Likely	40.6%	59.4%		

Note: * Fisher's Test P-value used for those constraints that had cell count less than 5

1.3.2 Bivariate Analysis among Non-Immigrant Girls

In regards to immigrant adolescent girls who did not immigrate, 43 variables were found significant through bivariate analysis which comprised of 20 individual constraints (Table 6), 17 environmental constraints (Table 7) and 6 task constraints (Table 8).

Individual constraints included race ($p=0.000$), self-reported overall health ($p=0.000$), having energy ($p=0.000$), having time ($p=0.000$), enjoying sports ($p=0.000$), perceived competence ($p=0.000$), confidence ($p=0.000$), feeling positive ($p=0.000$), strive to excel in sports ($p=0.000$), perceived body type ($p=0.001$) sports feel gross ($p=0.004$), and comfortable with dress code ($p=0.004$). In regards to individual beliefs, constraints

included belief that sport is fun ($p=0.000$), belief that sport makes you successful ($p=0.000$) and belief sport is important ($p=0.002$). Additionally, perceived individual skills included perceived being energetic ($p=0.000$), perceived speed ($p=0.000$), perceived flexibility ($p=0.007$), perceived assertiveness ($p=0.014$) and perceived strength ($p=0.021$). In terms of direction of association, among girls who perceived themselves as not being energetic, 82.1% did not participate regularly in sports compared to 17.9% who did regularly participate. Similar patterns were demonstrated with other perceived skills in which having low speed (68.3%), low flexibility (47.5%), low assertiveness (52.5%), and low strength (47.8%) were all related to low sport participation. Information on all associations for each individual variable is presented in Table 6.

Table 6. Significant Individual Constraints for Non-Immigrant Adolescent Girls (n=320)

Variable	Reference	Does not Participate in sports	Participates in sports	Chi-square	P value
Race *	Black	58.3%	41.7%	36.211	0.000
	East Asian	45.5%	54.5%		
	First Nations, Métis or Inuit	66.7%	33.3%		
	Latin American	50%	50%		

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	Middle Eastern	11.1%	88.9%		
	South Asian	68.4%	31.6%		
	South East Asian	60%	40%		
	White	26.1%	73.9%		
	Other	26.3%	73.7%		
	Mixed	25.0%	75.0%		
Self-rated Overall Health	Not Good	56.4%	43.6%	13.782	0.000
	Good	30.2%	69.8%		
Has Energy to Participate in Sports*	Disagree	85.2%	14.8%	32.646	0.000
	Agree	30.3%	69.7%		
Have Time to Participate in Sports	Disagree	71.9%	28.1%	22.019	0.000
	Agree	30.3%	69.7%		
Enjoy Sports	Disagree	83.3%	16.7%	33.609	0.000
	Agree	30.2%	69.8%		
Perceived Competence	Disagree	83.8%	16.7%	41.421	0.000
	Agree	29.0%	71.0%		
Confident	Disagree	76.9%	23.1%	62.646	0.000
	Agree	24.4%	75.6%		
Belief: Sport is Fun*	Disagree	82.4%	17.6%	17.487	0.000
	Agree	32.6%	67.4%		
Sports help feel positive *	Disagree	89.3%	10.7%	39.753	0.000
	Agree	29.8%	70.2%		
Strive to Excel in sports	Disagree	82.1%	17.9%	27.84	0.000
	Agree	30.8%	69.2%		
Belief: Sport participation makes you Successful	Disagree	80.0%	20.0%	34.989	0.000
	Agree	29.4%	70.6%		
Perceived Energetic	Low	82.1%	17.9%	29.803	0.000
	High	30.6%	69.4%		
Perceived Speed	Low	68.3%	31.7%	37.576	0.000
	High	27.1%	72.9%		
Perceived body type	Not Average	54.0%	46.0%	11.175	0.001
	Average	31.2%	68.8%		
Belief: Sport is Important	Disagree	68.4%	31.6%	9.763	0.002
	Agree	33.1%	66.9%		
Participate in sports feels gross	Disagree	30.7%	69.3%	8.392	0.004
	Agree	48.7%	51.3%		
Comfortable with Dress Code of Sport	Disagree	68.8%	31.2%	8.483	0.004
	Agree	33.1%	66.9%		
Perceived Flexibility	Low	47.5%	52.5%	7.195	0.007
	High	31.0%	69.0%		
Perceived Assertiveness	Low	52.5%	47.5%	6.061	0.014
	High	32.6%	67.4%		
Perceived Strength	Low	47.8%	52.2%	5.313	0.021
	High	32.0%	68.0%		

* Fisher's Test P-value used for those constraints that had cell count less than 5

Environmental constraints included having friends (p=0.000), culture (p=0.001), opportunity at school (p=0.004), family afford (p=0.007) parent high school education (p=0.007), opportunity outside of school (p=0.012), people think sport is important (p=0.013), society thinks sport is important (p=0.016), and family participates regularly (p=0.021). Furthermore, constraints related to the physical environment included facilities nearby (p=0.002), greenspace (p=0.004), safe places (p=0.007), clean facilities (p=0.039), and overcrowded facilities

(p=0.041). Additionally, constraints related to weather included cold temperature (p=0.016), rain (p=0.022), hot temperature (p=0.027). In regards to association, among girls who did not have friends, 69.7% of them did not participate regularly in sports compared to 30.3% who did participate regularly. Likewise, among girls who reported not having green space, 68.8% did not participate regularly whereas 31.1% did participate. Information regarding significant environment constraints is presented in Table 7.

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Table 7. Significant Environmental Constraints for Non-Immigrant Adolescent Girls (n=320)

Variable	Reference	Does not Participate in sports	Participates in sports	Chi-square	P value
Have Friends that Participate in Sports	Disagree	69.7%	30.3%	19.183	0.000
	Agree	31.2%	68.8%		
Culture expects girls to participate in sport	Disagree	47.0%	53.0%	11.045	0.001
	Agree	28.6%	71.4%		
Facilities near me offers Sports	Disagree	51.8%	48.2%	9.421	0.002
	Agree	30.2%	69.8%		
Opportunity at School for Sport	Disagree	56.8%	43.2%	8.416	0.004
	Agree	32.5%	67.5%		
Green Space	Disagree	68.8%	31.3%	8.488	0.004
	Agree	33.1%	66.9%		
Family Afford Sports	Disagree	60.0%	40.0%	7.365	0.007
	Agree	33.0%	67.0%		
Safe Places	Disagree	56.3%	43.8%	7.374	0.007
	Agree	32.4%	67.6%		
Parent 2 High school Education	Did not complete	61.9%	38.1%	7.224	0.007
	Completed	32.8%	67.2%		
Opportunity outside School for Sports	Disagree	45.0%	55.0%	6.254	0.012
	Agree	30.6%	69.4%		
People I know think sport is important.	Disagree	54.5%	45.5%	6.103	0.013
	Agree	32.9%	67.1%		
Sport Participation Important in Society	Disagree	59.1%	40.9%	5.841	0.016
	Agree	33.6%	66.4%		
Cold temperature affects sport participation	Disagree	24.4%	75.6%	5.834	0.016
	Agree	38.8%	61.2%		
Family Participates Regularly in Sports	Disagree	46.2%	53.8%	5.297	0.021
	Agree	31.8%	68.2%		
Rain affects sport participation	Disagree	26.0%	74.0%	5.216	0.022
	Agree	39.0%	61.0%		
Hot Temperature affects sport participation	Disagree	28.6%	71.4%	4.889	0.027
	Agree	40.5%	59.5%		
Clean Facilities	Disagree	55.6%	44.4%	4.255	0.039
	Agree	31.9%	68.1%		
Not Overcrowded Facilities	Disagree	47.5%	52.5%	4.175	0.041
	Agree	31.1%	68.9%		

Task constraints among this group included sports that have a long duration (p=0.000), sports that are physically intense (p=0.000), sports that are competitive (p=0.000), sports that have strict rules (p=0.000), sports that include both boys and girls (p=0.025) and sports that require contact (p=0.039). In particular, among girls who were less likely to participate in sports that are physically intense, 61.4% did not participate regularly in sports compared to

38.6% of those who did participate regularly. Similar associations are shown among girls who did not regularly participate in sports and who were less likely to participate in sports that were competitive (67.3%), have long duration (61.1%), are physically intense (61.4%), that have strict rules (54.5%), that have both boys and girls (46.3%), and that required contact (46.8%).

Table 8. Significant Task Constraints from Bivariate Analysis for Non-Immigrant Adolescent Girls (n=320)

Variable	Reference	Does not Participate in sports	Participates in sports	Chi-square	P value
Participate in sports that are competitive	Not Likely	67.3%	32.7%	30.197	0.000
	Likely	28.4%	71.6%		
Participate in sports that have Long Duration	Not Likely	61.1%	38.9%	20.052	0.000
	Likely	29.2%	70.8%		
Participate in sport that is Physically Intense	Not Likely	61.4%	38.6%	22.339	0.000
	Likely	28.5%	71.5%		

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Participate in sports that have Strict Rules	Not Likely	54.5%	45.5%	17.705	0.000
	Likely	28.3%	71.7%		
Participate in sports that have both Girls and Boys	Not Likely	46.3%	53.7%	5.019	0.025
	Likely	31.8%	68.2%		
Participate in sports that require contact	Not Likely	46.8%	53.2%	4.267	0.039
	Likely	31.9%	68.1%		

1.3.3 Multivariate Analysis for Immigrant Adolescent Girls

Results of binary logistic regression included constraints that were significant in the bivariate analysis, as well as those that had a p-value of less than 0.1. These additional constraints included age (p=0.064), perceived overall health (p=0.058) parent high school education (p=0.052), enjoy sports (p=0.066), culture (0.094), energetic (p=0.066). A total of 21 constraints were entered into the binary logistic regression.

Results of multivariate analysis revealed four significant constraints to sport participation among immigrant adolescent girls (Table 9). Results suggest that those who had family members that did not participate in sports were less likely to

participate in sports (OR=0.123, 95% CI 0.026-0.572, p=0.008). In regards to belief that certain sports are not for girls, those who disagreed were less likely to participate in sports (OR= 0.066, 95% CI 0.007-0.596, p=0.015). Additionally, those who had friends that did not encourage them to participate in sports were less likely to participate in sports (OR= 0.096, 95% CI 0.014—0.643, p=0.016). Lastly, physical intensity was found to be the only significant task constraint, whereby those who did not prefer physically intense sports were less likely to participate (OR= 0.086, 95% CI 0.010-0.741, p =0.026). As a result, findings of this analysis determined four constraints: friends' encouragement, family sport participation, belief that certain sports are not for girls, and physical intensity.

Table 9. Binary Logistic Regression Results for Immigrant Adolescent Girls(n=90)

Variable	Constraint	Reference	Odds Ratio	95% CI
Family Participates**	Environmental	Does not Participate	.123	(0.026,0.572)
Belief that certain sports not for girls*	Environmental	Disagree	.066	(0.007,0.596)
Friends Encourage*	Environmental	Does not Encourage	.096	(0.014,0.643)
Physical Intensity *	Task	Less likely	0.086	(0.010,0.741)

** p value <0.01* p value <0.05

1.3.4 Multivariate Analysis for Non-Immigrant Adolescent Girls

Constraints identified within the bivariate analysis along with any additional constraints that had a p-value of less than 0.1 were entered into a binary logistic regression to identify the most significant constraints among non-immigrant adolescent girls. Additional constraints included body satisfaction (p=0.052), sidewalk safety (p=0.056), having a negative experience (p= 0.058), humidity (p=0.064), employment (p=0.067), weather prevents (p=0.073) and family support (p=0.089). A total of 50 constraint variables were entered.

Results of the binary logistic regression for adolescent girls who did not immigrate found 10 significant constraints

(Table 10). This included confidence, perceived being energetic, having time, feeling positive, green space, rain, perceived flexibility, having friends, opportunity outside of school and the competitiveness of the sport. Based on the results, those who feel less confident (OR= 0.074, 95% CI 0.019-0.283, p=0.00), perceive themselves as less energetic (OR= 0.029, 95 CI 0.004-0.187, p=0.00) and less flexible (OR=0.264, 95% CI 0.095-0.733, p=0.011), have less time (OR= 0.074, 95 CI% 0.015-0.356, p=0.001) and who feel less positive (OR=0.026, 95 CI% 0.002-0.288, p=0.003), are all individuals who are less likely to participate in sports. In regards to green space, those who have less green space (OR=0.038, 95 CI% 0.003-0.407, p=0.007) in their environment are less likely to participate in sports. Alternatively, those

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who indicated that rain did not affect their participation (OR=3.793, 95% CI 1.350-10.659, $p=0.011$) were more likely to participate in sports. In terms of having friends (OR= 0.065, 95% CI=0.015-0.356, $p=0.012$), those who did not have friends were less likely to participate in sports. In regards to opportunity outside of school, those who did not have the opportunity outside (OR=2.976, 95% CI 0.002- 0.288, $p=0.051$), were more likely to participate.

Lastly, in relation to competitiveness of the sport, those who preferred less competitive sports (OR=0.236, 95% CI 0.053-1.044, $p=0.057$) were less likely to participate in sports. Within this sample, the top five constraints were determined based on p values and included the following: not feeling positive, being less energetic, not having time, low confidence and lack of green space.

Table 10. Binary Logistic Regression Results for Non-Immigrant Adolescent Girls($n=320$)

Variable	Constraint	Reference	Odds Ratio	95% CI
Confident**	Individual	Not Confident	0.074	(0.019,0.283)
Perceived Energetic**	Individual	Not Energetic	0.029	(0.004,0.187)
Have Time**	Individual	No Time	0.074	(0.015,0.356)
Positive**	Individual	Don't feel positive	0.026	(0.002,0.288)
Greenspace**	Environmental	Not a lot of green space	0.038	(0.003,0.407)
Rain*	Environmental	Does not affect sport participation	3.793	(1.350,10.659)
Perceived Flexibility*	Individual	Don't have flexibility	0.264	(0.095,0.733)
Have Friends*	Environmental	Don't have friends	0.065	(0.015,0.356)
Opportunity Outside of School	Environmental	Don't have opportunity outside	2.976	(0.002,0.288)
Competitive	Task	Not likely to participate	0.236	(0.053,1.044)

** p value <0.01, * p value <0.05

1.4 Discussion

Findings suggest that there is a clear difference in constraints to sport participation that immigrant adolescent girls face, in comparison to those experienced by adolescent girls who were born in Canada. In particular, three out of four of the top significant constraints among immigrant adolescent girls were identified as environmental. This may be a result of the change in environment when immigrating to a new country; individuals may require additional support when joining new activities. In comparison, among girls who did not immigrate, four out of five of the top constraints were identified as individual constraints.

1.4.1 Constraints to Sport Participation among Immigrant Female Adolescents

When examining environmental constraints to sport participation among immigrant girls, support from friends, family sport participation, and social norms related to sports being for females, all had significant associations. In regards to family sport participation, those whose family members did not participate in

sports regularly were found to participate in sports less. This was consistent with findings related to physical activity among female adolescents in which those parents who had inactive lifestyles influenced their daughters to also be inactive^{18,25}. Similarly, not having encouragement from friends was also associated with lower sport participation among immigrant girls in this study. This was found in previous literature regarding adolescent immigrants in Canada, in which support and interest in sports from friends and peers had a large influence on sport participation^{16,17}. In particular, friends were shown to be an important influence during adolescence; the activities young girls selected often depend on friend support^{8,25}. Thus, both results regarding family sport participation and friends encouragement support findings from previous research related to sport participation among immigrant adolescents¹⁹⁻²¹.

In addition to family participation and friends' encouragement, the belief that certain sports were not for girls also influenced sport participation. In particular, those who agreed with the belief that

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certain sports are not for girls were found to still participate in some sports. This belief may be a result of certain stereotypes presented at school which may influence the type of sports females participate in^{26,27}. A study described this theme in which females recognized basketball to be a 'male space', but would still participate in sports such as tennis and badminton²⁷. At the same time, when comparing with males, female adolescents were known to participate more often in individual physical activities compared to high-risk sports²⁸. This may be a result of attempting to be physically active while still maintaining an image of femininity. However, further exploration of social norms related to girl sport participation should be explored in future studies.

Lastly, physical intensity was also significantly associated with participation in sports; girls who did not prefer physically intense activities were less likely to participate in sports. This constraint may be related to the familiarity of sports where immigrant adolescents participated in sports less due to not knowing the sport or what it required^{16,17,29}. In particular, some immigrant youth assumed they lacked the skills to participate and were uncomfortable with the physical nature of certain sports such as basketball and hockey^{16,17}. These thoughts may also be a result of an individual's perceived competence in which the person may assume the sport may be too difficult for them. This was found among adolescent girls from diverse communities in Canada; some girls perceived themselves as not having the knowledge or skills to be active and feared being unsuccessful if they tried^{25,30}.

1.4.2 Immigrant Adolescent Girls versus Non-Immigrant Adolescent Girls

When focusing on adolescent girls who were born in Canada, findings demonstrated that individual and environmental constraints were associated with sport participation. In particular, individual constraints such as lack of time, confidence, feeling positive and being energetic were found to be the most

significant constraints among adolescent girls who were born in Canada. This is consistent with similar research regarding female adolescents who live in Canada, where challenges to sport participation involved interpersonal and environmental factors^{8,31}. Specifically, constraints among adolescent girls such as lack of time, self-image concerns, and not feeling good about participation were all consistent with the current findings^{7,8,31}. Likewise, previous research highlighted environmental challenges such as lack of peer support and accessibility to facilities which were also constraints identified within this study^{6,8,31}. Thus, there is a clear difference between the constraints faced between girls who immigrated versus those who did not immigrate.

1.4.3 Strengths and Limitations

This study determined significant constraints to sport participation for an underrepresented population. Previous studies regarding sport participation among female adolescents reported samples that had limited representation of diverse groups such as immigrants^{8,10}. Likewise, studies that focused on immigrant adolescents did not explore constraints specifically faced by females^{16-22,32}. Furthermore, in addition to providing knowledge on an underrepresented group, this study examined constraints to sport participation faced between two groups and acknowledged the differences between the two cohorts. This aided in demonstrating that different groups within a population may face different challenges to sport participation that is unique to their cohort.

Despite the various strengths, this study did have limitations regarding its generalizability. Participants all lived in the GTA and as a result, the findings may not be applicable to those living outside of the GTA. Similarly, when examining the 90 individuals who identified as immigrants, 62.2% of participants were born in countries in Asia and 23.9% of individuals identified as having a south Asian background. Thus, a large portion of the sample may share certain beliefs and cultures that may not be applicable to the rest of the immigrant population. At the same time, the definition of immigrant that

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was used did not account for how long an individual resided in Canada. As a result, the findings may differ between those who lived in Canada longer compared to those who newly arrived. Therefore, it is important to note the characteristics of this sample and not generalize findings to the entire immigrant population.

Another limitation to this study was the use of responses collected by a survey, which was developed from literature on constraints to sport participation among female adolescents. As a result, it is possible that the survey may have excluded constraints that are specific to those who immigrated. Possible constraints include specific cultural norms, experiences with discrimination, linguistic barriers, and unfamiliarity with certain sports. Thus, the use of this survey may have limited the number of constraints found among immigrant girls since its information was not based on immigrant populations. Therefore, in order to get a better understanding, further exploration of constraints to sport participation among immigrant girls is required.

1.5 Conclusion

As countries such as Canada continue to become more diverse with increased immigration, it is important to investigate sport participation among different groups as they may face complex challenges to sport participation. Through this study significant constraints to sport participation among an underrepresented group were highlighted. At the same time, this study addressed differences in constraints faced between immigrant girls and non-immigrant girls and highlighted how different groups can face different challenges exclusive to their cohort.

Overall, findings of this study provided valuable information regarding constraints to sport participation which may aid in promoting healthier lives among the Canadian adolescent population. In particular, results of this study may help in informing the development of tailored interventions for immigrant adolescent girls and their families that can mitigate the constraints faced. Given that family

participation played a role in sport participation, possible interventions can include programs that target both girls and their families in order to promote sport participation and address constraints regarding unfamiliarity of sports and social norms related to sport participation. At the same time, both immigrant and non-immigrant adolescent girls, faced various individual constraints related to self-perception and self-esteem that often limited their participation in sports. Therefore, in order to mitigate these constraints, future programs should focus on improving self-perception among girls by highlighting positive female role models who are physically active, and promoting female sport in the media^{25,33}. This may also help in improving physical activity rates for those not inclined to sports, since many girls reported intrapersonal factors such as self-efficacy and self-image concerns as reasons for not being physically active⁸. Overall, future programs and policies are imperative as participation in sports is linked to various health and social benefits that should be available to all individuals living in Canada. Thus, results of this study can inform future strategies and policies regarding sport participation among diverse adolescent populations.

Nevertheless, future studies should further examine constraints to sport participation among larger samples of immigrant adolescents and explore if there are differences in constraints faced depending on how long an immigrant resided in Canada. Similarly, studies should explore constraints to sport participation faced among individuals born in certain countries or, who identify with a specific ethnic background. Thus, future research must be inclusive of all diverse groups and focus on several different populations in order to ensure all individuals have equal opportunities to participate in sports and receive the benefits related to sport participation.

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