



Situational and Game Variables in Rink Hockey: A Systematic Review

Jordi Arboix-Alió^{1,2,3} , Bernat Buscà¹ , Javier Peña^{4,5,6} , Joan Aguilera-Castells¹ , Adrià Miró¹, Azahara Fort-Vanmeerhaeghe^{1,2}  & Guillem Trabal^{4,6*} 

¹ Department of Sports Sciences, Ramon Llull University, FPCEE Blanquerna, Barcelona (Spain).

² Faculty of Health Sciences, Ramon Llull University, FCS Blanquerna, Barcelona (Spain).

³ FC Barcelona, Sports Performance Area, Barcelona (Spain).

⁴ Centre for the Study of Sport and Physical Activity (CEEAF), University of Vic-Central University of Catalonia, Vic (Spain).

⁵ Department of Physical Activity Sciences, University of Vic-Central University of Catalonia, Vic (Spain).

⁶ Sport, Exercise, and Human Movement (SEaHM) Research Group, University of Vic-Central University of Catalonia, Vic (Spain).

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Abstract

The main objective of this paper was to review the available literature on situational and game variables in the sport of rink hockey. The most common research topics were identified, their methodologies described and the evolving trends in this area of research systematised. A systematic review was conducted in accordance with PRISMA (Preferred Reporting Items for Systematic reviews and Meta-analyses) guidelines. The following keywords were used: rink hockey and ice hockey, each combined with the terms "situational variables", "match variables" and "game variables". The databases used for the review were Pubmed, Web of Science and Google Scholar. The inclusion criteria were: (1) relevant data on match variables in the sport of rink hockey; (2) data referring to professional competitions and/or senior/superior categories and (3) written in English or Spanish. After the review process, 20 studies met the inclusion criteria. Situational variables such as the location of the match, the scoreboard status, spectators' presence or the level of the teams, as well as the influence of set pieces and the role of the goalkeeper, have been included as research objects, as they seem to be effective variables of performance in rink hockey.

In view of the limitations of the studies reviewed, future research should provide predictive models and integrate situational and interactive contexts into the analysis of rink hockey performance. It should also provide more scientific knowledge on the sport, using new technologies and new approaches to study tactical elements in a sequential way.

Keywords: game analysis, game variables, performance analysis, rink hockey.

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*Corresponding author:

Guillem Trabal
guillem_tt@hotmail.com

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A young sprinter prepares herself with a track series to work on her explosiveness. @Jérôme Aufort/Adobestock

Introduction

The increasing professionalisation of high-level sport has led to an increase in the number of studies on the parameters that influence the final match outcome in a team sport context in recent years (Lago-Peñas et al., 2016b). Consequently, there is now a growing trend towards studying all possible game variables.

Performance analysis, defined as the description and understanding of the properties of the different variables that condition performance in competitive sports, is of great interest. Game analysis is widely recognised by coaches, sport analysts and athletes themselves as a relevant procedure for analysing and improving performance (Liu et al., 2016). Accordingly, a performance indicator is defined as a selection or combination of different sport variables that aims to define some or all of the aspects related to their effectiveness or influence (Hughes & Bartlett, 2002). In this sense, the need to identify these indicators for each sport, as well as to understand and establish their impact on the result, seems evident.

A number of studies have examined the importance of performance indicators in team sports. In recent years, they have been studied in sports such as basketball, handball and football (García Rubio et al., 2015; Lago-Peñas et al., 2016a). Many of these contributions have identified influential variables such as ball possession (Gómez et al., 2015), sending off players (Lago-Peñas et al., 2016b), match location (Pollard et al., 2017), substitutions (Gómez et al., 2016), and time of scoring (Baert & Amez, 2018).

Rink hockey is a very popular team sport in Spain. The men's national team is the current European champion and is also the most successful national team in the world, with a total of 17 world championships. Paradoxically, however, research aimed at analysing characteristic aspects of the sport is scarce. Of the few recently published studies on game variables, those referring to context stand out, such as the analysis of home advantage (HA) (Arboix-Alió et al., 2020; Arboix-Alió & Aguilera-Castells, 2019; Gómez et al., 2011), which estimates a 60% influence in men's rink hockey, similar to that of other team sports. Other studies have analysed factors such as scoring the first goal of the match (Arboix-Alió & Aguilera-Castells, 2018), the goalkeeper's performance (Sousa et al., 2020), the influence of set piece actions (Trabal et al., 2019b; Trabal et al., 2020a) and competitive balance between teams in the same leagues (Arboix-Alió et al., 2019a; Arboix-Alió et al., 2021b).

However, as far as the authors are aware, there is no systematic review on the influence of situational and game variables on the final result in rink hockey. The findings of this review could provide an insight into the most relevant information related to sport and performance variables in rink hockey, providing a useful tool for a better understanding of the game as well as highlighting potentially significant data for coaches and staff. For these reasons, the purpose of the present study is to systematically review and organise the existing literature on situational and game variables in rink hockey in an attempt to identify the most common research topics, classify their methodologies and systematise the evolutionary trends in the sport.

Methodology

Documentary sources and selection criteria

A systematic review of the available literature on game variables in rink hockey was carried out following the guidelines of the PRISMA (Preferred Reporting Items for Systematic reviews and Meta-analyses) guide according to Moher et al. (2009). In addition, the quality of all eligible studies was assessed using a table following the criteria of Law et al. (1998). This table is composed of 16 indices measuring the methodological quality of the studies (Table 1). The scoring for each index follows a binary scale (0/1) where 0 corresponds to a negative response and 1 to an affirmative response. Out of the total 16 indices, two (6 and 13) were not applicable to all studies, so the option NA (not applicable) was included. The sum of the total number of positive indices was used to indicate the quality of the study. According to their score, articles were classified as: a) low methodological quality (< 50%), b) good methodological quality (51-75%) and c) excellent methodological quality (> 75%) (Sarmiento et al., 2018).

A search of the current literature was conducted using the electronic databases PubMed (1969-28 December 2021), Web of Science (1969-28 December 2021) and Google Scholar (1969-28 December 2021). The search strategy for each database is listed in Table 2.

Table 1
Analysis of study quality (Law et al., 1998).

Reference	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15	Q16
(Arboix-Alió & Aguilera-Castells, 2018)	+	+	+	+	-	NA	+	+	+	+	+	+	NA	+	+	+
(Arboix-Alió et al., 2020)	+	+	+	+	-	NA	+	+	+	+	+	+	NA	+	+	+
(Arboix-Alió & Aguilera-Castells, 2019)	+	+	+	+	-	NA	+	+	+	+	+	+	NA	+	+	+
(Arboix-Alió et al., 2022)	+	+	+	+	-	+	+	+	+	+	+	+	NA	+	+	+
(Arboix-Alió et al., 2021c)	+	+	+	+	+	+	+	+	+	+	+	+	NA	+	+	+
(Arboix-Alió et al., 2021f)	+	+	+	+	+	+	+	+	+	+	+	+	NA	+	+	+
(Arboix-Alió et al., 2021e)	+	+	+	+	+	+	+	+	+	+	+	+	NA	+	+	+
(Arboix-Alió et al., 2021a)	+	+	+	+	+	+	+	+	+	+	+	+	NA	+	+	+
(Arboix-Alió et al., 2021d)	+	+	+	+	+	+	+	+	+	+	+	+	NA	+	+	+
(Camões et al., 2022)	+	+	+	+	-	NA	+	+	+	+	+	+	NA	+	+	+
(Gómez et al., 2011)	+	+	+	+	-	NA	+	+	+	+	+	+	NA	+	+	+
(Kingman & Dyson, 1997)	+	+	+	+	-	NA	+	+	+	-	+	+	NA	+	-	-
(Kingman & Dyson, 2001)	+	-	+	+	-	NA	+	+	+	+	+	+	NA	+	+	-
(Sousa et al., 2020)	+	+	+	+	-	NA	+	+	+	+	+	+	NA	+	+	-
(Sousa et al., 2021)	+	+	+	+	+	-	+	+	+	+	+	+	NA	+	+	+
(Trabal et al., 2020a)	+	+	+	+	-	NA	+	+	+	+	+	+	NA	+	+	+
(Trabal et al., 2020b)	+	+	+	+	-	NA	+	+	+	+	+	+	NA	+	-	-
(Trabal et al., 2019a)	+	+	+	+	-	NA	+	+	+	+	+	+	NA	+	+	+
(Trabal et al., 2019b)	+	+	+	+	-	NA	+	+	+	+	+	+	NA	+	-	-
(Trabal et al., in press)	+	+	+	+	-	NA	+	+	+	+	+	+	NA	+	+	+

Tabla 2
Search strategy, filters and databases used.

Database	Records identified	Search strategy
MEDLINE (Pubmed)	$n = 25$	1 "rink hockey" OR "roller hockey" 2 "game variables" OR "match variables" 3 1 AND 2
Web of Science	$n = 26$	1 "rink hockey" OR "roller hockey" 2 "game variables" OR "match variables" 3 1 AND 2
Google Scholar	$n = 29$	1 "rink hockey" OR "roller hockey" 2 "game variables" OR "match variables" 3 1 AND 2
Total	$n = 80$	

Inclusion and exclusion criteria

Inclusion criteria for these articles were: (1) relevant data on match variables in the sport of rink hockey; (2) data referring to professional competitions and/or senior/superior categories and (3) written in English or Spanish. Studies were excluded if: (1) they included basic or training (non-senior) categories; (2) they did not include any relevant data; and (3) they were conference abstracts. In addition, articles with insufficient discussion, poor data presentation and unclear or vague descriptions of the applied protocols were excluded (see flow chart of the search and study selection in Figure 1).

The lead author (J. A.-A.) carried out the data analysis and search process in the main databases. All electronically identified records were evaluated by title and abstract. Duplicate articles, which appeared in more than one database, were eliminated and considered only once. The full texts of all articles deemed potentially eligible were obtained. The first and last authors (J.A.-A., G.T.) then independently examined the pre-selected records and chose the final studies for inclusion in the review. In case of disparity, the opinion of the second author (B.B.) was considered.

Results

Search results

Two independent reviewers identified a total of 81 articles in the initial search. 36 articles were duplicates, leaving 45

unique items. Based on the title/abstract, after reviewing the full text, 25 articles were excluded because they did not meet the inclusion criteria. On the basis of this selection, a total of 20 articles were chosen for the final review (Figure 1).

Of the twenty studies reviewed, the match variables studied were: match location (Arboix-Alió et al., 2020; Arboix-Alió et al., 2021d; Arboix-Alió & Aguilera-Castells, 2019; Gómez et al., 2011), scoring first (Arboix-Alió & Aguilera-Castells, 2018), influence of set pieces (Arboix-Alió et al., 2021c; Arboix-Alió et al., 2021e; Arboix-Alió, et al., 2021f; Camões et al., 2022), the result of direct free kicks (Trabal et al., 2019b), situational variables (Arboix-Alió et al., 2022; Arboix-Alió et al., 2021a) and goalkeeper intervention (Kingman & Dyson, 2001; Sousa et al., 2020; Trabal et al., 2019a; Trabal et al., 2020a; Trabal et al., 2020b).

The results are presented below according to the main objective of the study. Table 3 shows the main features of all the studies reviewed, highlighting the type of study, the sample used, the variables analysed and the results obtained.

Discussion

The main objective of the present research was to identify the situational and game variables studied by the scientific literature in the sport of rink hockey. Most research to date has focused on analysing the influence of context, the relevance of set piece plays and the influence of the goalkeeper on the final result. Each type of analysis is discussed below.

Figure 1
PRISMA flowchart of the search and selection of studies.

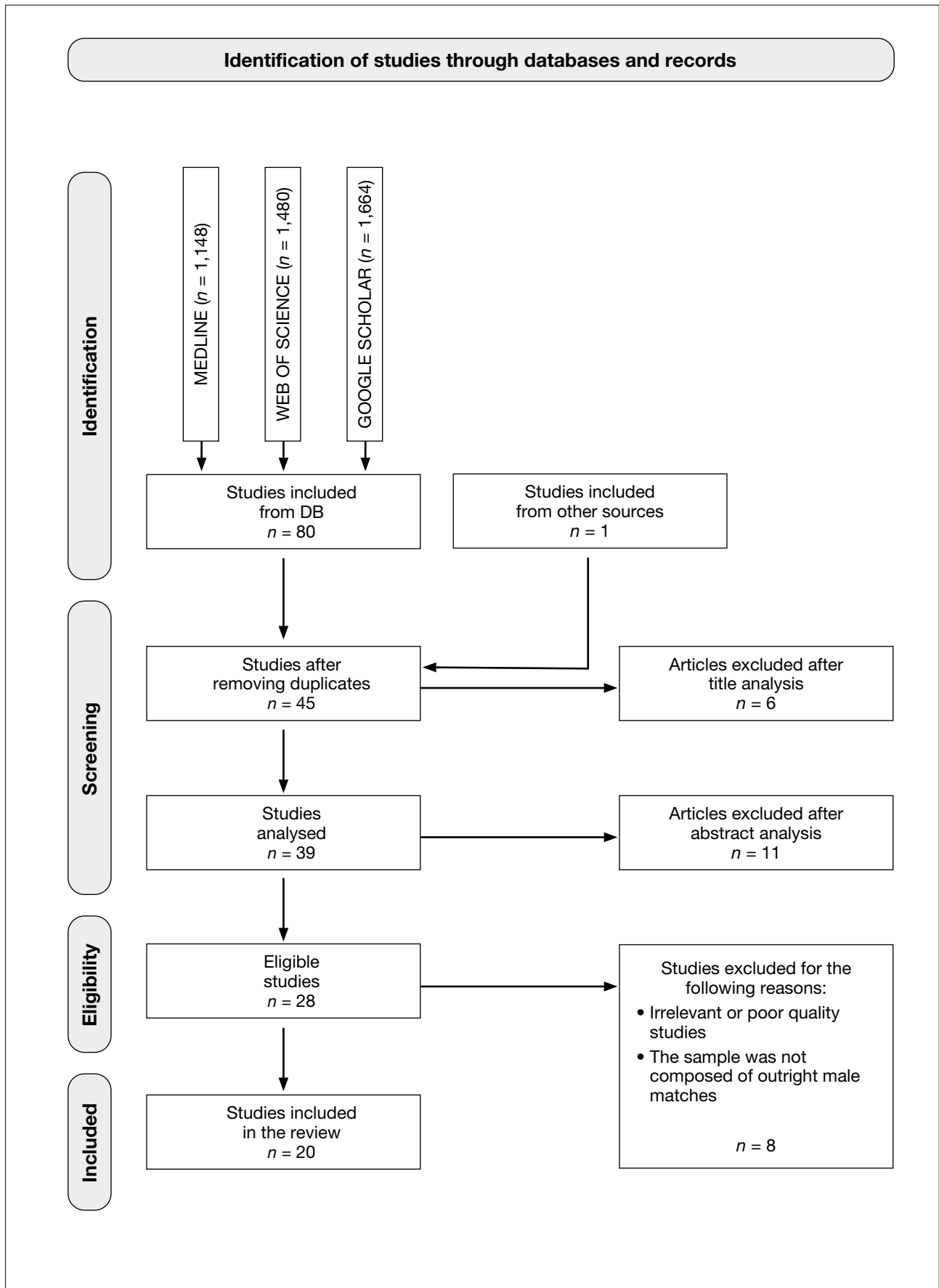


Table 3*Results of the review: Match variables in rink hockey.*

References	Objective	Type of study	Sample	Variables	Results
(Arboix-Alió & Aguilera-Castells, 2018)	To study the advantage of scoring the first goal of the game in rink hockey and to identify its impact on the final result.	Original article	240 matches in the Ok Liga and 182 in the First National Division. 2016-17 season.	Match result. First goal scored. Match location.	There is an advantage to scoring first in both leagues (64.14% and 62.91%, respectively). A significantly higher advantage in terms of scoring the first goal is obtained when teams are playing at home in the National First Division and a high correlation exists between the final performance of the teams (points obtained in the ranking) and the advantage of scoring the first goal.
(Arboix-Alió et al., 2020)	To quantify and compare the home advantage in the men's and women's rink hockey leagues in the Portuguese professional first division.	Original article	2,080 matches ($n = 1,632$ men's league and $n = 448$ women's league). 2009-2010 and 2016-17 seasons.	Match location. Goals scored by location.	Home advantage values were above 50% in both leagues, with significantly higher values in the men's league (60.88% compared to 54.33%). Significantly more goals are scored when playing at home in both the men's and women's competitions with no differences between the two leagues.
(Arboix-Alió & Aguilera-Castells, 2019)	To analyse the home advantage when playing in the Spanish men's professional rink hockey league (Ok Liga).	Original article	3,964 matches. Ok Liga season 1999-2000/ 2015-16.	Match location. Goals scored by location. Old regulation/new regulation.	Existence of home advantage in the Ok Liga at a value of 59.8%. Higher number of goals when playing at home. Decreased home advantage under the new regulations and increased number of goals per game.
(Arboix-Alió et al., 2022)	To analyse and predict the influence of the different game variables in the end result of the rink hockey matches.	Original article	440 matches. Ok Liga seasons 2017-18 and 2018-19.	Win at half-time (WH). Win by more than one goal at half-time (WHG). Match location (GL). First goal (SF).	The following variables were found to be predictive of victory: WHG (OR 4.47), WH (OR 3.35), SF (OR 2.05) and GL (OR 1.83).
(Arboix-Alió et al., 2021c)	Set piece plays (FDH and PEN) and the final ranking of the teams.	Original article	1,680 matches. 6,920 set piece actions (4,332 FDH and 2,588 PEN). Ok Liga seasons 2012-13 to 2019-20.	Points scored. Goals scored and conceded by FDH. %Efficiency of Goals scored and conceded by FDH. Goals scored and conceded by PEN. %Efficiency of Goals scored and conceded by PEN. % of total goals scored and conceded from set pieces.	Teams with a superior final ranking had a higher percentage of effectiveness in set piece play. The goalkeepers of these teams also had a higher success rate. Significant correlations were obtained between the final score and the variables.

Table 3 (Continued)*Results of the review: Match variables in rink hockey.*

References	Objective	Type of study	Sample	Variables	Results
(Arboix-Alió et al., 2021f)	To analyse the home advantage when playing in the Spanish men's professional rink hockey league (Ok Liga).	Original article	196 matches. 621 FDH and 292 PEN. Top competitions. Ok Liga seasons 2009–10 to 2018–19.	Match location. Time of the match. Scoreboard status. Importance of play	Only the variable "scoreboard status" was significant. The players were more successful in FDH when they led by two goals (OR = 2.4) and in PEN by three or more goals (OR = 3.83). Players were less effective in FDH when down by two goals (OR = 0.38). Situational variables have little influence on set piece actions.
(Arboix-Alió et al., 2021e)	To analyse the influence of set piece plays (FDH and PEN) on the outcome of the matches.	Original article	161 matches (82 semi-finals and 79 finals). Top competitions. Ok Liga seasons 2009–10 to 2018–19.	Match result. Goals from set piece plays	Scoring more from set pieces than the opponent was associated with winning (OR = 6.1; 95% CI: 3.7, 10.0). More relevant in imbalanced matches (OR = 19.5; 95% CI: 8.6, 44.3) than in balanced matches (OR = 2.3; 95% CI: 1.2, 4.5).
(Arboix-Alió et al., 2021a)	To analyse the predictive value of different situational variables interacting with each other on the outcome of matches.	Original article	238 matches. Ok Liga season 2017-18.	Team level. Opponent level. Match location. Score the first goal. Result at half-time.	The variable with the highest predictive power was the score at half-time, followed by the level of the opponent, the level of the team itself and the location of the match.
(Arboix-Alió et al., 2021d)	To analyse the influence of spectators on the performance of rink hockey teams.	Original article	1,665 matches (654 Ok Liga, 497 1a Divisao, and 514 Serie A1).	Spectator presence. Match location. Goals scored. Set piece plays. Fouls committed. Cards received.	The HA phenomenon was not eradicated despite playing without spectators, but decreased from 63.99% to 57.41% ($p = .002$). Playing without spectators damaged the performance of local teams, especially in the Portuguese and Italian leagues.
(Camões et al., 2022)	To analyse the correlations between the team's set pieces plays and the overall performance of the team.	Original article	182 matches. 1st Division (Portuguese season 2018-19).	Goals scored. Goals conceded. Free kicks. Penalties. Points at end of season.	Teams with a superior final ranking had a higher percentage of effectiveness in set piece play. The lower the final ranking, the higher the percentage of goals scored from set pieces compared to the total number of goals scored (1st to 4th: 15.3%; 5th to 9th: 25.6%; 10th to 14th: 23.9%; $p < .05$).

Table 3 (Continued)
Results of the review: Match variables in rink hockey.

References	Objective	Type of study	Sample	Variables	Results
(Gómez et al., 2011)	To analyse home advantage in nine professional team sports in Spain (including rink hockey).	Original article	1,200 matches. Ok Liga season 2005-2006/2009-2010.	Match location.	Existence of home advantage in the Ok Liga at a value of 58.3%.
(Kingman & Dyson, 1997)	To study the influence of the scoreboard, time of match and pitch position on the type of actions.	Original article	2 matches. Premier League Roller Hockey.	Actions (intensity, direction and type of action). Match result. Time of the match.	No significant differences were found in actions according to player position. The scoreboard had a small effect on the shooting actions. The match timing conditioned the number of high-intensity actions, with this being higher in the first half.
(Kingman & Dyson, 2001)	To analyse the shooting position and movement of goalkeepers during rink hockey matches.	Original article	6 matches. 1st English Division.	Shooting location. Goalkeeper efficiency.	The highest percentage of shots were aimed at the bottom corners of the goal. Goalkeepers receive an average of one shot every 67 seconds.
(Sousa et al., 2020)	To analyse the performance of goalkeepers and determine whether this is influenced by offensive patterns, actions and competence of opponents.	Original article	1,713 shots. Portuguese 1st Division 2016-2017 season.	Context (1st half, 2nd half, scoreboard status, final result). Goalkeeper performance zone. Shooting zone. Goalkeeper technique.	Goalkeepers performed better in the first half when the score is a draw. Goalkeepers tend to be less effective when shots are aimed at the upper areas. The most common goalkeeper technique is "knee on the ground".
(Sousa et al., 2021)	To analyse the perception of rink hockey coaches on the use of match analysis as a tool for match preparation.	Original article	7 coaches of Portuguese 1st Division.	Observation categories: goalkeeping action, overall game dynamics, attributes of opposing players, timing of the game, statistical data, behaviour of the opposing coach.	Video analysis proves to be the most widely used tool by rink hockey coaches. The main aspects to be observed are: analysis of the opposing goalkeepers and 5 specific match moments (defensive organisation, offensive organisation, defensive transition, offensive transition and set piece).

Table 3 (Continued)
Results of the review: Match variables in rink hockey.

References	Objective	Type of study	Sample	Variables	Results
(Trabal et al., 2020a)	To analyse the effect of situational variables of the match on the intervention of the rink hockey goalkeeper during free kicks.	Original article	637 free kicks. Ok Liga season 2015-16.	Free kick result (goal/non-goal). Match minute, scoreboard status, point in the season, importance of the free kick and location of the match.	The match minute presented a significant relationship with goalkeeper effectiveness ($\chi^2 = 17.665$; Sig. = .04; $p < .05$; $w = .167$), an increase in the frequency of free kicks in the closing moments (43.96% are committed in the last 10 minutes of the match) and an improvement in the efficiency of the goalkeeper in critical moments (77.1%).
(Trabal et al., 2020b)	To identify the most frequently occurring goalkeeper and player behaviours in the FD and determine their influence on FD effectiveness.	Original article	637 free kicks. Ok Liga season 2015-16.	% free kick efficiency. Player behaviour. Goalkeeper behaviour.	No significant relationships between player and goalkeeper behaviours on FD effectiveness. Players, highest % result in zone 3.
(Trabal et al., 2019a)	To identify the technical skills of the rink hockey goalkeeper in free kicks.	Original article	637 free kicks. Ok Liga season 2015-16.	% free kick efficiency. Goalkeeper technical ability.	The technical skills most utilised by the goalkeeper are PASV (hurdlng) (35.6%) and PNTLL (screening) (24.6%).
(Trabal et al., 2019b)	To determine if there is a relationship between free kicks and the final ranking of teams in rink hockey.	Original article	240 matches. Ok Liga season 2015-16.	% free kick efficiency. Team ranking.	No significant correlation between FD variables (number of goals, number of FDs and percentage of effectiveness) and the final ranking of the teams.
(Trabal et al., in press)	To compare performance variables between the national championships of Spain (OK Liga), Portugal (1st Division) and Italy (Series A1).	Original article	1,665 matches (654 Ok Liga, 497 1a Divisao, y 514 Serie A1).	League. Goals scored. Set piece plays. Fouls committed. Cards received.	In Spain, teams score fewer goals per game (3.18 vs. 3.66 and 3.76 in Portugal and Italy). In Portugal, there are more penalty and free kick shots and goals, more fouls and cards and a higher percentage of goals from set pieces in relation to total goals.

Situational influence

The situational influence on performance is a latent issue that has historically been of interest in the world of sport. As early as the 1970s, the effect of the competition's location on the final result has been studied (Pollard, 1986), a phenomenon that was termed "home advantage" (HA), since in most sports there is a tendency to perform better when competing at home compared to competing away from home.

The HA phenomenon has probably been the most studied situational variable in the sporting world and the influence of this factor has been analysed in most sports. The scientific literature provides various studies, on the one hand, in individual sports such as tennis (Koning, 2011), judo (Ferreira Julio et al., 2012) or golf (Nevill et al., 1997). On the other hand, it has also been studied in team sports, which are the most analysed, particularly in football (Pollard & Gómez, 2012). In most of these team sports the HA factor exists and is estimated to be around 60% (Jamieson, 2010). However, the values may vary for the same sport depending on the type of competition, nationality or level of competition. Specifically in Spain, rugby is the sport with the highest rate of HA at 67%, while volleyball has a rate of 55.73% and water polo has a rate of 56.2% (Gómez et al., 2011).

As for rink hockey, Gómez et al. (2011) and Arboix-Alió and Aguilera-Castells (2019) have studied the HA factor in the men's Ok Liga (Spain) finding a value of 58.3% and 59.8%, respectively. In the Portuguese championship, values of 60.88% in the men's competition and 54.33% in the women's competition have been reported (Arboix-Alió et al., 2020). In another predictive study, Arboix-Alió et al. (2022) estimated that Ok Liga teams were twice as likely to win when playing at home (OR = 2.085). Although there is a lack of studies in the present sport in relation to tactical and game aspects comparing winning and losing teams, these findings indicate that strategies in hockey may be influenced, in part, by the location of the match and that teams may alter their style of play accordingly. Pollard and Pollard (2005) highlight seven factors that explain HA, divided into psychological factors, tactical factors, territoriality, familiarity with the venue, referee bias, spectator support and physical fatigue caused by pre-match travel. Among these seven factors, it is worth highlighting the recent study published by Arboix-Alió et al. (2021d), who, taking advantage of the pandemic situation caused by COVID-19, which led to many matches being played behind closed doors, analysed the influence of spectators on HA in the Spanish, Portuguese and Italian

leagues. Although the HA phenomenon did not vanish, its value experienced a significant decrease (63.99% with spectators vs. 57.41% without spectators), as well as revealing changes in different game variables. These include a decrease in goals scored at home and an increase in fouls committed or cards received for home teams when playing without a home crowd.

In relation to scoring the first goal of the match, as in other team sports, this is an advantageous factor for the final result of the match. Arboix-Alió and Aguilera-Castells (2018) found that the advantage of scoring the first goal of the match amounted to 64.14% for the Ok Liga and 62.91% for the Ok Plata (Spain's second highest national competition). Additionally, this factor has been estimated to have a predictive power of an OR of 2.289 (Arboix-Alió et al., 2022). Another of the situational variables studied in this sport has been leading at the end of half-time. This situation seems to have the highest predictive value (OR = 7.862) (Arboix-Alió et al., 2021a), and is even more evident when the result is positive with a difference equal to or greater than two goals (Arboix-Alió et al., 2022).

The above situational variables could be explained by several reasons. Authors such as Jones (2009) would attribute the importance of scoring first or winning at half-time to the mere fact that this factor is already reflected in the final result of the match. Other authors attribute this to the psychological momentum theory, an explanation for the added advantage gained when an initial successful event occurs in a sporting context, which produces a psychological momentum in the athlete that will lead to subsequent success (Gayton et al., 1993).

In rink hockey alone, Arboix-Alió et al. (2021a) have analysed the interaction between the different situational variables, and it seems that, as in other team sports, the sum of these variables tends to increase their influence on the final outcome of matches (Lago-Peñas & Dellal, 2010; Lago et al., 2010).

Influence of set piece plays

As far as set piece plays are concerned, there are two situations that occur frequently in rink hockey matches: direct free kicks (FDH) and penalty kicks (PEN). In FDH the kicker has five seconds to kick off (from 7.4 metres), with a choice between a direct kick or dribbling towards the goalkeeper, whereas, in PEN, the kicker has five seconds and must kick directly from the penalty spot (at 5.4 metres). In both situations there is a direct interaction

between player and goalkeeper, the former being the more frequent due to the new rules of the European Committee of Rink Hockey (CERH), which in 2009 introduced the rule of penalising blue cards or the accumulation of 10 defensive fouls with a free kick for the offending team.

In this sense, Arboix-Alió et al. (2021c) reported that 21.08% of the Ok Liga goals are scored by FDH and PEN (11.58% and 9.49%, respectively), values similar to those of Camões et al. (2022) regarding the Portuguese league. Also, when comparing the effectiveness of set piece plays with end of the season ranking, the best teams launched a greater number of plays and obtained a higher effectiveness. The teams ranked in the top positions of the table have a significantly higher average number of goals from set pieces than the rest of the teams. Moreover, their effectiveness was higher, indicating better performance in this type of play (Arboix-Alió et al., 2021c).

In terms of set-pieces conceded, there were also significant differences in the performance of goalkeepers according to the final ranking of the teams. The results showed that goalkeepers of teams ranked in the top positions of the table (1st to 4th) had a lower percentage of goals conceded (27.19%) compared to teams that achieve promotion or relegation (34.78% and 38.23%, respectively) (Arboix-Alió et al., 2021c). This trend has already been observed by Trabal et al. (2019b) in the Ok Liga teams, who demonstrated that the best teams tended to have the best goalkeepers in set pieces.

On the other hand, the study by Arboix-Alió et al. (2021e) reported that scoring more set pieces than the opponent was associated with the chances of winning (OR = 6.1; 95% CI: 3.7, 10.0) in a match sample composed only of national and international championship semi-finals and finals. In this sense, the authors confirmed the popular belief among coaches, players and supporters of rink hockey that the effectiveness of set pieces is a determining factor in the outcome of matches in contemporary hockey.

Finally, as regards the influence of situational variables on set-piece plays, neither the study by Trabal et al. (2020a) with a sample from the Ok Liga, nor the study by Arboix-Alió et al. (2021f) with a sample of matches corresponding to finals and semi-finals of national and international competitions, seem to indicate that context has a great relevance in the performance of these actions. Only scoreboard status had a significant influence on both FDH and PEN effectiveness. The players were significantly more successful in FDH when they led by two goals (OR = 2.4) and in PEN by three or more goals (OR = 3.83). In contrast, aspects such as location and time

of match were not significant. In this sense, the present results reveal little influence of situational variables on the performance of these types of actions.

Goalkeeper influence

Another area that has brought together an important element of research on game variables in this sport has been related to the actions and influence of the figure of the goalkeeper. The behaviour of the goalkeeper, widely recognised as the most decisive figure in rink hockey (Sousa et al., 2021; Trabal, 2016), has been analysed both in the overall match (Sousa et al., 2020) and in an analytical way in set-piece, FD and PEN actions (Trabal et al., 2019a; Trabal et al., 2020b). Likewise, these studies have also analysed the influence of the situational variables: match time, type of defended actions and the scoreboard status, on the effectiveness of the goalkeeper.

In a recent study in the Portuguese 1st Division, Sousa et al. (2020) found that goalkeeper effectiveness was significantly better in the first half (OR 1.388) compared to the second half. This difference in effectiveness between halves could be explained by the inherent physical exhaustion of the goalkeepers involved in the match itself, a situation already observed in various technical actions with other team sports (Sarmiento et al., 2014) and because in the second halves the goalkeeper has to face a greater number of set pieces (FDH and PEN) in which the percentage of effectiveness is lower than any other type of shot made during the course of a match (Sousa et al., 2020). The effectiveness observed in FDH is between 66.1% and 70.2% and in PEN, between 50.8% and 56.5% (Arboix-Alió et al., 2021f; Sousa et al., 2020; Trabal et al., 2020a), both percentages lower than the other types of finishes. Specifically, in the Ok Liga, 82.74% of FDH are executed in the second half (Trabal et al., 2020a), and in international competitions, 74.9% of FDH and 54.1% of PEN are executed in the second half (Arboix-Alió et al., 2021f).

Another situational variable influencing goalkeeper effectiveness is the scoreboard status. With two goals or more conceded, the effectiveness over the course of the match decreases by 45% compared to a draw (Sousa et al., 2020). The same trend is observed in FD and PEN, where the percentage decreases to 57.7% and 32.2%, respectively (Trabal et al., 2020a). In these actions, the goalkeeper can be affected by a loss of concentration and motivation due to a decrease in the chances of winning the match (Trabal, 2017).

The technical characterisation of the goalkeeper in FD makes it possible to identify two basic starting positions, which are the knee on the ground (49.1%) and the half-screen (28.2%), with a direct relationship with the two most used technical skills, "hurdling" (35.6%) and "screening" (24.6%) (Trabal et al., 2019b). The goalkeeper-player opposition in FDH creates a reciprocal influence on each other in which they condition one another. The most commonly used action against free kicks is "screening", a technical action that has proven to be the most effective against these types of shots. On the other hand, in the face of dribbling, it is "hurdling"; a technical alternative based on the goalkeeper's comfort and not so much on effectiveness (Trabal et al., 2019a; Trabal et al., 2020b).

Limitations and recommendations for future research

In this systematic review, most of the references are from 2018 or later, which indicates that the study of match variables in rink hockey has historically had little relevance, although it has recently attracted interest and has been gaining popularity among the sports science community. On the other hand, although this restricts historical comparisons, it ensures the validity of the analyses carried out, since they take into account the changes in regulations and playing trends currently used by teams and players. Only articles in English and Spanish have been included, so the lack of potentially relevant articles in other languages (i.e. Portuguese or Italian) may be a possible additional limitation. On the other hand, being a minority sport worldwide, but of great importance in certain territories of some countries, means that the vast majority of the research comes only from these geographical areas (e.g. Spain and Portugal). It would be interesting for future research to carry out studies with samples from other international leagues, as well as from different sports divisions in the same country in order to obtain a more global spectrum of sports data.

At the methodological level, it has been observed that most of the studies analysed have been descriptive in nature. This leads to lower levels of scientific evidence than systematic reviews that consider scientific studies of a different nature (i.e. randomised clinical trials). However, given the scarcity of research in the sport of rink hockey, presenting all the evidence to date in a single article that synthesises it all is of great interest as it allows for learning about hitherto little-known data and can provide new information on the match variables in this team sport. However, for future studies and following

the recommendations of authors such as Gréhaigne et al. (2001), it is suggested that it is necessary to prioritise prospective studies with more complex designs and methodologies of analysis that allow for analysing the factors that explain sporting success in rink hockey to a greater extent and independently.

Conclusions

After conducting this systematic review, the authors confirm the influence of the situational variables and the degree of interaction of each one on both the outcome of the match and the competition in general. In the same way, the high relevance of set-piece actions in rink hockey and the role played by the goalkeeper in these actions is corroborated.

The results of the present review are of general interest in the field of sports science, as they provide new data on match analysis in this collective sport, something that has never been seen before.

On the other hand, and more particularly, these findings can provide valuable information to coaches and practitioners of this sport in aspects such as line-ups, according to the needs of the team itself, the characteristics of the opponent, the time of the match or the location. In this sense, they could also help coaching staff members to design specific training sessions based on specific match situations or also to simulate different match scenarios where the scoring advantage or disadvantage is present. These hypothetical situations could be useful to analyse and assess individual athletes' responses to such situations and thus improve their performance under pressure. For this reason, it would also be advisable to consider the application of psychological alternatives to optimise sporting performance in moments of psychological pressure or sporting uncertainty inherent to competitive sports.

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