

MENTAL WELLBEING AND SLEEP HYGIENE IN UNDERGRADUATE DANCE STUDENTS DURING THE CORONAVIRUS PANDEMIC: AN EXPLORATORY ANALYSIS

The novel coronavirus caused a global pandemic with negative implications on stress, and a significant impact on dance education. The aim of this study was to investigate mental wellbeing and sleep hygiene in undergraduate dance students during this global pandemic. Fourteen undergraduate dance students completed the DASS-21, PSQI and questions relating to motivation to participate in online and in-studio classes in week 2 and week 26 of the academic year 2020/21. Although no significant differences were found between these time points for depression, anxiety, stress, or sleep quality, levels of anxiety and stress were classified as severe and extremely severe consistently. Sleep quality, efficiency and duration were good, however sleep timings may impact mental wellbeing. It is recommended that due to chronic levels of stress amongst dancers, which may have also been accentuated by the global pandemic, that mindfulness, somatic practice and aerobic fitness training be incorporated into dance programmes.

Keywords: COVID-19; coronavirus; mental health; sleep; dance; dance student; wellbeing

INTRODUCTION

The novel coronavirus (COVID-19) caused a global pandemic that has been characterised as a ‘longitudinal, multifaceted, unpredicted, non-controlled change-event’ (Samuel, Tenenbaum, and Galily 2020) with significant impact on athletes’ and coaches’ lives and potential career trajectory (Samuel, Tenenbaum, and Galily 2020); a view which can also be applied to those working in the performing arts. Pandemics can be classified as life events associated with loss of control and uncertainty which can trigger emotional distress including anxiety and depression (Shanahan et al. 2020). It

has been noted that the pandemic had negative implications on stress amongst young adults and thus negative impact on psychological wellbeing (Genç and Arslan 2021). This has also included studies documenting decline in psychological health during the pandemic (Shanahan et al. 2020), with many people experiencing increased adverse psychological reactions such as fear, anxiety, stress, addictive behaviours, post-traumatic stress disorder (PTSD), self-blame, depression, helplessness and loss of sense of safety (Polizzi, Lynn, and Perry 2020) however it is difficult to ascertain the specific causes of these increases in mental ill health.

Dance training establishments welcome students at an important stage in their development and therefore need to consider both the physical and psychological health of their students and ways to support this within their training programmes, particularly when faced with stressful life events.

THE IMPACT OF ONLINE LEARNING ON MENTAL WELLBEING

During the coronavirus pandemic, dance teaching moved to a predominantly online format, with some blended learning at later stages, dependent on various lockdown restrictions nationally and internationally. Prior to the pandemic, dancers were already beginning to utilise digital technology in their teaching and performance activities, although there were still varied opinions as to the place of technology within the dance studio (Parrish 2016). Benefits of learning online have been noted, including the ability to connect, engage and empower students to take control of their own learning (Parrish 2016) as well as connect with the wider, international dance community (Heyang and Martin 2020). The ability to engage with learning synchronously, asynchronously, to return to recorded material and thus study at their own time (Parrish 2016), enables

students' autonomy over their learning and a wealth of resources to draw upon at any given time.

However, being forced into an online learning environment due to the pandemic may have also had a detrimental impact on students' wellbeing, motivation and ability to learn effectively. Social support is necessary for adaptive functioning as a key buffer of stress (Polizzi, Lynn, and Perry 2020; Mainwaring and Finney 2017) however, this support has been negatively affected during COVID-19 through necessary isolation and social distancing measures. Dancers' psychological wellbeing has been affected, both through general reactions to the pandemic, and possibly feelings of loss of identity similar to athletes (Vaughan, Edwards, and MacIntyre 2020) through reduced or altered dance practice, training and performance and periods of isolation and cancellation of performances.

During the pandemic, dancers were restricted predominantly to learning online, many of them isolated from their peers across the country and across the globe. This physical isolation can thwart feelings of connectedness that are imperative for mental wellbeing as well as the need for connection prevalent in a high-contact, group activity such as dance. Dance teachers are able to foster mental wellbeing via the environment they create during teaching (Quested et al. 2011), however this ability may have been negatively affected through the online and distanced training programme. A focus on health and wellbeing has become more commonplace in academic programmes (Blevins et al. 2020) and therefore consideration should be given to levels of mental wellbeing in students, and how educational establishments can support students through wellbeing provision within their dance programme.

STUDENT MENTAL WELLBEING

Mental health involves the ability to function in daily activities, to develop healthy habits and relationships, the ability to adapt to life changes and cope with adversity (van Winden et al. 2020). People with high levels of trait anxiety frequently experience stress and anxiety (Lench, Levine, and Roe 2010; Hamilton et al. 1989). Development of mental health issues such as anxiety, stress or depression will impede the dancer's ability to cope with these aspects of life (van Winden et al. 2020), particularly in high stress situations such as a global pandemic, and may determine a dancer's reaction and ability to cope with high stress situations. Thus, perceptions of certain situations such as examinations, auditions, or life circumstances such as a global pandemic, may induce differing levels of stress in different people.

It has been reported that under normal world circumstances, professional ballet dancers are prone to chronic stress, physical and mental load (Fietze et al. 2009) and must withstand constant pressures during demanding training and careers, alongside external pressures (Lench, Levine, and Roe 2010; van Winden et al. 2020; Blevins et al. 2020), making them prone to mental health conditions (van Winden et al. 2020). Blevins et al (2020) identified that dance students must balance the stress that results from high training loads, external stressors such as moving away from home for the first time, academic workloads, and dance environment cultural factors, potentially leading to a decline in mental wellbeing, and thus potential for increases in stress, anxiety and depression.

A nationwide survey on physical and psychological wellbeing in dance (Laws 2005) reported that 92% of dancers had experienced a psychological problem in the previous 12 months, with 85% experiencing more than one. Within professional contemporary dancers the most commonly reported psychological issues were general anxiety (62%), tension with people (60%) and external stress (59%), and amongst dance students these were tension with people (62%), constant tiredness (60%) and low self-confidence (58%) (Laws 2005). Additionally, Blevins et al identified stressors that affect dancers to include those related to environment, daily hassles, and major life events (Blevins et al. 2020).

A study into mental health characteristics in contemporary dance students (van Winden et al. 2020) found 300 mental health issues reported by 58 students over the course of one academic year. The most commonly reported unique mental health issues were general anxiety (20%), constant tiredness (16.7%) and stress due to external factors (18.3%) (van Winden et al. 2020), thereby reflecting the earlier results of Laws (2005). Results by van Winden et al (2020) also demonstrated a higher prevalence of mental health issues between November and June of the academic year, with no substantial reported mental health issues in September and October. These lower levels at the beginning of term could be related to the summer break, and thus the ability to recover, spend time with family and friends and return to studies refreshed in the autumn term.

It is therefore possible that these existing high levels of stress and anxiety found amongst professional and student dancers were accentuated due to the global pandemic, particularly in relation to the inability to train effectively from home via online learning.

SLEEP HYGIENE

Lack of structure in the day during lockdown meant that sleep patterns and sleep hygiene were impacted. Sleep, or rather lack thereof, can have an effect on mood and emotional regulation (Gruber and Cassoff 2014), with poor sleep quality linked to mental and physical health difficulties amongst college students (Caldwell et al. 2010). Lack of sleep has also been shown to have a negative impact on athletic performance (Knufinke et al. 2018; Arbinaga 2018). However, recent research has shown that athletes have poorer sleep quality than non-athletes, often impacted by competition and long days of intense training (Arbinaga 2018). Similarly, dancers usually undergo long days of training and rehearsals, with performances often taking place late into the evening, however these patterns and performance opportunities were impacted by the coronavirus pandemic.

Sleep has been identified as an important aspect of recovery and crucial for optimal performance (McCloughan et al. 2016) particularly after physical and psychological stress in elite athletes. However, athletes' sleep has also been characterised by long periods to fall asleep (sleep onset latency) and excessive daytime fatigue; often sleeping for less than 7 hours per night (Arbinaga 2018). It has been proposed that individuals with high anxiety also demonstrate chronically low sleep onset latency (SOL) and higher disturbances throughout the night (McCloughan et al. 2016).

With high levels of anxiety already reported in the dance population (van Winden et al. 2020), it might be expected that this is accompanied by poor sleep

hygiene including poor SOL. Arbinaga (2018) states the importance of regulating healthy sleep patterns in dance students to enhance emotional functioning and improve performance. Caldwell et al (2010) found that amongst college students, poor sleep quality was associated with mental and physical health difficulties. The same has been noted within the adult population, with increased emotional disturbances following sleep restriction (5 hours a night) (Walker 2009). With healthy sleep, anxiety, depression, anger, fatigue and confusion decreased, whilst vigour levels increased (Baum et al. 2014), potentially impacting upon students' academic performance (Caldwell et al. 2010) with impaired concentration in theory classes and reduced memory retention.

Sleep quality and quantity also relates to resilience levels. Arbinaga (2018) noted that dance students with poor self-reported sleep quality, and <7 hours of sleep quantity per night, demonstrated a higher risk of reduced resilience levels, when compared to dance students that reported sleeping longer. Dance students that were efficient sleepers scored the highest on self-reported resilience testing (Arbinaga 2018).

Gruber & Cassoff (2014) investigated the interplay between sleep and emotional regulation amongst adults, noting sleep regulation - sleep duration and timing of sleep, are regulated by circadian processes. Arbinaga (2018) recommends that sleep-wake patterns should be regulated, to enhance both emotional functioning and performance. Arbinaga (2018) and McClung (2011) state that disruptions in circadian rhythms (including sleep-wake cycle) amongst vulnerable individuals can result in mood-related problems. Gruber & Cassoff (2014) note that mood also follows a circadian rhythm pattern, varying with the time of day, beginning low in the morning, and becoming

better with wakefulness in the evening, with mood instability occurring when the circadian system received conflicting timing cues.

Evening types may experience difficulty in regulating emotions, and be more prone to anxiety, addiction, depression, or personality disorder (Gruber and Cassoff 2014). In contrast, “morningness” has been suggested to play a protective role towards better emotional regulation, demonstrating increased persistence and decreased emotional reactivity, impulsivity and aggressive behaviour (Gruber and Cassoff 2014). Therefore, bedtime and rising time can play a significant role on emotional regulation, mood and mental wellbeing, an important consideration when designing student timetables.

Research to date provides a picture of dancers who are prone to chronic stress, as well as managing heavy workloads and demanding training and careers (Lench, Levine, and Roe 2010; van Winden et al. 2020; Fietze et al. 2009). The novel coronavirus is a stressful life-event which has had a significant impact on the wellbeing of people across the globe (Sood and Sharma 2020; Samuel, Tenenbaum, and Galily 2020; Shanahan et al. 2020), and thus it is expected that this has also had a negative effect on the wellbeing of undergraduate dance students, exacerbating levels of stress and anxiety and negatively impacting sleep quality.

The aim of this study therefore was to understand sleep hygiene and levels of mental wellbeing over the course of an academic year, during a global pandemic. It is hypothesised that levels of anxiety and stress will increase over the course of the academic year and that students will be more motivated to participate in practical in-

studio classes than online classes. It is also expected that in line with prior research, students will demonstrate high levels of stress and anxiety.

METHODOLOGY

A longitudinal, prospective study design was utilised. Approval for this study was granted by Middlesex University Creative Arts and Industries ethical committee. All participants gave informed consent before participating in the study.

Fourteen undergraduate dance students (1=M, 13=F, mean age 21.5years±2.77) completed a self-report online survey at two time points in the 2020-21 academic year; week 2 (October 2020) and week 26 (April 2021). Psychometric measurements included the Depression, Anxiety and Stress Scale -21 Items (DASS-21) (Lovibond and Lovibond 1995) and the Pittsburgh Sleep Quality Index (PSQI) (Buysse et al. 1989).

The DASS-21 is shorter version of the original 42-item DASS and has been shown to have strong factorial analysis, internal consistency and good reliability within clinical and non-clinical settings (Vaughan, Edwards, and MacIntyre 2020; Brown et al. 1997; Henry and Crawford 2005; de Manincor et al. 2016; Antony et al. 1998) and has been found to be a useful tool in analysing the impact of COVID-19 in athletic populations (Vaughan, Edwards, and MacIntyre 2020). It has also been suggested that the DASS-21 relates to other sport-specific measures of burnout, psychological strain, anxiety and depression (Vaughan, Edwards, and MacIntyre 2020). The DASS-21 is a self-report 1-week measure of state negative affect, with subscales of Depression, Anxiety and Stress. Respondents indicate the degree to which they experienced each

symptom listed in the past week on a Likert-type scale of 0 (Did not apply to me at all) to 3 (Applied to me very much, or most of the time). DASS-21 mean scores were calculated for depression, anxiety and stress, and classified by severity according to the DASS-21 scoring system (Henry and Crawford 2005). To complete scoring for the DASS-21, final scores are doubled, a format that has been demonstrated to have adequate construct validity and reliability (Henry and Crawford 2005).

The Pittsburgh Sleep Quality Index (PSQI) (Buysse et al. 1989) consists of 19 self-rated questions relating to the previous month. Each question is rated on a Likert-type scale of 0 – 3. Scores are then assimilated to provide a score of 0 – 3 on seven subscales: subjective sleep efficiency; sleep latency; sleep duration; sleep quality; sleep disturbance; sleep medication use; and daytime dysfunction due to sleepiness. These subscale scores are then summed to provide a Global PSQI score ranging from 0 – 21. Greater sleep disturbances/poorer sleep quality is indicated by a higher PSQI number (>5) (Caldwell et al. 2010).

In addition, students rated their current motivation for participating in: studio based practical dance class, online practical dance class (live or pre-recorded), studio based conditioning exercises, online conditioning exercises (live or pre-recorded), theory lectures, and written tasks (including essays, reports, critical analysis). Students scored each class or task on a Likert-type scale of 0 - 5 (0 = Not at all motivated, 5 = extremely motivated).

Data was analysed for change over time using a Wilcoxon signed rank test using SPSS statistics (IBM® SPSS® Statistics, V25.). Significant was set at $p < 0.05$.

Differences between in studio and online learning were also analysed.

RESULTS

There were no statistically significant differences between the two time points for participation in any activity or task, whether it be online or in person in the studio (Table 1). However, motivation for participating in studio-based classes was significantly higher than for online classes for practical dance classes in October and April; $T = 0.00$, $p = 0.002$, $r = -0.629$, $T = 7.00$, $p = 0.007$, $r = -0.532$ and for conditioning classes in October and April; $T = 0.00$, $p = 0.003$, $r = -0.632$, $T = 6.500$, $p = 0.018$, $r = -0.506$.

There were no significant differences reported in the DASS-21 for any of the three subscales of depression; $T = 52$, $p = 0.308$, $r = 0.21$, anxiety; $T = 65$, $p = 0.172$, $r = 0.27$ or stress; $T = 51.5$, $p = 0.326$, $r = 0.20$. However, depression scores were categorised as severe (21-27), anxiety scores as extremely severe (20+) and stress scores as moderate (19-25) (Table 2) according to the DASS-21 categorisation.

[Table one near here] [Table two near here]

There were no statistically significant differences between any PSQI subscale, nor within the Global PSQI score (Table 3). At both time points results demonstrated

fairly good sleep quality and few sleep disturbances, indicated by a score close to 5 in the global PSQI score.

[Table 3 near here]

Mean bedtime, rising time and time spent in bed are presented in Table 4.

[Table 4 near here]

DISCUSSION

As a practical medium, dance faced unique restrictions and impact on motivation and participation through the shift to online teaching during the global pandemic. During this research project, students took part in a combination of online only and blended learning (online and studio-based classes), dependent on their location and current coronavirus restrictions. Although motivation declined slightly for all classes by the second time point (Table 1), results were not statistically significant. Time point 2 also coincided with student assessments and the end of term, so could be related to end of year fatigue. However, differences were noted between motivation to participate in studio-based classes in comparison to the same class delivered online. Students had access to a variety of spaces when working from home, some restricted to less than 1m² in their student halls, which may have had an impact on their motivation to participate in practical classes via an online medium.

Although no statistically significant differences were reported in the response to the DASS-21 between time points 1 and 2, students reported very high levels of anxiety and stress (severe and extremely severe respectively) (Table 2). This reflects prior research that dancers are prone to chronic stress, even under normal circumstances, due to highly demanding training and performance environments (Fietze et al. 2009). This

may also have been accentuated by the coronavirus pandemic, through the shift to online learning and isolation from peers. Likewise, this also correlates with the prevalence of general anxiety, constant tiredness and stress due to external factors (18.3%) amongst contemporary dance students (van Winden et al. 2020) and in professional and student dancers (Laws 2005).

Although causality is difficult to ascertain in this instance, high levels of stress and anxiety amongst dance students are cause for concern. Correlations between high levels of stress and anxiety reported in this paper, along with those of prior research therefore warrant further investigation into interventions which may help to address these chronically high levels which subsequently impact on dance performance and ability to cope with stressful life events including auditions, examinations, performance and global events such as the coronavirus pandemic.

Despite research demonstrating poor sleep quality amongst dance students and athletes (Arbinaga 2018), and reports of constant tiredness (Laws 2005; van Winden et al. 2020), results to the PSQI revealed relatively good sleep quality and duration amongst participants. Greater sleep disturbances/poorer sleep quality is indicated by a Global PSQI number >5 (Caldwell et al. 2010), however at both week 2 and week 26, students reported a global PSQI of 6.14 ± 4.33 and 7.86 ± 5.35 respectively. Each PSQI subscale also elicits a component score of 0 – 3, with 3 demonstrating poorer sleep quality or higher sleep disturbances. All subscales recorded a score of <2 (Table 3), suggesting good sleep quality and duration amongst dance students.

Sleep onset latency (SOL) relates to the difference between the number of hours slept and the amount of time spent in bed, also providing a sleep efficiency percentage. A study of female dancers aged 18-23 reported sleep efficiency of 88.06% (McCloughan et al. 2016). In comparison, participants of this study reported a mean sleep efficiency of 78.57% at time point 1 and 92.86% at time point 2. However, although the sleep duration and sleep efficiency appear satisfactory, the timing that the subjects were going to bed were not ideal in relation to circadian processes or an academic timetable. Average bedtime at time point one was 00:08:34±01:49:23 and 00:10:42±1:49:30 at time point two, with average time of rising at 9:19:17±1:49:23 and 8:57:51±1:57:23 respectively (Table 4). Gruber & Cassoff (2014) recognised emotional dysregulation associated with a circadian shift towards the evening amongst both adolescents and adults; evening types were more susceptible to stress and impulsivity than morning types (Gruber and Cassoff 2014). This suggests that it is possible that the time that the subjects were going to bed may have had an effect on their emotional well-being. Circadian rhythm undergoes a later shift from approximately age 16 years, with peak wakefulness in the evening, possibly going towards explaining the later bed times in participants. This resolves in young-middle adulthood (Walker 2018). However, given the anxiety, depression, and stress results, it is recommended that it is important for these dance students to address their sleep-wake cycle and circadian cycle.

The impact of the pandemic on levels of depression, anxiety, stress and sleep quality are difficult to ascertain from this study due to the lack of comparative data prior to the pandemic. It can be noted, however that severe levels of anxiety and stress in particular are cause for concern within educational establishments, particularly when moving away from home for the first time to study at university or vocational schools. Blevins et al (2020) noted that dancers experienced a delayed development of life skills

due to early exposure to adult situations such as living away from home at a young age, creating negative feelings such as not feeling equipped to look after themselves. These stress levels may have been heightened by the pandemic, but with chronically high levels of stress reported in dancers (Fietze et al. 2009; Laws 2005), consideration of how to address student mental health and wellbeing within academic programmes is important. Not only will this address students' wellbeing, levels of self-confidence and motivation; but also their academic and dance performance.

A focus on health and wellbeing has become more commonplace in academic programmes (Blevins et al. 2020) as well as a greater focus on the use of somatic practices, proprioceptive and kinaesthetic awareness (Caldwell et al. 2013; Redding 2010). Strategies such as mindfulness have been associated with improvement in relaxed mood, a reduction in perceived stress and tiredness, in turn reducing sleep disturbance and predicting better quality sleep (Caldwell et al. 2010). Caldwell et al (2010) noted that interventions based on mindfulness were effective in reducing stress, anxiety, depression, and disordered eating, also noting that students who were reticent with counselling, may find movement based courses a way to manage stress and develop mindfulness.

Somatic practice can be utilised as a tool to enable dancers to explore the internal landscape of the dancing body, alongside emotional regulation (Batson 2010). Somatic practice, particularly the use of constructive rest, allows a moment of pause within ongoing activity or action (Batson 2010). However, the value of such strategies as constructive rest within a dance programme are still met with some reticence (Batson 2010). Nevertheless, there is a careful balance to be explored between the required rigor

of dance training, and the use of somatic practice (Batson and Schwartz 2007), and research into the impact of somatic practices and mindfulness on mental wellbeing is still conflicting, and is yet to provide significant evidence of consistent changes in professional and pre-professional dancers. It is therefore recommended that further studies are carried out into the impact of various somatic practices and mindfulness practices on undergraduate dance students to ascertain if there is a visceral impact on mental wellbeing, academic and athletic performance.

Participation in physical activity alongside dance training may be beneficial for supporting dancers' mental wellbeing and sleep. Reductions in anxiety and depression are maximised through low-moderate intensity exercise that is either aerobic (30-70% of maximal heart rate) or anaerobic (30-50% maximal heart rate), and is between 20-30 minutes, three to four times a week, for approximately two to four months (Weinberg and Gould 2018; Ströhle 2009). Aerobic training can have antidepressant effects (Salmon 2001) and can help to increase resilience to and protect from the effects of stress. It should be noted however that exercise is not as effective as psychopharmaceuticals in reducing anxiety (Carek, Laibstain, and Carek 2011), and individuals with a panic disorder may be more vulnerable to exercise triggering somatic effects (such as panic attack) following exercise (Ströhle 2009). More research is also needed into the clinical application of exercise to address mental health issues, as well as methods for encouraging those with conditions such as depression to commence participation in physical activity (Ströhle 2009). Although exercise provision may be made for dance students, those with high levels of stress, anxiety or depression, may find it difficult to engage in these activities initially.

Subjects in this study took part in 8.81 ± 4.08 hours dancing at time point one, alongside 2.12 ± 1.53 hours of additional physical activity (gym, exercise class, running, conditioning), compared with 11.67 ± 9.71 hours of dance and 4.36 ± 7.47 hours of physical activity at time point two. It is clear therefore that the dancers participate in more hours of dance activity than additional physical training alongside their dance training. The increase in dance activity and greater standard deviation at time point two may relate to end of term performances where dance activity is dependent on modules and year group of the student. Dance is a high intensity intermittent activity, therefore possibly cortisol inducing (alongside performance) (Quested et al. 2011). It has also been demonstrated that dance class does not elicit enough physiological demand to see an adaptation in physical fitness parameters, including aerobic fitness (Koutedakis and Jamurtas 2004; Wyon and Redding 2005; Wyon 2005). Therefore, due to the chronically high levels of stress in dancers both prior to, and during the pandemic, it could be beneficial for dance students to complete additional low intensity aerobic exercise and mindfulness alongside their dance training to support their mental health and well-being, and prevent anxiety and depression, in addition to attaining physical fitness goals. This can be incorporated into dance programmes as scheduled group runs, discounted access to local swimming pools or gym facilities, guided mindfulness classes or recordings to be used at home.

Although participants were provided with weekly wellbeing information during the pandemic via a wellbeing email and a wellbeing folder within their online learning environment, these were not timetabled activities and therefore available to students as additional activities. Activities provided included access to yoga classes, mindfulness exercises, healthy sleep recommendations, guided exercises videos, however

engagement in these activities was difficult to ascertain due to the online and self-directed nature. It can be suggested that the students' current high levels of anxiety and stress presented difficulties in motivation to engage with such additional activities, despite the reported benefits of participation in these activities. This reticence to participate may have also been impacted by screen fatigue due to the high prevalence of online learning during the pandemic. Although a focus on health and wellbeing has become more commonplace in academic programmes (Blevins et al. 2020), with increased exercise, mindfulness and somatic practice provision, it can only be beneficial to the students if they actively participate. Integration of these practices into the academic timetable as compulsory sessions could enhance adherence and help to develop habitual practice through exposure to new somatic practices, mindfulness techniques, or additional physical activity.

Exposure to a variety of somatic practices such as Body Mind Centreing, Ideokinesis, Feldenkrais technique, Alexander technique and Bartenieff Fundamentals may help students to identify a practice that resonates with them and can become an integral part of their practice. It is suggested that these are led by experienced practitioners in order to develop students' understanding and develop a habitual practice through their guidance. Additionally, developing the students' ability to focus internally, away from external stressors, may help to reduce levels of stress and anxiety.

In addition, it is suggested that students increase their participation in aerobic training alongside their dance training, either as part of their timetabled activity or through their own workouts at home. Not only will this help to mediate levels of stress and anxiety, but also improve levels of aerobic fitness, both of which will have positive

implications for dance performance. Care must however be taken not to overload timetables with additional activity, which may in itself have a negative impact on physical and mental wellbeing, putting students at risk of burnout. It is the role of dance educators to foster a learning environment that supports and develops the dancer as a holistic whole, both physically and psychologically.

LIMITATIONS

Although this survey was sent to all students currently enrolled on the undergraduate dance programmes, only a small sample completed the survey at both time points, thereby reducing the participant numbers. No baseline data prior to the global pandemic was also available for comparison of levels of mental wellbeing and sleep quality/quantity. As with all self-report studies, there is also potential for misrepresentation within answers or altered interpretations of questions, as well as difficulty with recall, such as average bedtime or rising time. The nature of the PSQI questions also means that answers relating to sleep quality and quantity are subjective.

CONCLUSION

Levels of stress and anxiety are particularly high amongst student dancers, although causality for these levels are difficult to ascertain within the scope of this study and therefore further research beyond the pandemic is recommended. Nonetheless, research has continually reported chronically high levels of stress, particularly in relation to external factors. It is therefore imperative that tools are found that can help to improve mental wellbeing, and thus academic achievement and dance performance. Dancers often face challenging life events as part of their career in dance and their ability to cope

with these events in future will be enhanced by addressing mental health issues such as anxiety, stress or depression (van Winden et al. 2020).

Despite research demonstrating poor sleep quality and sleep onset latency amongst athletes and dancers, students were found to have good sleep duration and quality, however timings of sleep may not be conducive with an academic timetable and circadian rhythm processes. It has been suggested that this age group show a tendency towards wakefulness during the evening, and thus are not at optimal functioning early in the morning. This perhaps suggests that timetables should be adapted to address these physiological differences in this particular population with a slightly later start to the morning timetable.

Further research is required into the causes of high levels of stress and anxiety amongst dance students, as well as levels outside of a global pandemic. It is therefore recommended that a replication of this study be carried out in an academic year where university teaching is comparatively normal, with practical classes taking place in the studio rather than online. This data will allow a greater understanding of the impact of the pandemic on levels of mental wellbeing and to design academic dance programmes that address not only the technical and skill based dance training, but also optimise physical and mental wellbeing through a varied programme of physical activity, mindfulness and somatic practice.

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