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Problem gambling among elite ice hockey players in Sweden – elevated prevalence among male, but not female athletes

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ABSTRACT

Objectives: An emerging body of research reveals a heightened risk of gambling problems among elite athletes, particularly among males, but these studies often suffer from small sample sizes and lack diverse representation across sports and groups. This study aimed to investigate gambling problems and their correlates among elite male and female ice hockey players in Sweden's top leagues.

Methods: During the labor union's on-site visits to Swedish ice hockey clubs in the top two tiers for males and the top tier for females, a web-based survey was conducted. Players were screened for gambling problems using the Problem Gambling Severity Index, and for depression, anxiety, and hazardous drinking using other standardized instruments. Estimated study participation was 75–80%.

Results: Among male athletes, 12% met the criteria for moderate-risk or problem gambling, while none of the females met this threshold. Approximately 24% of male and 2% of female participants reported any degree of at-risk gambling. In males, gambling problems were strongly associated with depressive and anxiety symptoms and with hazardous alcohol consumption.

Conclusion: Gambling problems are 3–4 times more prevalent among elite male ice hockey players compared to young men in the general population. The authors discuss the associated mental health consequences, vulnerability to match-fixing-related fraud, and the need for preventive measures and easy access to treatment.

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Gambling disorder; problem gambling; behavioral addiction; sports psychology; ice hockey; alcohol use disorder

Introduction

In Sweden, gambling problems are most prevalent among young adults, with 1–3% exhibiting moderate-risk gambling or problem gambling behavior [1]. Elite athletes – a subgroup comprised of primarily young adults – appear to be particularly prone to developing these issues [2]. This increased vulnerability may be attributed to several factors, including the pervasive exposure of sports to gambling and vice versa, the influence of sports sponsorship by gambling entities, and personality traits commonly associated with sports, such as competitiveness, which may increase the likelihood of engaging in gambling activities [3–5]. In a recent review of studies [6], one Australian study did not find an increased risk of gambling problems in elite athletes, while the remaining five studies demonstrated a markedly heightened risk in male elite athletes. However, there are significant differences by sex. Studies that included female athletes did not consistently show a clear increase in risk compared to the general female population.

Gambling problems, which typically cause over-indebtedness and psychological suffering, may put athletes at higher risk of becoming subject to sports-related fraud, sometimes referred to as match-fixing crime [7,8]. This, along with the health hazards associated with gambling problems [9], contributes to the need for an improved understanding of gambling problems in athletes.

Studies to date have predominantly focused on commercially larger team sports, with limited evidence distinguishing whether gambling problems are more prevalent in these sports compared to individual sports [10]. Large team sports – both nationally and internationally – are often characterized by highly visible sports betting opportunities and related advertising [11]. A common hypothesis suggests that team-based sports contexts may foster more favorable attitudes toward gambling [12]. This likely explains why team sports have been the primary focus of research on sports-related gambling thus far [6]. For example, in the studied geographical setting, large team sports have been the main focus. In the top leagues of soccer, ice hockey, and handball, 10% of men (and none of the included women) met the criteria for problem or moderate-risk gambling [13]. In a separate study, 10–13% of male players in ice hockey, soccer, basketball, and floorball fulfilled the criteria for moderate-risk or problem gambling [14].

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Ice hockey is one such sport in which elevated rates of gambling problems among males have been reported. Driven by anecdotal evidence and the identified need for deeper insights from the players' union within Swedish ice hockey, the present study aimed to enhance our understanding of gambling issues within this sport. Additionally, the study sought to address the issue of low response rates found in previous research in this area [13]. The study aimed to assess gambling problems and their mental health correlates among elite ice hockey players in Sweden. Specifically, we aimed to establish the point prevalence of these gambling issues in both males and females and examined the associations between these problems and mental health symptoms. Due to the significant differences in the risk of gambling problems between males and females [13], participants were assessed separately by sex in this study. Based on extant research, we hypothesized that elite athletes would report higher rates of problem gambling compared to the general population and that these issues would be positively correlated with hazardous alcohol consumption, depression, and anxiety.

Materials and methods

This is an online survey study conducted among male and female elite ice hockey players in Sweden. The data collection, despite being an online survey, was carried out during physical on-site visits to each team. The study was tried and approved by the Swedish Ethics Authority (file number 2019–03393).

Setting

The present study was carried out in Sweden, specifically in elite ice hockey, which is one of the largest sports in the country with respect to the annual number of sports events and the number of participants nationally. Sweden has a license gambling market that allows operators, mostly online-based, to operate under specific conditions. These conditions include adhering to an 18-year age limit, participating in a nationwide multi-operator self-exclusion service managed by a government authority, and implementing responsible gambling practices. These operators provide a variety of gambling options, including online sports betting, casino games, poker, horse betting, and in-person gambling venues. Several studies identify online sports betting, online casino, and horse betting to be the most popular among users [15, 16]. The present study addressed male players in the top two Swedish ice hockey leagues (Swedish Hockey League and HockeyAllsvenskan), and female players in the top female league (Swedish Women's Hockey League; SWHL). All three leagues exhibit a high degree of international representation, with international players comprising between 20% and 40% of team rosters. Notably, Svenska Spel, the government-owned gambling operator, serves as a main sponsor for all three leagues.

Study procedures

The players' union for professional ice hockey players in Sweden (SICO) conducts regular visits to all the teams in the top two male leagues and the top female league, in which players can be members of this union. Although membership is not compulsory, it is common among players across all three leagues. Likewise, team visits are not mandated, though SICO endeavors to visit each team at least once per season. We collaborated with SICO to distribute our survey during these visits to union-affiliated players, as we believed this approach would enhance participant recruitment. SICO was involved in the study from its inception and has previously assisted our research team in collecting data related to COVID-19 and changes in the sports world and the gambling market during the summer of 2020 [13]. During SICO's club visits, the study was presented by the union's staff, with members of the research group also attending the initial visits. Participants present at these meetings were invited to participate in the survey online via a web link. The survey could be completed on-site immediately after the meeting or at a later time in exceptional cases. Potential participants had the option to accept or decline the invitation. Upon providing informed consent via the online link, the survey became accessible. Participants were given the choice to complete the survey in either Swedish or English.

Data collection in both male and female teams was carried out during their respective regular seasons – from August 2022 to February 2023 for male teams and January to February 2024 for female teams. Altogether, the surveys were completed by 468 males and 173 females. Among males, 447 chose to answer the survey in Swedish, and 21 in English, with most being 26 years or older (56.0%). Among females, 103 answered in Swedish, and 70 in English, with most being 25 years or younger (80.9%). The attrition rate cannot be calculated precisely due to the familiarity of many study participants to the general public locally or nationally. We collected minimal demographic data and did not collect data on individuals who took part in the team meeting but chose not to enroll in the study. Given the typical team sizes of around 21–25 players per male team and 20–23 players per female team, across 27 male and 10 female clubs, the estimated total number of potential respondents is approximately 620 males and 220 females. This corresponds to an estimated study participation rate of 75–80% for both male and female participants.

The study survey comprised various item batteries and has been published elsewhere [17]. Some batteries are not reported here and have been studied in other contexts (e.g. history of head injury and mental health issues related to this). The present study utilized the Problem Gambling Severity Index (PGSI [18]), to measure problem gambling, the brief version of the Alcohol Use Disorder Identification Test (AUDIT-C, [19,20]); to measure alcohol misuse, and the Patient Health Questionnaire (PHQ-9 [21]); and Generalized Anxiety Disorder questionnaire (GAD-7 [22]); to measure symptoms of depression and anxiety, respectively. In line with the use of PGSI in general population studies in Sweden [1], moderate-risk and problem gambling were grouped together in comparisons against individuals with no risk gambling or only at-risk gambling. We also included items pertaining to performance satisfaction, age, sex, and previous history of concussion resulting in amnesia or loss of consciousness (LOC). A summary of the different batteries, their respective cutoffs and internal reliabilities is presented in Table 1.

Table 1. Survey instruments used in present study.

Clinical Variables	Measure	Cutoffs	α
Problem Gambling	Problem Gambling Severity Index (PGSI [18]);	0 = No-risk 1–2 = At-risk 3–7 = Moderate-risk ≥ 8 = Problem Gambling	.88
Hazardous Alcohol Use	Alcohol Use Disorder Identification Test (AUDIT-C; [19, 27]);	Females: ≥ 4 = Hazardous Males: ≥ 6 = Hazardous	.69
Depression	Patient Health Questionnaire – 9 (PHQ-9 [21]);	0–4 = No/minimal symptoms 5–9 = Mild symptoms ≥ 10 = Moderate-to-severe symptoms	.85
Anxiety	Generalized Anxiety Disorder – 7 questionnaire (GAD-7 [22]);	0–4 = No/minimal symptoms 5–9 = Mild symptoms ≥ 10 = Moderate-to-severe symptoms	.87

All internal reliabilities were satisfactory or better. α = Cronbach alpha.

Statistical methods

Descriptive statistics were summarized as frequencies and percentages for categorical variables, means with standard deviations for normally distributed continuous variables, and medians with interquartile ranges for skewed data. Differences in depressive symptoms, anxiety symptoms, alcohol consumption, and demographic characteristics between individuals with and without moderate-risk/problem gambling were assessed using a range of statistical tests. These included linear, ordinal, and negative binomial regression models for continuous and count data, as well as chi-square and Fisher's exact tests for categorical variables. Analyses were restricted to males, as no females met the criteria for moderate-risk/problem gambling. Effect sizes were reported as mean differences, odds ratios (OR), risk ratios (RR), or symptom count ratios (SCR), each accompanied by 95% confidence intervals. All statistical analyses were performed using R (version 4.4.0).

Results

Gambling problems in the two top male ice hockey leagues

Thirteen male participants did not respond to gambling related items and were thus excluded from further analyses. In total, 11.9% of male respondents fulfilled criteria for moderate-risk or problem gambling. Specifically, 2.2% fulfilled the narrower criteria of problem gambling (PGSI 8+), and 9.7% fulfilled criteria of moderate-risk gambling (PSGI 3–7). In addition, 12.3% fulfilled criteria for at-risk gambling (PGSI 1–2). Thus, altogether, a total of 24.2% fulfilled criteria of at least at-risk gambling.

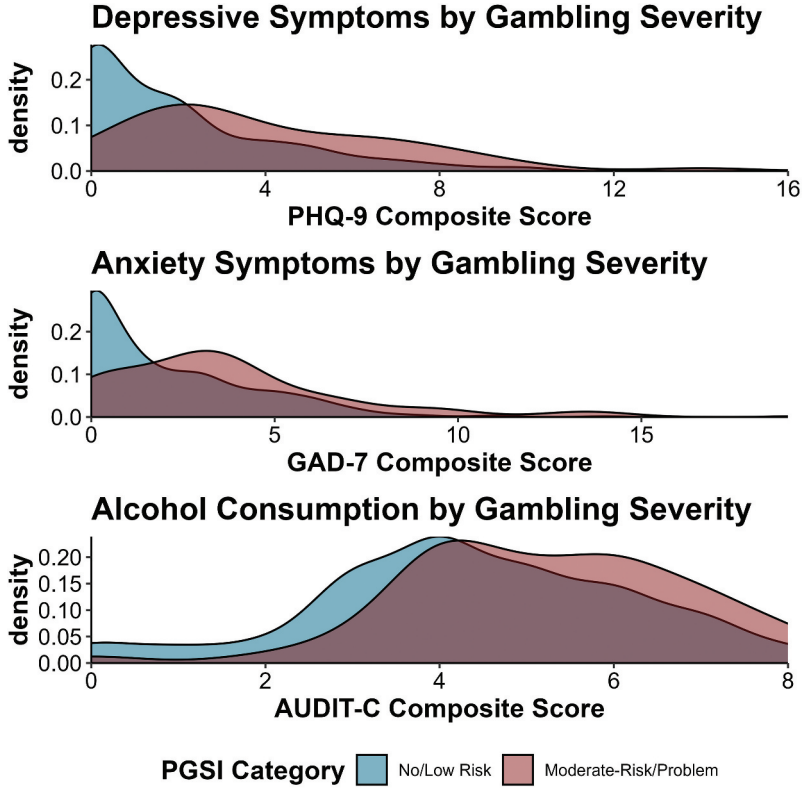

Figure 1. Differences in mental health symptoms by problem gambling severity among male athletes.

PHQ = Patient Health Questionnaire, GAD = Generalized Anxiety Disorder questionnaire, AUDIT-C = Alcohol Use Disorder Identification Test-Consumption, PGSI = Problem Gambling Severity Index. Moderate-Risk/Problem gamblers are participants with PGSI ≥ 3.

Those who reported at least moderate-risk gambling endorsed greater depressive symptoms overall and were more likely to endorse at least mild symptoms of depression. They also endorsed greater symptoms of anxiety and were more likely to endorse moderate-to-severe symptoms of anxiety. Additionally, those with at least moderate-risk gambling had significantly higher AUDIT-C scores compared to those with no to low-risk gambling, indicating a greater likelihood of hazardous consumption (see Figure 1).

Gambling problems were unrelated to age, history of concussive injury with amnesia or LOC, or current satisfaction with one's own sports performance. Full group comparison results are presented in Table 2.

Gambling problems in the top female ice hockey league

None of the included females fulfilled the criteria of moderate-risk or problem gambling. Three individuals (1.7%) fulfilled criteria of at-risk gambling.

Discussion

This study confirms the previously observed trend that male elite athletes, particularly those in large team sports, exhibit a higher risk of gambling problems compared to their male counterparts in the general population. Compared to similar age groups from the general population [1], males in elite ice hockey were found to be three to four times more likely to meet these criteria (12% versus ~ 3%).This may be due to more favorable attitudes toward gambling among elite ice hockey athletes compared to the general population [12]. Gambling is prevalent in large team sports [11] and frequently appears in television advertisements [4]. Additionally, gambling entities have historically and currently serve as primary sponsors of Swedish ice hockey leagues, which may generate more favorable attitudes toward gambling while also raising awareness about support resources and promoting communication on the issue.

In a previous study in ice hockey players specifically, in Sweden, 12% of men and 4% of women fulfilled the same degree of gambling problems as reported here [14], which should be compared to the rates of 12% and 0%, respectively, reported in the present study. While the response rate in the previous study was somewhat lower than in the current one, the relatively high prevalence of gambling problems among female ice hockey players observed in that study (higher than in the three other female team sports included) could not be replicated here, as no gambling problems were detected. Consistent with the present study, a smaller sample study conducted during the COVID-19 pandemic also found no female ice hockey players with gambling problems [13]. Overall, this study supports the finding that elite female athletes do not currently demonstrate a clear increased risk for gambling problems. However, the earlier data [14] underscores the need for continued monitoring of this issue in women.

In the present study, gambling problems were associated with symptoms of poor mental health, consistent with previous research [23]. Additionally, ice hockey players with gambling problems were more likely to report higher levels of

Table 2. Group differences in clinical outcomes and demographics by risk gambling profiles for male athletes.

Variable	No/Low-Risk Gamblers (n = 401)	Moderate-Risk/Problem Gamblers (n = 54)	Statistic	Effect	95% CI	p
AUDIT-C, $M \pm SD$	4.35 ± 1.83	5.20 ± 1.62	$t(453) = 3.23$	$M_{diff} = 0.84$	[0.33, 1.36]	.001
Hazardous consumption (≥ 6), n (%)	110 (27.4%)	24 (44.4%)	$\chi2(1) = 6.63$	RR = 1.62	[1.16, 2.27]	.01
Missing, n	0	0				
PHQ-9, *Mdn* [Q1-Q3]	1.0 [0.0–3.0]	3.0 [2.0–6.0]		SCR = 1.98	[1.46, 2.74]	<.001
Mild-to-severe (≥ 5), n (%)	59 (14.9%)	19 (35.2%)	$\chi2(1) = 13.65$	RR = 2.36	[1.53, 3.64]	<.001
Moderate-to-severe (≥ 10), n (%)	5 (1.3%)	2 (3.7%)	*FE*	RR = 2.93	[0.58, 14.75]	.20
Missing, n	5	0				
GAD-7, *Mdn* [Q1-Q3]	1.0 [0.0–3.0]	3.0 [1.3–4.8]		SCR = 1.84	[1.32, 2.61]	<.001
Mild-to-severe (≥ 5), n (%)	62 (15.5%)	14 (25.9%)	$\chi2(1) = 3.61$	RR = 1.66	[1.00, 2.75]	.06
Moderate-to-severe (≥ 10), n (%)	4 (1.0%)	3 (5.6%)	*FE*	RR = 5.51	[1.27, 23.97]	.04
Missing, n	4	0				
Age, n (%)						
16–25	182 (45.4%)	21 (38.9%)	$\chi2(1) = 0.81$	RR = 1.12	[0.89, 1.41]	.37
26+	219 (54.6%)	33.0 (61.1%)				
Missing, n	0	0				
Previous concussion with amnesia or loss of consciousness, n (%)	120 (29.9%)	17 (31.5%)	$\chi2(1) = 0.05$	RR = 1.05	[0.69, 1.60]	.81
Missing, n	0	0				
Performance satisfaction, n (%)			Wald $\chi2(1) = 0.11$	OR = 0.91	[0.53, 1.58]	.74
Not at all satisfied	32 (8.1%)	7 (13.0%)				
Somewhat satisfied	161 (40.8%)	20 (37.0%)				
Satisfied	172 (43.5%)	22 (40.7%)				
Very satisfied	30 (7.6%)	5 (9.3%)				
Missing, n	6	0				

Risk gambling profile used as explanatory variable across all analyses. Comparisons carried out after listwise deletion. The No/Low-Risk Gamblers group consists of participants with PGSI scores less than 3, while the Moderate-Risk/Problem Gamblers group consists of participants with PGSI scores greater than or equal to 3. AUDIT-C = Alcohol Use Disorder Identification Test – Consumption; PHQ-9 = Patient Health Questionnaire – 9; GAD-7 = Generalized Anxiety Disorder – 7; OR = odds ratio; FE = Fisher Exact test, RR = Risk ratio, SCR = count ratio (equivalent to incidence rate ratio).

hazardous alcohol use. This link, however, has not been clearly demonstrated in previous studies in Sweden due to limitations, including small sample sizes [10]. In this study, as many as 30% of male athletes met criteria for hazardous alcohol consumption. While this assessment was based on a brief screening tool, further research is needed to explore whether this degree of alcohol use is unique to male elite ice hockey or if it can also be observed – and is associated with gambling problems – in other elite sport settings. Notably, this level of alcohol consumption was not seen in female athletes, underscoring the importance of addressing these sex differences in future studies.

Altogether, the present study demonstrates an increased occurrence and association with elevated mental health distress and alcohol consumption, but it cannot explain whether specific features of male ice hockey, or any male elite sports setting, contribute to the current results. Also, it can be argued that people with increased interest in sports betting and other gambling may be more likely to initiate an elite sports career. The role of these, or other, potentially mediating factors, need to be addressed in future research.

In addition to the potential mental health consequences of disordered gambling in this population, gambling problems among active elite athletes also may put them at risk of match-fixing fraud. While this has been sparsely studied so far, it has been hypothesized that an own gambling problem and subsequent over-indebtedness may increase the risk of such involvement [8]. While this goes beyond the scope of the present study, it will be worthwhile to assess in future studies in elite ice hockey players and in other sports.

In contrast to the assumed effect of possible gambling-related attitudes within sports [12], the difference between men and women in elite sports may be influenced by the natural progression of gambling behavior in the general population, which shows significant gender differences in onset. For example, Swedish men typically begin gambling at a younger age than women [16]. In the context of elite athletes, especially in late adolescence or early adulthood, it is possible that many female athletes have not yet started gambling, which is particularly relevant given that elite female ice hockey players are generally younger than those in the top male leagues. This highlights the need for further research, particularly longitudinal studies, to track the gambling behaviors of male and female elite athletes over the course of their careers, while also examining potential differences between sexes related to factors such as player salaries, as male ice hockey players typically earn more than their female counterparts in the Swedish elite ice hockey leagues.

Specific treatment may be required for elite athletes with gambling problems. For general mental health issues, it has been suggested that specialized treatment pathways may be more effective for athletes suffering from mental distress, given that stigma and reluctance to seek general psychiatric treatment are common barriers. Tailored sports psychology interventions have been proposed to address these challenges [24]. Treatment seeking for gambling problems is generally low [25], and accessing specialized care for gambling disorders can be particularly challenging [26]. In this context, athletes may feel even more reluctant to seek help due to stigma or fear of revealing an addictive behavior. Therefore, treatment pathways specifically designed for athletes, which ensure confidentiality and support, are crucial.

Limitations of the present study include the fact that for reasons of confidentiality, demographic data were limited and specific sports-related variables, such as position, experience, and league performance, could not be addressed. Additionally, the risks of recall bias or other biases in reporting sensitive topics must be considered. Conversely, a strength of the study was its high response rate, likely due to the data collection being driven by the labor union and the physical presence of union staff during team visits. Another limitation is the inability to easily compare gambling patterns between men and women due to very low rates of detected gambling problems in women; this is particularly evident as none of the female participants endorsed criteria for moderate-risk or problem gambling. Larger sample sizes, such as those involving other countries, might still not provide sufficient data with adequate statistical power for meaningful comparisons. Gambling patterns in female elite athletes will need to be further explored in future research, potentially through qualitative in-depth interviews. Lastly, our sample was non-clinical and generally healthy, with few instances of moderate-to-severe symptoms. Consequently, the effect sizes should be interpreted with caution, given the limited number of such cases.

In conclusion, male ice hockey players in Sweden's top leagues exhibit high rates of gambling problems in comparison to those of similar age in the general population, which are statistically associated with hazardous alcohol use and depressive and anxiety symptoms. No risk increase for gambling problems is observed in elite female ice hockey players. Further research is needed to compare these findings with other team sports and individual sports, and to explore contextual factors potentially linked to gambling problems among ice hockey players.

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