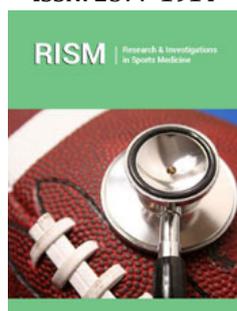


Managing Change and the Related Performance Dimensions of Multiple-Discipline Science and Medical Services Departments in High Performance Sports Organizations: A Systematic Review

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Abstract

Rationale: To synthesize evidence related to effective practices, in relation to change management and performance management dimensions, in multiple-discipline science and medical services departments.

Methodology: Systematic review, employing a search and screening strategy, in accordance with the PRISMA protocol.

Data sources: Web of Science, Sport Discus, Cinahl, Medline, PubMed

Eligibility criteria: Primary empirical evidence, published in English language peer reviewed journals, related to change management or performance management dimensions, as demonstrated in the service provision by multiple-discipline science and medical services departments in high performance sports organizations.

Findings: Twenty studies satisfied the inclusion criteria. Thematic synthesis identified factors related to foundational perspectives of change management and dimensions of performance management, across the following themes: micro perspectives of change management, meso perspectives of change management, macro perspectives of change management, strategic performance management, operational performance management, individual performance management and leadership of the multiple-discipline science and medical services team.

Practical implications: Guidance is provided in relation to the training and practical application of skills required by practitioners operating in such leadership roles.

Research contribution: Implications for high performance sports organizations are considered across these themes, in relation to the identification, recruitment and continuing development of suitable multiple-discipline science and medical services department directors.

Keywords: Change management; Operational performance management; Strategic performance management; High performance sport; Leadership; Sports science; Sports medicine

Introduction

Rationale

Player wages have risen dramatically through sport's post-commercialization, as teams from 18 leagues, in 8 major sports, paid \$22.2B in 2018 (\$15.75B in 2013) (Sporting Intelligence, 2018). Consequently, investment in player care by high performance sports organizations (HPSOs) has escalated, increasing associated scrutiny [1-4]. Implemented in the mid-1900s by state-sponsored sports institutes in Eastern Europe [5], Australasian and Western European organizations began investing in multiple-discipline models of athlete management in the 1990s [6]. Exploration by North American HPSOs of such performance models has gathered momentum in line with major league player wage increases [5]. Financial

and strategic investment in these “Teams Behind the Team” demonstrates the perceived value of specialist science and medical services in contributing to enhanced performance [7]. However, given the traditional structures and cultures of many HPSOs, introduction of multiple-discipline science and medical services departments (MSMSDs) represents significant internal change that requires careful management [8,9]. Employing specialist knowledge to implement holistic high performance systems and meet complex needs of athletes and coaches, presents challenges in integrating numerous practitioners from various disciplinary backgrounds, each characterized by distinct codes and interests [10,11].

The promoters and barriers that impact the development of multiple-disciplinary departments from multi-disciplinary (additive), to inter-disciplinary (interactive) or trans-disciplinary (holistic) groups have been researched in healthcare [10,12,13]. These factors are exacerbated in HPSOs, that are complex and volatile environments, inherently promoting competition, conflict, and insecurity [11,14-17]. Empirical research into the change management [18,19], performance management [15,20,21], culture [11,22-26], leadership [11,27-33], relationships [16,34-37], emotional factors [38,39], governance and systems [36,40,41] that prevail in HPSOs has focused on roles, responsibilities, methods and qualities of performance directors/general managers, coaches or athletes.

Most articles published about MSMSDs operating within HPSOs are based on conjecture and opinion [14,42-52], with anecdotal prescription prevailing, often derived from subjective experience and “arbitrary amalgamations of previous prescription” [11]. Quantitative and qualitative analysis neither supports the efficacy of advice offered, nor confirms robustness of the models theorized [5,19,53-73]. Expectations related to the operation of MSMSDs, notoriously lack understanding of how complex, multifaceted and involved change management processes of driving development and integration into established HPSOs are. Leadership recruitment is often sub-optimal, rarely screening for role-appropriate attributes and skills, whilst the support MSMSD directors require to succeed is barely recognized [48,74]. Consequently, as with the coaching sector, management turnover has become an established reflex to results failing to meet expectations, which if lacking in comprehension and clarity from the outset, are often less than rational and frequently unrealistic in the time frame permitted [11].

Objectives

Empirical research supporting best practice in change management and performance management dimensions in MSMSDs within HPSOs is not sufficiently reported. This study will conduct a systematic review, with thematic analysis of the change management perspectives (micro, meso and macro) and related performance management dimensions (strategic performance management, operational performance management, individual performance management and leadership of performance), employed by MSMSDs during integration into HPSOs, and

the subsequent intra- and inter-departmental relationships experienced once established within them.

Definitions

HPSOs: organizations operating at the “top end of sport development...any athlete or team that competes at international or national level”, thus demonstrating expertise, operating in a “fast paced, highly dynamic environment” [32], including Olympic, non-Olympic, professional and team sports [20,32]. MSMSDs: departments providing sports science and medical services, supporting the physical, physiological and psychological performance, health and well-being of athletes and coaches.

Method

‘Preferred Reporting Items for Systematic Reviews and Meta-Analyses’ (PRISMA) and ‘Assessing the Methodological Quality of Systematic Reviews (AMSTAR)’ guidelines were followed to ensure an appropriate standard of reporting [75,76].

Eligibility criteria

Inclusion criteria were: (1) investigations focused on MSMSDs operating in HPSOs, incorporating service provision by disciplines related to sports science, analytics, adjunct coaching (e.g. strength and conditioning), sports medicine, therapies (e.g. physiotherapy, athletic training) and mental performance (e.g. mental skills coaching, clinical psychology), in addition to communicating with coaching and management departments (2) examinations of change management perspectives (micro, meso and macro) and performance management dimensions (strategic performance management, operational performance management, individual performance management and leadership of performance) in the integration of MSMSDs in, and subsequent inter- and intra-departmental relationships experienced within, HPSOs (3) studies containing primary empirical evidence (4) studies published in an English language, peer-reviewed journal.

Information sources

Table 1: List of electronic databases searched, years of coverage & search date.

Database	Dates of Coverage	Date Searched
Web of Science (Clarivate)	1900 - 2019	27 August 2019
Sport Discus (EBSCO)	1837 - 2019	27 August 2019
Cinahl (EBSCO)	1982 - 2019	14 August 2019
Medline (EBSCO)	1946 - 2019	20 August 2019
PubMed	1946 - 2019	27 August 2019

Search strategy & study selection

Broad subject headings and text words were used as keywords and phrases for the database search, including combinations of

the following keywords adapted for each database: “sport”, “high performance sport”, “elite sport”, “sports science”, “sports medicine”, “interdisciplinary medicine and science”, “holistic performance”, “multidisciplinary performance”, “science and medicine”, “high performance”, “medical services”, “exercise science”. Citations were downloaded into Endnote (Clarivate Analytics, Philadelphia) and duplicates removed. Titles and abstracts were independently screened for eligibility by two authors (OF and AM). Full text versions of eligible studies were screened according to the inclusion criteria. Cross-referencing of reference lists was conducted, highlighting relevant articles not identified in the screening process.

Quality assessment

Studies were subjected to quality assessment using the Mixed Method Appraisal Tool (MMATv2018) [77], which enables critical appraisal of qualitative research, randomised controlled trials, quantitative descriptive studies and mixed methods studies. This informed evaluation of studies’ contributions to analytical themes [78]. A score of 100% was classified as “high quality”, 75% “good quality”, 50% “moderate quality” and 0%-25% “low quality”. Discrepancies between quality assessment ratings were discussed between 2 reviewers (OF and AM).

Results

Search strategy

Data collection process & data synthesis

Data was extracted from the selected articles and verified by the reviewers, reaching consensus through discussion where necessary. Information was recorded regarding study design, objectives, context, sample size, participant characteristics, methodologies and outcomes of each investigation. Thematic synthesis was utilized to organize, integrate and structure data from methodologically diverse studies, which included qualitative and quantitative evidence. Three-stage thematic synthesis [78] was conducted by the primary reviewer. In quantitative studies, findings correlating with change management or performance management dimensions were identified as key factors and extracted as reported in the study findings [20]. In qualitative studies, findings correlating with change management and performance management dimensions were extracted as raw data to ensure analysis retained consistency with original authors’ findings [78]. Factors were grouped with others portraying similar meaning to construct ‘descriptive themes’. These were discussed under higher level ‘analytical themes’, based upon current theoretical conceptualizations of change management perspectives and performance management dimensions. Results were critiqued by the secondary reviewer.

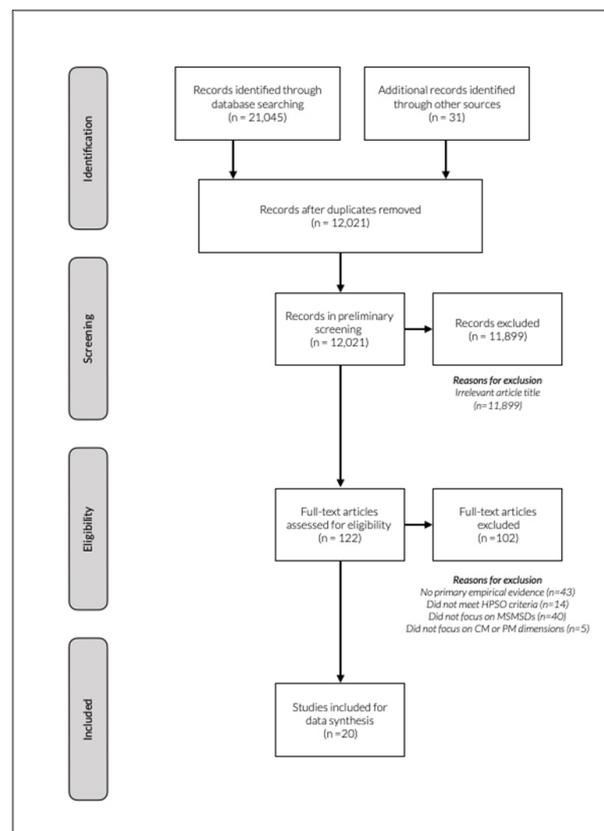


Figure 1: Flow diagram illustrating the screening process as per the ‘Preferred Reporting Items for Systematic Reviews & Meta-Analysis’ methodology.

The electronic search strategy retrieved 21,045 records, with 31 supplementary records identified through citation tracking and manual reference checks. 12,021 records subsequently remained with duplicates removed. 122 full text articles were assessed for eligibility against the inclusion criteria, resulting in 102 articles being excluded. The remaining 20 articles satisfied all eligibility criteria and were included in full review and data synthesis (Figure 1). Three studies focused on change management perspectives, whilst 17 focused on performance management dimensions. Data extraction details are detailed in Supplementary Section 3.

Study characteristics

Study characteristics, including research design classification, sample characteristics and quality assessment ratings (cognizant

of bias) [77] are outlined in Table 2. Methodological quality scores for the studies ranged from 25% (low quality) - 100% (high quality), in accordance with MMATv2018 [77]. Consensus was reached by the primary authors on each study. Qualitative studies represented 45% of the articles returned (grounded theory (30%), ethnographic (5%), narrative (5%), case study (5%), 45% were quantitative studies (case studies (20%), cross-sectional (5%), descriptive (15%), correlational (5%)) and the remaining 10% adopted mixed methods approaches. 60% of studies were conducted in British HPSOs, whilst European and Canadian HPSOs were each represented in 10% of investigations. Three articles each concentrated on HPSOs in separate locations (Australia, Sweden, South Africa), whilst the remaining study was conducted on a global cohort.

Table 2: Research design, characteristics & MMATv2018 quality assessment ratings.

Study Characteristics	Reference Number
Design	
Qualitative (grounded theory)	1, 5, 14, 17, 18, 20
Qualitative (ethnographic)	6
Qualitative (narrative)	9
Qualitative (case study or case studies)	15
Quantitative (case study)	2, 4, 7, 17
Quantitative (cross-sectional)	3
Quantitative (descriptive)	8, 12, 13
Quantitative (correlational)	10
Mixed Methods (qualitative description & quantitative descriptive)	11, 19
Data Collection	
Interviews	1, 5, 6, 9, 11, 14, 17, 18, 19, 20
Observation protocol	15
Various measures of task & workload performance	2, 3, 4, 7, 8, 10, 16
Questionnaires	11, 12, 13, 19
Sample Size	
10-Jan	2, 4, 5, 7, 15, 16
Nov-50	1, 3, 6, 9, 11, 17, 18, 20
51-100	12, 13, 14, 19
More than 100	8, 10
Gender	
Male only	2, 5, 6, 7, 8, 16
Female only	4
Combined	1, 9, 11, 12, 13, 15, 18
Not stipulated	3, 10, 14, 17, 19, 20
Location	
UK	1, 2, 4, 5, 6, 9, 10, 11, 12, 14, 19, 20
Europe	3, 8
Canada	17, 18
Other Nations	15 (Australia); 7 (Sweden); 13 (combined); 16 (S. Africa)

MMAT Quality Assessment	
High quality 100%	1, 10, 13, 20
Good quality 75%	3, 5, 6, 9, 11, 14, 17, 18
Moderate quality 50%	2, 4, 7, 8, 12, 15, 16
Low quality (0%-25%)	19

Synthesis of results

Results were organized under 7 analytical themes, with 3 change management perspectives [79,80] and 4 performance management dimensions [20]: (1) micro perspectives of change management (2) meso perspectives of change management (3) macro perspectives

of change management (4) strategic performance management (5) operational performance management (6) individual performance management (7) leadership of MSMSDs. For each analytical theme, descriptive themes were identified, grouping relevant factors (Table 3).

Table 3: Thematic synthesis representing change management and performance management dimensions in MSMSDs operating in HPSOs.

Analytical Themes	Descriptive Themes	No. of Factors	Number of Studies (Reference Number)
Change Management (Micro Perspectives)	Resisting change	1	1 (6)
	Growth mindset	1	1 (20)
	Fixed mindset	1	1 (20)
Change Management (Meso Perspectives)	Evidence based strategic planning	2	2 (6,20)
	Supporting change (change agent)	1	1 (6)
	Research of change	1	1 (11)
	Systems & processes	2	1 (20)
Change Management (Macro Perspectives)	Institutional philosophy	1	1 (6)
	Org-wide communication of vision	2	2 (6, 20)
	Supporting change (leadership)	1	1 (6)
	Organizational change	3	2 (9, 15)
	Market driven change	1	2 (11, 12)
Strategic	Working with stakeholders	8	6 (6, 12, 13, 15, 19, 20)
Performance Management			
Operational	Alignment with organizational objectives	1	1 (8)
Performance Management	Addressing performance environment	17	15 (1, 3, 6, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20)
	Building team relationships	11	13 (1, 3, 4, 5, 6, 9, 10, 11, 15, 16, 17, 18, 20)
Management	Internal processes & procedures	17	19 (1, 2, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20)
	Adapting culture	15	18 (2, 3, 4, 5, 6, 7, 8, 9, 10, 12, 13, 14, 15, 16, 17, 18, 19, 20)
	Debriefing, feedback & learning	12	12 (2, 3, 4, 7, 8, 9, 11, 13, 14, 15, 16, 20)
Individual Performance Management	Understanding of context	8	6 (6, 11, 14, 17, 18, 20)
	Evaluating performance of people	6	7 (1, 9, 10, 11, 12, 19, 20)
Leadership of MSMSD	Enhancing capability & capacity of people	7	8 (1, 9, 10, 11, 12, 14, 19, 20)
	Autocratic leadership style	4	3 (1, 6, 9)
	Transformational leadership style	2	2 (3, 20)
	Aggressive leadership styles	1	1 (3)

Change management - micro perspectives, meso perspectives & macro perspectives

Micro perspectives of change management comprised three factors across three descriptive themes: 'resisting change', 'growth mindset' and 'fixed mindset'. 'Resisting change' referred to employees who sought to undermine systems, processes and behaviors not aligned with their personal desires or agendas. 'Growth mindset' referred to leaders who listened to MSMSD members, empowering and engaging them to contribute to the change initiative. In contrast, 'fixed mindset' referred to leaders who drove change from top down without consulting MSMSD staff. Whilst change and innovation are defining aspects of HPSOs, evidence illustrating how senior leaders, change leaders and employees are able to impact and are impacted by change initiatives is sparse. Evidence fails to demonstrate how leaders interact with their environment and team to increase chances of successfully introducing change, whilst supporting employees to survive and thrive throughout the process. Meso perspectives of change management comprised six factors across four descriptive themes: 'evidence based strategic planning'; 'supporting change (change agent)'; 'research of change' and 'systems and processes'.

'Evidence based strategic planning' considered the extent to which HPSOs supported plans for implementing and integrating change initiatives with pertinent evidence acquired through research. 'Supporting change (change agent)' identified whether change initiatives were supported by designated change agents, responsible for coordinating planning and integrating new practices into current service provision. 'Research of change' considered how/if individuals affected by change identified additional training required to maintain relevance and succeed in the evolved environment. 'Systems and processes' addressed whether designated change leaders were appointed to drive the initiative, using formal change management processes to guide the undertaking. Results illustrated that, whilst some medical services professionals (notably physicians and physiotherapists in English soccer and rugby, plus physicians, physiotherapist and chiropractors working in Canadian and British Olympic sports), were proactive in undertaking post-graduate sport-specialization education, HPSOs did not adequately ensure change initiatives were well managed. No evidence showed that HPSOs designated qualified change leaders, trained employees in change management practices, or utilized formal change management processes to guide research, planning and execution of such resource-demanding and potentially destabilizing pursuits. Macro perspectives of change management comprised eight factors across five descriptive themes: 'Institutional philosophy'; 'organization-wide communication of vision'; 'supporting change (leadership)'; 'organizational change' and 'market-driven change'.

'Institutional philosophy' reported whether change was rooted in the HPSO's philosophy and strategic objectives, accordingly, perceiving initiatives to be integral to its overall vision. 'Organization-wide communication' referred to constant

and consistent reinforcement of change initiatives through communication from senior leaders. 'Supporting the change (leadership)' describes whether initiatives had sponsorship from a senior leader, with significant influence in the HPSO. 'Organizational change' described organizational awareness of how changes would impact employees and whether effects of initiatives were monitored and managed. 'Market-driven change' referred to change initiatives implemented by HPSOs in response to political or environmental influence (e.g. governing body or federal government legislation). There is little evidence related to how MSMSDs align planning and implementation of change initiatives to organization-wide strategic plans. This negatively impacts the development of operational MSMSDs, by affecting how HPSOs formulate and convey their expectations to MSMSD directors in relation to outcome, timing and manner of execution.

Performance management - strategic, operational, individual & MSMSD leadership

Strategic performance management comprised nine factors across two descriptive themes: 'working with stakeholders' and 'alignment with organizational objective'. 'Working with stakeholders' described how MSMSD leaders worked with internal stakeholders (e.g. sporting directors, board members) to achieve departmental objectives and maintain strategic alignment through transition. Work with external stakeholders (e.g. sports or professional governing bodies), to address governance issues or build research collaborations to develop greater scientific understanding of relevant performance parameters, was also considered. 'Alignment with organizational objectives' illustrated how leaders aligned departmental performance management objectives with strategic objectives of their HPSOs. Evidence supported departmental strategies that facilitated relationships between MSMSD practitioners and coaches in European soccer teams. These relationships significantly influenced time lost through injury (training and games) and the assimilation of sports science into aspects of coaching. In contrast, there was no evidence to illustrate effective collaboration between MSMSD leaders and senior executives, in order to align departmental objectives with HPSOs' strategic objectives. Results demonstrated that MSMSDs within HPSOs support the strategic promotion of effective research collaborations, to underpin interventions with ecologically valid scientific evidence.

Operational performance management comprised 81 factors across six descriptive themes: 'addressing the performance environment'; 'building team relationships'; 'internal processes and procedures'; 'adapting culture'; 'debriefing, feedback and learning' and 'understanding of context'. 'Addressing the performance environment' covered creation of optimal conditions for players and staff; monitoring and managing organizational stressors; managing competition for resources and welcoming new staff. 'Building team relationships' considered team cohesion, interpersonal relationships, conflict management and cross-disciplinary collaboration. 'Internal processes and

procedures' related to developing systems and processes to facilitate collaborative decision-making and working practices, monitoring emotional regulation and enhancing communication, in addition to the definition of roles and responsibilities. 'Adapting culture' reported inclusive working environments, collaborative identification and communication of values, beliefs and behaviors, decision-making consistent with values, beliefs and behaviors and integration of staff. 'Debriefing, feedback and learning' covered the use of open-system feedback loops to guide service revisions; identification of barriers to collaboration; scheduling of structured feedback sessions and implementation of research demonstrating ecological validity. 'Understanding of context' referred to how internal stakeholders regarded the impact of change initiatives and supported measures introduced to mediate it; how pre-existing operational factors contributed to outcomes; blurring of jurisdictional boundaries through the evolution of environmental factors and how collaboration between different factions affected operational decisions. Data demonstrated that despite improved understanding, MSMSD leaders are not effectively managing factors influencing emotional labor and subsequent mental wellbeing, which causes high rates of burnout, stress and subsequent job turnover. Whilst some studies reported effective interdisciplinary functioning, others reported multi-disciplinary environments, characterized by operational silos and interpersonal conflict, which negatively affected staff and athlete performance. Individual performance management comprised 13 factors across two descriptive themes: 'evaluating performance of people' and 'enhancing the capability and capacity of people'. 'Evaluating the performance of people' included contract issues and assessment of employees' task execution and psychological reactions to emotional labor. 'Enhancing the capability and capacity of people' covered professional development, within the HPSO and through higher education institutions, and education of employees related to the recognition and management of organizational stressors.

Results demonstrated that continued institutionalization of sport-specific sub-disciplines [81] increases the risk of role overlap between practitioners [82,83]. This reinforces the importance of role, responsibility, and task clarification to reduce risks of conflict, high levels of insecurity, low levels of trust [7,81,84] and subsequent organizational stress within an MSMSD [85]. Leadership was recognized as a critical contextual variable within MSMSDs, affecting change management and performance management dimensions, however, evidence detailing critical characteristics, attributes and styles of effective leadership was limited. Seven factors were extracted across three descriptive themes: 'autocratic leadership style'; 'transformational leadership style' and 'aggressive leadership styles'. 'Autocratic leadership style' factors referred to leadership behaviors causing organizational stress, including lack of openness, top-down leadership and poor communication. These were closely aligned to negative leadership traits detailed in 'aggressive leadership styles'. Conversely, 'transformational leadership style' detailed positive factors including openness, inspirational motivation and inclusive communication.

Discussion

This systematic review synthesizes the primary empirical evidence on change management perspectives and performance management dimensions related to MSMSDs in HPSOs.

Change management - Micro perspectives, Meso perspectives & Macro perspectives

Micro perspectives of change management consider the psychological impact on individual perceptions, coping strategies and the stress imparted on those exposed to change [80]. Demands for sustained success in HPSOs promote ongoing organizational change and subsequently prompt high turnover of performance staff [86]. Change can precipitate sudden revision of strategic and operational objectives, rendering previously institutionalized systems obsolete and consequently impacting employees' roles and responsibilities [87]. Four phases of personal change are experienced by MSMSD employees: (1) anticipation and uncertainty (2) upheaval and realization (3) integration and experimentation (4) normalization and learning [87]. These findings highlight the potentially negative impact of change, as individuals respond to organizational stressors in a variety of emotional and behavioral ways, possibly contributing to burnout, dissatisfaction, and impaired performance [7,38,81]. Departmental vulnerability during transition requires leaders to monitor individual and group functioning, ensuring that changes are conducted in a considered manner [17]. Poor management can result in impaired group cohesion, with pervading distractions impacting employees' role execution and on-field performance, through the interdependence of athletes and support staff [11,39,81,88]. Meso perspectives of change management consider the organizational context including organizational identity, values, processes and overall expectations [80]. Failure to integrate MSMSD operational objectives with HPSOs' strategic objectives increases the likelihood that stakeholder expectations may not align as leadership succession occurs, jeopardizing foundational systems, installed and maintained by institutional entrepreneurs favoring secrecy and inimitability. Successors may introduce practices, which weaken and undermine institutional norms and processes, irrespective of previous contributions to HPSO identity and operational success [87].

Employees' professional values, institutional practices and expectations influence interdisciplinary conflict and cooperation [89]. Consequently, operational norms in some MSMSDs have evolved, with sports physiotherapists and sports medicine physicians operating through mutually supportive relationships, which promote "close...collaborative work" practices and blur professional boundaries [89,90]. Whilst such models of inter-professional equity are supported by evidence highlighting successful athlete-centered performance outcomes and cross-disciplinary working practices, physicians in other sporting [55,71] and geographical [60,69] contexts have anecdotally proposed hierarchical, rather than flattened, structures, favoring medical dominance. Successful organizational change is context specific,

recognizing complex interactions between tradition, systems and relationships and adopting performance management systems compatible with the culture and unique circumstances of each HPSO [19,29]. Best practice is guided by principles that embrace and proactively manage, rather than ignore and react to, the socially complex and contested nature of culture change delivery [91]. Macro perspectives of change management consider the organizational ecology, including structure, inertia, legal implications, political landscape and organizational fitness and mortality.

Change in sport occurs more quickly than in corporate realms [17,86]. Consequently, MSMSD directors may not have time to establish foundational components of process-driven service models before unrealistic stakeholder expectations, or internal resisters with political agendas, persuade executive sponsors to pivot upon reaching the “messy middle of change” [11,29,79]. Predication for hastily repeated cycles of change creates emotional labor, reducing employee loyalty and trust, whilst impacting HPSO stability. This increases potential for conflict escalation and creates pathways for opportunistic employees to follow self-serving agendas rather than operate in HPSOs’ best interests [84,86]. Aligning MSMSDs’ operational objectives with HPSOs’ strategic objectives helps overcome initial inertia, promoting departments as key differentiators within the competitive landscape and supporting on-field results that defy expectations based upon financial expenditure [87]. Allied to succession planning and retention of intellectual property, such integration can reduce risks of proprietary system deinstitutionalization should significant change occur [87]. The prevalence of British, Canadian and Australasian physicians, physiotherapists and chiropractors undertaking extensive specialist post-graduate education is driving change [48,89,92], raising recruitment expectations in soccer and Olympic sports and recently influencing US HPSOs. HPSOs are migrating towards MSMSDs from traditional models where athletic trainers provide generalist therapy services, managed by orthopedic surgeons [4,5,64], as evidence highlights how collaboration between MSMSDs and coaching teams is more effective in reducing injury burden than single discipline, reductionist approaches [55,93,94].

Performance management - Strategic, operational, individual & MSMSD leadership

Strategically, evidence suggests that leaders expose MSMSDs to the effects of change within other areas of HPSOs, particularly coaching, by neglecting relationships with key stakeholders [86,87]. These results contrast with research into performance directors in Olympic sport [29] and indicate that many MSMSD’s operational objectives are aligned to those of the coaching department, rather than those of the wider HPSO. This defers ultimate control of departmental operations and employees to the head coach, thus compromising consistency and continuity of service [86]. Succession plans, incorporating specialist managerial knowledge, help maintain institutional practices [87], promote independent MSMSD structures that retain control over key support systems

and are less vulnerable to coaching changes. Recommendations to underpin sports science, sports medicine and coaching with high quality evidence to further impact sport, identify obstacles to producing ecologically relevant research [2,45,49,59,95,96]. Including research objectives within organizational objectives and fostering relationships between key stakeholders may facilitate collaborations between academic institutions and HPSOs [95]. The bias of results towards aspects of operational performance management may indicate that MSMSD directors are often recruited based on performance related to their clinical/coaching responsibilities, rather than key skills related to change management or performance management.

Operationally, evidence demonstrates MSMSDs operating in European soccer, British and South African rugby and British, Canadian, Swedish and Australian Olympic sports are providing multiple-disciplinary services that positively impact athlete’s health and performance beyond HPSOs adopting generalist approaches to sports medical services [1,82,83,87,94,97]. MSMSDs effectively integrating intradepartmental and interdepartmental (e.g. coaching, talent identification) lines of service: create and resource optimal environments for staff and athletes [7,17,48,74,81,83,84,86]; intentionally build interpersonal relationships and team cohesion; effectively manage communication and conflict [7,17,81-87,89,94,97,98]; underpin evidence-based systems and processes with clear vision, mission and performance objectives [81,82,87,92,95,96]; establish inclusive and collaborative cultures, founded upon shared values, beliefs and behaviors [7,17,81-85,87,89,93,98]; employ formal research, review and continuous improvement processes [48,74,83,87,93-96,99] and operate in a manner consistent with the demands of the context within which they exist [1,17,48,74,79,86,87,89,94,97,98]. If not consciously managed, these dimensions contribute to organizational stress [7, 81,100]. Organizational stress is the ongoing transaction between individuals and their environmental demands [81]. To perform effectively, people must manage organizational stressors through emotional regulation, however, this constitutes emotional labor [81]. Increased presentation of organizational stressors is positively associated with increased physical and emotional burnout dimensions, affecting focus, decision-making and performance [81]. Stressors can be mediated through the education of management strategies [7], however, individual performance management at an organizational level is often poor, with HPSOs failing to fulfil duties of care to employees [7,84]. Optimally, HPSOs maximize their organizational performance, whilst enhancing employees’ experiences and wellbeing [7,15].

According to Signalling Theory [20], individuals need tangible information to understand organizational values and expectations. Evidence indicates performance appraisals should focus proactively on positive perspectives of individual contributions, over determining weaknesses and dysfunctional behavior [15]. Individual performance objectives should center around organizational citizenship behaviors (i.e. alignment with the group’s shared values, beliefs and core behaviors) and task performance,

rather than athlete performance, health or wellbeing parameters, which include variables out with the individual's control [7,39,73]. MSMSD directors must provide clear role delineation and task responsibility, connecting how these fit with the HPSO's vision and must be intentional in developing team cohesion, interpersonal relationships and conflict management training [7,17,86,89]. HPSOs operate in complex and idiosyncratic environments, where multiple stakeholders demand results related to performance, entertainment and financial profit. Subsequently, MSMSDs must support sustained optimal performance [11], with directors responsible for building and nurturing multiple-discipline groups, renowned for complicated inter-professional relationships, whilst concurrently managing an expansive web of change management and performance management dimensions [17,86].

Specialist leadership roles have evolved, demanding a unique array of 'hard skills', required to efficiently guide MSMSDs in service of HPSOs. Dimensions of change management, performance management, governance and human resource management [11,19,21,22,27,29,39,91] are often novel for fledgling recruits [86], which negatively impacts MSMSD performance if the leader is not appropriately supported [11,86]. Failings in aspects of MSMSD management by physicians operating in leadership roles in HPSOs have recently led to allegations and findings related to athlete safeguarding, negligence and corruption [9,36], and highlight the need for education beyond the leader's primary professional training. Research evaluating the desired qualities of MSMSD leaders is sparse, with evidence centering around negative behavior traits demonstrated by "autocratic" or "aggressive" leaders, who micro-manage, abuse power, make ethically questionable decisions and shun evidence-based advice, causing subsequent stress [7,84,87]. Poor communication between MSMSDs and head coaches was associated with reduced player availability and increased injury burden, compared to teams that enjoyed good interdisciplinary connection [98]. Contrarily, transformational leadership was associated with high-quality communication, openness, increased team cohesion and collaboration, better decision-making, and reduced organizational stress [86,98]. Commentary articles identify sports medicine physicians [55,60,69,71], conditioning coaches [5,70] and sports physiotherapists [87,89,90,93] as the professional designations most suited to MSMSD leadership, however, the conjecture is predominantly clouded by author bias. Empirical evidence focuses on personal attributes, reflecting leadership demands revolving around vision and inspiring people related to direction and goals, as opposed to applied, hands-on clinical or coaching skills. As individual performance management becomes increasingly important in determining sporting success, leaders must possess the 'soft skills' required to support, develop and challenge colleagues to look beyond personal goals, whilst empowering them to contribute meaningfully in delivering their HPSO's vision [29]. Emotional intelligence attributes are necessary to accurately perceive, manage and act upon the emotions of self and others, whilst critical for managing interpersonal relations and creating bonds with the stakeholders invested in HPSOs [30].

Tools that evaluate facets of emotional intelligence are, therefore, valuable resources for recruiting and developing leaders [27]. Effective communication is vital for successful leadership in HPSOs [17,81-85,87,89,93,96-98]. MSMSD leaders must "speak the language" of various disciplines, understanding and respecting all skillsets represented within their department, to facilitate a collaborative and integrated community, capable of operating as an interdisciplinary or transdisciplinary team, as context requires [13,72]. This trait has most pertinence to the leader's professional disciplinary training and applied experience.

Practical implications

The findings are relevant to current and aspirational MSMSD leaders and those responsible for their recruitment. By considering the perspectives of change management and components of performance management at the micro (individual), meso (operational) and macro (strategic and contextual) levels, practitioners will be better equipped to understand, plan and implement best practice leadership in high performance sport. Identifying gaps in performance attributes, will inform professional development plans and support the advancement of service leaders' capabilities and subsequent capacity. HPSOs will be better able to identify requirements of leadership roles and formulate realistic expectations of the processes involved in building, maintaining, and evolving an effective MSMSD in their specific context [101].

Future research

Future qualitative studies should focus on the perceptions of individuals operating within, and collaborating with MSMSDs, related to how they are able to impact, and how they are impacted by change initiatives. Adapting previous investigations into the management of change and performance dimensions by performance directors of Olympic HPSOs and head coaches of professional HPSOs, would be valuable to understand the challenges faced by leaders of MSMSDs in HPSOs. Future quantitative studies should evaluate the efficacy of the various structures, systems and processes of the MSMSD models proposed and theorized in the opinion and anecdotal literature.

Limitations

A limitation of the inclusion criteria, is that only primary empirical research studies, published in English language peer reviewed journals were considered for review. The methodological quality of one study, assessed as poor by MMATv2018 is acknowledged.

Conclusion

This systematic review is the first study to appraise the evidence published on change management and dimensions of performance management in MSMSDs, with a view to informing service provision in HPSOs. The results illustrate how change management and performance management dimensions are currently applied in HPSOs, where best practice differs from sub-optimal practice and, how these impact both services and people. These findings will inform leaders, practitioners and HPSOs in their

ongoing review, evaluation, feedback and management of people, structures, systems and processes.

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Contributors

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