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Systematic review of methods used to measure training load in dance

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ABSTRACT
Dance is a popular physical activity. Increased dance training has been associated with an increased risk of injury. Given the established association between training load (TL) and injury in sport, knowledge of how TL is currently being measured in dance is critical. The objective of this study is to summarise published literature examining TL monitoring in dance settings. Six prominent databases (CINAHL, EMBASE, Medline, ProQuest, Scopus, SportDiscus) were searched and nine dance-specific journals were handsearched up to May 2022. Selected studies met inclusion criteria, where original TL data were collected from at least one dancer in a class, rehearsal and/or performance. Studies were excluded if TL was not captured in a dance class, rehearsal or performance. Two reviewers independently assessed each record for inclusion at title, abstract and full-text screening stages. Study quality was assessed using Joanna Briggs Institute Critical Appraisal Tool checklists for each study design. The 199 included studies reported on female dancers (61%), ballet genre (55%) and the professional level (31%). Dance hours were the most common tool used to measure TL (90%), followed by heart rate (20%), and portable metabolic systems (9%). The most common metric for each tool was mean weekly hours (n=381; median=9.5 hours, range=0.2–48.7 hours), mean heart rate (n=143) and mean oxygen consumption (n=93). Further research on TL is needed in dance, including a consensus on what tools and metrics are best suited for TL monitoring in dance.

WHAT IS ALREADY KNOWN ON THIS TOPIC
⇒ Training load tells us how much and how hard a dancer is working.
⇒ There are many different tools available to measure training load.

WHAT THIS STUDY ADDS
⇒ Dance hours, heart rate, and portable metabolic systems are the most commonly used tools to assess training load in dance.
⇒ There is large variability in reported training load values due to heterogeneous dance samples and differing training load protocols.

HOW THIS STUDY MIGHT AFFECT RESEARCH, PRACTICE OR POLICY
⇒ Results from this study highlight the need for further investigation into training load tool validity, dance genre-specific and participation level-specific studies, and representation from under-represented genres and participants.
⇒ Practitioners can use results from this study to support development of effective training load monitoring programmes.

INTRODUCTION
Dance is a popular physical activity that incorporates elements of performing arts, athleticism and aesthetics.[1] Many elements of dance participation, such as cultural connection and enjoyment, have contributed to the increase in the popularity of dance (inclusive of all genres) in recent years.[2–4] However, high injury rates have been reported in dance, categorising dance as a high-risk activity.[5–8] Previous studies in sport have identified training load (TL) as a risk factor for injury,[9] but this association has yet to be established in dance.[10–12]

The demands of dance have been compared with those of sporting athletes, suggesting that the dancer is not only an artist,[1] but also an athlete.[1 13–15] Although there are differences between dance genres, the physiological demands of dance are largely characterised by short periods of high intensity intermittent activity, combined with lower intensity rehearsal and choreographic session blocks, and rest periods.[16–23] Many elements that make up a dance performance—including physical preparation, aesthetics, technique and psychological preparation—can have direct and indirect effects on the presentation and execution of movement,[24] and therefore, TL and responses to TL are important to investigate further.

TL can describe the physiological response to exercise (ie, internal TL) or the physical work that is performed (ie, external TL).[25] There are many ways to measure internal and external TLs. Recall and schedules/timetables can be used to assess training volume, journals and questionnaires can be used to assess self-reported ratings of perceived exertion (RPE), and wearable technology such as heart rate monitors and portable metabolic systems (measuring oxygen uptake) can be used to determine the objective internal TL.[26] While exposure provides information about the volume of training, it does not provide any information about the intensity of training.

Increased availability of wearable technology has improved the feasibility of capturing TL during activity. Devices such as heart rate monitors and global positioning systems are now common place in sport, and allow internal and external TLs to be recorded.[27] In dance, wearable technology, such as accelerometers and inertial measurement units (IMUs) measuring dance movement, has been used to quantify dancers' external TL.[28 29] A dancers' external TL can also be used to estimate the intensity of dance by examining how often movements such as jumps and partner lifts are performed, which have been reported to be more physically demanding than pliés and tendus.[20] While jumps and partner lifts have been explored in professional ballet dancers,[30] not all dance movements are applicable to all dance genres.[1 22] Differences in the physical work performed in different dance genres must be considered when reporting external TL in dance.

Examining how dance TL is currently being measured, what tools are being used and what metrics are being reported will inform future research on dance TL and injury. Therefore, the purpose of this systematic review is to summarise and critically appraise the published literature examining TL monitoring in the dance setting. Specifically, the primary objective is to identify methods that are currently being used to capture TL in dance. The secondary objectives are to summarise reported TL metrics and values that are currently being observed in dance.

METHODS

This review was developed in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines and guidelines for performing systematic reviews in sport sciences.[31 32] The review was registered with the Centre for Open Science Framework (registration DOI: 10.17605/OSF.IO/FWZEA).

Eligibility criteria

Original studies reporting TL (ie, volume of training, intensity of training or a composite measure incorporating volume and intensity of training) in dance in any dance genre, any dance participation level and using any TL tool were included. Only studies reporting TL during a dance class, rehearsal, and/or performance or competition were included. Studies were excluded if exposure was reported as number of sessions, if hours were reported in study methods for a company or a school to describe the programme, and if TL was captured for isolated dance exercises, the dance aerobic fitness test or supplementary training (ie, Pilates, yoga, strength training for dancers). Review articles, books, chapters, editorials, abstracts, position statements and articles not available in English were excluded.

Information sources and search strategy

Six databases were searched on 24 May 2022 (MEDLINE (Medical Literature Analysis and Retrieval System Online via PubMed), CINAHL (Cumulative Index for Allied Health Literature), Scopus (Elsevier), SPORTDiscus, EMBASE and ProQuest). Additionally, nine dance-specific journals were handsearched and titles related to TL were included for further screening. The search strategy identified records that contained at least one search term in the following two themes: dance and TL. Keywords relevant to TL monitoring (ie, TL, workload, work load) and dance (ie, ballet, contemporary, jazz, tap, lyrical, modern and hip-hop) were used. Search strategies used for each database are available in online supplemental material S1.

Study selection process

The search results from all databases were combined and duplicate studies were removed. All studies were screened independently for eligibility by two authors (VGV and AR) in two stages (ie, title/abstract and full text). Discrepancies were resolved by a third author (LCB).

Data items and data collection process

An Excel (Microsoft, Redmond, Washington, USA) worksheet was used for the extraction of the following data: author(s), publication date, country, study design, study sample (sex, age, dance genre, level of participation, sample size), duration of follow-up, tool used to measure TL, TL metrics reported and key findings. One author (VGV) extracted data from all included studies.

Study risk of bias assessment

For the purpose of this review, the risk of bias was assessed for reporting of TL only. The risk of bias was assessed using the Joanna Briggs Institute (JBI) Level of Evidence checklists for each unique study design (ie, randomised controlled trial, quasi-experimental, cohort, case control, cross-sectional and case reports).[33] Study designs were extracted from each included study, and where not reported, the study design was interpreted by one author (VGV). Questions evaluating each study criteria were answered as 'yes', 'no', 'unclear' or 'not applicable'. As per the JBI protocol, a final quality assessment score was not tabulated. Three authors (VGV, AR and LCB) were involved in the risk of bias assessment. Inter-rater reliability was completed by all three authors on 10% of the included studies (inter-rater reliability ranged from 67% to 74% between each pair of authors), and discrepancies were resolved by consensus. Each included study was then independently assessed by two authors (each author assessed two-thirds of included studies), and discrepancies were resolved by a third author.

Data synthesis

The data extracted from each study were recorded in an Excel table. A combination of Tableau and custom Excel

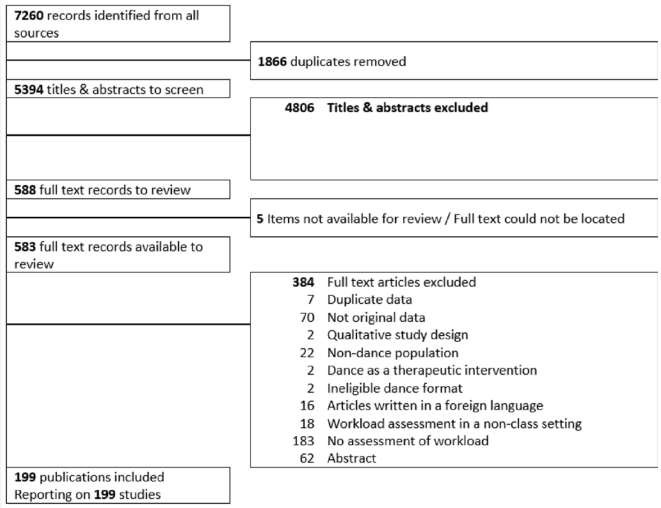

Figure 1 Preferred Reporting Items for Systematic Reviews and Meta-Analyses flow diagram of the studies reporting dance training load across all dance genres and dance levels of participation.

worksheets were used to estimate descriptive characteristics (counts/sums, means, medians, ranges and SD). Reported countries of data collection were grouped into world regions.[34] Reported dance levels (n=39) were grouped into seven categories according to similarities in training requirements, participation in competitions/performances, and age of participants. Of the 51 unique dance genres reported by included studies, 10 groupings were made using dance genre categories suggested by the Canada Council of the Arts report in 2013.[35] Dance genre groupings were also informed by similarities and differences in movement. A table of the dance level and dance genre categorisations is available in online supplemental material S2. Where monitoring period was reported in prospective cohort studies, it was converted into days, such that 1 year=12 months=52 weeks=365 days OR 1 month=4 weeks=30 days.

RESULTS

Study selection

A total of 7260 articles were identified through the electronic database search and the handsearching of 9 selected journals. The inclusion criteria were met by 199 studies, and these studies were included for critical appraisal and data extraction (figure 1).

Study characteristics

Full details and characteristics of each included study can be found in online supplemental material S3. Studies ranged in publication year from 1970 to 2022, with 21 studies published in 2020. Studies were conducted across the world, spanning 8 world regions (Europe=96, North America=70, Australia/Oceania=22, Asia=14, Middle East=10, South America=10, sub-Saharan Africa=4 and Antarctica=1).

In 199 studies, 389 unique participant samples were studied. The mean (SD) size of the sample was 62 (133). The majority of study samples (N=309) had a sample size between 1 and 75 dancers. The total number of included participants in the review was 24 158, of which 14 819 (61%) were female and 2503 were male (10%). The sex for 6836 participants was not reported as they were presented as a combined sample (both males and females). The mean (SD) age of female participants was 19.9 (7.7) years (reported by 134 studies); of male participants was 24.9 (4.8) years (reported by 60 studies); and of participants with unreported sex, the mean age was 21.6 (8.4) years (reported by 40 studies).

Tools used to capture TL in dance

The majority of studies used hours as their measure of TL (N=180). Wearable technology was used in 26% of studies (N=52/199), comprising heart rate sensors (N=39), portable metabolic systems (N=17), accelerometers (N=12) and IMUs (N=1). The first wearable technology used for TL in dance was a heart rate monitor, followed by portable metabolic systems, accelerometers and IMUs (figure 2). There were 47 studies that implemented more than one tool to measure TL.

TL metrics and reported values

Dance hours were most commonly reported as weekly hours (mean, median) (N=431), session hours (mean) (N=147) and seasonal hours (sum, mean) (N=96). While these were the most common hours metrics, mean daily hours and mean monthly hours were also reported, for a total of 8 different hours TL metrics reported across all studies. Mean weekly dance hours are presented in figure 3, by dance level and dance genre.

Heart rate was the second most common TL tool used. A total of 25 different heart rate (HR) metrics were reported, with the most common being HR_{mean} (N=143), mean $\%HR_{max}$ (N=46) and HR_{max} (N=30).

Portable metabolic systems were the third most common TL tool used, with six different metrics reported. The most common metrics were mean rate of oxygen consumption ($VO_{2mean)}$ (N=93), per cent of VO_{2peak} (N=33) and energy $expenditure_{mean}$ (N=16).

Characteristics of monitoring period and session types

Among unique cohort studies, total study follow-up length was reported by 67% (48/71) of studies. The median follow-up for prospective cohort studies was 151 days (range: 1–1825). While length of follow-up refers to the total study follow-up, 26 studies also reported the number of sessions for which participants' TL was recorded for (median: 7.5, range: 1–218).

Three different session types were reported by included studies. TL was examined in class by 108 studies, rehearsal TL was examined in 75 studies, and performance TL was examined in 56 studies. More specifically, some studies looked at a combination of session types (eg, class and rehearsal (N=12), class, rehearsal and performance

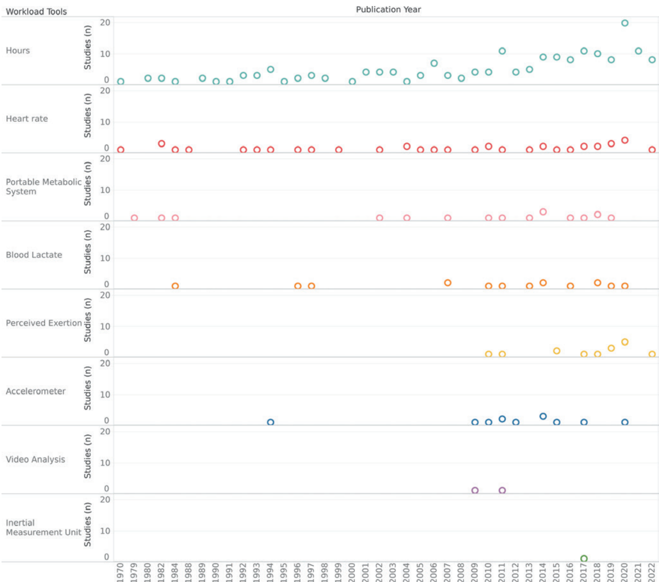

Figure 2 Trend of training load tools used over time.

(N=25), or rehearsal and performance (N=1). TL session type was not reported in 91 studies.

Dance genres and dance levels

Across all dance genres, 109 studies were performed in ballet, 47 studies with multiple dance genres and 43 studies in modern dance. Of note, 11 studies did not report the dance genre of their sample. A single study could examine multiple genres, and multigenre studies are also captured in the individual genres (eg, in ballet, contemporary, jazz). The number of included participants studied in each genre is presented in figure 4A.

The most common dance participation levels examined were professional (N=62 studies), competitive (N=43 studies) and recreational (N=35 studies). Of note, 16 studies examined more than one dance level, and 29 studies did not report the dance level of their participants. The number of included participants studied in each dance level is presented in figure 4B. The largest number of studies examined professional ballet dancers (N=40 studies), preprofessional ballet dancers (N=27 studies) and competitive Dancesport dancers (N=19 studies).

By number of participants, female dancers were studied more than male dancers across all genres, with the exception of street dance. Street dance had the most similar participant sex proportions (46% female and 54% male), while tap had the largest difference (94% females and 6% males). In studies where dance genre was combined or not reported, the discrepancy between sexes was more pronounced (98% female and 2% male). Males were not studied in jazz or 'other' dance genres.

By level of dance participation for each sex, female recreational dancers were studied most (N=6079), followed by professional female dancers (N=1744) and competitive female dancers (N=1662). Male dancers were most commonly studied at the professional level (N=922), followed by the competitive (N=602) and preprofessional level (N=291).

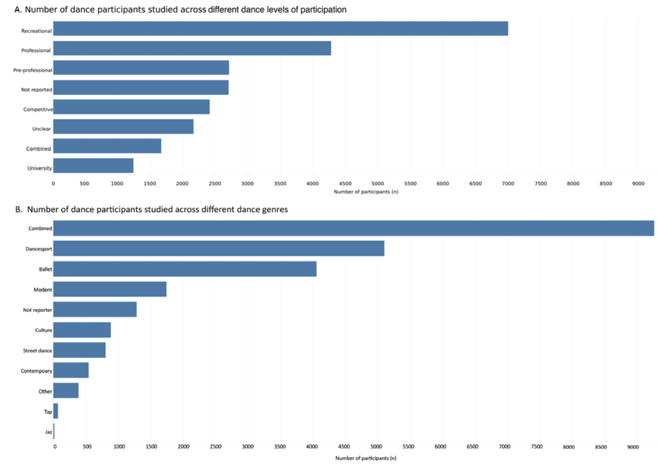

Figure 4 (A) Dance genres of all included study participants and (B) dance participation levels of all included study participants.

Risk of bias in studies

The 199 included studies spanned 6 study designs: 109 cross-sectional studies (96 analytical and 13 prevalence only), 1 case control, 4 case reports, 71 cohort studies, 9 quasi-experimental studies and 4 randomised controlled trials.

The quality of level 2 studies (N=4) was moderate (see online supplemental materials S4). The studies lacked blinding of participants and researchers to treatment, and it was unclear if assessors of outcome were also blinded to treatment. True randomisation and concealed

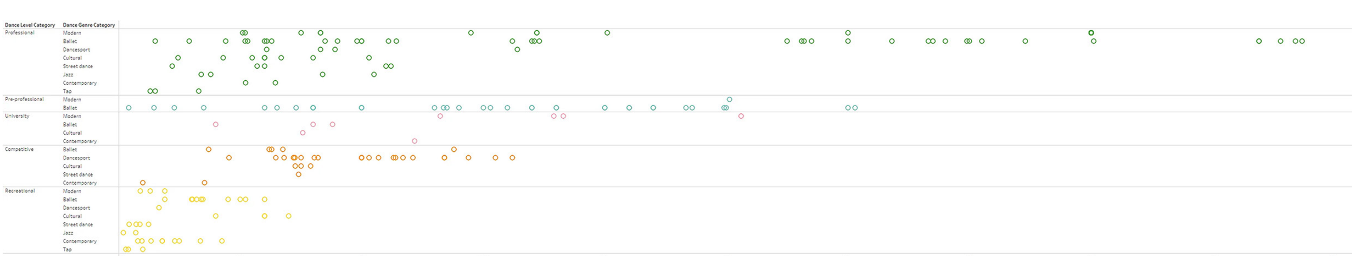

Figure 3 Mean weekly hours for each dance genre and level, as reported by individual included studies. Each circle represents the mean weekly hours data point from each unique study.

allocation to groups was not always clear. The risk of bias impacting true dancer TL in these studies was low.

The quality of level 3 studies (N=80) was also moderate, with all studies reporting sufficient information about their sample groups, minimising the risk of selection bias. One-quarter of studies used an exposure measure that was not clearly stated to be valid or reliable (or not at all), suggesting that there may be a small likelihood of error in the reported TL values. In studies where follow-up was incomplete, strategies to address incomplete follow-up were unclear or not stated. Additionally, many quasi-experimental studies did not have a control group.

The quality of level 4 studies (N=115) was fair. Similar to level 3 studies, it was unclear if the exposure measure used was valid and reliable in more than 40 studies. In studies where TL was modelled, cofounders (such as dance genre and dance level) were not implemented in the model. In most prevalence studies, the recruitment strategy was ambiguous and therefore it was unclear whether the recruitment strategy was appropriate, introducing a risk of selection bias. Sample size calculations were not performed and studies did not indicate whether their response rates were sufficient for their research question. Taken altogether, the level 4 studies were likely to have moderate error, indicating that strong conclusions cannot be drawn from their results.

DISCUSSION

To our knowledge, this is the first study to synthesise and critically appraise literature examining TLs across dance genres. The objectives of this review were to identify tools that are being used to capture TL in dance and describe TL metrics (and their reported values) that are being captured in dance. A total of 199 eligible articles were identified that ranged in dance genres, dance participation levels, participant characteristics, TL tools used and Tl metrics reported.

Tools used to capture TL in dance

TL helps dance science practitioners understand how much (ie, volume and frequency) and/or how hard (ie, intensity) dancers are working over a defined period of time across different session types.[25] In this review, the most commonly used tools to capture TL were hours of dance, heart rate and portable metabolic systems. While video analysis was first used in dance in 2009, no studies using this tool have been conducted since 2011 to quantify TL. One possible reason is due to the time and resources required to capture and analyse video data.[36] In professional sport, video analysis has been used to provide player tracking information in real time,[37] however, indirect methods using wearables (such as global positioning systems) are becoming more prevalent in outdoor sport settings.[36 38] Video analysis is not a feasible tool for longitudinal TL monitoring in the dance setting.

Increasingly, tools specific to quantifying TL (rather than only assessing exposure or providing real time tracking information) are being developed and used in dance. Session rating of perceived exertion, which our review identified as the fifth most commonly tool used for measuring TL in dance, was specifically developed to measure internal TL,[39] and wearable technologies such as accelerometers and IMUs have begun to be implemented in dance to assess external TL. While self-report tools (such as ratings of perceived exertion) are subject to recall bias, subjective internal TL coupled with objectively measured external TL can improve our understanding of an individual's response to training.[25 40] Two dancers can perform the same physical work, but their psychophysiological responses to that external TL may differ based on their fitness level, psychological state, rest, recovery, nutrition, stress and muscle soreness.[41] Subjective response to a TL is also important to measure because psychological/mental states can impact one's perception of their TL.[41] For this reason, subjective TL using a tool such as ratings of perceived exertion should be collected in tandem with objective TL.

The use of wearable technology for monitoring TL in sport has accelerated over the years,[42] however, the same trend does not appear to be as prominent in dance. In our review, wearable heart rate monitors were identified as the second most commonly used tool for TL, but other wearables such as accelerometers and IMUs were some of the least commonly used tools. Despite the popularity of wearable technology use in sport for TL monitoring,[42] the use of wearables in dance requires additional resources for successful implementation of a TL monitoring programme. In sport, many professional sport organisations have the resources to employ sport scientists as part of their integrated performance teams to perform data acquisition, data processing and data communication. The same abundant resources are not yet commonplace in dance, but as dance organisations and companies move towards having a dedicated dance scientist overseeing a TL monitoring programme, the adoption of wearable technology for TL in dance is expected to accelerate.

TL metrics and values in dance

Large variations were reported across all TL tools and metrics for different genres, levels, sexes and session types, making it difficult to make meaningful comparisons without adjusting for important confounding factors. While mean weekly dance hours across all included studies ranged from less than 1 hour to more than 45 hours, without providing additional context (such as the dance level of participants and the session types in which that TL was observed), comparisons are not useful. For TL comparisons to provide useful insights, TL values can only be compared between dancers with similar characteristics (ie, similar age, sex, dance level, dance genre) and with similar session types.

In this review, multiple TL metrics were used to quantify TL for each tool reported, making it even more difficult to compare TL in the dance population. This finding is similar to what was reported by Benson *et al*[42] where the studies included in their review varied in the cut-off values used for classifying accumulated metrics such as distance covered at different running speeds in soccer and rugby (ie, some studies used tertiles while others used means and SD, or quartiles to determine cut-off values).[42]

Characteristics of monitoring period and session types

Only 67% of included prospective cohort studies reported their total study length of follow-up, ranging from 1 to 1825 days, with the number of sessions that dancers were monitored for ranging from 1 to 218 sessions. These ranges indicate that sufficient length of monitoring was not performed by all TL studies. For TL monitoring to be useful in informing a dancer's future training sessions, it should be conducted over a longer period of time, such as a specific period of a season (ie, performance period) or over an entire training year.

Dance TL was reported for a variety of sessions (eg, class, rehearsal, performance/competition), but nearly 40 studies reported a TL value that represented a combination of sessions. Reporting one value to cover class and performance sessions may not be valid as training intensity differences between session types have been previously reported in dance populations.[17 28 43] Above all, the session type of recorded TLs was not reported in 91 studies, indicating that improved reporting of TL session type is needed in future studies.

Characteristics of participants in dance TL studies

More than 24 000 participants were included in this review, of which over 60% were female and 10% were male. The sex of nearly 30% of participants was not reported, indicating that improved reporting of study participants characteristics is needed. Female dance participants were identified to be younger than their male counterparts by about 5 years. Male dancers remain an underrepresented study population across most dance genres, particularly male adolescent dancers under the age of 20.

Across all dance genres and dance levels of participation, the number of female participants studied outnumbered the number of male participants (with the exception of street dance). The largest differences were observed in multigenre studies, ballet and cultural dance, as well as at the recreational dance level. Males were not studied in jazz and 'other' genres. Differences in female and male participants across genres were at least 2–4X more female dancers than male dancers, however, it may be unreasonable to expect a similar sex distribution in most genres because females outnumber males in dance participation in general.

Most included studies were conducted with professional and competitive dancers. One possible reason for this observation is due to their being many professional ballet and modern dance companies around the world, affording them more resources to have TL monitoring in place, compared with dance genres at the recreational level. Jazz and tap dance genres were only studied at the recreational level, while contemporary and modern dance were not studied at the recreational level at all. Local dance studios often do not have the financial and human resources to have extra programmes in place (ie, dance science) that extend beyond instructing dance, possibly explaining the observed differences in dancers studied at different levels of dance participation.

Improved reporting of study participants is still needed, as more than 10 studies (representing nearly 1300 dancers) did not report their study sample dance genre, and nearly 30 studies did not report the dance level of their participants (representing over 2700 dancers). Additionally, four studies did not clearly describe the dance participation level of their participants—while all the participants in these four studies were labelled as 'students', it was not clear if they were students at a local studio (eg, recreational dancers), students at a university dance programme (eg, university dancers), or studio dancers participating in competitions (eg, competitive dancers). Improved reporting of participant characteristics details is needed in dance studies moving forward.

Risk of bias in studies

In this review, most included study designs were analytical cross-sectional, collecting TL at one point in time. Only 71 studies used a cohort design, in which dancers were followed for more than one dance session, providing additional information about variations in TLs from session to session or day to day. Longitudinal athlete TL monitoring permits observing variations in internal and external TLs over time,[44] which may be used to inform future training planning and prescription. Retrospective reporting of TL is subject to recall bias and the usefulness of outdated TL information is low.[40] A possible reason for longitudinal study designs being uncommon for dance TL at this point in time is due to the increased burden on dancers, dance teachers and dance practitioners in order to longitudinally capturing TL.

The overall quality of studies in this review was moderate. Common risks of selection bias included inconclusive reporting of inclusion criteria, participation characteristics and recruitment protocols. Studies using measurement tools with unreported validity and reliability were particularly prone to reporting TL values with measurement errors. For example, the use of timetables to report individual dancers' weekly hours is not a reliable measure, unless the weekly hours also account for a dancer's absences. Where performed, statistical analyses of TL data did not always account for confounding variables (such as sex, age, dance genre, dance level), resulting in large variability of load estimates.

Future directions

Further work on TL in dance is needed, particularly in areas of tool validity, genre-specific and participation level-specific studies, and more representation from under-represented genres and participants. Future studies should report on the validity and reliability of their tools, including whether they have been validated for use with a specific dance population (inclusive of dance genre and dance participant characteristics).

Despite some dance genres being influenced by and crossing over with other genres, the generalisability of single-genre TL studies to other dance genres may be low. For example, ballet includes partnered lifts, modern includes floor work, and tap is primarily only performed upright. Likewise, generalisability of TL metrics from multidance participation levels may not extend to single level studies, as recreational dancers' TLs differ from those in professional settings. For this reason, future studies should examine TL in different dance genres and dance participation levels independently of others.[1]

Finally, more representation in dance TL studies is needed from (adolescent) male participants, jazz and 'other' dance genres, and university dancers. Moving forward, studies examining TL in dance need to follow a prospective design, where dancers are followed over a sizeable period of time, with dancer recruitment and participant characteristics being thoroughly described.

While TL has been established as a modifiable risk factor for injury in sport, it may also play an important role in reducing the risk of preventable overuse injuries in dance. To date, inconclusive associations[10–12] have been reported in dance studies that examined TL and injury, warranting the need for additional research. Furthermore, it has been recognised that prescribing appropriate TLs can also optimise athlete performance in sport,[36] but the TLs required to improve athletic performance are still unclear in sport and have yet to be examined in dance.[45] The present systematic review helps to pave the way for future research on the association between TL and injury in a multitude of dance genres and examining how TLs can be appropriately prescribed to optimise dancers' performance.

Limitations

As with any study, this systematic review is not without its limitations. The first limitation concerns the search and selection of articles. Articles not indexed in databases may not have been captured by the search, and would therefore have been excluded from this review. Abstracts and non-English studies were not included in this review as it was not possible to assess the methodological quality of a study based on its abstract alone or without knowledge of the language. It is possible that studies examining dance TLs are present in abstract-form only (eg, were presented at a conference) or in other languages. We acknowledge the possibility that during the screening process, some titles and abstracts that were removed may actually have been eligible if their full-text articles were assessed first.

The second limitation concerns the quality assessment of included articles. The quality assessment was focused on assessing the methodology concerning TL exposure only. For example, if studies examined exposure and outcome (such as injury), their outcome measures were not assessed. Therefore, the quality of the included articles may actually be lower than reported in this review. A total quality assessment score was not tabulated for each included record, as the Joanna Briggs Institute screening protocol does not encourage summing scores.

Finally, the third limitation of this review is related to the data extraction process. Given the large variety of dance genres and dance participation levels, categories were established to group similar genres and levels together. It is possible that some genres and levels were miscategorised, if insufficient information was provided by the article. Only one author completed all data extraction, and therefore, it is possible that some data were transcribed/input incorrectly. All efforts were made to ensure correct data entry, including quality checks and custom formulas to flag errors in the Excel worksheet used.

CONCLUSION

Dance hours, heart rate and portable metabolic systems were identified as the most commonly used tools to assess TL in dance at the present time. Large variability in reported TL values was observed due to heterogeneous dance samples and TL protocols, limiting comparisons between similar genres and participation levels. Monitoring TL has become commonplace in sport to monitor injury risk and optimise performance. There is a need for future research to investigate under-represented dance populations, to use valid and reliable TL tools, and to improve reporting of inclusion criteria, participant characteristics and recruitment protocols.

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